

RĒZEKNES TEHNOLOĢIJU AKADEMIJA  
Izglītības, valodu un dizaina fakultāte

REZEKNE ACADEMY OF TECHNOLOGIES  
Faculty of Education, Language and Design

ISSN 1691-5887

**SABIEDRĪBA. INTEGRĀCIJA.  
IZGLĪTĪBA**

Starptautiskās zinātniskās konferences materiāli  
2019.gada 24.-25.maijs

**IV daļa  
SPORTS UN VESELĪBA  
MĀKSLA UN DIZAINS**

**SOCIETY. INTEGRATION.  
EDUCATION**

Proceedings of the International Scientific Conference  
May 24<sup>th</sup> - 25<sup>th</sup>, 2019

**Volume IV  
SPORTS AND HEALTH  
ART AND DESIGN**

Rēzekne  
2019

SABIEDRĪBA. INTEGRĀCIJA. IZGLĪTĪBA. Starptautiskās zinātniskās konferences materiāli. IV daļa. Sports un veselība. Māksla un dizains. 2019.gada 24.-25.maijs. Rēzekne, Rēzeknes Tehnoloģiju akadēmija, 2019, 574 lpp.

*SOCIETY, INTEGRATION, EDUCATION. Proceedings of the International Scientific Conference. Volume IV. Sports and Health. Art and Design. May 24<sup>th</sup> - 25<sup>th</sup>, 2019. Rezekne, Rezekne Academy of Technologies, 2019, p. 574.*

Rekomendējusi publicēšanai Rēzeknes Tehnoloģiju akadēmijas Zinātnes padome, 2019.gada 19.martā.

*Recommended for publication by the Scientific Council of Rezekne Academy of Technologies on March, 19, 2019.*

**Redaktori/Edited by Velta Lubkina, Aivars Kaupuzs, Aina Strode**

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ISSN 1691-5887

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*Art and Design*

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**SPORTS UN VESELĪBA**  
*Sports and Health*





## **STUDIJU PROGRAMMAS “VESELĪBAS SPORTA SPECIĀLISTS” REFLEKTANTU AEROBO DARBASPĒJU IZMAIŅAS VIENPADSMIT GADU PERIODĀ**

*The Changes in Aerobic Work Capacity of the Study Program  
"Health Care Specialist" During the Eleven Years Period*

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**Abstract.** Aerobic work capacity is one of the main indicators of physical fitness and health. Aerobic work capacity depends on many factors, both physical activity level and age and gender and other factors. Aerobic work capacity falls down under the influence of sedentary lifestyle, but it can also decrease as a result of over-intensity loads. Applicants for the study program are young people who have recently graduated from the high school and people of different ages with different sporting experiences. The purpose of the research: to explore applicants aerobic work capacity of Rīga Stradiņš University study program "Health Care Specialist" and their relation to various factors and changes in the dynamics of 11 years. A total of 731 participants (268 males and 473 women) conducted the World Health Organization Bicycle ergometer test. The average level of aerobic work capacity for health care specialist applicants will increase from 2007 to 2013, but declines relatively fast between 2014 and 2017. Over the last 6 years, aerobic work capacity has fallen sharply for men as women. Body mass index does not change significantly over 11 years. The correlation between body mass index

*and aerobic capacity is weak. Over the last 3 years aerobic work capacity downturn trend has been particularly pronounced for women aged 20-29.*

**Keywords:** *aerobic work abilities, applicants, health fitness specialists.*

## **Ievads** **Introduction**

Pasaules Veselības organizācija iesaka arvien lielāku uzmanību pievērst fiziskām aktivitātēm kā efektīvam sabiedrības veselības uzlabošanas un dzīves kvalitātes paaugstināšanas līdzeklim (WHO, 2010) Fizisko aktivitāšu samazinājums ir aktualizējies līdz ar straujo industrijas attīstību – kur agrāk bija nepieciešama cilvēka enerģija, lai kaut ko pārvietotu, tagad ir mašīnas, kas atvieglo cilvēku darbu. Tāpat ļoti daudzi brīvo laiku pavada sēžot pie televizora, datora utt. Bet arī tie, kuri nodarbojas ar kādām fiziskajām aktivitātēm, reti darbojas pēc individuālas treniņa programmas, kas būtu piemērota viņu fizisko darbaspēju paaugstināšanai.

Pasaules veselības aprūpes zinātniskās datu bāzes arvien vairāk piepilda pētījumi, kuri atklāj pārsteidzošus faktus par sabiedrības motivāciju nodarboties ar fiziskajām aktivitātēm, par sabiedrības locekļu sev atvēlēto laiku fiziskajām aktivitātēm un par arvien agrāk esošām dažādām saslimšanām, kuras veicina kustību trūkums organismā. Latvijas iedzīvotāju fiziskā aktivitāte ir viena no viszemākajām no visām attīstītām valstīm un pēdējos 10 gados fiziskā aktivitāte ir pazeminājusies. Cilvēku skaits, kuri brīvajā laikā veic vismaz 30 minūšu fiziskos vingrinājumus 4-6 un vairāk reizes nedēļā laika periodā no 2008. gada līdz 2014. gadam samazinājās no 24,7% līdz 9,9%, tomēr turpmākajos gados jau ir raksturīga tendence šim fiziskās aktivitātes rādītājam nedaudz palielināties (Grīnberga, Velika, Pudule, Gavare, & Villeruša, 2017). Arī "Latvijas skolēnu veselības paradumu pētījumā" noskaidrots, ka daudz maz pietiekama fiziskā aktivitāte ir tikai 18,4% skolēnu (Grīnberga, Velika, Pudule, Gavare, & Villeruša, 2015). Latvijas Sporta politikas pamatnostādņēs 2014.–2020. kā galvenais mērķis ir formulēts "Palielināt to Latvijas iedzīvotāju īpatsvaru, kas vismaz 1-2 reizes nedēļā nodarbojas ar fiziskām vai sportiskām aktivitātēm". Pēdējos gados arvien vairāk cilvēku, lai kompensētu kustību trūkumu, uzsāk nodarbības ar fiziskiem vingrinājumiem. Palielinās fitnesa klubu skaits un to apmeklētāju skaits, tomēr vairumam cilvēku fiziskā aktivitāte ir nepietiekama. Arī tie cilvēki, kuri cenšas būt fiziski aktīvi un regulāri veic fiziskos vingrinājumus, bieži vien izvēlas savai fiziskai sagatavotībai nepiemērotus fiziskos vingrinājumus un fiziskās slodzes, kā rezultātā aerobās darbaspējas neuzlabojas. Pārmērīgi intensīvu slodžu ietekmē aerobās darbaspējas var pazemināties.

Aerobās darbaspējas ir viens no veselības rādītājiem, kas raksturo sirds un asinsvadu, elpošanas, kā arī citu organisma sistēmu funkcionālo stāvokli. Aerobās

darbaspējas ir atkarīgas no daudziem faktoriem: veselības stāvokļa, dzimuma, vecuma, kā arī no fiziskās aktivitātes līmeņa. Jaunatnes un studentu fiziskās aktivitātes līmenis ir ļoti zems. Studenti daudzas stundas pavada sēžot lekcijās, bibliotēkās, gatavojot mājas darbus, kā arī pie televizora un datora. Tā rezultātā pazeminās studentu darbaspējas un pasliktinās veselības stāvoklis, rodas stājas, liekā svara problēmas, sirds asinsrites un elpošanas sistēmas problēmas, pasliktinās rādītāji, pēc kuriem var izvērtēt fizisko sagatavotību (Arnīs, Vīnberga, & Upeniece, 2015).

Veselības aprūpes speciālistiem ir jābūt fiziski aktīviem arī pašiem, ne tikai savas pašsajūtas un veselības stāvokļa dēļ, bet arī lai spētu motivēt savus klientus aktīvam dzīvesveidam (Chevan & Haskvitz, 2010). Ir pētījumi, kas norāda, ka tie veselības aprūpes speciālisti, kuri paši ikdienā ir fiziski aktīvi, ir tie, kas visvairāk, visdrošāk, vispārliciecinātāk spēj parādīt, iedvesmot klientus un ieteikt klientiem un pacientiem fiziskās aktivitātes ilgtermiņā, radot aktivitāšu ieradumu, veicinot veselīgāku dzīvesveidu (Carrera & Frank, 2007).

**Pētījuma mērķis:** izpētīt Rīgas Stradiņa universitātes studiju programmas „Veselības sporta speciālists” reflektantu aerobās darbaspējas un to saistību ar dažādiem faktoriem un izmaiņas 11 gadu dinamikā.

Aerobās darbaspējas noteiktas ar Pasaules Veselības organizācijas veloergometrijas testu 731 Rīgas Stradiņa universitātes studiju programmas “Veselības sporta speciālists” reflektantam (473 sievietēm un 268 vīriešiem), laika periodā no 2007. līdz 2018. gadam. Aerobo darbaspēju testēšanai izmantoti laboratorijas veloergometri Monarc Ergomedic 839E.

## Literatūras apskats

### *Literature review*

Aerobās darbaspējas ir viens no veselības rādītājiem, kas raksturo sirds un asinsvadu, elpošanas, kā arī citu organisma sistēmu funkcionālo stāvokli. Aerobās darbaspējas ir atkarīgas no daudziem faktoriem: veselības stāvokļa, dzimuma, vecuma, kā arī no fiziskās aktivitātes līmeņa.

Visbiežākais mērījums, kas tiek iegūts dažādos pētījumos aerobo darba spēju noteikšanai ir maksimālais skābekļa patēriņš ( $VO_2max$ ), kas ir arī starptautiski atzīts fizisko darba spēju standarts (Loe & Rognmo, 2013; Ranković & Mutavdžić, 2010).  $VO_2max$  ir rādītājs, kas atspoguļo aerobo procesu intensitāti organismā un parāda organisma spēju patērēt skābekli konkrētajā mirklī. Daudzi autori  $VO_2max$  atzīst kā labāko organisma aerobās kapacitātes rādītāju, jo tas atspoguļo kardiovaskulārās un respiratorās sistēmas funkcionalitāti, jeb atspoguļo organisma audu spēju izmantot skābekli. Maksimālais skābekļa patēriņš tiek definēts kā maksimālais skābekļa daudzums, ko organisms spēj patērēt konkrētā laika vienībā, veicot pieaugošas intensitātes slodzi un kuru nav iespējams vēl

vairāk palielināt, palielinot slodzes intensitāti (Loe & Rognmo, 2013; Ranković & Mutavdžić, 2010).

Kaut arī maksimālās slodzes tests tiek uzskatīts par „zelta standartu” maksimālā skābekļa patēriņa (VO<sub>2</sub> max.) noteikšanā, šie testi ir ļoti dārgi un nevar tikt izmantoti lielai cilvēku populācijas pārbaudei. Tie ir arī laika un darbietilpīgi, tam nepieciešama speciāli aprīkota laboratorija un apmācīts personāls, pie tam nepieciešama augsta motivācija un sadarbība no pētāmā cilvēka, jo slodzes intensitāte ir augsta. Tos pārsvarā izmanto sportistiem, lai noteiktu fizisko darbaspēju līmeni uzsākot treniņus, starp treniņiem, lai noteiktu treniņu efektivitāti, kā arī pirms sacensībām utt. Tāpēc ikdienā izmanto aerobo darbaspēju testus ar netiešo metodi, kas balstīti uz fizioloģiskām sakarībām. Visbiežāk izmantotās sakarības ir lineāra (vai tuvu lineārai) sakarība starp slodzes jaudu un sirdsdarbības frekvenci un sakarība starp slodzes jaudu un skābekļa maksimālo patēriņu. Uz šīm sakarībām ir balstīts arī Pasaules veselības organizācijas tests, Eurofit veloergometrijas tests. Šie testi ļoti plaši tiek izmantoti pasaulē un arī Latvijā. Pasaules Veselības organizācijas testa laikā persona veic trīs progresējoši pieaugošas slodzes un katras slodzes beigās tiek reģistrēta sirdsdarbības frekvence. Maksimālā skābekļa patēriņš tiek aprēķināts saistībā ar sirdsdarbības frekvenci un slodzi testa laikā, kuru aprēķina veloergometra Monarc Ergomedic 839E datorprogramma.

Ir veikti dažādi pētījumi, kuros tiek mēģināts noskaidrot darba spēju tendenci sabiedrībā. Pētījuma problēma un aktualitāte izriet no teorētiski argumentētiem un empīriskos pētījumos apstiprinātiem faktiem, ka, paaugstinoties labklājībai un ieviešot jaunākos zinātnes sasniegumus ikdienas dzīvē, kuri samazina nepieciešamību fiziski piepūlēties, cilvēki kļūst mazkustīgi un fiziski neaktīvi (Kravalis, 2009).

Visbiežākais aspekts, kurā tiek pētītas studentu darba spējas ir ļoti vispārīgi, brīvi izvēlēti kādas universitātes studenti un viņu darba spēju salīdzinājums ar vidējo populāciju, nekonkretizējot specialitāti, vai gluži pretēji pētīti sportisti vai konkrēta sporta veida sportisti un viņu darba spējas viena gada griezumā, nevis to izaugsme/ kritums ilgākā laika periodā viena un tā paša vecuma indivīdiem. Arī dažādās Latvijas universitātēs, kur pastāv fizisko uzdevumu iestājekšāmeni, nav atrodamas apkopotas darba spēju analīzes reflektantu vidū. Lietuvā, Kauņas Sporta izglītības akadēmijā (Lithuanian Academy of Physical Education), izmantojot Eurofit testu kopumu, analizēja atšķirības dažāda vecuma jauniešu fiziskajā attīstībā 1992. un 2002. gadā. Lai noteiktu atšķirības fiziskajā attīstībā un sagatavotībā, tika mērīts jauniešu augums un svars, kā arī fiksēti viņu rezultāti Eurofit testos (Loe & Rognmo, 2013). Apkopojot iegūtos rezultātus, tika secināts, ka ir samazinājušās aerobās spējas un lokanība, bet nedaudz uzlabojusies vēdera muskulatūras izturība. Kāju muskulatūras attīstība nedaudz samazinājusies meitenēm, bet zēniem palikusi iepriekšējā (1992. gada) spēju līmenī. Ir

samazinājušās ikdienas fiziskās aktivitātes, kas lielā mērā noteikušas aerobo spēju un lokanības mazināšanos, jo sporta nodarbību reorganizācija skolās nav devusi vēlamo efektu un nekompensē ikdienas aktivitāšu mazināšanos (Kravalis, 2009; Loe & Rogmo, 2013).

Belgradas universitātē darba spēju testi tika pielietoti 605 studentiem, kas studē fiziskās sagatavotības un sporta fakultātēs. 389 vīrieši un 216 sievietes, vecumā no 18 – 28 gadiem tika sadalīti 3 grupās, balstoties uz gadu, kurā tika veikts tests. Pirmā grupa tika testēta laika posmā no 1997. – 2000. gadam (n = 299), otrā – 2001. – 2004. n= 200 un trešās grupas testēšana notika 2012. gadā n = 106. Studenti veica UKK 2km soļošanas testu (Mantarri & Pekka, 2013). Rezultātā tika iegūti 2 rādītāji, maksimālais skābekļa patēriņa rādītājs un fiziskās sagatavotības indekss. Abiem dzimumiem, abiem rādītājiem augstākie rezultāti novērojami 1997.-2000. gada grupā. Abi rādītāji, turpina kristies abām turpmākajām pētāmajām grupām un dzimumiem. Jāpiebilst, ka sievietēm šie darba spēju rādītāji kritās nedaudz lēnāk kā vīriešiem. Piemēram, VO2 max pirmajai grupai vidēji bija 51.3 ml/min/kg, otrajai 46.1 ml/min/kg, kas ir vērtējams kā „virs vidējā” darba spēju rādītājs, bet jau 3. grupai tas bija tikai 40.8 ml/min/kg un vērtējams kā „vidējs” (Prebeg & Mihajlovic, 2012).

Arī divās Ungāru universitātēs tikai veikti darba spēju testi ar 15 gadu intervālu. Deviņi Eirofit grupas testi tika veikti 1997.- 1998. mācību gadā un 2011.- 2012. mācību gadā. Kopā brīvi izvēlēti 123 vīrieši un 309 sievietes, ar vidējo vecumu 21.19 +/- 2.19 gadi. Rezultātā – ķermeņa masas indeksa rādītāji un testa rezultāti (vērtējot līdzsvaru, veiktību/ātrumu, lokanību, vēderpreses muskuļu spēku, un darba spējas) 1997 – 1998. mācību gadā bija krietni augstāki, kā 2011. – 2012. mācību gadā. Tomēr 2 testi uzrādīja, nelielus, bet tomēr uzlabojumus 2011.-2012. mācību gadā. Uzlabojumi bija vērojami satvēriena spēkā un kārienā pie stieņa. Šī pētījuma rezultāti bija ļoti ietekmīgi, lai tiktu veikti valstiski svarīgi pasākumi, lai palielinātu regulāru fizisko aktivitāšu daudzumu Ungāru jauniešu vidū (Kai & Tekus, 2015).

Latvijā veikts pētījums, par Rīgas Stradiņa universitātes studentu darba spējām, salīdzinot tos ar atbilstošās vecuma grupas populācijas rādītājiem: pētījuma grupu veidoja 730 studentiem (517 sievietes, 213 vīrieši) vecumā no 18-30 gadiem. Dalībnieku atlase tika veikta pēc brīvprātības un nejaušības principa, iekļaujot 286 pirmā studiju gada studentus, 233 otrā, 110 trešā un 101 ceturtā un piektā studiju gada studentus no Rehabilitācijas fakultātes, Medicīnas fakultātes, Sabiedrības veselības fakultātes. Pēc PVO testa rezultātiem studentu skābekļa maksimālais patēriņš bija vidēji sievietēm 35,99±4,1 ml/kg/min, vīriešiem 43,63±5,4 ml/kg/min. Analizējot pētīto studentu aerobās darba spējas kontekstā ar atbilstošās vecuma grupas populācijas rādītājiem, tika konstatēts, ka 55,32% sieviešu un 53,05% vīriešu tās ir zemākas par vidējiem populācijas rādītājiem un tikai 17,02% sieviešu un 18,31% vīriešu tās ir virs vidējiem

rādītājiem. Pētījuma rezultāti liecina, ka salīdzinot pirmā un otrā studiju gada studentu vidējos aerobo darbaspēju rādītājus ar ceturta un piekta studiju gada studentu aerobo darbaspēju rādītājiem, vecāko studiju gadu studentiem tās bija vidēji par 12,4% zemākas. Medicīnas fakultātes piekta studiju gada sievietēm aerobās darba spējas bija par 14,3%, bet vīriešiem par 20,2% zemākas nekā vidēji pirmā un otrā studiju gada studentiem. Rehabilitācijas fakultātes fizioterapijas ceturta studiju gada sievietēm aerobās darba spējas bija par 6,4%, bet vīriešiem par 8,6% zemākas nekā vidēji tās pašas studiju programmas pirmā un otrā studiju gada studentiem (Arnis, Vīnberga, & Upeniece, 2015).

## **Metodoloģija** *Methodology*

Pētījumā izmantoti veloergometrijas testa rezultātu Rīgas Stradiņa universitātes studiju programmas "Veselības sporta speciālists" reflektantiem par 12 gadiem. Kopā 827 reflektanti (298 vīrieši un 529 sievietes), veikuši Pasaules Veselības organizācijas veloergometrijas testu. Reflektantu vecums no 18 – 59 gadiem. Vīriešu reflektantu vidējais vecums ir  $22 \pm 1,45$  gadi, bet sieviešu –  $24 \pm 0,99$  gadi. Katru gadu reflektantu skaits variēja no 40 (2008/2009. mācību gadā) līdz 101 (2013/2014. mācību gadā).

Šie testi tika veikti ar veloergometru „Monark Ergomedic 839E”. Pētījumā izmantotais darba spēju noteikšanas tests ir Pasaules Veselības organizācijas tests (PVO). Šajā testā, ņemot vērā indivīda dzimumu, vecumu un ķermeņa masu tiek dotas 3 pieaugošas slodzes, katra 4 minūšu garumā. Kopā tests ilgst 12 minūtes. Slodzi dozē pati veloergometram piesaistītā programmatūra, atkarībā no uzrādītajiem antropometriskajiem rādītājiem. Mīšanās temps testā tiek turēts ar 70 apgriezieniem minūtē. Pēdējā slodzē šis sirds frekvences rādītājs visbiežāk pārsniedzis 80% no maksimālās sirdsdarbības frekvences. Veloergometra datorprogramma aprēķina maksimālo un relatīvo skābekļa patēriņu.

Datu analīzē tika izmantota pasaulē atzīta aerobo darba spēju vērtēšanas sistēma (Shvartz & Reibold, 1990), kuras pamatā ir attīstīto valstu iedzīvotāju darba spēju rādītāji. Rezultātu analīzē, tika izvērtēti 7 darba spēju līmeņi – ļoti vājas, vājas, zem vidējām, vidējas, labas, ļoti labas un izcilas darba spējas, vīriešiem un sievietēm atsevišķi. (sk. 1. un 2. tab.)

Iegūtie darba rezultāti tika apstrādāti, izmantojot datu apstrādes programmu SPSS17 un Microsoft Excel, nepieciešamajiem aprēķiniem un grafiskajam atspoguļojumam.

Veikta arī visu reflektantu aptauja par fiziskajām aktivitātēm pēdējos gados, kā arī par ilgtermiņa fiziskajām aktivitātēm.

Pētījumā iekļauti gandrīz visi reflektanti, izņemot dažus augstas klases izturības sporta veidu sportistus, kuri ir Latvijas izlases sastāvā.

**1.tabula. Maksimālā skābekļa patēriņa tabula vīriešiem pa vecuma grupām**  
**Table 1 Maximum Oxygen Consumption Table for Men by Age Group**

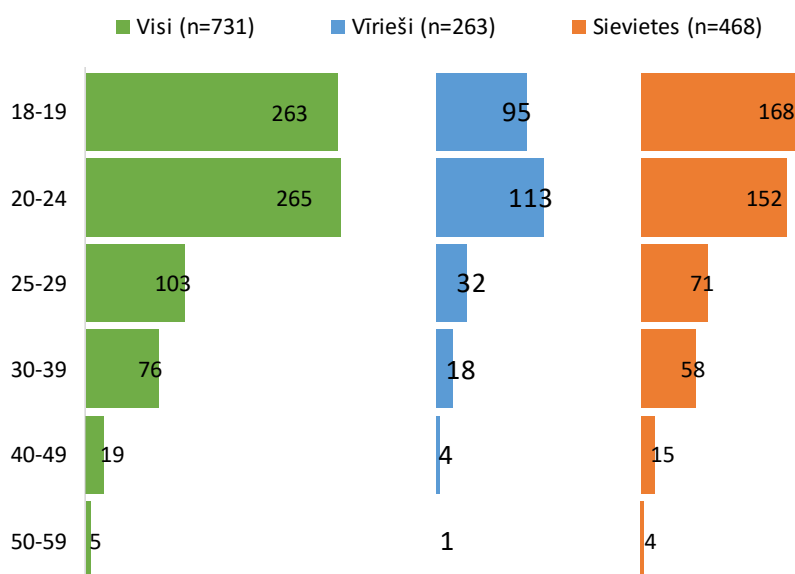
Maksimālais skābekļa patēriņš vīriešiem (VO <sub>2</sub> max ml/kg/min)							
Vecums	Ļoti vājas	Vājas	Zem vidējām	Vidējas	Labas	Ļoti labas	Izcilas
20 – 24	<32	32- 37	38 - 43	44 – 50	51 - 56	57 - 62	> 62
25 – 29	< 31	31 - 35	36 - 42	43 – 48	49 - 53	54 - 59	> 59
30 – 34	< 29	29 - 34	35 - 40	41 – 45	46 - 51	52 - 56	> 56
35 - 39	< 28	28 - 32	33 - 38	39 – 43	44 - 48	49 - 54	> 54
40 – 44	< 26	26 - 31	32 - 35	36 – 41	42 - 46	47 - 51	> 51
45 – 49	< 25	25 - 29	30 - 34	35 – 39	40 - 43	44 - 48	> 48
50 - 54	< 24	24 - 27	28 - 32	33 – 36	37 - 41	42 - 46	> 46

**2.tabula. Maksimālā skābekļa patēriņa tabula sievietēm pa vecuma grupām**  
**Table 2 Maximum table of oxygen consumption for women by age group**

Maksimālais skābekļa patēriņš sievietēm (VO <sub>2</sub> max ml/kg/min)							
Vecums	Ļoti vājas	Vājas	Zem vidējām	Vidējas	Labas	Ļoti labas	Izcilas
20 – 24	<27	27 - 31	32 - 36	37 – 41	42 - 46	47 – 51	>51
25 – 29	<26	26 - 30	31- 35	36 – 40	41 - 44	45 – 49	> 49
30 – 34	< 25	25 - 29	30 - 33	34 – 37	38 - 42	43 – 46	> 46
35 - 39	< 24	24 - 27	28 - 31	32 – 35	36 - 40	41 – 44	> 44
40 – 44	< 22	22 - 25	26 - 29	30 – 33	34 - 37	38 – 41	> 41
45 – 49	<21	21 - 23	24 - 27	28 – 31	32 - 35	36 – 38	> 38
50- 55	< 19	19 - 22	23- 25	26 – 29	30 - 32	33 – 36	> 36

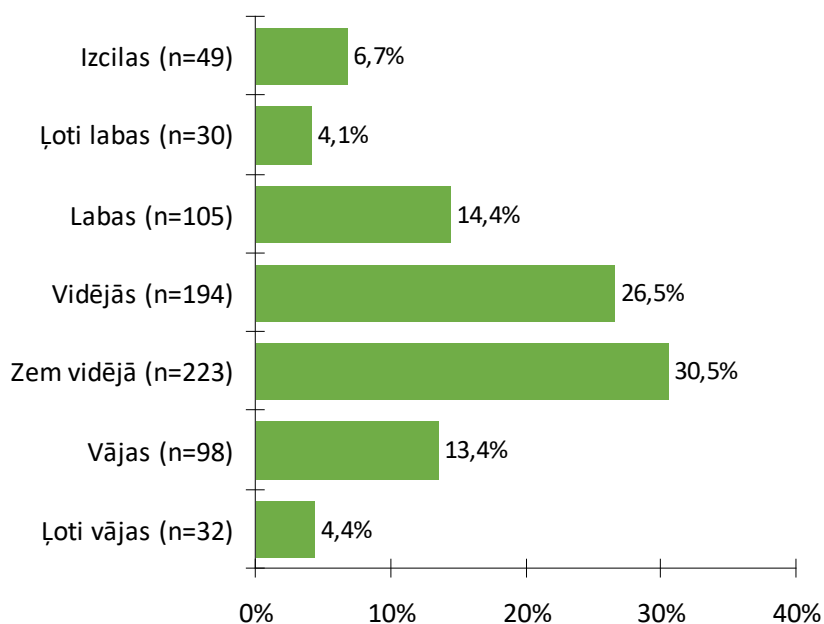
### **Pētījuma rezultāti** **Research results**

No 731 reflektanta visvairāk pārstāvēta ir 20 – 24 gadu vecuma grupa, un tai, ar divu reflektantu mazākumu seko 18 – 19 gadu reflektantu vecuma grupa. 18 – 19 ir vecums, kurā reflektanti tikko ieguvuši vidējo izglītību un uzsāk studijas Rīgas Stradiņa universitātē.



1.attēls. Reflektantu sadalījums pa vecuma grupām  
Figure 1 Distribution of applicants by age groups

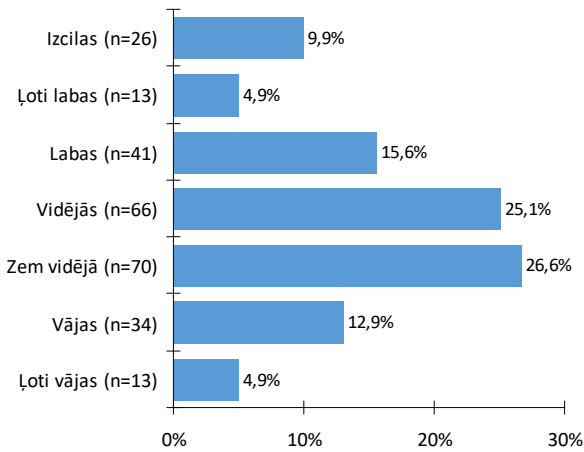
Apkopojot kopā gan sieviešu, gan vīriešu rezultātus, (sk. 2. att.) vairāk kā 55% (n=417) no reflektantiem uzsāk studijas veselības sporta speciālistu jomā ar vidējām vai pat zem vidējām darba spējām. Viena ceturtda daļa reflektantu (n=184) ir ar labām līdz izcilām darba spējām, tikai 10,8% no visiem reflektantiem (n=79) studijas uzsākt ar ļoti labām un izcilām darba spējām.



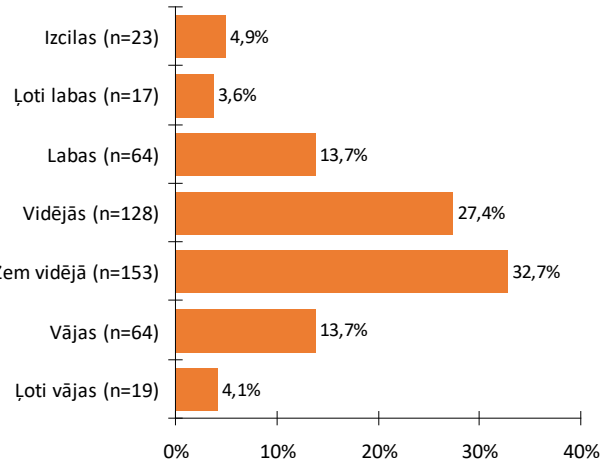
2.attēls. Procentuālais reflektantu darba spēju līmenis 11 gadu kopsumma  
Figure 2 Percentage of applicants' ability to work 11 years total



11 gadu laikā, gan vīrieši (51,7%), gan sievietes (60,1%) piesakās sabiedrības veselības speciālista programmai ar vidējām vai zem vidējām darba spējām (skat. 3. un 4.att).

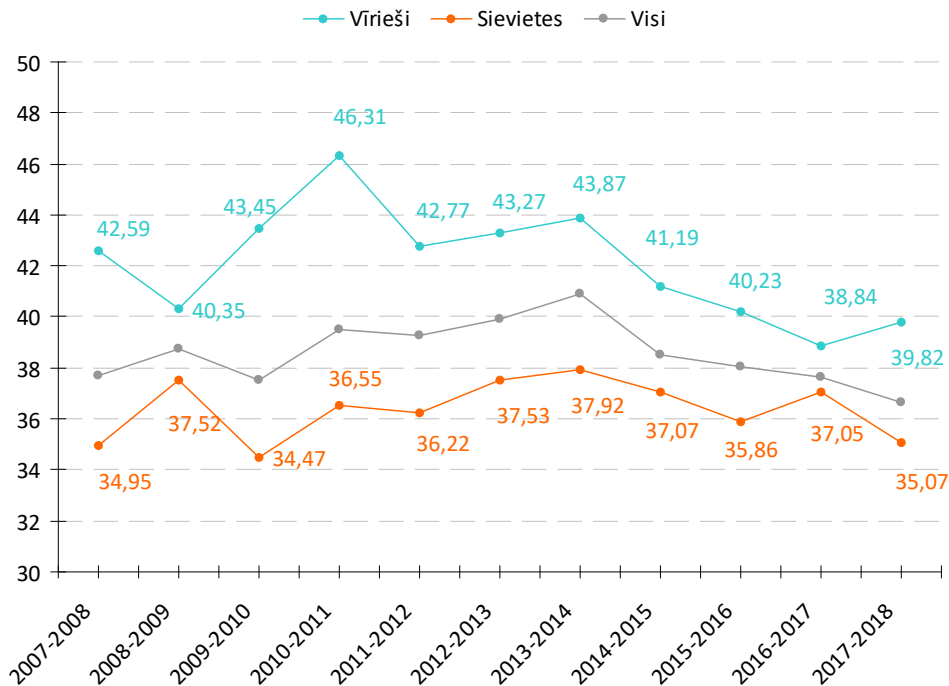


3.attēls. Vīriešu darba spēju vērtējums  
Figure 3 Men's work capacity value



4.attēls. Sieviešu darba spēju vērtējums  
Figure 4 Female work capacity value

Ļoti labas un izcilas darba spējas uzrādījuši 14,8% vīrieši, bet sievietes ļoti labu un izcilu rezultātu uzrāda tikai 8,5% gadījumos, bet sieviešu un vīriešu attiecība, uzrādot vājas un ļoti vājas darba spējas ir ļoti vienāda - 17,8%. Jāpiemin, ka vīriešu reflektantu ar ļoti vājām darba spējām ir nedaudz vairāk kā sieviešu – 4,9% vīriešu reflektantu un 4,1% sieviešu reflektantu.



5.attēls Vidējie darba spēju rādītāji katram mācību gadam  
Figure 5 Average performance rates for each school year

11 gadu vidējie rādītāji uzskatāmi parāda darba spēju kritumu pēdējo 5 gadu garumā. (skat. 5. att). No  $40,89 \pm 1,18$  ml/min/kg 2013./2014. mācību gadā, pakāpeniski krītoties, savu zemāko punktu vidējās darba spējas sasniegušas pēdējā apskatītajā, 2017./2018. mācību gadā ( $36,67 \pm 1,18$  ml/min/kg), kas ir zemākais vidējais darba spēju rādītājs. Nākamais zemākais rādītājs ( $37,53 \pm 1,8$  ml/min/kg) fiksēts 3. uzņemšanas, 2009/2010. mācību gadā.

Visaugstākais vidējais darba spēju rādītājs bijis 2013/2014. mācību gadā ( $40,89 \pm 1,18$  ml/min/kg), kad studijām pieteikušies 101 reflektanti (skatīt 1. tabulu), bet viszemākais – tieši 2017/2018. mācību gadā.

Analizējot aerobo darbaspēju izmaiņas pa vecuma grupām, konstatējām, ka darbaspējas pēdējo 3 gadu laikā visstraujāk pazeminās vecuma grupās no 20-24 gadiem un no 25 – 29 gadiem, neskatoties uz to, ka šo vecuma grupu dalībnieki aktīvi sporto un lielākā daļa apmeklē fitnesa klubus. Lielākā daļa vīriešu regulāri veic spēka treniņus, bet samērā maz kardiotreniņus, savukārt sievietes apmeklē dažādas grupu nodarbības, to skaitā zemas intensitātes grupu nodarbības (Pilates, Fitnesa joga u.c.), kurās nav aeroba slodze. Pēdējos gados arī vīrieši vairāk apmeklē grupu nodarbības, to skaitā abu dzimumu reflektanti apmeklē augstas intensitātes intervālu treniņus, intensīvas spēka nodarbības, funkcionālos treniņus, to skaitā augstas intensitātes funkcionālos treniņus. Iespējams, ka viens no galvenajiem aerobo darbaspēju pazemināšanās iemesliem ir fiziskajai sagatavotībai neatbilstošas un nepiemērotas slodzes, gan pārāk zemas intensitātes nodarbības, gan arī pārāk augstas intensitātes slodzes, tomēr lai to pierādīta nepieciešama detalizētāka slodžu uzskaitē un analīzē, kas šajā pētījumā netika veikta.

## **Secinājumi** **Conclusions**

1. RSU studiju programmas “Veselības sporta speciālists” reflektantu vidējais darba spēju līmenis no 2007. līdz 2013. gadam paaugstinās, bet no 2014. līdz 2018. gadam samērā strauji pazeminās. Pēdējos piecos gados vīriešiem aerobās darbaspējas pazeminās straujāk nekā sievietēm.
2. Pēdējo 3 gadu darba spēju lejupslīdes tendence ir īpaši izteikta tieši 20 – 29 vecuma grupām gan sievietēm, gan vīriešiem, kas varētu būt neadekvātas slodzes dozēšanas rezultāts individuālajos vai dažāda veida grupu treniņos.
3. Vidēji, vīriešu reflektanti piesakās studijām 22 gadu vecumā ar darba spējām, kas atbilst „zem vidējām” rādītājam, bet sieviešu vidējais vecums ir 24 gadi un tiek uzrādītas „vidējas” darba spējas.
4. Vēlams veikt plašāku pētījumu par darba spēju pazemināšanās iemesliem.
5. Visi reflektanti tiek informēti par aerobo darba spēju līmeni un ieteiktas iespējas to uzlabošanai un uzturēšanai.

6. Studiju procesā studenti iegūst nepieciešamās zināšanas, prasmes un kompetences aerobo darba spēju paaugstināšanai.

### Summary

Aerobic work capacity is one of the main indicators of physical fitness and health. Aerobic work capacity depends on many factors, both physical activity level and age and gender and other factors. Aerobic work capacity falls down under the influence of sedentary lifestyle, but it can also decrease as a result of over-intensity loads. Applicants for the study program are young people who have recently graduated from the high school and people of different ages with different sporting experiences.

The purpose of the research: to explore applicants aerobic work capacity of Rīga Stradiņš University study program "Health Care Specialist" and their relation to various factors and changes in the dynamics of 11 years.

A total of 731 participants (268 males and 473 women) conducted the World Health Organization Bicycle ergometer test.

Very good and excellent aerobic work capacity has been shown 14.8% of men, but women has show very good and excellent results in only 8.5% of cases, while the ratio of women and men showing weak and very poor working capacity is very similar - 17.8%. It should be noted that the male applicants with very poor working capacity are slightly more than 4.9% of male applicants and 4.1% of female applicants.

Most men regularly do strength training, but quite a few cardio workouts exercises, while women attend a variety of group classes, including low-intensity group classes (Pilates, Fitness Yoga, etc.) with no aerobic work capacity. In recent years, men have also been attending group classes, including both sexes attending high-intensity interval trainings, intense exercises, functional trainings, including high-intensity functional trainings. One of the main reasons for the decrease in aerobic work performance is the inadequate and inappropriate workloads, the low-intensity classes, and the high-intensity workloads, however, this has been demonstrated by more detailed load tracking and analysis that was not done in this research.

The average level of aerobic work capacity for health care specialist applicants will increase from 2007 to 2013, but declines relatively fast between 2014 and 2017.

Over the last 6 years, aerobic work capacity has fallen sharply for men as women Over the last 3 years aerobic work capacity downturn trend has been particularly pronounced for women aged 20- 29.

It is desirable to carry out a more extensive study of the reasons for the decline in work capacity.

All applicants are informed about the level of aerobic work capacity level and are advised to improve and maintain them.

During the study process students acquire the necessary knowledge, skills and competences for the improvement of aerobic work ability.

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## UNIVERSITIES SPORTS MANAGERS ON DUAL CAREER

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**Abstract.** *The aim of this article is to give an overview on possibilities for students – top athletes to combine their career in respective sports field with studies in different Latvian higher education establishments. Authors of the article analyse scientific literature and the opinions expressed in the individual interviews of the heads of higher education institutions of Latvia as well as officials of State departments responsible for Sports regarding support opportunities that are important for the promotion of dual careers for students – top athletes. Authors of the article study and analyze the possibilities for top athletes to obtain higher education and opportunities to improve the training process. The article gives a theoretical insight and analyzes the results of surveys led by sports managers in Latvia's higher education institutions. After processing the responses, recommendations for the management of the dual career process in higher education institutions have been developed, which could help to achieve a successful implementation of dual career for athletes in Latvia.*

**Keywords:** *dual career, education, sports, top athletes.*

### Introduction

On average, 19 - 25 years of age for a person are referred to as adult *early maturity*, which falls within the same time when young people have completed secondary education and study at the university. The transition from high school to university for young people is associated with major changes in personal life (change of the environment, transition from junior sport to adult sport), which often gives young athletes additional stress. They face difficulties in getting involved in adult society and taking on the responsibility as adults for their decisions that will affect their future career in work and sport. Feeling that it is hard to achieve high-level athletic results, young people often make hasty decision to stop their athletic career in order to gain a profession (Ābeļkalns, 2013).

Young people today think of integration into society as of a successive transition from school to university, which prepares for certain education and employment positions. Such opinion corresponds to the situation of everyday life

that is based on work and family. It is true for the most of young people and it marks the difference between young people and adults.

## **Methodology**

The survey interview as a measurement tool for analyzing opinions was based on similar published studies on the formation of dual careers for students – top athletes (Wylleman & Lavallee, 2004; Aquilina, 2009; Engström, 2011; Stambulova, 2010).

Qualitative data processing program AQUAD Seven, statistical processing methods of EXCEL, descriptive and conclusive statistics, factor analysis and content analysis was used in processing of the data obtained in the survey.

Typically, an interview is not a complete, continuous story told by the respondent, but rather a series of responses to questions or suggestions from a researcher (Holstein & Gubrium, 1995; Kroplijs & Raščevska, 2004). To obtain the results a semi-structured interview, with pre-written questions and option to provide free answers was used.

This type of interview allows the researchers to ask additional questions during the interview and, if necessary, to obtain more detailed information, as well as free responses reduce the possibility for the interviewed person to provide some pre-defined answers (Kroplijs & Raščevska, 2004; Geske & Grīnfēlds, 2006; Kristapsone, 2008), and which respectively helps to acquire more objective information.

Individual interviews were documented in the form of an audio record, and then deciphered for more convenient use during analysis.

Before the interviews, the authors of the article met with 14 respondents, 8 men and 6 women, to agree to the interview and inform the respondents about their intent. The expected length of individual interviews was 30 - 40 minutes.

## **Results**

In order to get an opinion on the management of dual career process for students – top athletes and to develop recommendations for students – top athletes dual career guidance at the university, an interview developed by the authors was used. The interview is intended to acquire the information, while both the respondent and the researcher are in close social interaction. This is a time consuming process, because it is conducted with each respondent individually (Creswell, 1998).

The aim of the interviews was to obtain information, views and opinions on support during the studies and athletic career of students – top athletes which are both important factors for effective management of dual career.

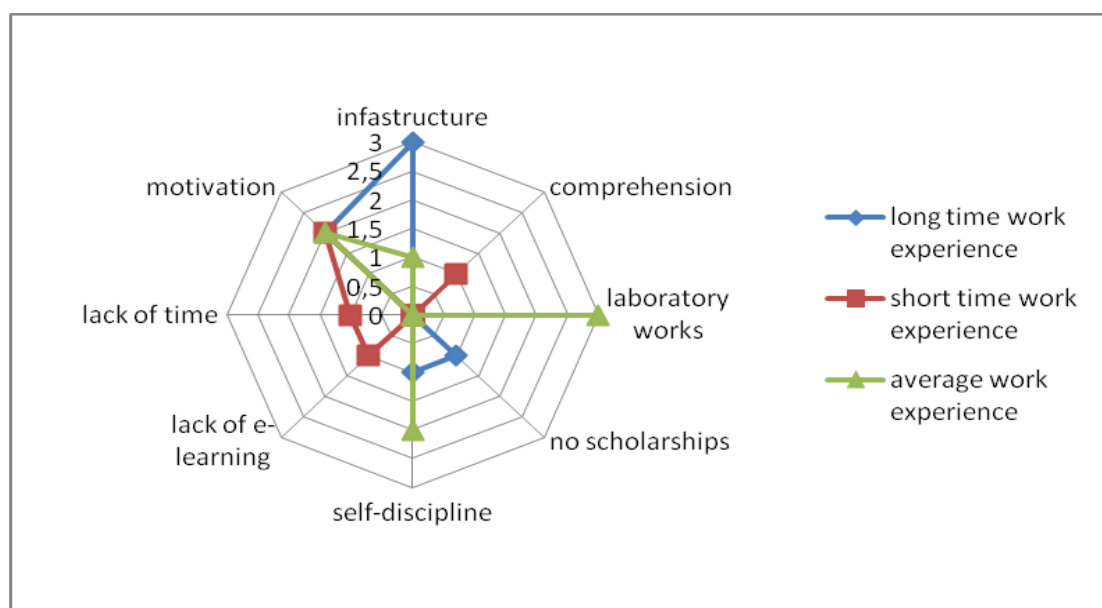
All respondents were divided into three groups according to the length of their work experience: short time (ST) work experience at university - up to 3 years; average work time (AT) experience at university - 4-7 years' work experience at university; long time (LT) work experience at university - 8 years' work experience at university and more. In each group there was similar amount of participants: 5 respondents had a long time work experience, 4 had average and 5 respondents had short time work experience at university. 12 of the respondents are sports managers in Latvia's higher education institutions (University of Latvia (LU), Riga Technical University (RTU), Latvian Academy of Sports Education (LSPA), Latvia University of Life Sciences and Technologies (LLU), Riga Stradins University (RSU), Daugavpils University (DU), Liepajas University (LiepU) whose students have proved to be students – top athletes. And 2 respondents are officials of State departments responsible for Sports.

There are long and exhaustive answers to the question “Why do students – top athletes have to study at universities?” pointing out that, first of all, education is necessary if athletes want to prove themselves in labour market, to gain stability, and obtain a profession that will be needed once the athletic career is over. And athletic careers usually are not very long. Education also gives better understanding about life processes not only in sports, but expands the horizons and provides a wider range of knowledge that helps athletes to develop their personalities and helps to find motivation to achieve higher athletic results. After analysing the respondent answers using *AQUAD Seven* data processing program, authors of the article conclude that respondents with longer time work experience as well as men emphasize the importance of the future profession. Respondents with average work experience and 4 women believe that education is necessary to improve the general knowledge which would help in further development. E.F. says “*I can honestly say that my great and long-time experience in sports confirms that athletes, who have good education, can also achieve great results in their respective athletic field. I can name several examples: J. Rubļevska – Olympic Vice-champion, Mg. degree obtained at LSPA, Laura Ikauniece-Admiņa – World Championship medallist, 4<sup>th</sup> place in Olympic games, graduated from LU, A. Kovals - Olympic Vice-champion, Mg. degree obtained at LU.*”

On this basis, it was important to understand what exactly are the factors, according to the opinion of sports managers, that help athletes to choose a study program and university. There are a lot of opinions: some sports managers (LT and ST) point out that the choice of education and studies depend on the athletes themselves and training conditions play an important role – it is important to have the possibility for high quality trainings near their establishment of education. There is also an opinion (AT) emphasising more the impact of family and coaches on the choice of further studies. The respondents also noted that for the athletes representing team sports, the team they play for has an important role. This is

based on the fact that it is easier to organize both study and training work for the athletes of the same team if they study at the same university. Many athletes want to develop their work career in close relation with their athletic career, working as coaches or trainers, physiotherapists, nutritionists, or sports journalists. It determines their choice for studying in programs related to sports. Based on theoretical knowledge and analysis of respondents' data, we can conclude that at this age, highly achieving athletes make their own career choices independently, but close cooperation with parents and coaches is desirable.

In this research sports managers in Latvia's higher education institutions defined problems that prevent highly achieving athletes to pursue a dual career in Latvia. As can be seen in Figure 1, in all work experience groups the most popular answer to the question is the lack of motivation of students. This fact is also supported by theoretical knowledge. By identifying to what kind of motivation the athlete is responding and knowing the differences between different kinds of motivation, and by creating conditions that increase the motivation enhancement possibilities, it is possible to increase athlete's self-motivation. Factors such as family, coaches, school and teachers, training group, friends, mass media, past events are all influencing motivation. But high performance athletes have to be willing to help themselves, to go analyze themselves, to move forward, because no one else can do it for them in their place. British scientist J. Whitmore (2013) explains that self-motivation is in the minds of every human being, even if it cannot be accessed by the highest level of power. He also believes that sports can be more motivating than business, and the best coaches are looking for ways to reinforce motivation.



**Figure 1 Problems as defined by the respondents, for highly achieving athletes pursuing the dual career in Latvian universities**



Respondents have observed lack of motivation for athletes - students during the first two years of studies, which in turn is related to the changes of environment from high school to university, from youth age to adult stage.

Sports managers who have a long time work experience at universities identify infrastructure as one of the main problems, because universities lack or do not have a high-level athletic training facilities, and therefore athletes - students should take a great distance from university to training area, then home, and vice versa.

The second largest problem is study programs involving laboratory and practical work. Athletes are often participating in competitions or training camps outside the country and cannot attend practical work, while lecturers are not interested to do extra work with athletes.

When students – top athletes get to the university, it is important to find out what support universities and their sports clubs can offer students - athletes to train and learn at a high level. There is still no unified system in Latvia's universities to support high level athletes in order to combine their studies and trainings; only individually-designed regulations exist at each university. Respondents mentioned e-learning as a solution (noting that there is still a lot to do in this area), and studies according to an individual plan. Discounts to tuition fees in amount of 50 - 100% are offered to high level athletes, and in some cases, “budget places”.

Opinions of respondents on tuition fee discounts:

H.V. emphasizes: “students – top athletes *study at our university free of charge (study fee discount 100%). Their grades often are not good, but there is a City Council Decision regarding their studies, and they study for free. This is not always justified. A contract is necessary. There are athletes who are studying whose tuition fee is covered by budget funding, but they have poor grades, they are unable to organize their time, do not take studies seriously*”.

Whereas S.S. says “*We support students – top athletes by creating individual study plans: they have the opportunity to study one study course for two years free of charge, having their study fee covered by budget funding*”

I.Ā., U.B. are supporting tuition fee discounts: “*A while ago we tried to support athletes – students by allowing their tuition fee to be covered by budget funding in some study programs, but it didn't really work because students thought they were entitled to this funding and their rights were untouchable. Starting from year 2000 we do not allocate budget funding, instead we provide an individual tuition fee discount that varies from 50% to 100%. Athletes must submit reports both on study and training work after each semester. If the results are satisfactory, the discount is extended for the next semester, if not, the discount is lost. Students – top athletes evaluate opportunities, start planning and feel more responsible for their study work*”.

Analyzing the opinions of the respondents, it can be concluded that sports managers emphasize the need for the establishment of a national system and the need for modern sports infrastructure at universities, as well as the need to improve the existing e-learning process. Other managers underline the importance of teachers' understanding and implementation of individual study plan. In order to be able to see more easily what support is provided and what would be needed in Latvian higher education institutions, the information is summarized in Table 1.

*Table 1 Support for students – top athletes in Latvian universities*

	<b>The support provided</b>	<b>What would be needed</b>
LSPA	Individual study plans and programs; Participation fee for competitions is paid in some cases.	To create a Career Counselling Centre; Teachers' understanding; Support from Psychologists; e-learning; Financial support, living conditions, training opportunities close to the place of residence and studies.
RTU	Usage of training facilities and different travel costs paid for the participants of National Teams; 20 scholarships per year for students – top athletes; Individual study plans and programs	Creation of infrastructure for sport; possibility to work individually on laboratory works; nationwide system for support
LU	Tuition fee discount; Scholarships; Training possibilities for as much as possible; Student hostel; Individual study plans and programs; Participation in competitions	Financial support to provide studies/training possibilities; Cooperation with IZM [ <i>Ministry of Education and Science</i> ], LSFP [ <i>Latvian Sports Federations Council</i> ]; Improvement of training facilities; medical supplies
RSU	100% study fee discount (for 5 students – students – top athletes per year); Training facilities; Physiotherapist is available	Own sports complex
DU	One-time scholarships; Tuition fee discounts up to 100%; Applicants having high achievements in sport, are matriculated out-of-competition in any study program for full-time studies on budget funding; Individual study plans and programs.	Support from the State
LiepU	Tuition fee 100% paid by City Council; Individual study plans and programs.	Contracts with athletes; e-learning; Budget funding.
LLU	Individual study plans and programs; e- learning; Tuition fee discount.	Financial support from university
LSFP/ LOK	Each year students – top athletes (35 ± 4) receive scholarships of up to €1000 / month each. The amount of the scholarship depends on the results achieved.	Create a dual career system in the country / at national level; Greater support from universities; Flexible study schedule; Special Scholar-ships for athletes; Student sports in general; Dual career adviser (mentor) at university; Staff

When studying the impact of the environment on the dual career of students – top athletes, authors note close cooperation is needed between the university and the sports club, as well as university and sports federations. During the research it was concluded that the cooperation is not close. Some of the sports managers say, “Unfortunately, the federations very little support athletes' willingness to learn, one can say they do not support it at all! On the contrary, we support them. Collaboration exists, but only as moral support, no more”. In this context, a new field of challenges for future research is emerging.

In all respondent groups, the following phrase related to the environmental factor was mentioned: “*It is important that the place of studies, training facilities and place of residence should be as close as possible. A lot of (useless) time is spent while getting from one place to another*”.

The Latvian Olympic Committee (LOC) spokesperson M.V., while explaining the environmental factor, says: “*Character, purposefulness helps in learning. Motivate. Silovs lived in Riga, but when Ventspils Olympic Center was opened he moved to Ventspils because he could train and study at Ventspils University College. Edžus Treimanis is from Valmiera and studies at Vidzeme University of Applied Sciences, Anastasia Grigoryeva is training and studying in Daugavpils. The LOC provides the opportunity to train at the Olympic Centers. If at first the Olympic Centers could only be used by athletes from the list A of LOV, they are now also used by B-list athletes*”. J.G. says “... *if athletes can prove themselves in their respective athletic field then they want to prove themselves also in their studies as they have a high self-esteem. This is especially true for students in the Master's programs, as they come themselves to lecturers and ask when it would be possible for them to pass their tests*”.

After summarizing the opinions of the universities sports managers and taking into account the theoretical knowledge of the scientists, a table (Table 2) was created portraying problems and solutions for successful dual career development for high-end athletes – students.

*Table 2 Problems and solutions for successful dual career in Latvian higher education institutions, as formulated by Respondents*

<b>Main challenges for successful integration of higher education and high performance sport</b>	<b>Suggestions for solutions</b>	<b>Notes</b>
Specifics of the University (laboratory works; studies in medical study programs, and engineering programs); Planning of study programs;	Support from university, by informing lecturers about the specifics of studies for students – top athletes in order to achieve mutual understanding between both parties. Support from the State – in some universities, such as LU, LSPA, RSU,	State budget funding to pay for lecturers for additional work Sign mutual agreements for the implementation of study programs

	ViA, study programs should be developed only for students – top athletes.	
Time management	e-environment that is up to date and well arranged	Organize additional courses for athletes in time management
Attitude and will of athletes	Athletes must make the decision on their own that they need education	Federations need to educate trainers on creation of attitude and will
Motivation	The support of coaches, friends, and parents, as well as advices from career advisers (mentors) is important.	reinforcement of motivation and dual careers
Infrastructure	Convincing the government and local governments of the need to create a sport-friendly environment for all population groups.	
Low funding in sports; Scholarship	Create the will of the federations to be interested in expanding the athlete's potential in the field of education.	
Communication	There should be a website to find out about higher education institutions, opportunities for tuition fees for students – top athletes, information from Olympic centres, sports federations.	The work could start on the homepage of the Latvian University Sports Association and Latvian Sports Federations Council

Analyzing the views and opinions on dual career of all sports managers from different universities, the authors of the research conclude (see Figure 2) that representatives of all age groups indicate that the most important is to find the solution of financial problems and the introduce dual career advisers (mentors) in higher education institutions. The need to prioritize dual career system at national level, educate athletes so that they could set and achieve their goals on their own is mentioned to be essential. *“We need the kind of people (consultants, coaches) as there are abroad. For Ice hockey there is an association... That helps to integrate into life, into study programs. I have seen several athletes who don't know what to do after school. They are about to finish high school, but they have no hobbies that could become a career. They are not interested in anything. The biggest problem for athletes is that they think that without sports there is nothing else. Sport is the only thing that exists in life. But once their sports career is over, they will understand that the world is much bigger. It would be great if an adviser could help athletes expand and broaden their horizons”*.

A good example of time-planning skills: *“The desire to learn and time planning skills is very important for students – top athletes. For example A. S. is already studying at their third university (Banking Institution of Higher*

Education, Law College, LSPA). He says: *Jurmala City Council came to me and offered to organize a beach volleyball school, promised to help pay for studies, which is a support in a way. A.S. takes also dance classes, and learns Arabic in Egypt, which in a way would be a nuisance for sport but at the same time this widens his horizons”.*

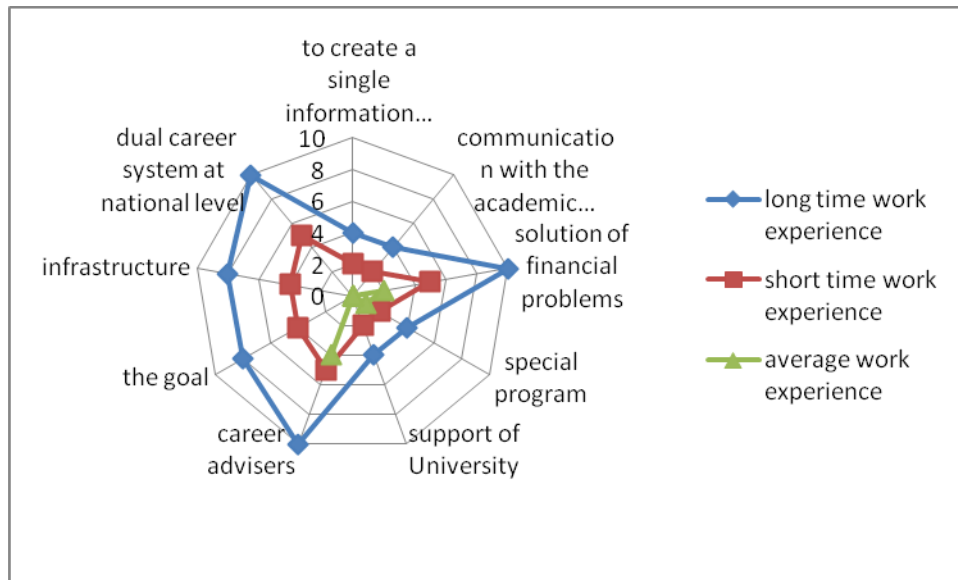


Figure 2 *Recommendations of universities sports managers on development of dual career in Latvia; grouped according to work experience*

The leader of the LSFP mentions courses organized by sports federations that could be one of the options for education of students – top athletes and an opportunity for dual career: *“Development of additional study programs in cooperation with federations. There are several athletes who have come to me after their athletic careers are over and asked: What can I do? If some 5-6 jobs were created in different sports organizations, our athletes would get acquainted with job responsibilities and would be able to understand what sport management means. Some practical things – managers of sports events, organizers. So that they could see what sport is like looking from the other side”.*

Based on the analysis of the theoretical literature, the analysis of the surveys and interviews conducted (Fig. 3), authors of the article developed recommendations for sports managers in universities on how to work with the dual career of students – top athletes.

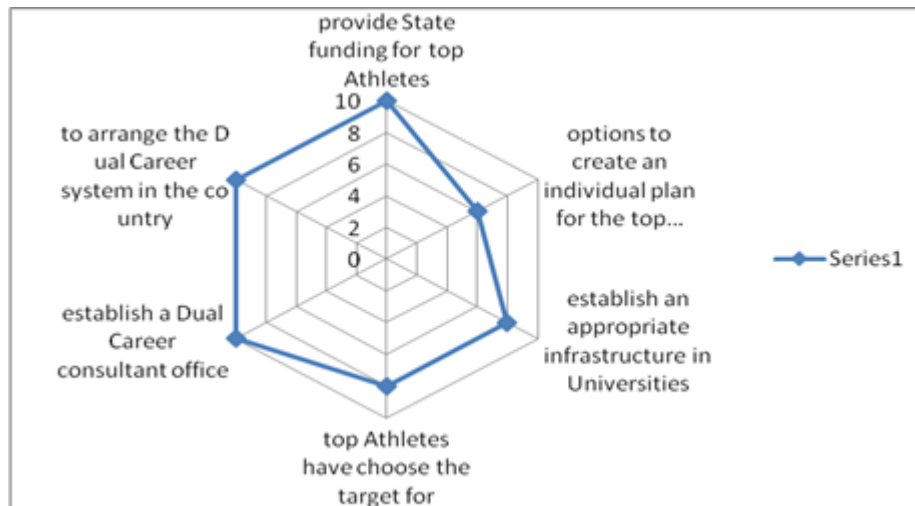


Figure 3 Recommendations of universities sports managers for dual career development in Latvia

## Conclusion

Universities should pay more attention to the organization and quality assurance of the study process, rather than to the content of studies, in order to implement the transition of higher education to study-based qualifications. The boards of higher education institutions should implement a successful, quality-based and forward-looking management of the study process, thus promoting for their students the development of the competences necessary for life.

Creation and implementation of dual career guidelines at national level is required. There is European Union guidelines developed to ensure that young athletes continue to benefit from quality education through further development of their sports training process. EU guidelines are recommendations to the governments of the Member States. Each Member State has its own culture and specificity; therefore the authors of the article propose to develop dual career guidelines that are suitable for Latvia. When creating dual career guidance opportunities for students – top athletes, it is not enough to have organization and individuals. It is essential that there is a person that helps to create and manage a dual career.

It is necessary to find financial resources from the State budget to implement institution of adviser (mentor) for students – top athletes, as well as to be able to fund additional practical and laboratory work of lecturers. Lecturers should develop distance learning courses.

Authors' suggest Sports Federations to organize additional time management courses for athletes. Also it is recommended to work with and make

them understand the essence of dual careers, so that they would work with their students in this direction too.

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## INVALIDITĀTES KONCEPCIJAS KONSTRUĒŠANA LATVIJAS NORMATĪVAJOS AKTOS

### *Construction of Conception of Disability in Laws and Regulations of Latvia*

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**Abstract.** Title of article research is “Conception of Disability in Laws and Regulations of Latvia”. Wherewith this research is carried out in communication and disability studies disciplines. This topic for research was chosen because the conception of disability in regulations and laws is impacting overall legislation related to persons with disabilities and thus directly impacting their lives. And Disability law of Latvia is one of the main laws which is directing regulations related to dividing persons with disabilities in groups, receiving of assistant and guide services and similar issues. As basic method for the research of this article was chosen to be critical discourse analysis which according to Norman Fairclough is providing tools to research text, discursive practice related to this text and sociopolitical context. Articles and amendments of Disability law of Latvia has been researched according to theoretical models of disability described, also process related to creation of the law and passage of it and sociopolitical context from which the main part is in 2010 ratified United Nations (UN) Convention for the rights of persons with disabilities which should impact the legislation of Latvia. By doing research the main conclusion made was that in Disability law of Latvia persons with disabilities are seen more from the point view of medical model of disability but in its amendments from the point of view of “gap” model. It can be explained with the ratification of UN Convention for the rights of persons with disabilities and with being in European Union (EU), willingness to bring principles of welfare state in Latvia.

**Keywords:** disability, discourse studies, Latvia, law, UN Convention.

### **Ievads**

#### **Introduction**

Invaliditātes studijas ir starpdisciplinārs akadēmisks virziens, kurā tiek analizēta invaliditāte un cilvēku ar invaliditāti izdzīvotās pieredzes no humanitāro, sociālo un mākslas zinātņu perspektīvas, ne no medicīnas vai ar to saistīto zinātņu perspektīvas. Invaliditātes koncepts invaliditātes studijās tiek pētīts kā sociāls, kulturāls un politisks fenomens. Pretstatā medicīniskajam skatījumam Invaliditātes studijas koncentrējās uz to, kā invaliditāte ir definēta un reprezentēta sabiedrībā. Praksē ir bijuši dažādi mēģinājumi skaidrot invaliditātes jēdzienu. Invaliditātes studijās, galvenokārt, ir definēti 2 teorētiskie modeļi –



medicīniskais modelis, kuru definēja medicīnas pārstāvji jau Apgaismības laikmetā un 1980. gadā Pasaules Veselības organizācija, un sociālais modelis, kuru definēja paši cilvēki ar invaliditāti Anglijā - Cilvēku ar invaliditātēm apvienības pret segregāciju pārstāvji, kādā prizmā sabiedrībā un politikā skatās uz invaliditāti un kuri ir arī savstarpēji izslēdzoši. “Medicīniskais modelis izprot invaliditāti (*disability*) kā indivīda fizisku vai intelektuālu traucējumu (*impairment*) un tā personīgās vai sociālās sekas. Pret ierobežojumiem, ar ko saskaras cilvēki tas attiecas kā tādiem, kuri rodas tikai un vienīgi no viņu trūkumiem. Pretēji tam sociālais modelis invaliditāti izprot kā attiecības starp individu un tās sociālo vidi: cilvēku ar noteiktām fiziskām vai mentālām raksturīpašībām izslēgšanu no galvenajām sabiedriskās dzīves sfērām.” (Stanford Encyclopedia of Philosophy, 2011). No šiem diviem invaliditātes teorētiskajiem modeļiem ir atvasināti vēl 2, proti, plaisas un minoritātes modelis. Savukārt, Apvienoto Nāciju organizācijas (ANO) Konvencijā par personu ar invaliditāti tiesībām (turpmāk tekstā – Konvencija) ir izveidots jauns invaliditātes teorētiskais modelis – biopsihosociālais, kurā tiek apvienotas vairāku modeļu pazīmes un kurš kalpo kā vidus ceļš starp medicīnisko un sociālo modeli. Kādēļ šie modeļi ir svarīgi? Tādēļ, ka tie nosaka, kā par invaliditāti un cilvēkiem ar invaliditāti tiek runāts, šajā gadījumā likumā. No tā, kā invaliditāte tiek definēta Invaliditātes likumā kontekstā, ir atkarīgs tas, vai likums būs atbrīvojošs un iekļaušanos veicinošs vai gluži otrādi – kļūs par praktisku ierobežojumu, pat stigmatu. Likums var kļūt par stigmatu ne tikai tāpēc, ka tas nosaka praktiskos ierobežojumus vai risinājumus cilvēku ar invaliditāti dzīvēs, bet arī tāpēc, ka tas veido priekšstatu par cilvēkiem ar invaliditāti arī plašākai sabiedrības daļai.

Raksta **mērķis**, ir: analizēt invaliditātes koncepciju Latvijas Invaliditātes likumā un tā grozījumos. **Pētījuma objekts**: Latvijas Invaliditātes likums un tā grozījumi. Kā pētījuma objekts izvēlēts Latvijas Invaliditātes likums, jo, “kā Slee un Cook (1999) raksta: pats par sevi likums nevar mazināt invaliditātes diskrimināciju. Paradoksāli, likums var tikt izmantots kā taktika spēju mazināšanai vai palielināšanai.” (Liasidou, 2016, 149). Tas norāda arī uz kontekstu, kurā likums ir jāskata, lai tā interpretācija nebūtu nekorekta.

### **Literatūras apskats** *Literature review*

Pētnieki (Oliver, 1990; Barnes, 2004; Grue, 2011) izstrādājuši četrus teorētiskos modeļus: medicīniskais, sociālais, “plaisas” un minoritātes modelis. “Invaliditātes teorētiskie modeļi ir kā noteiktas sabiedrības parādības skaidrošanas instrumenti, kuri ir daļa no diskursa, ir iestrādāti diskursā un parasti arī tiek nostiprināti diskursā” (Grue, 2015, 776). Dažādās valstīs ir atšķirīgas pieejas invaliditātei.

ASV Invaliditātes studijās cilvēkus ar invaliditāti skata kā etnisko – kultūras minoritāti, Lielbritānijā - kā apspiesto sabiedrības daļu, un Skandināvijas valstīs - kā ieguvējus no labklājības valsts programmām (Grue, 2015, 796).

Šiem modeļiem ir divi pamatā atšķirīgi uzskati par cilvēkiem ar invaliditāti. Vienā gadījumā viņus redz kā atkarīgus no sabiedrības un tas draud īstenoties paterniālismā, segregācijā un diskriminācijā. Otrajā gadījumā viņi ir sabiedrības pakalpojumu klienti, un tas veicina vienlīdzību un integrāciju (Michigan Disability Rights Coalition, Models of Disability). Piemēram, medicīniskais modelis, kurā ir novērota tendence visus invaliditātes aspektus skatīt kā ķermeņa vājumu, kas ir indivīda problēma, bet par kura ārstēšanu valstij ir jāuzņemas atbildība, pārstāv pirmo filozofijas virzienu.

### **Medicīniskais modelis**

Šis teorētiskais modelis, kādā skatīties uz invaliditāti, attīstījās Apgaismības laikmetā. “Medicīniskajā modelī cilvēka “slimība” jeb “vājināšanās” tiek uztverta kā problēma. Un, pastāvot šim uzskatam, galvenais fokuss bija un ir uz individuālā cilvēka “izārstēšanu” vai “labošanu”” (Odex, 2016, 71). Saskaņā ar šo modeli, cilvēka “labošana” vai “izārstēšana” nepieciešama, lai cilvēks varētu iegūt vai atgūt pilnvērtīgu dzīvi saskaņā ar sabiedrības, kurai tas pieder, standartiem. “Pastāv diskusijas par to, vai šo modeli var saukt par invaliditātes teorētisko modeli, vai tā nav vienkārši uzskatu sistēma, kura pakļauj cilvēkus, kurus skārusi kāda veida invaliditāte, “ārstēšanai”, tādā veidā piešķirot varu medicīnas pārstāvjiem. Tiek piedāvāts viedoklis, ka “medicīniskais modelis” kā vārdkopa definē medikalizācijas praksi un ne kādu teorētiski precīzi formulētu “invaliditātes” skaidrojumu” (Grue, 2015, 1124). Saskaņā ar Jana Grue rakstīto šo modeli var uztvert kā “ideoloģisku rāmi, kas katru invaliditātes aspektu reducē līdz fiziskai “nespējai”, slimībai un tikai medikalizāciju un normalizāciju uzskata par piemērotām iejaukšanās metodēm, tādejādi noliedzot cilvēku ar invaliditāti spēku – pašnoteikšanos – un nododot un nostiprinot varu medicīnas profesionāļu rokās” (Grue, 2011, 9/540). Raksturīgi ir tas, ka šī modeļa ietvaros netiek apskatīti citi invaliditātes aspekti. Vēloties noteikt, vai kādā politikas diskursā vai politiskajā dokumentā “invaliditāte” tiek skatīta no šī modeļa prizmas, svarīgi apskatīt, kādi temati tiek apskatīti – vai tādi, kas ir saistīti tikai ar cilvēku slimību diagnozēm, to ārstēšanu vai arī ar citiem invaliditātes aspektiem

Visi vēlākā laika posmā izstrādātie invaliditātes teorētiskie modeļi, galvenokārt, ir radīti kā pretstati medicīniskajam modelim. Tas tā ir, jo dažādās valstīs dažādām cilvēkus ar invaliditāti pārstāvošām organizācijām viens no galvenajiem dibināšanas un pastāvēšanas mērķiem ir bijis mazināt medicīniskā modeļa ietekmi uz cilvēku ar invaliditāti dzīves kvalitāti. Laikā, kad izveidojās sociālais invaliditātes teorētiskais modelis, invaliditātes kustības protestēja pret

to, ka invaliditāte tiek tieši identificēta ar slimību, pirmkārt, tādēļ, ka tajā netiek apskatīti citi invaliditātes aspekti.

### **Sociālais modelis**

Sociālais modelis tika izveidots 1970tajos gados. Tas tika attīstīts, 1972. gadā izveidojoties Cilvēku ar fiziskām invaliditātēm apvienībai pret segregāciju Anglijā. “1976. gadā apvienība izstrādāja dokumentu “Fundamentālie invaliditātes principi”, kurā tika ielikts pamats sociālajam modelim” (Grue, 2015, 838). Šis tiek saukts par britu teorētisko invaliditātes modeli. “To ir ietekmējusi neo – marksistiskā socioloģija un ticība, ka politiski ekonomiskie spēki un struktūras ir noteicošie sabiedrības veidošanā” (Grue, 2015, 838). Caur šī modeļa prizmu cilvēki ar invaliditāti tiek uzskatīti par politiski un ekonomiski apspiesto sabiedrības daļu, kura tāda ir savu īpašo vajadzību un atšķirīgo ķermeņu dēļ, nespējot pildīt industriālās sabiedrības prasības. Pretstatā iepriekšējam teorētiskajam modelim šajā cilvēku ar invaliditāti slimību atstātais iespaids nav viņu individuāla problēma, kuru nepieciešams pēc iespējas ātrāk novērst, bet gan ir izaicinājums sabiedrībai kopumā. Šajā modelī no sabiedrības, kurā ir cilvēki ar kāda veida trūkumiem jeb slimībām (angliski – *impairments*, kas izskaidro jēdzienu labāk, bet latviešu valodā vēl tam nav atbilstoša tulkojuma), tiek pieprasīts, ka tā tiktu pārveidota un pielāgota, lai nodrošinātu cilvēkiem ar invaliditāti visu nepieciešamo pilnvērtīgai funkcionēšanai sabiedrībā. Sociālajā modelī tiek kultivēts uzskats, ka sabiedrība rada barjeras, kuras traucē cilvēkiem ar invaliditāti iekļauties tajā un piedalīties tās aktivitātēs, tādējādi radot apstākļus cilvēku “invaliditātes” attīstībai. Latvijas kontekstā šo teorētisko modeli uzsver dažādas cilvēku ar invaliditāti organizācijas. Piemēram, viena no galvenajām Invalīdu un viņu draugu apvienības “Apeirons” darbības sfērām ir vides pieejamības veicināšana cilvēkiem ar dažādu veida invaliditāti. Tas tiek darīts ar mērķi, lai veicinātu cilvēku ar invaliditāti sekmīgu iekļaušanos sabiedrībā. Vairāk kā 30 gadus arī citās valstīs šis modelis ir kalpojis kā noteicošais cilvēku ar invaliditāti un viņus pārstāvošo organizāciju darbībā. Taču arī tam ir savas problēmas un viena no tādām ir tā saucamā “slimības problēma”. “Sociālais modelis izvairās apskatīt lietas, kas skar slimību, jo šajā modelī izšķiroši būtisks ir nodalījums starp cilvēka “slimību” un sabiedrības radītu “invaliditāti”” (Grue, 2015, 1676). Tas ir satraucis gan pētniekus ar invaliditāti, gan sociālos aktīvistus, jo ignorēt slimību un/vai tās radītās sekas nozīmē ignorēt daļu no cilvēku ar invaliditāti realitātes. “Bieži šis modelis tiek kritizēts arī dēļ tā, ka tas ir konstruēts ap “ideālo” cilvēka ar invaliditāti tēlu – vīrieti, ratiņkrēsla lietotāju, kurš ir noteiktas etniskās izcelsmes un necieš no citām veselības problēmām saistībā ar savu “vājumu”” (Grue, 2011, 7/538). Dažādos dokumentos, likumu tekstos un tajos lietotajā valodā cilvēku ar invaliditāti un ar viņiem saistīto lietu skatīšana no šī invaliditātes teorētiskā modeļa perspektīvas var atspoguļoties kā slimību un to

seku ignorēšana un kā uzsvāra likšana uz sabiedrības un tās vides pielāgošanu cilvēku ar invaliditāti vajadzībām. “Taču ir arī pētnieki un zinātnieki, kuri šo kritiku noraida, sakot, ka Britu sociālais modelis nenoliedz “trūkuma” jeb slimības nozīmīgumu, bet gan cenšas ierobežot “invaliditātes” uzskata kultivēšanu kā iemeslu sociālajai izstumtībai un apspiestībai (Beaudry, 2016)” (Stanford Encyclopedia of Philosophy, 2011).

Pamatojoties uz medicīniskā modeļa kritiku un vēlēšanos pilnveidot sociālā modeļa nepilnības Norvēģijā un ASV tika attīstīti vēl vairāki invaliditātes teorētiskie modeļi.

### **“Plaisas” modelis**

Šis invaliditātes teorētiskais modelis ir izveidojies Skandināvijas valstīs. “Tā pamatā ir fakts, ka noteiktai daļai no sabiedrības agrāk vai vēlāk būs kāds “vājums” (lietots šis vārds, jo vārds “invaliditāte” tiek lietots citā kontekstā) vai slimība, kas kādā veidā ietekmēs šo cilvēku funkcionālo kapacitāti. Šī modeļa ietvaros “invaliditāte” tiek skaidrota kā plaisa starp cilvēku funkcionālo kapacitāti un iespējām, ko piedāvā sabiedrība un tās institūcijas” (Grue, 2015, 884 - 888). Līdz ar šādu invaliditātes izpratni patstāvīgi notiek mēģinājumi mazināt tās radītās sekas ar dažādiem politiskiem un ekonomiskiem līdzekļiem. “Birokrātiskie instrumenti var būt visdažādākie, ar kuriem mazināt “vājuma” vai slimības radītās sekas uz indivīdu dzīves kvalitāti – sākot ar medicīnisku iejaukšanos līdz pat pret diskriminācijas likumiem, kuri ir jāievēro darba devējiem, izglītības un dažādu institūciju pārstāvjiem” (Grue, 2015, 888). Rūpes par indivīdu dzīves kvalitāti un pilsoņtiesībām ir raksturīgas labklājības valstīm. Diskursā tas var izpausties kā rūpes par cilvēku ar invaliditāti dzīves līmeni, par iespēju radīšanu tā paaugstināšanai. Šī modeļa ietvaros tiek meklēti dažādi līdzekļi – ekonomiski un politiski – lai veicinātu līdzvērtīgu ar visu pārējo sabiedrības daļu dzīves standarta nodrošinājumu cilvēkiem ar kādu “vājumu” vai slimību.

### **Minoritātes modelis**

Minoritātes modelis ir izstrādāts, galvenokārt, ASV veiktajos pētījumos. Lielbritānijā tas izveidojās no strādnieku šķiras un jaunu sabiedrības šķiru apziņas un cīņas par tiesībām, bet ASV no pilsonisko tiesību un pretdiskriminācijas kustības saistībā ar etnisko piederības apziņu. Šajā teorētiskajā modelī invaliditāte tiek skaidrota kā rase, uz kuras pamata cilvēki, kuriem ir kāds “vājums” vai slimība, tiek diskriminēti. Pamata uzskats šī modeļa ietvaros ir tāds, ka cilvēku minoritātei, kas kādas savas īpašības dēļ tiek diskriminēta, ir jānodrošina līdzvērtīgas pilsoniskās tiesības, lai rūpētos par tās vajadzībām. “Dekāžu garumā minoritātes invaliditātes teorētisko modeli kultivēja dažādi pilsonisko tiesību aktīvisti un lobiji. Līdz beidzot 1990. gadā tika izveidots Amerikāņu ar invaliditāti akts, kuru tālāk pielietoja arī akadēmiskajās invaliditātes studijās, invaliditāti

skaidrojot kā kompleksi iemiesotas identitātes formu, kas *a priori* nav ne pozitīva, ne negatīva “(Grue, 2015, 865). Invaliditāte šī teorētiskā modeļa ietvaros tiek uztverta kā kultūras identitāte, kas raksturo cilvēkus, kurus ir skārusi kāda “nespēja” vai slimība. Piemēram, Skandināvijā ir veikts pētījums, kurā ir atspoguļots, kā “cilvēki ar dzirdes traucējumiem noraida invaliditātes “birku”, tā vietā, velkot paralēles starp pašiem un geju un lesbiešu kopienām” (Grue, 2011, 8/538). Salīdzinot ar medicīnisko modeli, kurā “vājums” vai slimība ir jālabo, jāārstē, šajā teorētiskajā modelī “vājums”, slimība tiek uztverta kā kaut kas, ar ko jālepojas un ko jāizceļ. Tas ir pretrunā ar viedokli, kāds ir daudziem cilvēkiem ar to vai citu “nespēju” vai slimību, kas tiem ir nevēlamas. Līdz ar to arī minoritātes modelis tiek daudz kritizēts. Un šī modeļa galvenā pazīme būtu uzsvāra likšana uz cilvēku ar invaliditāti pilsoniskajām tiesībām, to līdzvērtīgu nodrošinājumu.

### **Metodoloģija** *Methodology*

Lai pētītu, kāds no iepriekš aprakstītajiem invaliditātes teorētiskajiem modeļiem ir Latvijas invaliditātes likuma un tā grozījumu tekstā, tiks pielietota kritiskā diskursa analīze (KDA). “Kritiskā diskursa analīze uztver zināšanas kā varu un pieņem, ka vara tiek realizēta, organizējot un izmantojot zināšanas” (Grue, 2015, 383). Kritiskā diskursa analīze ir pieeja pētniecībai, kura diskursa analizē fokusējas uz diskursīviem apstākļiem, komponentiem un dominējošo grupu un institūciju varas izmantošanas sekām. (van Dijk, 1995)

Savā darbā, rakstot par kritisko diskursa analīzi un invaliditāti norvēģu pētnieks Jans Grue raksta, ka “šī diskursa analīzes novirziena galvenais mērķis ir identificēt varas lietojumu caur valodu. Tas arī sniedz vietu teorētisko novērojumu izdarīšanai par to, kāda loma ir valodai invaliditātes sociālajā konstruēšanā” (Grue, 2015, 82). Līdz ar to arī, pētot Latvijas likumdošanas dokumentus, gan jau spēkā esošus, gan vēl neapstiprinātus, tajos lietoto valodu ir iespējams arī aptvert un skaidrot uz cilvēkiem ar invaliditāti attiecināmo lēmumu pieņemšanas praksi un līdz ar to sociālās dzīves struktūru un varas attiecību veidošanu ar likumdošanas palīdzību. Šeit jāņem vērā arī tas, kam ir pieeja valdības un parlamentārajam diskursam, vai tie ir tikai politiķi, kuriem ir kontrole, vai sava veida teikšana ir arī vidusmēra cilvēkiem, vēl jo vairāk pašiem cilvēkiem ar invaliditāti. Esošās prakses izpēte var palīdzēt nākotnē ieviest korekcijas, tādejādi veicinot cilvēku ar invaliditāti sekmīgu iekļaušanos sabiedrībā un līdzvērtīgas iespējas dzīvot un realizēties, kas ir viens no galvenajiem virsmērķiem šāda veida pētījumiem.

Par kritiskās diskursa analīzes pamatlicēju tiek uzskatīts Normens Ferklafs (Norman Fairclough) - ne tikai dēļ tā, ka viņš izmanto un skaidro terminu “diskurss” un šis termins mūsdienās tiek izprasts, galvenokārt, saskaņā ar šī autora

atziņām. Par iemeslu tam kalpo arī Normena Ferklafa pētījumi par saikni starp verbālo un fizisko varu. Normens Ferklafs par KDA ir rakstījis šādi: “Kritiskā diskursa analīze nodarbojas ar kontinuitāti un izmaiņām abstraktajā, vairāk strukturālajā līmenī kontekstā un ar to, kas notiek konkrētos tekstos” (Fairclough, 2003, 3). Jāņem vērā, ka valodas lietojums kā sociālā prakse ietekmē realitāti un ar to saistītos notikumus un kontekstu sabiedrībā. Piemēram, izpētot, kāda veida modelim visvairāk atbilst Latvijas Invaliditātes likums, būs iespējams izdarīt secinājumus par to, kādā invaliditātes teorētiskā modeļa prizmā uz cilvēkiem ar invaliditāti skatās šajā likumā un tā grozījumos, kas savukārt palīdzēs iezīmēt, kāda veida cilvēku ar invaliditāti identitāte tiek konstruēta no likumdošanas varas puses Latvijā.

*1.tabula. Invaliditātes teorētiskie modeļi un tos raksturojošās pazīmes*  
**Table 1 Theoretical models of disability and characteristics of those models**

<b>Medicīniskais modelis</b>	<b>Sociālais modelis</b>	<b>Plaisas modelis</b>	<b>Minoritātes modelis</b>
Uzsvars retorikā uz slimību un tās radītajām sekām kā indivīda problēmu.	Uzsvars retorikā uz “vājumu”, slimību un tās radītajām sekām kā sabiedrības problēmu.	Uzsvars retorikā uz “vājuma”, slimības radīto “zaudējumu” kompensēšanu cilvēkiem, kurus tas ir skāris, ar politiskiem un ekonomiskiem līdzekļiem.	Uzsvars uz cilvēkiem ar invaliditāti kā atsevišķu kultūru un tās aspektiem.
Indivīda labošanas pieprasīšana	Sabiedrības labošanas pieprasīšana	Prasa ar politiskiem un ekonomiskiem līdzekļiem aizvērt vai mazināt plaisu starp indivīda, kuru ir skārusi kāda slimība vai “nespēja” vajadzībām un sabiedrības un tās institūciju piedāvātajām iespējām.	Vienlīdzīgu iespēju pieprasīšana cilvēkiem ar invaliditāti.
Koncentrēšanās uz tādiem tematiem kā slimību diagnozēm, rehabilitāciju, indivīda “korektūru”, lai atgrieztu “normālajā” dzīvē un sabiedrībā	Koncentrēšanās uz tādiem tematiem kā vides pieejamība, sabiedrības pielāgošanās, integrācija.	Koncentrēšanās uz tādiem tematiem kā labklājības valsts, vienlīdzīgas iespējas, vienlīdzīgs dzīves līmenis, invaliditātes sociāla konstruēšana.	Koncentrēšanās uz tādiem tematiem kā pilsoņu tiesības, vienlīdzība, solidaritāte.

Kritiskā diskursa analīze šī raksta ietvaros veikta lasot Latvijas Invaliditātes likuma un tā grozījuma tekstus, tad no iepriekš veiktajiem invaliditātes teorētisko modeļu aprakstiem, izveidojot 1. tabulu ar tos raksturojošām pazīmēm un tad pielīdzinot katru Latvijas Invaliditātes likuma un tā grozījumu pantu šīm pazīmēm un secinot, kura modeļa pazīmēm konkrētais pants visvairāk atbilst. Tādā veidā tiks saskaitīts pantu daudzums, kas atbilst katra invaliditātes teorētiskā modeļa pazīmēm. Beigās, veicot teksta analīzi ar šādu metodi, būs iespējams izdarīt secinājumus, kura invaliditātes teorētiskā modeļa pazīmes ir visvairāk pārstāvētas Latvijas Invaliditātes likumā un savukārt no tā varēs izdarīt secinājumus, kā tas ietekmē cilvēkus ar invaliditāti Latvijā. Visbeidzot pētījuma metodes, paša pētījuma un secinājuma kvalitātes nodrošināšanai tiek ņemta vērā starptautiskā prakse, pētījumi un KDA skaidrojumi, atrodot piemērotāko pieeju šī pētījuma veikšanai. Pirms Latvijas Invaliditātes pantu un to grozījumu analīzes veikšanas un pielīdzināšanas attiecīgo invaliditātes teorētisko modeļu pazīmēm tiek apskatīts arī likuma teksts, invaliditātes definīcija tajā un sniegts skaidrojums loģikai, kāpēc viens vai otrs pants atbilst konkrētā invaliditātes teorētiskā modeļa pazīmēm.

## **Pētījuma rezultāti un to interpretācija** *Results and discussion*

### **Latvijas Invaliditātes likums un tā grozījumi**

Latvijas Invaliditātes likuma tiesību akta pasē, kur norādīta pamatinformācija par tiesību aktu, ir teikts, ka tā izdevējs ir Saeima. Likums ir pieņemts 2010. gada maijā un tas stājās spēkā 2011. gada 1. janvārī. Tas liek secināt, ka Invaliditātes likuma teksta pieņemšana netika saistīta vai tika minimāli saistīta ar Konvencijas ratifikāciju, kas notika 2010. gada 31. martā. Likuma mērķis – “novērst vai mazināt invaliditātes risku personām ar prognozējamu invaliditāti un mazināt invaliditātes sekas personām ar invaliditāti” (LR Invaliditātes likums) – ir atbilstošs Konvencijas mērķim: “ir veicināt, aizsargāt un nodrošināt to, lai visas personas ar invaliditāti varētu pilnībā un vienlīdzīgi izmantot visas cilvēktiesības un pamatbrīvības, un veicināt tām piemītošās cieņas ievērošanu.” (Konvencija, 1. pants). Likuma mērķis ir atbilstošs Konvencijas mērķim, jo gan likuma, gan konvencijas mērķī ir uzsvērtas invaliditātes seku mazināšana. Tas, kas ir atšķirīgs ir invaliditātes jēdziena konotācija lietojumā. Ja Invaliditātes likumā, lietojot vārdu “invaliditāte” tas tiek lietots kopā ar vārdu “risks”, tad Konvencijā jēdziens “invaliditāte tiek lietots kopā ar jēdzienu “persona” un “cilvēktiesības”. Tas norāda, ka likumā invaliditāte pozicionēta kā risks un negatīva, bet Konvencijā kā cilvēktiesību lieta.

Analizējot ne tikai Latvijas Invaliditātes likuma mērķi, bet tā tekstu, redzams, ka visi tā panti ir iedalīti tematiskajos blokos:

1. 1. - 3. pants – vispārīgie noteikumi;
2. 4. - 6. pants – prognozējama invaliditāte un invaliditāte;
3. No 7. panta līdz 10. pantam – prognozējamās invaliditātes un invaliditātes ekspertīzes organizēšana;
4. No 11. panta līdz 13. pantam – atbalsta pasākumi prognozējamās invaliditātes, invaliditātes riska un invaliditātes seku mazināšanai.
5. Pārejas noteikumi.

Lielākā satura daļa ir par invaliditātes un prognozējamās invaliditātes definēšanu un noteikšanu, lai gan likuma mērķis ir mazināt invaliditātes jeb funkcionēšanas ierobežojuma iegūšanas riska vai jau iegūta funkcionāla ierobežojuma sekas uz cilvēka dzīvi. Invaliditāte tiek noteikta indivīdam un saskaņā ar Ministru Kabineta noteikumiem Nr. 805 to veic Veselības un darbspēju ekspertīzes ārstu valsts komisija, ir iespējams secināt, ka indivīda funkcionēšanas ierobežojumi, ko rada viņa/-as slimība, tiek skatīti medicīniskā modeļa prizmā. Uz medicīnisko modeli Latvijas Invaliditātes likumā norāda arī “invaliditātes” definīcija. Saskaņā ar to: “Invaliditāte ir ilgstošs vai nepārejošs ļoti smagas, smagas vai mērenas pakāpes funkcionēšanas ierobežojums, kas ietekmē personas garīgās vai fiziskās spējas, darbspējas, pašaprūpi un iekļaušanos sabiedrībā.” (Latvijas Invaliditātes likums). Saskaņā ar šo definīciju, invaliditāte ir indivīda problēma un nevis sabiedrības konstruēta kā tas būtu, piemēram, sociālajā invaliditātes modelī vai jēdziens, kas patstāvīgi mainās un attīstās, mainoties sabiedrībai, tās norisēm, cilvēku vēlmēm un vajadzībām, kā tas ir saskaņā ar Konvenciju.

Latvijas Invaliditātes likumam kopš pieņemšanas Saeimā 2010. gada 20. maijā un stāšanās spēkā 2011. gada 1. janvārī ir bijuši 6 grozījumi. 4 no 6 reizēm izmaiņas bijušas 12. pantā, kurš aizsāk 3 pantu garo invaliditātes seku mazināšanas tematisko bloku. No tā var secināt, ka vairāk jautājumu rada nevis invaliditātes noteikšana, bet gan tās seku mazināšana.

### **Latvijas Invaliditātes likuma un tā grozījumu KDA**

Veicot Latvijas Invaliditātes likuma analīzi ņemtas vērā 1. tabulā apkopotās invaliditātes teorētisko modeļu pazīmes un veidota 2. tabula.

Lai demonstrētu, kā veidojās tabula nr. 2, tika izvēlēti likuma panti 4 un 2.

Likuma 2. pants: “Likuma mērķis ir novērst vai mazināt invaliditātes risku personām ar prognozējamu invaliditāti un mazināt invaliditātes sekas personām ar invaliditāti.” (Latvijas Invaliditātes likums)

Šis pants, saskaņā ar 1. tabulā apkopotajām invaliditātes teorētisko modeļu pazīmēm atbilst plaissas modelim, jo tajā ir uzsvars uz invaliditātes seku, tātad kādu zaudējumu, mazināšanu, kompensēšanu. Un tajā paredzēta prognozējamās



invaliditātes mazināšana, kas arī norāda uz plaisas mazināšanu starp nespēju un spēju, radot spēju cilvēkiem tik ilgi, cik vien tas ir iespējams. Paturot prātā, ka arī invaliditātes pabalsta jeb pensijas līmenis tiek noteikt, ņemot vērā šo likumu un tajā noteikto cilvēku iedalījumu grupās, ir iespējams secināt, ka invaliditātes sekas tiek mazinātas jeb kompensētas arī finansiāli. Tas ir raksturīgi sevišķi plaisas teorētiskajam modelim.

Ja šajā pantā skaidri redzama piederība plaisas teorētiskajam modelim, tad 4. pantā 1. punktā skaidri redzama ir piederība medicīniskajam modelim.

Likuma 4. pants 1: “Prognozējama invaliditāte ir slimības vai traumas radīti funkcionēšanas ierobežojumi, kas gadījumā, ja netiek sniegti nepieciešamie ārstniecības un rehabilitācijas pakalpojumi, var būt par iemeslu invaliditātes noteikšanai.” (Latvijas Invaliditātes likums)

Šis pants saskaņā ar 1. tabulā apkopotajām invaliditātes teorētisko modeļu pazīmēm atbilst medicīniskajam modelim, jo tajā invaliditāte tiek definēta tikai saistībā ar slimību, kas rada funkcionēšanas ierobežojumus. Un vēl skaidra pazīme par piederību medicīniskajam modelim ir tas, ka jālabo jeb jāārstē šajā gadījumā ir indivīds. Līdz ar to visa atbildība tiek uzlikta indivīdam un viņa slimības vai traumas radītajiem funkcionēšanas ierobežojumiem. Zemāk visi Latvijas Invaliditātes likuma panti ir apkopoti, atbilstoši katru ievietojot tabulā zem invaliditātes teorētiskā modeļa, kam konkrētais pants atbilst visvairāk ņemot vērā 1. tabulā apkopotās invaliditātes teorētisko modeļu pazīmes.

*2.tabula. Latvijas Invaliditātes likuma pantu atbilstība noteiktiem invaliditātes teorētiskajiem modeļiem*

*Table 2 Conformity of articles of Disability law of Latvia with concrete theoretical models of disability*

<b>Medicīniskais modelis</b>	<b>Sociālais modelis</b>	<b>Plaisas modelis</b>	<b>Minoritātes modelis</b>
1.pants 1; 2; 3; 4; 5; 6; 8; 9;		1.pants 7, 10	
		2. pants	
3.pants 1; 2:1	3. pants 2:2	3.pants 2:3	
4.pants 1		4.pants 2	
5.pants 1		5.pants 2; 3	
6.pants 1, 2, 3, 4			
7.pants 1; 2; 3; 5		7.pants 4	
8.pants 1; 2; 3; 4; 5:1; 5:2; 5:3		8.pants 5:4	
9.pants			
10.pants 1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11			
11.pants: 1		11.pants 2; 3	
12. pants 1:1; 1:9; 2; 2:1		12.pants 1:2; 1:3; 1:3:1; 1:4; 1:5; 1:6;	

		1:7; 1:8; 1:10; 4; 5; 5:1; 6; 7	
13. pants 1; 1:1;	13.pants 3	13.pants 2; 4; 5	
Pārejas noteikums 1; 5		Pārejas noteikums 2; 3; 4	
KOPĀ = 48 (60% no visiem Latvijas Invaliditātes likuma pantiem un to apakšpunktiem)	KOPĀ = 2 (2% no visiem Latvijas Invaliditātes likuma pantiem un to apakšpunktiem)	KOPĀ = 31 (37% no visiem Latvijas Invaliditātes likuma pantiem un to apakšpunktiem)	KOPĀ = 0

2. tabulā pantu un to apakšpunktu piederību medicīniskajam modelim, noteica medicīniskais invaliditātes definējums. Savukārt, piederību “plaisas modelim”, noteica ekonomisko kompensāciju no valsts budžeta līdzekļiem un pakalpojumu nepieciešamības uzsvērums invaliditātes radīto seku mazināšanai uz indivīdu dzīvi, izglītošanos un darbību. Un divu Latvijas Invaliditātes likuma pantu apakšpunktu piederību sociālajam modelim noteica sabiedrības, nevalstisko organizāciju (NVO) iesaistīšana invaliditātes radīto seku mazināšanai, jo sociālo invaliditātes teorētisko modeli pārstāv visvairāk NVO sektors dažādās valstīs. Tik neliela sociālā invaliditātes modeļa pārstāvēniecība Invaliditātes likuma tekstā norāda arī uz NVO ietekmi uz likumdošanu. Līdz ar to tālākā pētniecībā būs interesanti izpētīt, vai un kā Latvijas normatīvo aktu tapšanā tiek iesaistītas NVO un to pārstāvji. Pēc šī pētījuma var secināt, ka iesaiste nav liela. Lai gan svarīgi piebilst, ka Satversmē ir noteikts, ka sabiedrībai ir tiesības piedalīties likumu izstrādes procesā. Portālā lvportals.lv atrodama arī shēma, kura uzskatāmi parāda, ka likuma pieņemšanas process ir komplikēts, līdz ar to apgrūtinot sabiedrības iesaisti tajā.

2. tabulā redzams, ka Latvijas Invaliditātes likuma pantu punktu un apakšpunktu teksta valoda visvairāk atbilst medicīniskajam invaliditātes teorētiskajam modelim. Ņemot vērā Ferklafa un Vodakas teorētiskās atziņas par diskursa funkcijām, var secināt, ka šī likuma tekstā tiek konstruēta cilvēku ar invaliditāti identitāte, jo tas var tikt lietots kā taktika, lai veicinātu cilvēku ar invaliditāti spēju vai tieši otrādi – nespēju. No medicīniskā modeļa konstruētu cilvēku ar invaliditāti identitāti raksturo pārējās sabiedrības un valsts vēlme šo cilvēku grupu “izārstēt”, “padarīt atkal normālu”, lai tā spētu atbilst sabiedrības standartiem un funkcionēt tajā pilnvērtīgi. Savukārt, ja medicīniskais teorētiskais modelis, korelējot ar Latvijas Invaliditātes likumu un tā grozījumiem, kultivēs medicīnisko invaliditātes teorētisko modeli, tad, ņemot vērā šajā rakstā iepriekš rakstīto par šo teorētisko modeli, tas var novest pie ievērojamas cilvēku ar invaliditāti stigmatizācijas un stereotipu veidošanās sabiedrībai par cilvēkiem ar invaliditāti un pašiem cilvēkiem ar invaliditāti par sevi. Un šie faktori nav

invaliditātes sekas mazinoši, kaut gan to darīt ir viens no Latvijas Invaliditātes likuma mērķiem.

Plaisas modeļa pazīmju esamību pētītajā likuma tekstā var skaidrot arī ar Latvijas dalību ES un ANO, līdz ar to ar nepieciešamību sniegt atbalsta pasākumus cilvēkiem ar invaliditāti un viņu iekļaušanai sabiedrībā. To nosaka ES normas un Konvencija, nosakot vienlīdzīgas iespējas visiem. Taču arī termina “vienlīdzīgas iespējas” visiem izpratne, interpretācija un lietojums būtu jāizanalizē pirms šāda apgalvojuma, kā iepriekšējā teikumā, izteikšanas.

Lai iegūtu plašāku skatu uz Latvijas Invaliditātes likumu kontekstā, veikta arī tā grozījumu KDA, nosakot to atbilstību teorētiskajiem invaliditātes modeļiem. Zemāk redzamā tabula izveidota pielietojot līdzīgu loģiku kā veicot Invaliditātes likuma pamata pantu pielīdzināšanu noteiktiem invaliditātes teorētiskajiem modeļiem. Piemēram, grozījuma 8. panta 1. punktā - "Personas funkcionēšanas ierobežojumu izvērtē sertificēti Valsts komisijas ārsti. Valsts komisijas ārsti funkcionēšanas ierobežojuma izvērtēšanā ir neatkarīgi." (Grozījumi) Invaliditātes likumā)- piederību medicīniskajam modelim nosaka tā uzsvars uz pilnīgas varas nodošanu pār cilvēkiem ar invaliditāti, viņu funkciju noteikšanu ārstu rokās. Savukārt, grozījuma 12. panta 2. punktā – “2”) personām ar I grupas redzes invaliditāti, kuras nesaņem valsts pabalstu invalīdam, kuram nepieciešama kopšana, - līdz 2012. gada 31. decembrim nodrošinot tiesības saņemt pabalstu par asistenta izmantošanu 10 stundas nedēļā, pašām izvēloties konkrēto asistentu. Šo pabalstu nav tiesību saņemt personām, kuras atrodas ilgstošas sociālās aprūpes institūcijā, stacionārā ārstniecības iestādē vai ieslodzījuma vietā;” (Grozījumi Invaliditātes likumā) piederību plaisas modelim nosaka tā uzsvars uz finansiālo invaliditātes kompensēšanu. Bet saistībā ar šo pantu un grozījumiem tajā rodas arī jautājumi. Saskaņā ar šī likuma 12. panta 2. apakšpunktu cilvēki ar I grupas redzes invaliditāti nav tiesīgas saņemt pabalstu par asistenta pakalpojuma izmantošanu, ja viņš/-a atrodas ilgstošas sociālās aprūpes institūcijā. Vai tad cilvēks, kurš atrodas šādā institūcijā nav tiesīgs saņemt asistenta pakalpojumu un doties ārpus institūcijas pat, ja to atļauj viņa/-as fiziskais stāvoklis? Tādejādi šis pants veido cilvēku dzīves realitāti un neiziešanu ārpus institūcijas. Turpinot šāda veida analīzi, izveidota tabula un diagramma līdzīgi kā analizējot Invaliditātes likuma pamata pantus.

Kā redzams pēc Latvijas Invaliditātes likuma grozījumu tematisko bloku izpēti, tad grozījumi pārsvarā ir skāruši pantus, kuri paredz invaliditātes prognozējamā riska un seku novēršanu vai samazināšanu. Ar plaisas modeli šie grozījumi ir raksturoti, jo tajos tiek apskatīti pakalpojumi, kas cilvēkiem ar invaliditāti un ar prognozējamu invaliditāti tiek sniegti no valsts puses, lai invaliditāti kompensētu. No tā var izdarīt secinājumu, ka invaliditātes seku mazināšana izraisa vairāk jautājumu kā pārējie tematiskie bloki. Šāds diskusiju apjoms par šo tematisko daļu var radīt gan pozitīvas, gan negatīvas sekas uz

cilvēku ar invaliditāti dzīvi Latvijas sabiedrībā. Pozitīvās sekas būtu tādas, ka pārmaiņu rezultātā likums paredzētu arvien lielāku atbalstu invaliditātes radīto seku mazināšanai uz cilvēku dzīvi. Negatīvas – var tikt radīta neskaidrība saistībā ar veicamajiem pasākumiem invaliditātes seku mazināšanai, kas var radīt tieši pretēju efektu – cilvēku ar invaliditāti dzīves pasliktināšanos, jo neskaidrības rezultātā var tikt iznīcināta iniciatīva no valsts iestāžu puses sniegt atbalstu un no cilvēku ar invaliditāti puses - pieprasīt un saņemt nepieciešamo atbalstu ikdienas funkciju veikšanai sabiedrībā.

*3.tabula. Latvijas Invaliditātes likuma grozījumu atbilstība noteiktiem invaliditātes teorētiskajiem modeļiem*  
**Table 3 Conformity of amendments of Disability law of Latvia with concrete theoretical models of disability**

Medicīniskais modelis	Sociālais modelis	Plaisas modelis	Minoritātes modelis
		12.pants 1:2; 4; 5; 6.	
		12.pants 1:5; 3; 5; 6; 13.	
		12. pants 1:4; 2; 2 <sup>1</sup> ; 5; 6; 7.	
6.pants 2; 3		12. pants 1:2; 1:3; 3 <sup>1</sup> ; 1:6; 2; 3; 4; 5 <sup>1</sup> ;6; 13.pants nosaukums; 1 <sup>1</sup> ; 3; 4;	
8.pants 1			
		Pārejas noteikums 5	
KOPĀ = 3 (9% no visiem LR Invaliditātes likuma grozījumiem)	KOPĀ = 0	KOPĀ = 29 (91% no visiem LR Invaliditātes likuma grozījumiem)	KOPĀ = 0

Secinot no apkopojuma 2. un 3. tabulā likuma pamattekstā dominē medicīniskais modelis, taču likuma grozījumos “plaisas” teorētiskais modelis. Tas var būt skaidrojams ar sociopolitiskā konteksta izmaiņām, ņemot vērā Konvenciju un Eiropas Savienības normatīvos aktus, kas līdz ar dalību šajās organizācijās ir mums saistoši.

### **Secinājumi** **Conclusions**

1. Latvijas Invaliditātes likuma pantu apakšpunkti visvairāk atbilst tam, ka tajos uz cilvēkiem ar invaliditāti skatās medicīniskā invaliditātes modeļa prizmā. Tas paredz, ka lielākā var valstī pār cilvēku ar invaliditāti dzīvi pieder medicīnas speciālistiem, kuri nosaka šo cilvēku invaliditātes grupu un

- pastarpināti arī to, kas šai cilvēku grupai nepieciešams funkcionēšanai Latvijas sabiedrībā.
2. Latvijas Invaliditātes likuma grozījumi visvairāk ir skāruši pantus, kuri saistīti ar prognozējamu invaliditātes risku mazināšanu un invaliditātes seku mazināšanu uz cilvēkiem ar invaliditāti iekļaujoties sabiedrībā. Grozījumi visvairāk bijuši pantos un to apakšpunktos, kuri atbilst plaisas teorētiskajam modelim. Tas ir skaidrojums ar dalību ES un tās saistošajiem normatīvajiem aktiem dalībvalstīs invaliditātes jomā un Konvenciju, kas Latvijā ir ratificēta, līdz ar to stājusies spēkā 2010. gada 31. martā, tātad arī likumos un grozījumos respektējama. Protams, šo izmaiņu esamība ir vērtējama kā laba. Tas, kas izraisa jautājumus ir tas, ka proporcionāli no visa Latvijas Invaliditātes likuma teksta panti par invaliditātes riska un seku mazināšanu aizņem tik nelielu tā daļu – 3 pantus.
  3. Latvijas Invaliditātes likumā dominē medicīniskais modelis, savukārt grozīti tiek pārsvarā tie likuma panti, kuri atbilst plaisas modelim. No tā var secināt, ka lielākās diskusijas Latvijas Invaliditātes likumā rada tieši atbalsta pasākumi cilvēkiem ar prognozējamu invaliditāti un invaliditāti.
  4. Latvijas Invaliditātes likumā cilvēku ar invaliditāti identitāte tiek ne vien konstruēta, jo tas tiek izmantots, veidojot spēju un nespēju, piemēram, ar asistenta pakalpojuma pieejamības noteikšanu no medicīniskā modeļa, bet tieši veidota. Tas tā ir, jo likums nosaka tieši konkrētu cilvēku dzīves apstākļus un paredz ierobežojumus.
  5. Šajā rakstā kā invaliditātes koncepta konstruēšanas Latvijas normatīvajos aktos piemērs tika ņemts Latvijas Invaliditātes likums un tā analīze ratificētās Konvencijas kontekstā. Turpinot šo izpēti noteikti jāanalizē citi Latvijas normatīvie akti, kuros definēta invaliditāte, lai iegūtu vēl pilnīgāku izpratni pat invaliditātes jēdzienu, līdz ar to arī izpratni par struktūru, kurās cilvēkiem ar invaliditāti jādzīvo un jāstrādā, to veidošanos, invaliditātes izpratni sabiedrībā. Jo Invaliditātes likums nav vienīgais invaliditātes koncepta konstruēšanas rīks, bet viens no svarīgākajiem, kura analīzes kontekstā būs iespējams tālāk padziļināti pētīt invaliditātes koncepta konstruēšanu Latvijas normatīvajos aktos.

### Summary

The aim of this article was to research conception of disability in Disability law of Latvia and in its amendments. Object of research was the Disability law of Latvia and its amendments. Disability law of Latvia was chosen to be research object because “as Slee and Cook (1999) are writing: on its own law can't diminish discrimination of disability. It is a paradox but law can be used to diminish or to increase abilities.” (Liasidou, 2016, 149). That's way it is important to do research on laws and regulations

because they are creating structures in which people then need to live and these structures are also as instruments to create identities of persons with disabilities.

In this article research was carried out by using approach of critical discourse analysis by analysing text and context in the light of ratification of UN Convention for the rights of persons with disabilities. To do analysis theoretical models of disability were used. 4 theoretical models of disability which were described and used were – medical, social, “gap” and minority model. After describing main characteristics of those models they were summarized in table to make analysis of each article and amendment in Disability law of Latvia more productive and faster. And so each of those articles and amendments were read and put in to perspective of main characteristics of disability theoretical models. And then table to represent all text of law was created where each article and amendment were put under the disability theoretical model which could be seen there the most. And after doing research with this method there could be made conclusion that in Disability law of Latvia persons with disabilities are still seen more from the point of view of medical model because there are more articles under the medical model and because they are defined and put in to groups according to their diagnosis and main part of the text of this law is about how to split persons with disabilities in to those groups and only 3 articles are about services of support for everyday activities. But in amendments of Disability law of Latvia persons with disabilities are seen more from the point of view of “gap” model. It can be explained by the ratification of UN Convention for the rights of persons with disabilities in 2010 and being member state of EU. Viewing persons with disabilities from the medical point of view means that conception of disability is created as if it is individual tragedy and problem of the person or patient who needs to be medically treated. It gives all control over the lives of persons with disabilities in the hands of medical experts because according to the law they are also the ones deciding in which group concrete person with disability will be. Thus medical experts are controlling what benefits or support services concrete person will get for living. And by that law and in this case medical experts can create ability or disability of concrete persons. But to make even more conclusions about disability conception in laws and regulations in Latvia more research needs to be carried out and it will be done in future.

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# COMPETENCY DEVELOPMENT IN EDUCATING HEALTH CARE SPECIALISTS AT WORK WITH OLDER PEOPLE

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**Abstract.** *Health and social care specialists who work with older people and provide systematic direct and indirect professional care and support to people older than 65 and to their families, thus ensuring various care and support services in different environments including preventive, supportive, disease management, recuperative, palliative, short-term and long-term care, need specific competences in order to understand and ensure older people's needs and care. Older people and especially frail older people can have problems that are interlinked, for instance, cognitive and functional limitations that are combined with psychosocial problems and social isolation. In order to develop students' competence at work with older people- understanding and empathy, it is necessary to research these problems during the study process by integrating study courses that would ensure emphatic and reasonable attitude and action in clinical practice in the sphere of health and social welfare when taking care of older patients. Aim - To characterize acquisition process of professional competences of future health care specialists that are to be developed purposefully and applied when working with old people. Methodology – Analysis of study course descriptions in the study programme “Nursing”. Results - RSU study programme “Nursing” contains clearly defined descriptions of professional competences.*

**Keywords:** *competences, older people, study programme.*

## Introduction

Health and social care specialists who work with older people and systematically provide direct and indirect professional care and support to people older than 65 and their families giving care and support services in various



environments including preventive, supportive, disease management, recuperative, palliative, short-term, and long-term care require specific competences in order to understand and ensure older people's needs and care. Older people, especially frail old people could have problems that are interlinked, for instance, with cognitive and functional limitations combined with psychosocial nuances of behaviour and social isolation. According to ELLAN (European Later Life Active Network) project results, it has been concluded that in Latvia youth's willingness to work with older people in health and social care is low (Coffey, Tyrrell, & Buckley, 2015)

**Aim** – to analyze and compile theoretical and empirical conclusions on how to develop professional competences of health care specialists, particularly nurses, at work with older people during the study process.

**Tasks:**

1. Research theoretical aspects of the professional competence.
2. Analyze descriptions of study courses in study programme "Nursing" to identify presence of words "competence" and "older person" that show the potential development of the professional competence at work with older people

**Research object** – possibilities of the development of study programmes applying competency based approach during the study process in order to ensure students', who are future health care specialists, professional competences at work with older people.

**Research methods:** Analysis of theoretical sources and normative documents, and analysis of descriptions of study courses in study programme "Nursing".

## Theoretical overview

Nowadays, by learning culture we understand that studies are self-organised, they are focused on a wider choice of possibilities and centered on competences, and created to develop competences – the growing need in competences demand new learning culture, they both are inseparable (Tauriņa, 2012).

The current situation creates challenges for the whole health care system, including health care education because specialists with new competences, especially in older people's health care are required. Hence, changes that would enable to acquire detailed knowledge about the ageing process and would improve society's attitude towards ageing and work with older people are necessary (Samra, Griffiths, Cox, Conroy, & Knight, 2013).

Therefore it is especially important to invest in health care and in knowledge, and technologies (life sciences, biomedicine, pharmacology) related to it, as well as, in promoting healthy lifestyle in all generations. Preparations should be made

in order to meet the increasing need in daily care for older people by developing care or "silver economy".

Currently, the main tendency in reaching higher education goals is the requirement to integrate higher education into the market structure as one of services, as part of economy, at the same time with the help of education and science to ensure sustainable development of the society, formation and maintenance of the value system in the society. A better health and social care integration means that professionals who work with older people need specific competences that are formed according to the needs of older people and that do not have strict professional borders between health care and social care services.

Throughout Europe there has appeared a need to educate students and professionals in health and social care who would have appropriate competences at work with older people.

Competences have been defined in multiple ways. Competence (*competens*) means expertise, wide knowledge in a particular sphere. Competence is readiness to act, also, subject's cognitive needs, an integrated indicator of holistic development of the personality. Types of competences (professional competence, social competence, individual development of sociocultural competence) are interlinked, they are not separable but they are characterised by emphasizing the direction.

Professional competence is the ability to carry out actions within the job functions using value priorities, building skills, ability to integrate knowledge and values to reach the goal in professional activity. Obviously, professional competence is linked with intellectual competence that involves understanding, reasoning, logical thinking, analytical skills and problem solving skills (Garleja, 2006)

The definition used by ELLAN project in European Core Competences Framework is the following: "Competences are job related descriptions of an action, behaviour or outcome that should be demonstrated in individual's performance" (Dijkman, 2016).

Competences in TRACE Project are defined as person orientated, they refer to person's basic characteristics and qualities, and lead to an effective professional performance (TRACE Project. Overview of European competences frameworks, 2005).

According to TRACE Project, competence includes:

- cognitive competence involving the use of theory and concepts, as well as, informal tacit knowledge gained experientially;
- functional competence (skills or know-how), i.e. those things that a person should be able to do when functioning in a given area of work, learning or social activity;

- personal competence involving knowing how to conduct oneself in a specific situation;
- ethical competence involving the possession of certain personal and professional values (TRACE Project, 2005).

Another important aspect of competency approach is empathy, which is a common term used in the context of professional activities of the nurse. Empathy is an integrated multidimensional complex basically formed by two factors: cognitive factor and affective factor. S. Mercer and V. Reynolds point out that the term "emphathy" differs from the term "sympathy". Clinical empathy involves emotional experience and is related to identical understanding of feelings and sympathy – emotional responsiveness, emphatic action in order to help another person, not excluding feelings of kindness towards the other person (Mercer & Reynolds, 2002).

It is difficult to measure empathy, but it is a positive emotional competence that promotes cooperation between the nurse and the patient. Empathy with the cognitive filter allows to keep an adequate distance between the patient and the nurse and promotes efficient cooperation.

Social competence is characterized by social skills. It is expressed by professional action, as well as, empathy, skill of communication, behavioral culture and ability to work in a team, skill of convincing and conflict solving, skills of knowing people. Whereas social culture or individual development competence is characterized by an interaction between the previous social culture and the new social culture, it is a developing process of knowledge, skills and attitude, in which objective (study process is formed according to the regularity of social environment and pedagogy) and subjective (studying, cooperation) conditions are included (Garleja, 2006).

Structure of the description of competences in European Core Competences Framework for Health and Social Care Professionals Working with Older People:

- Role descriptions for professionals who work in the sphere of health and social services based on 7CanMEDS
- Each role involves several competences – 18 altogether;
- Each competence has action indicators;
- Each competence has the description of the result .

Competence Framework worked out in ELLAN project is in accordance with Level 6 (Bachelor's degree) in European Qualification Framework. This level of complexity is described in terms of autonomy by

- Knowledge: Advanced knowledge of a field of work or study, involving critical understanding of theories and principles;

- Skills: Advanced skills, demonstrating mastery and innovation required to solve complex and unpredictable problems in a specialised field of work or study;
- Competence: Managing complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts; taking responsibility for managing professional development of individuals and groups. (A framework for Qualifications of the European Higher Education Area. 3.3 Descriptors of learning outcomes including competences, 2008).

The student nurse has to learn how to assess, comprehend the specific situation characterised by various physical, psychological, socioeconomic and cultural dimensions with the focus on the older person:

- Environmental factors (cold, warm, safety risks concerning falls, clean underwear);
- Assessment of patient's basic needs (food, liquid, their intake and discharge);
- Ability of physical activity (respiration, volume of muscles and skeleton);
- Capacity of mental abilities (interest in the news, literature, mass media);
- Interpersonal cooperation (relatives, neighbours, children), personal involvement in communication;
- Sensor abilities (smell, touch);
- Limited financial condition;
- Safety risks (alcohol, smoking, drugs);
- Diseases.

Professional competences can never be fully acquired, it is necessary to develop, evolve, acquire new technologies. Competences focus on actions, point at the main characteristic features of care workers that lead to effective professional performance (McMullan et al., 2003).

European Core Competences Framework describes the compulsory minimum of competences needed in productive collaboration with older people, the closest support systems at home or health and social care institutions. The competences are based on roles (7) of professionals in health and social care working with older people and according to them competences have been formulated – 18 altogether, extendedly describing prospective competence results – an overview is shown in Table 1.

The developed competences are suitable for health and social care specialists who work with older people, as well as they ensure provision of health care

service in a growing varied multi-cultural environment. Competences are valued by service receivers, community and society.

*Table 1 Overview of the link between roles and competences (Dijkman, 2016)*

No.	Role	Competence
1	Expert	a) Evaluation b) Analysis and identification of the problem c) Planning d) Interference based on professional standards e) Evaluation
2	Communicator	a) Relations and maintenance of effective communication b) Authorization c) Support and management
3	Collaboration partner	a) Inalienable collaboration and coordinated services b) Informal care and support
4	Organizer	a) Collective prevention and promotion of healthcare b) Social cards and social networks
5	Health and welfare advocate	a) Collective prevention and promotion of healthcare b) Social cards and social networks
6	Scientist	a) Specific knowledge b) Innovations in the field of care and support
7	Professional	a) Professional ethics b) Professional connections and personal understanding

Source: *European Core Competences Framework, 2016*

## Research Results

RSU 63 study courses in study programme "Nursing" contain clearly defined professional competences to be acquired. According to the aim of the study course, competences are both different and complimentary.

While analyzing the 63 study courses in study programme "Nursing" from the 1<sup>st</sup> till the 3<sup>rd</sup> year and the mentioned methodological terms there, it has been concluded that the study process helps students create knowledge and skills about the essence and ethics of a nurse, as well as, general principles of health and patient care – patient care planning, provision and evaluation, the physical and social environment's influence on a person's health condition, as well as patients' and their families' education about health care and prevention.

Research results show that in the descriptions of the themes of study courses there have not been identified skills/competences and knowledge necessary at work with older people apart from study course *Care of Older People* (2 lectures, 2 classes) and study course *Practice V* (one section – 1.5 ECTS) where students have practice in geriartry and palliative care. When analyzing study course *Care*

of Older People, it can be concluded that the number of lectures and classes is too small.

At the same time according to Y.Wells, when improving education in gerontology with analysis of specific cases, practice in social care institutions, it is possible to improve nurses' comprehension about situation assessment and promote students' understanding about the significance of the development of positive attitude towards older people (Wells, Foremam, Gething, & Petralia, 2004).

Students in the study course "*Caring Process and Nursing Theory*" acquire Nursing theory and its application in practice (D. Orema, F. Abdelah, V. Henderson, K. Roy, D. Johnson, M. Gordon, H Peplau, etc.). It has to be mentioned that H. Paplau's theory describes nurse's roles (6) only giving its descriptions, not pointing out competences that should be acquired.

In study course "*Health Care, the History of Nursing and Philosophy of Caring*" the ethic issues are discussed on a low level. It is important for students to understand that in the caring process and prevention actions, empathy, which is made up from the cognitive/reference factor and effectiveness/fellow-feeling factor, as well as, the respect for older people and their family cultures, mental and ethnic values and beliefs, plays an essential role.

## Discussion

European Later Life Active Network (ELLAN) project promotes cooperation and innovation, and exchange of best practices on European level concerning the ageing of population and education of those social and health care specialists who work with older people. During the implementation of ELLAN project, research on students' attitude towards ageing and work with older people, as well as, on innovative approaches used in gerontology studies that influence students' attitude was carried out. The result of ELLAN project is better quality of higher education concerning care and services provided to older people

In educational institutions, members of faculty are involved both in mutual cooperation process and cooperation with an individual – future health care specialist, by taking the role of an advisor. According to N.L. Gage and D.C. Berliner: the cooperation with an advisor is an interaction between a competent model and a beginner in the particular field – a connection that provides social learning. During the cooperation of the advisor and the beginner the concepts of the profession or job, viewpoints and value concepts and action manners are being discussed (Geidžs & Berliners, 1999).

The cooperation is based on many participants involved in the study process and their common goal is to encourage the development of student competences, based on the goals and tasks of the study programme. Competences not only

include practical performance but also a positive attitude towards the predictable patients, without which it is impossible to compete successfully in the labour market in the future. Interinstitutional study model in which the student is involved gives an opportunity for students to obtain more information, develop skills and use them in practice.

It is not a rare case when students' uncertainty at work with older people is rooted in the lack of skills of social cooperation with old people. Students' cooperation with older people can be:

- Helpful – help old people carry out optimal care, ensure basic needs;
- Educational – inform patients about important and interesting things;
- Developing – develop emotions, motivation to learn about unknown, join NGOs;
- Preventive – deal with issues about patients' physical, emotional security and psychosomatic diseases.

Also, P. Jonsson points out that well educated health care workers could have a larger involvement in providing relevant competences at work with old people (Bing-Jonsson, Hofoss, Kirkevold, Bjork, & Foss, 2016).

According to S. Verma, there has to be created an environment that would promote possibilities and ensure assessment of responsibilities and actions by developing competency approach at work with older people through extending the process of practical education at work with older people (minimum a two-week training in social care institutions) (Verma, Paterson, & Medves, 2006).

## Conclusions

1. Professional sphere of future health care specialists is very wide. They work with all age groups. As the percentage of older people in developed countries is rising, it is essential to pay greater attention to work with older people. It is suggested that descriptions of competences that health and social care specialists require at work with older people should be worked out and integrated in thematic descriptions of study courses.
2. It is necessary to evaluate the study courses, so that future nurses can develop competences needed at work with older people. Competences specific to work with older people could be integrated not only in study course *Care of Older People*, but also in other courses of study programme "Nursing" because there is little time and resources allocated to get future health and social care specialists interested in work with older people and create positive attitude towards this work.

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## THE EFFECT OF FITNESS EXERCISE ON ANAEROBIC POWER AND AEROBIC POWER

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**Abstract.** *There are many discussions about how to increase anaerobic power and anaerobic power capacity in cross-country skiing. Many scientists research the possibilities of increasing anaerobic power and anaerobic power capacity in this sport. The aim was to research the possibilities of increasing anaerobic power and anaerobic power capacity. A pilot study was carried out. Two BJSS "Arkādija" cross-country skiing specialization participants (15 years old girl (G) and boy (B)) participated in the study. The following methods were used in the study: test exercises (bench press, leg press, push up, pull down, pull up), WO2 max, Skierg Concept-2, Skierg Thorax and mathematical statistics. Fitness exercises used one month after that three month period of endurance exercise and last month fitness exercises again. The results: having stated the result difference before fitness exercises and after it. The participant G and B results difference in anaerobic power test was 48,7% and 37,1% and aerobic power test results was 39,8% and 32,4%. Conclusions: the obtained data from both BJSS "Arkādija" specialization participants prove that after the fitness exercise periods the results have improved. The results testify significant improvement of double pooling results on skiergs, what is showed by the difference of the mean results.*

**Keywords:** anaerobic power, fitness, skiers.

### Introduction

The fastest stride of locomotion in cross-country skiing is double-poling, which is also the most economical, it is believed that maximum oxygen consumption ( $VO_2$  max) is reduced by about 20% for arms, but athletes can only develop a very high speed only for a short duration of time. This means that the muscles of the arms, the shoulder girdle and back muscles get tired fast and are unable to produce high-intensity sustained power of push-off (Stöggl, Lindinger, & Muller, 2007; Stöggl & Muller, 2009; Holmberg, Lindinger, Stöggl,

Björklund, & Müller, 2006; Lindinger, Stöggl, Müller, & Holmberg, 2009; Camenisch, 2007). Studies have been carried out to compare the speed of movement on an even terrain and while ascending a hill, as well as were found the physiological changes due to the relief of the terrain and how it affects the speed of locomotion.

The maximum consumption of oxygen in the classic style of skiing ascending a hill increases per 5% compared to the even terrain, while in the glide step, both on the even terrain and ascending a hill, the maximum oxygen consumption is equal, although it is higher than the maximum consumption skiing in classic style on even terrain. It has been proven by many scientists (Mygind, Andersen, & Rasmussen, 1994; Holmberg et al., 2006). At the same time, Swedish scientists Berg and Forsberg believe that there is no difference in the maximum consumption of oxygen in classical style and glide step (Bergh & Forsberg, 1992). Swedish scientists carry out research on ski biomechanics and physiology in snow conditions, with rollers, and on a skiing exercise unit – “double poling ergometer”. Research is still being carried out on various strides of locomotion to obtain data on the speed of the strides of locomotion, moving at maximum speed, changes in physiological parameters, performing each stride separately, and have been found various affirmations.

The speed of locomotion is believed to depend on the speed of the cycle, under the condition that the length of the cycle is kept. In order to achieve the maximum speed in stride of locomotion, the athletes change the subtleties of the correct stride technique, the consequences being that the movements are not economical (Lindinger et al., 2009; Camenisch, 2007). Particular attention is paid to the work of the hand and leg of the swing: the shorter the time of the swing, the faster the next push-off can be performed, as the result the speed of locomotion will increase. However, to be able to cover the distance at a constant speed as long as possible, it is necessary to improve the power of the push-off, respectively, to train muscle strength.

Several authors have also drawn attention to the work of relaxation and contraction of various muscles by studying integrated neuromuscular activity of the upper body during the push-off. At present, in order to develop strength and the manifestations of its power, more and more fitness workouts are being used in the training process, and as coaches tend to consider - general physical fitness.

### **Material and methods**

Two 15-year-old twins took part in a pilot study: a male and a female. The male was 168 cm tall with a weight of 55kg, but the female was 170cm tall with a weight of 54.5kg on 20.05.2018. In its turn, during the second measurement on 20.06.2018 the male's height was 172cm, and weight was 59.2kg, but the female's

height was 171cm and weight - 57.8kg. The third measurement was performed on 15.10.2018, the male's height was 174cm and weight - 60kg, and the female's height was 172cm and weight - 58.8kg, but during the last measurement session on 11.11.2018 the male's height was 174cm and weight - 61kg, but the female's height and weight remained the same.

Both teenagers with ski sports have been engaged in sports school and outside for 4 years. In order to increase the work capacity in power expressions and in endurance, a program was developed at the beginning of summer for 3 weeks and in autumn for 1 month. In order to determine the strength indicators of both adolescents, test exercises were carried out: bench press, leg press, push up, pull-down and pull-up, as well as specialized tests for skiing on Concept-2 SkiErg: maximum aerobic power, maximum power and 100m sprint.

The test exercises were repeated several times to make sure that the result have increased. At the beginning of the summer period, a 3-week fitness workout was carried out, with a total of 9 training sessions of 90 minutes (see Table 1) and 12 training sessions of 90 minutes were held in the autumn.

*Table 1 Summer and autumn training session program*

<b>Training session</b>	<b>Training1</b>	<b>Training 2</b>	<b>Training 3</b>	<b>Test Exercises</b>
Week 22	GPF 50% of the maximum	GPF 70% of the maximum	GPF 80% of the maximum	
Week 23	GPF to exhaustion	GPF 50% of the maximum	GPF to exhaustion	Test exercises
Week 24	SPF maximal, submaximal	GPF 80% of the maximum	SPF submaximal	Test exercises
Week 42	SPF and GPF submaximal	SPF and GPF submaximal	SPF and GPF submaximal	Test exercises
Week 43	SPF and GPF submaximal	SPF and GPF submaximal	SPF and GPF submaximal	Test exercises
Week 44	SPF and GPF submaximal	SPF and GPF submaximal	SPF and GPF submaximal	Test exercises
Week 45	SPF and GPF submaximal	SPF and GPF submaximal	SPF and GPF submaximal	Test exercises

\* The legends used in the table: GFS - General Physical Fitness and SPF - Special Physical Fitness.

For each of the adolescents, an appropriate load was adjusted by calculating the dose and weight required from the maximum result. In order to determine the increase in endurance, the maximum consumption of oxygen was also determined - VO<sub>2</sub> max both before and after fitness classes.

## Results

To determine the maximum oxygen consumption of adolescents -  $VO_2\text{max}$ , it was determined by starting fitness trainings at the LSPA functional test laboratory on the Thorax SkiErg ergometer. The first time  $VO_2\text{ max}$  for the male was 64 mL/kg/min, but for the female - was 58 mL/kg/min. But the second time on the Monark bike ergometer the  $VO_2\text{ max}$  for the male was 61 mL/kg/min, but for the female - 49 mL/kg/min.

In the first test the aerobic threshold and the anaerobic threshold for the male were 148 bpm and 179 bpm, respectively, and in the second test - 139 bpm and 167 bpm, respectively. The female's results in the tests were more similar, in the first test the aerobic threshold was 141 bpm and in the second test- 139 bpm, while the anaerobic threshold in the first test was 177 bpm and in the second test - 171 bpm.

*Table 2 Dynamics of results as a result of fitness training for the male*

Date Test exercise	20.05.	04.06.	11.06.	20.06.	15.10.	02.11.	11.11.
Bench press	45	52	57.5	60	60	67,5	70
Pull - down	70	-	-	80	80	85	90
Leg press	140	150	160	160	160	180	185
Pull up	10	12	15	16	16	15	16
Push up	26	31	38	41	41	53	57
Concept2- SkiERG max	369w	-	-	458w	458w	506w	506w
Concept2- rowingERC	431w	448w	486w	537w	576w	601w	644w
Thorax SkiERG	233w	243w	252w	289w	351w	-	411w

Upon starting fitness training, youngsters performed test exercises, as well as repeated them during training sessions to determine the dynamics of the results, thus accurately calculating the load in each training session, see Tables 2 and 3. The results show that strength in the test exercises has increased more for the male.

Examining the test results in the bench press was found that the male has the increase from the first time when the weight lifted was 45 kg and the male's weight was 55 kg has lifted weight has risen to 70 kg and the male's body weight has also risen to 61 kg. For the female, the increase in the results in the bench press was from 30 kg to 42.5 kg, whereas the initial weight of the female was 54.5 kg and the last weighing it reached 58.8 kg. Therefore, both the adolescents showed increased indicator of relative strength.

Table 3 Dynamics of results as a result of fitness training for the female

Date Test exercise	20.05.	04.06.	11.06.	20.06.	15.10.	02.11.	11.11.
Bench press	30	30	30	35	35	40	42,5
Pull - down	50	-	-	55	55	60	65
Leg press	110	110	120	120	120	130	-
Push up	10	12	16	21	21	30	35
Concept2- SkiERG max	240w	-	-	298w	298w	337w	357w
Concept2- rowingERG	337w	379w	385w	392w	401w	389w	420w
Thorax SkiERG	166w	174w	185w	200w	202w	-	219w

Similar results were obtained also in other test exercises: pull-down, leg press, push up. Determining the increase of the results on Ski Ergometers, was found an increase in power on both Concept2 - SkiErg and Thorax SkiErg, as well as the increase of the results on Concept2 - SkirowingErg. For the male, the increase in results on Concept2- SkiErg is from 369W (watts) to 506W, while on Thorax SkiErg the increase of the results is from 233W to 411W. On the Concept2-rowingErg the results increased from 431W to 644W. Also, for the female was observed the increase in the results after fitness training sessions. Performing a test on Concept2- SkiErg for the first time the female's result was 240W, but during the last time it was 357W, and performing the test on Thorax, the SkiErg, was observed the increase of the results from 166W to 219W. Determining the difference in results with Concept2-rowingErg, it was found to be from 337W to 420W. The results show that fitness training sessions with the developed program for adolescents - skiers has had a positive effect on strength indicators and power expressions in skiing tests.

### Discusion and conclusion

Numerous scientists, e.g., (Berg & Forsberg, 1992) have paid their attention to the possibilities of increasing the speed of locomotion in cross-country skiing. Most studies are based on maximum oxygen consumption and other physiological characteristics during load. However, little attention has been devoted to the development of strength, although various studies have been carried out to determine the subtleties of the technique of foot and arm action on the tracks with different reliefs and the manifestations of strength. Many studies show that the speed of locomotion depends on the length of the stride cycle. The highest speed skiers show moving in double-pole stride, where the speed of locomotion is determined by the strength of the muscles of the hands and the subtleties of the technique. Therefore, muscle strength plays a particularly important role in cross-country skiing.

Based on J. Nilsson and other studies, it can be concluded that, depending on the different biomechanical structural changes in locomotion technique, the push-off with skis and poles is one of the determining factors in increasing the speed of locomotion. Regular physical exercises - physical activities are very important activities to ensure the health of children and adolescents (Krauksts, 2006). Many authors believe that relative strength increase occurs during pre-pubertal, pubertal, and post-pubertal periods.

It is considered that during preparatory period increases fitness training - or GPF training endurance per 50%, maximum strength - per 30% and flexibility with coordination even per 20%. The obtained data show that with the improvement of the fitness test exercise results, improve also the results in the tests on specialized ski ergometers.

Conclusions: Using a fitness training program with strength loads, were improved both the GPF results for both adolescents, as well as SPF indicators on various specialized ergometers, suggesting a possible improvement on skis in cross-country ski tracks.

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## OLYMPIC TEAM ROWER STROKE TECHNICAL ANALYSIS

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**Abstract.** *It is much spoken about and researched how to increase the speed of moving in rowing. Many scientists have researched the technical aspects in rowing. Most part of researches is based on oxygen maximal consumption and other physiological changes during a load. Although there are various researches, stating the technical nuances of leg and arm work, comparatively little attention is paid to the role of the arm work. The cycle length in different distances and having different water flow – before the wind, against the wind and with the side wind is stated. The aim was to research one stroke technical nuances in rowing looking for stroke rate from 24 till 34. A pilot study was carried out. One Lithuanian Olympic team rower was participated this pilot study and he was tested in different stroke rate. The following methods were used in study: test exercise, video analysis with KinezioVideoAnalyzer 3.0. and mathematical statistics. The results: having stated the result average of stroke rate was 28,6 and speed of stroke was 0,82 sec. Conclusions: the obtained data from rower show small differences changing stroke rate.*

**Keywords:** rowers, stroke technical analysis, stroke rate.

### Introduction

The origins of rowing have been around for thousands of years, although in the modern sense the beginning of the sport rowing (Halladay, 1990; Wigglesworth, 2013; Krauksts, 1997) dates back to the 18th century, thus the mechanical form of the boats and the biomechanical basic principles of rowing have changed dramatically. Biomechanics as a science has originated from biology, biochemistry and biophysics, which investigates mechanical properties

and mechanical phenomena in the course of life processes (Fung, 2013; Lanka, 1995), although Aristotle already in the 4th century BC began to perform motion descriptions and tractates. Meanwhile, human biomechanics could be an interdisciplinary study analyzing and evaluating human movements (Winter, 2009). Contrary to classical biomechanics, the dynamics of each joint motion is being studied today (Ivancevic & Ivancevic, 2008), which allows to evaluate movements more accurately. Rowing practice mentions two basic concepts: rowing technique and rowing (Fig. 1) styles (Krauksts, 1997; Kleshnev, 2006; 2007, Cornett, Bush, & Cummings, 2008). Rowing technique is a complex of executed movements in a boat, coordinating individual movements in the body parts, achieving rational use of the body energy and reaching maximum speed of movement, as well as including psychological and tactical training. Thus, athletes are filmed and viewed in different planes, setting the rower's movements in relation to boat movements (Kleshnev, 2004, 2010). Rowing style is a form of expression of the rower's movement, which includes: sitting on the bench, peculiarities of the paddle holding - grabbing, type of the movement during the stroke (Fig. 1), as well as other parameters.

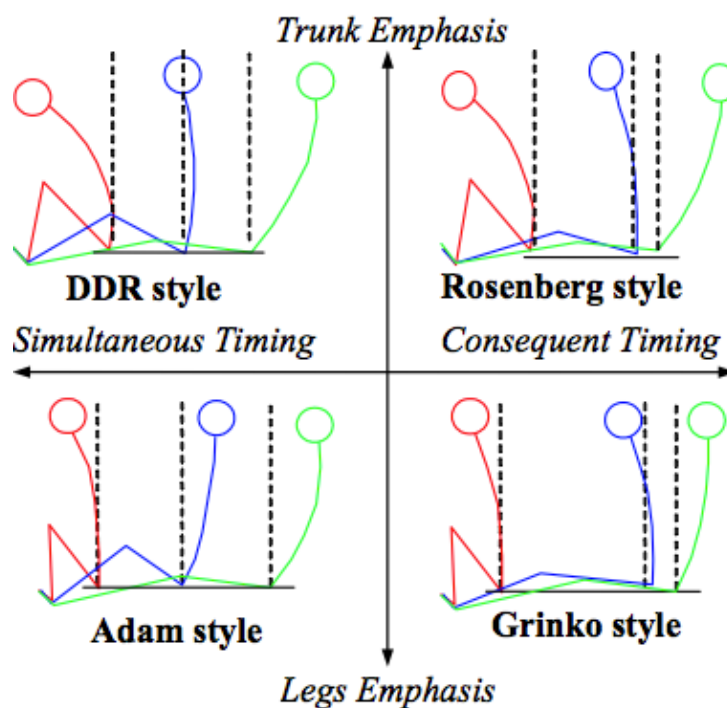


Figure 1 Rowing styles (Kleshnev, 2006)

In rowing, rowing styles are determined by the emphasis on the leg activity and the upper body function (Fig. 2), as well as the time when the movement with the legs and the upper body is started simultaneously or separately.



**DDR style** – long-lasting strong stroke with the upper body at the same time pressing with the feet on the support.

**Rosenberg style** – a very strong stroke starting with the legs and then with the upper body, at the end of the cycle, the upper body is tilted back.

**Adam style** – a strong and long beginning of the stroke with the legs and simultaneously with the upper body, which is less involved in the stroke.

**Grinko style** – invented relatively recently, with an explicit emphasis on the leg activity at the start of the stroke and a relatively small movement with the upper body (Fig. 2).

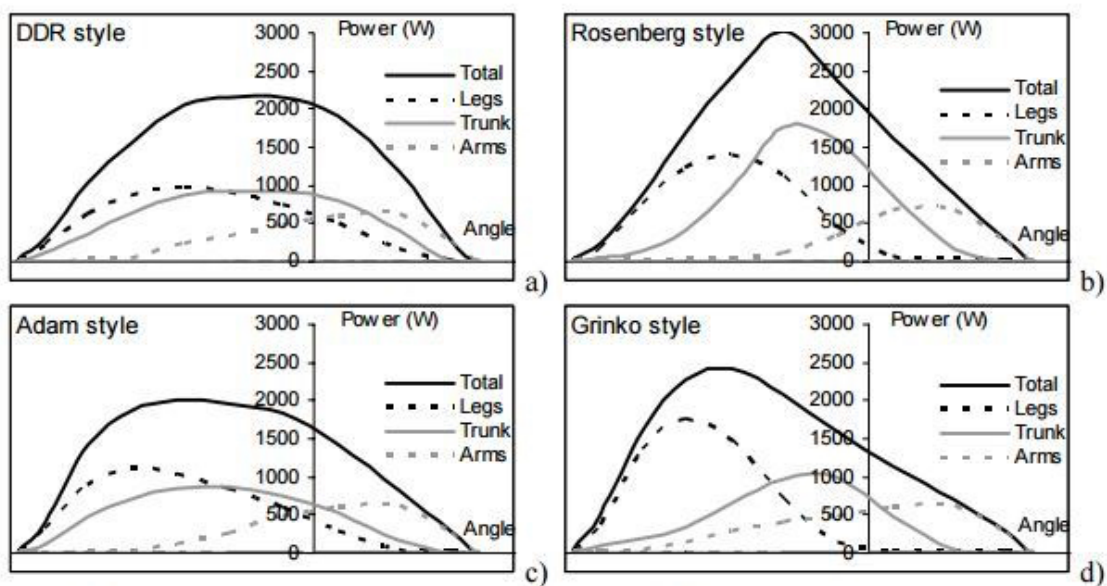


Figure 2 Graphic representation of the power of rowing styles in the stroke phase (Kleshnev, 2006)

As shown in the Figure 2, the system of the highest powers (the body, legs, and arms) during the stroke can be developed in the Rosenberg style, but the most even power in the stroke is achieved in the DDR style. In the Grinko style, which originated from the Adam and Rosenberg style, a strong action is precisely by pushing the feet on the support in the boat. Currently it is considered that these four styles include some other styles (Green, 1980; Kleshnev, 2006, 2007, 2010; Secher & Volainitis, 2007). Each athlete looks for the style or style combination that suits him/her.

## Material and methods

The experiment was held on July 2017 in the rowing centre in Trakai in Lithuania. The test exercises in the boat were executed using various stroke rate, starting from 24 up to 34.1 stroke. A Lithuania state Olympic medal holder, aged

33, height 189 cm and weight 91 kg, participated in the rowing video analysis. The video analysis was carried out applying a specialized programme exactly for water sport KinezioVideoAnalyzer 3.0. The video was taken using the video camera Panasonic with 60Hz frequency when filming a rower from the lateral position while riding a motor boat. The obtained data were mutually compared using the method of mathematical statistics – t Test.

## Results

In the experiment – test exercise 15 strokes having different intensity and their data, seen in the Table 1, were stated. Preliminary the rower’s strokes in the test exercise could be divided into two groups. The 1<sup>st</sup> group, where the stroke rate varied from 24 – 27.8 and strokes lasted from 0.82 – 0.88 seconds, shows an average result in the distance. The 2<sup>nd</sup> group, where the stroke rate varied from 30.3 – 34.1 and strokes lasted from 0.72 – 0.84 seconds, shows a high result in the distance.

*Table 1 Stroke rate and time spent in stroke*

Strokes	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Str./min.	24	24.8	25	25.6	25.9	26.5	26.8	27.3
Drive t.s	0.86	0.88	0.86	0.86	0.86	0.88	0.88	0.82
Strokes	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	
Str./min.	27.8	30.3	31.9	32.6	33.3	33.7	34.1	
Drive t.s	0.84	0.84	0.78	0.78	0.76	0.74	0.72	

The mean results show that in the 1<sup>st</sup> group the drive was executed on average 0.86 seconds at 26 strokes per min., and in the 2<sup>nd</sup> group the stroke rate was 32.7 at average stroke length 0.77 seconds. Stating the p value with the t-Test we conclude that p=0.001 when comparing the stroke length in the 1<sup>st</sup> and 2<sup>nd</sup> group, but, stating the differences of the stroke number in a minute, p=0.000. The results of both data show significant differences at p<0.05.

Taking a look at Figure 3, which shows 24 stroke rate rowing, the drive phase and recovery phase can be stated. A rower makes the movement speed curve against the boat, which in stroke is explicitly higher for the hands and trunk, but the leg movement speed is the lowest. Similar tendency can be observed also in other stroke cycles, at different stroke rates.

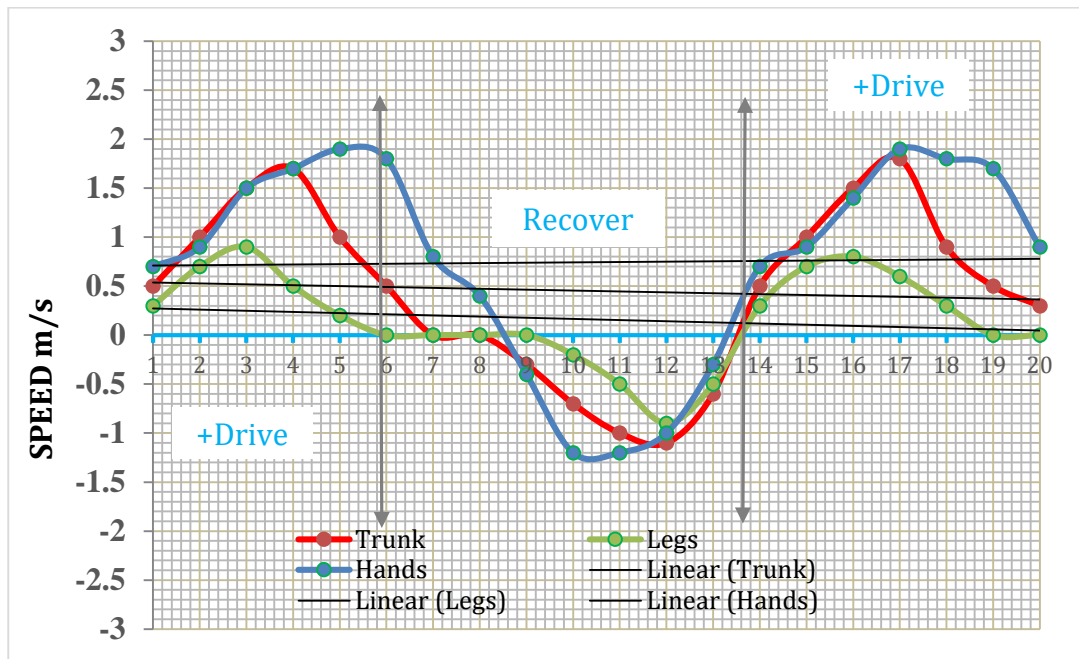


Figure 3 Movement speed of the trunk, legs and hands in one stroke cycle

Stating the result differences between the drive and recovery, it was stated (Table 2) that the movement speed in a stroke for the hands, trunk and legs is positive in connection with the boat which reached: for hands 2.7m/s at 34.1 stroke rate. The highest movement speed of the trunk is 1.9m/s at 31.9 and 34.1 stroke rate, but the fastest of the legs is 0.9m/s, at 34.1 stroke rate, although the leg movement speed is observed similar at all stroke rates.

Table 2 Movement speed in the stroke cycle of the back, arms and legs

Speed	Blade in the water	Knee 90°	Trunk 90°	Blade 90°	Legs straight	Trunk end	Blade in the air	Blade turned	Blade 45°	Blade 90°	Knee 90°	Hands over Stretcher	Blade touches the water	Blade in the water
Hands (m/s)	0	0,9	1,5	1,7	1,9	1,8	0,8	0,4	-0,4	-1,2	-1,2	-1	-0,3	0,7
Trunk (m/s)	0	1,5	1,5	1,7	1	0,5	0	0	-0,3	-0,7	-1	-1,1	-0,6	0,5
Legs (m/s)	0	0,9	0,9	0,5	0,2	0	0	0	0	-0,2	-0,5	-0,9	-0,5	0,3

## **Discussion**

In rowing movements have been studied already from the end of the 19<sup>th</sup> century, although the research has been approximate. In the 20<sup>th</sup> century the biomechanical analysis in rowing developed very rapidly, and it is continuing to develop also in the 21<sup>st</sup> century (Halladay, 1990). In rowing movement structure classically is divided into four phases, although today already five phases are given (Panjkota, Šupuk, & Zanchi, 2006) and even nine micro-phases (Kleshnev, 2007). The classical movement structure in rowing includes four phases which last on average 1.7s, which corresponds to 36 strokes per minute:

Phase 1 – catch

Phase 2 – beginning of stroke

Phase 3 – end of stroke, relaxation

Phase 4 – rest, recovery (Krauksts, 1994; Cornett, Bush, & Cummings, 2008).

In the phase 1 the oar is put in the water, it is followed by the phase 2 – stroke. Stroke is the main phase of the cycle where the movement speed of the boat depends on the stroke power. According to the dominating muscle groups, the stroke phase can be relatively divided into three parts (the leg movement, the back movement and the hand movement). At correct oar pull in the water the boat moves continuously and straight along the water (Mazzone, 1988; Krauksts, 1997; Kleshnev, 2004, 2010; Découfour & Pudlo, 2007), as well as the relative strength or potential power of every part of the body is stated by coordinating the movements of the parts of the body. To provide continuous movement stroke should be executed along the horizontal axis of the boat, and movements in the boat are regular and synchronised. Taking a look at the data obtained in strokes, we can precisely state that the movement speed of the boat directly depends on synchronous action of rower's parts of the body. The legs start the movement in rowing, then the trunk – the back, and the stroke is finished by the hands. If some of these stages is missing, rower will move more slowly, it is sometimes proved by the rowers – beginners, often executing the stroke brokenly or trying to do it only with the hands and legs. Rower, finishing the stroke, takes the oars out of the water. This is a very important movement for the boat not to be hindered, if oars are taken out of the water too late, or vice versa, when oars are taken out of the water too fast and the applied power in the stroke will not be fully realised. In recovery rower relaxes, thus he moves backward along the boat and prepares for the next stroke, testified also by the negative speed curve in Figure 3.

## Conclusions

The results show that by choosing a bigger stroke rate, the leg, hand and trunk movement speed increases during the stroke. At the same time also the negative movement speed of the legs, hands and trunk increases during the recovery. The mathematical statistics of the results testify that emphasizing the stroke rate and the time spent in stroke at average stroke rate and high stroke rate significant result differences can be observed.

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## INFLUENCE OF LOCAL VIBROSTIMULATION ON FOCUS PERSISTENCE

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**Abstract.** Nowadays computers, data input and processing is vital part of many companies, and this job is carried out mostly by humans. Employees have to focus all the day for not to allow errors. In many companies there can be a several breaks for rest. Local vibrostimulation is a vibration method, which can offer stimulating, tonic effect on central nervous system, therefore increasing human physical abilities. Aim of research: Comparison of 30-45 year old, physically active and inactive women under the influence of local vibrostimulation. Participants carried out digital focus test for one week long, during a second week they executed this test again after a local vibrostimulation session. After processing average results we observed significant increasement (0.956 before vibrostimulation and 1.381sec after vibrostimulation) in focus persistence test, which makes us believe that local vibrostimulation of upper back muscles can lead to focus increasement of office workers.

**Keywords:** focus persistence, local vibrostimulation.

### Introduction

Working with computers increases the responsibility of each individual for their work. Constant information overloading and mental strain creates chronic psychological overload, which can be observed as emotional exhaustion, cynicism, lack of professional self-indulgence. Psychological strain not only causes central nervous system response in the form of fatigue, but also increases muscle tension, thus increasing muscle fatigue, feeling discomfort and pain (Roja, Roja, Kalķis, Kalķis, & Laganovska-Dīriņa, 2007). These factors may reduce the reaction and persistence of the focus that can negatively affect the employee's professional duties.

Both physical and mental fatigue significantly prolong the response time on certain stimuli. The amount of focus is quantitatively is characterized with the speed at which the subject chooses one from many stimuli, but qualitatively with the accuracy with which these stimuli were selected. The efficiency indicator is a

complex that is made up both of quantitative and qualitative indicators (Крылов & Маничев, 2000).

Local vibrostimulation can be applied for the development of physical abilities of human (Issurin, 2005). Local vibrostimulation means that a particular place is stimulated, the subject is usually at a resting position at that time. Local vibration stimulation can be divided, depending into the site of application: on the muscle itself, on the tendon of the muscles, on the ligament, on the attachment location of tendon/ligament to the bone. Local vibrostimulation equipment is characterized by easily variable vibrostimulation parameters and piston motion planes, nozzles. There are a number of machines that implement vibration in one or two planes (Issurin, 2005).

Research shows that muscular automatic, passive contraction involves a higher number of muscle fibers than the conscious, potentially strongest muscle contraction, however, if the stimulation intensity is too high, muscle fatigue may occur, the muscle can be overstrained (Delecluse, Roelants, Diels, Koninck, & Verschueren, 2005; Cormie, Deane, Triplett, & McBride, 2006), this fact has been proven by measuring the electromyographic activity of muscles (Delecluse, Roelants, & Verschueren, 2003).

These studies also suggest that, based on measured twice as high electric activity in the muscles during vibration, processes in the central nervous system (CNS) are stimulated, resulting in a greater CNS training effect than all the training methods known to date. In this research we wanted to assess this CNS stimulating effect of local vibrostimulation on reaction and focus persistence. Aim of research: Comparison of 30-45 year old, physically active and inactive women under the influence of local vibrostimulation.

### **Literature review**

Vibration is characterized by a number of parameters, which, when varied, also changes the vibration effect, thereby acting differently on the structure of the various substances of human body, simply swinging, resonating, or even breaking them. Tissue resonance can be achieved if the frequency of oscillation of the tissue itself coincides with the frequency of the oscillation applied to them externally.

Carmelo Bosco and Marko Cardinale point out that vibration is a mechanical stimulus characterized by oscillatory movements, and biomechanical parameters that determine the intensity of vibrostimulation are amplitude (mm), frequency (Hz), and vibrostimulation strength (light, medium, strong) (Cardinale & Bosco, 2003), as well as the direction of vibration - forward, backward, sideways. Some authors, analyzing their studies, consider that vibration amplitude is the most important factor in achieving maximum vibration effect (Marín & Rhea, 2010; Rittweger, 2010). Vibration devices are characterized by acceleration measured

in meters per second in squares or gravitations - g ( $1g = 9.8m/s^2$ ). Some other scientists in their studies consider exactly acceleration as an important factor in ensuring vibration effect (Issurin & Tenenbaum, 1999). Vibrostimulation with acceleration, acting on a muscle group or a separate muscle, causes it to change its length. These changes in muscle length are transmitted to the central nervous system (CNS), which processes the signal and sends it back to the vibrated muscle or muscle group (Abercromby et al., 2007).

There are two separate vibration trends used in rehabilitation and sports training. In one case, the vibration is carried out directly on a particular muscle group, muscle tendon, ligament. In the second case it is the whole body vibration.

The methodology of applying the vibration training can be various and depends not only on the vibration parameters, but also on the application plan when the vibration is used – before training as a warm up, during a training or separately as individual procedure when only local vibrostimulation or whole body vibrations is applied. Vibrostimulation can be used as a warm up instrument, in which case vibration is used just before the basic training with increased vibration parameters. If vibration is used as an instrument for the direct development of physical abilities, then vibration can be used during the basic training (development of strength, power and flexibility) (Issurin, 2005).

### **Methodology**

In our study we used local vibrostimulation, directly acting on the muscles of upper back, with an accent on the middle part of the erector spinae group, as the central part of the sympathetic nervous system is the lateral side of the spinal cord and the partially lumbar gray matter. The local vibrostimulation was performed on erector spinae muscle group from the seventh vertebra of the neck down to the third lumbar vertebrae, including an muscles supraspinatus, rhomboideus minor et major, partially latissimus dorsi.

The experiment uses a dosed frequency of 70Hz and an amplitude of 2mm. One of the basic conditions for frequency selection is the vibrating surface as well as the amount of muscle mass, so the frequency can vary greatly. Frequency can also be selected based on the muscle sensations of the participants in the experiment, which in this case will indicate the effect of vibration on the nervous system. In this case, the frequency was chosen according to the subjective sensations of the participants, so that the vibration would not cause unpleasant sensations, but in the same time vibration must not be too weak, then stimulating effect cannot be achieved. The local vibration stimulation frequency of 70Hz is considered to be the medium strength frequency that was accepted by the experiment participants. The condition of experiment was that each subject has a different muscle mass and therefore muscle tones is slightly different, that



requires frequency and amplitude variation to induce resonant oscillations. Therefore, in order not to complicate the course of the experiment, and for each participant not to change the frequency and amplitude of vibration, the participating women were selected by a similar body configuration. Amplitude 2mm was the maximum that could be installed on the equipment used in the experiment. We used this range to achieve a tonic effect on large muscles. The study used local vibrostimulation equipment RE21.

During the local vibrostimulation, there is only one independent variable - the downforce of the vibrostimulator. To partially eliminate the variability of this parameter, the vibrostimulation was performed by one person during the whole experiment, who was instructed to try not to change the downforce of the vibrator during the experiments.

The experiment was carried out in year of 2016, in Bauska city, Latvia. As a research base we used 10 female office workers, 30 – 45 years old.

### **Research results**

In order to determine the focus persistence of physically active women during the working day, the participants of the experiment performed a digital attention, reaction speed test with a graphical interface used as a control exercise. The first phase of the experiment lasted one week from Monday to Friday. In this week, the participants of the experiment performed only a digital test of focus persistence. For each participant, the test result was calculated as the arithmetic mean of the three test runs performed. The test results showed focus level during the working day. Summarizing the average results of all respondents per day, the daily indicators for the persistence test were obtained, after which the mean of the persistence test for all five working days, showing the persistence of focus throughout the week (see Table 1).

*Table 1 Average results of focus persistence in each day, seconds*

<b>Day of week</b>	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>	<b>Total average</b>
<b>Average results</b>	1,018	0,918	0,924	1,083	0,836	0,956

*n=10*

For a good result in a test is considered 2 seconds, very good is considered 3 seconds and excellent - over 4 seconds. The arithmetic mean of the first week of experiment indicates that focus persistence rate is low, as the arithmetic mean does not exceed one second.

As the second stage of the experiment is an application of local vibrostimulation before the digital focus persistence test. The period in this stage of experiment was the same as in first stage – working days from Monday to Friday. At this stage of the study we added the local vibration with toning effect (to receive increasement of muscle tone and hoping to stimulate sympathetic nervous system), setting the maximum amplitude of the vibrostimulator (2mm) using the U-shaped nozzle and individually adjusting the frequency close to the pain threshold (70Hz in our case). Equal vibration stimulation amplitude and frequency 70Hz were applied to all participants. Local vibration stimulation for the upper back was performed before the focus persistence test. We applied a local vibrostimulation procedure for 4-5 minutes, immediately followed by a digital focus test. The result of the focus test was obtained by calculating the mean arithmetic from 3 test results. Participants completed focus test three times in a row, recording each test result (Table 2).

Summarizing the total test results of all participants, the arithmetic mean values for the overall persistence for the week were obtained.

*Table 2 Average results of focus persistence in each day after application of local vibrostimulation, seconds*

Day of week	Monday	Tuesday	Wednesday	Thursday	Friday	Total average
Average results	1,496	1,220	1,088	1,345	1,756	1,381

*n=10*

Comparing average arithmetic test results without local vibration stimulation with test results using local vibrostimulation results in the following – before vibrostimulation average result was 0,956sec, after local vibrostimulation – 1,381sec, so we observed an increasement in focus persistence time in digital test. For statistical analysis we used variation (15%), significance level with alpha one-tail test, the increasement in persistence may be considered as significant ( $\alpha < 0.05$ ).

### Conclusions

The results of the study shows that local vibration stimulation could increase the productivity and save the time that would be spent in correcting inaccuracies. Local vibration stimulation can be used as an active break instead of a simple break, thus providing stimulation of the sympathetic nervous system throughout the working day, not just on the first part of a day. As the results of the first week's

focus test show, end-of-week focus persistence drops sharply, increasing the incidence of various errors in the work. It may take extra time for employees to correct errors and additional costs for the employer if mistakes are made and they need to be corrected. There are previous researches, where local vibrostimulation was applied to achieve tonic effect on muscles, thus increasing anaerobic power for rowers (Ciekurs, Krauksts, Krauksta, Smila, & Kaupuzs, 2017), so we used same effect on nervous centers of sympathetic nervous system centers in spinal cord for tonic effect, increasing focus persistence. Average arithmetic test results without application of vibrostimulation and with application vibrostimulation indicate that local vibrostimulation can influence the sympathetic part of the vegetative nervous system, resulting in increased focus during the working week.

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# IMPACT OF LOCAL VIBROSTIMULATION ON PARAMETERS OF LEG MUSCLES STRENGTH ENDURANCE

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**Abstract.** *Vibration as a tool for massage and rehabilitation has been known for a long time. However, the vibration as a tool in sport workout is used very recently and is being used to increase strength, power, flexibility and coordination. It should also be noted that proper dosing of whole-body vibration plays a very important role in lymph drainage and in the treatment of overloaded joints. Improving and retaining physical fitness as well as repeating sets of exercises on one muscle group to spend as much energy resources in this muscle is important in fitness, in order to increase muscle mass and conditioning. Tonic effect of local vibrostimulation can warm up single muscle or muscle group, but also it can lead to excessive fatigue. So the aim of research is assessment of the effects of local vibrostimulation on the strength endurance for women in seated knee extension motion. Literature was analysed and an experiment was used to find out how strength endurance parameters change for 18-23 year old women after local vibration stimulation. A study was conducted with 20 women aged 18 to 23 years. For these women, control of single leg strength endurance was performed by seated leg extension movement, followed by local vibrostimulation of the quadriceps femoris muscle. This procedure was followed by a repeated strength endurance control. In this study, we found that the strength endurance parameters of the stimulated leg increased by an average of 5 repetitions during 30 seconds of control motion. We conclude that dosed local vibrostimulation sessions can increase strength endurance parameters locally for one muscle group.*

**Keywords:** *leg muscles, local vibrostimulation, seated knee extension.*

## Introduction

Vibration can pass its positive effect on the body mainly through the neuromuscular system. As a result of vibration, the human muscles work the same way as during physical exercise, but this process does not produce lactate, which in turn does not accumulate in the blood and the level of work capacity does not decrease. Thanks to vibration, muscle relaxation can be achieved, the person gets rid of stress, reduces the feeling of pain, and reduces body weight as the excess body fat (Krauksts, 2012). One of the first scientists to disseminate the idea of using vibration in sports was Vladimir Nazarov. He practiced both the whole body

vibration and the vibration of some parts of the body, namely local vibrostimulation. The scientist himself called this method biomechanical stimulation (Назаров, 1987). This idea was further developed in Belarus, the University of Physical Culture and led by professor Mikheev, who used Nazarova's vibrostimulation equipment to stimulate biological activity. Exercises and methods for various sports with the usage of the Nazarov's system were created (Михеев, 2007). Using this equipment, a vibratory workout was developed that included a vibration training plan for various muscle groups and was used by many athletes and sports representatives. Improvement of acute muscular work capacity through whole-body vibration has been demonstrated by many authors (Cardinale & Wakeling, 2005; Issurin, 1999; Rittweger, 2010).

With the application of prolonged vibration, there is possibility to get a vibration disease. It is stated, that prolonged vibration with a frequency less than 1000Hz can negatively affect bone structure, ligaments and joints. A vibration with frequency from 2000Hz to 10000Hz can lead to disorders in blood vessels in extremities, but higher frequencies can affect nervous system (Jankovskis, Beldava, Čūrišķis, & Strēlis, 2005). It is possible to avoid these negative effects, if vibrostimulation is applied locally (Abercromby, Amonette, Layne, McFarlin, Hinman, & Paloski (2007).

### **Application of local vibrostimulation**

During the experiment, the author used local vibrostimulation, so it is necessary to look over a methods of vibration application. The first method is the previous mentioned local vibrostimulation or method of direct application of local vibrostimulation, when the vibrotode can be applied straight to a muscle or its tendon. During this method it is possible to vibrate only a separate muscle, not a whole body. Usually in this method can be applied relatively high frequency of 100-150 Hz with a low amplitude no 1-2mm. When this method is applied, there can be observed an increasement of muscle tone, so it is called the tonic effect of local vibrostimulation. Other method includes indirect application of vibration, when the vibrations can be passed to a target location through other parts of the body. This method is called a whole body vibration, most of applications includes a subject standing on a vibration platform, or a subject can perform exercises on vibration platform. For example, when training a thigh quadriceps muscle while standing on a vibration platform, where vibration is made in a vertical direction, subject can perform various exercises, such as a squat, lunges and others. Vibration from the platform is guided through the lower leg to the four-headed muscles and other parts of the body (Krauksts, 2012). In this method usually low frequency oscillations are used, 25-45 Hz, but an amplitude can be 2-10 mm (Cardinale & Bosco, 2003). A side effect of this method is that other parts of a

body also receive vibrations, excessive or prolonged vibrations can lead to vibration sickness.

It is noted that the impact of vibration on work capacity is best seen by elite athletes, but it also depends on the individual's gender, age, psychological and, of course, physical fitness level (Cardinale & Bosco, 2003). Each individual has its own optimal vibration frequency depending on the set of goals and vibrating position. Therefore, during our experiment, subjects were able to individually adjust the frequency of local vibrostimulation according to their muscle senses to obtain a relaxing effect. This was necessary to temporarily improve the outcome of the next control set.

### **Methodology**

At the beginning of the practical part of the work, an empirical method was used - an experiment using a method of control tests for women aged 18-23. The results of the study were compiled with a set of mathematical statistic methods: arithmetic mean, standard error, standard deviation and t-test.

During the experiment, local vibrostimulation was applied between the sets of control tests, during recovery period. Vibration was done on the femoral muscle of the lower extremity.

Initially, the participants of the experiment were interviewed for a short anamnesis vitae to find out about their health, and the history of injuries. If a subject previously had knee joint injuries, then she was excluded from an experiment as well as if the subject previously had health problems or trauma in the knee joint. Participants were questioned about age, fitness experience, weekly workouts and personal weight, as well as subjects were introduced with a local vibrostimulation and what effect it can provide, most of the subjects in the experiment had never heard of it. Based on the information obtained, 10% of the personal body weight was determined, this transformed to a resistance in kilograms on training machine, that was used to perform contraction – seated knee extension. Prior to executing the experiment, all its participants completed a unified warm-up procedure to ensure an identical level of conditions for all of participants, as well as to reduce the risk of injury during the experiment.

In total, three sets were done, each lasting for 30 seconds. Before the 2nd and 3rd set a vibrostimulation was performed in a recovery time with a low frequency of up to 50Hz to achieve a relaxing effect. Each subject was able to apply and adjust the frequency individually to achieve a relaxing, pleasant effect. Test subjects was explained before about feelings of relaxing effect of vibrostimulation. During the stimulation, as well as at the end of the experiment, the participants were questioned about the vibration senses in affected leg muscles. Most of participants admitted that for the first time feeling of local

vibration was not pleasant, but during the experiment the subjects concluded that the stimulated leg feels much relaxed, less tense. The test is carried out in a knee extension training machine, the motion was leg extension in knee joint. Training machine applies resistance with pneumatic principle, such excluding an inertia. During the exercise, the foreleg and the thighs muscles are included to execute an motion – a quadriceps femoris muscle group with vastus medialis, vastus lateralis, vastus intermedius and rectus femoris. For exercising this machine, the starting position is sitting on the machine, with the palms gripping the handles of the trainer to hold the body steady, the legs bent in the knees and the ankles remain under the fixating rollers. Procedure: 1. subject inhales and lifts the legs to a horizontal position; 2. subject exhale and lower legs to the starting position.

In the experiment, local vibrostimulation was implemented with the stimulating machine RE21 (vibrotode). Local vibration stimulation kit RE21 has different stimulation nozzles and each has its own effect and mode of action to different parts of the body. For example, a U-shaped nozzle has two heads that are parallel to each other at a distance of 3 cm, with a small surface area, giving a deeper impact on the vibrating surface. This nozzle provides a deep resonance effect that is amplified by both parallel-positioned heads and is used for high muscle mass vibration sessions by pushing the nozzle according the lymphatic flow. When performing a vibration session, the vibrotode is pressed by a force that did not cause discomfort to the athletes, and the pressure force was be given to the specialist who carries out the local vibrostimulation, taking into account the muscle mass to which stimulation is exposed. For example, the thigh quadriceps muscle will require more pressure on the vibrotode than the lower leg triceps surae muscle group. During the experiment, the author used local vibrostimulation with a narrow T-shaped nozzle of the vibrotode RE21. With this type of nozzle it was possible to achieve vibration effect deep over a larger area of the surface, the nozzle is also widely used for vertebra vibration stimulation, also on Achilles tendon, knee joint anterior cruciate ligament etc.

It should be taken into account that when acting on the joint, the frequency and amplitude, as well as the pressure force, must be correctly selected to avoid local damage. During the experiment, the author applied local vibrostimulation to a quadriceps femoris muscle with selected the nozzle, and the vibration complex RE21 was placed next to the subject and the subjects were allowed to adjust vibration frequency independently by themselves at a beginning of vibrostimulation sessions. The local vibration stimulation complex RE21 consists of a power supply unit with a potentiometer for frequency control, an on/off switch and a vibrotode. A separate switch regulates the rotation of the vibrotode engine, but it was not regulated in the author's experiment and was constant. The power supply unit also has a potentiometer that signals overload in the electrical circuit, the power supply unit is easy to handle behind the handle and weighs about

2.5 kg. During the experiment, the vibrotode was moved slowly in a straight line from the distal part of muscle to the proximal over a quadriceps femoris muscle surface, evenly pressed against the skin. The downforce with which the vibrotode was pressed on the surface was optimal without causing the subject a discomfort, as well as throughout the experiment it remained unchanged. Initially, the frequency was chosen to provide a relaxing feeling and not to cause excessive shock to the muscle.

### **Research results**

Subjects on a pneumatic machine carried out a test exercise with a resistance of 10% of their body weight, for example, if the female body weight is 70 kg, the resistance will be 7 kg. The test set lasts for 30 seconds, during which the subject tries to as many repetitions as possible. The subject makes the first set without the effect of stimulation. In total, three sets of test exercise was done, with a stimulation after 1<sup>st</sup> and 2<sup>nd</sup> set of test exercise.

After test the subject answers the questions asked by the author and describes the feelings created by the vibration. At the beginning of the experiment, the local vibrostimulation was implemented at a frequency of 50 Hz and an amplitude of 1.5 mm, the vibration complex was positioned adjacent to the subject, so that each subject could individually adjust the frequency. When using vibrostimulation for the first time, subjects felt an itchy and a stinging sensation; however, with stimulation after the second set, the senses were no longer as intense as subjects were trended to raise the frequency, as comparing the first and second application of vibrostimulation frequency, an average increase of five hertz was observed.

The first set of knee extension was done without vibrostimulation and the average result was  $20 \pm 1$  repetitions. The second set, which was performed immediately after local vibrostimulation, showed an average increasement of 3 repetitions with a result of  $23 \pm 2$  repetitions. The data is statistically reliable and proves the effectiveness of local vibrostimulation after the second set. On the third set, an average increasement of 5 repetitions with a result of  $25 \pm 2$  was observed compared to the first one. The experimental t-test empirical value is 7,667 but the t-theoretical value is 2,262, the data is statistically reliable with significant increasement, data variation was 9%, and due to local vibrostimulation, the median result was improved on the stimulated leg.

### **Conclusions**

Other researches shows, that in a voluntary contraction of a muscle more motion units can be involved than in a human controlled contraction via the somatic nervous system (Issurin & Tenenbaum, 1999), vibration training can



increase result in strength and speed expressions (Delecluse, Roelants, Diels, Koninckx, & Verschueren, 2005), so the vibration effect can be used to increase muscle strength.

The local vibrostimulation of the quadriceps femoris muscle showed an average increasement in both the second and third post-stimulation set. Result of stimulated leg was  $25\pm 2$  times. Local vibration stimulation has a positive effect on the increasement of strength endurance. When comparing the first set ( $20\pm 1$  repetitions) with the third set ( $25\pm 2$  repetitions), the data show a mean increasement of results by 5 repetitions. The descriptive statistics data is statistically reliable and proves the effectiveness of local vibration on the stimulated leg, the empirical value of the t-test exceeds t-theoretical value. We can conclude that the application of local vibrostimulation with a subjects own chosen frequency can increase muscle strength endurance in local unilateral exercises even in several successive exercise sets.

This effect can be used in additional warm up (if it is necessary for an athlete), at the same time increasing athletes physical abilities. Then physician can rely on vibration caused soft tissue oscillations from vibrotode to solid surface (usually bone), creating a resonance, therefore more soft tissue can be affected (Михеев, 2007), but also this research shows, that each part of our body can have their own resonating frequency, even each subject can have their own resonating frequency for their muscles (according to strength and anthropometrical parameters of muscle). Therefore we used subject self-controlled frequency adjustment.

Also, local vibration can be used in rehabilitation, if subject is unable to contract his muscles for some reason, but a muscle tissue motion is required for rehabilitation process in joints (Захарченко, 2011).

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# ESSENTIAL CHARACTERISTICS OF THE FITNESS CONCEPT AND THE AREA OF FITNESS IN LATVIA AND THE WORLD

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**Abstract.** *Despite the great popularity of fitness around the world, it is still unclear what fitness is and how people understand it. The essence of fitness has gradually evolved from simple physical fitness to a cultural phenomenon. The second path of fitness development is from the physical health of a person reflected in a person's readiness to do physical work to the desire to improve their own quality of life. That is why the aim of this study was to investigate in depth the essential characteristics of the fitness concept and the area of fitness. The study is based on 41 literature sources and scientific articles, 8 of which are in Russian and 33 – in English. The essence of the content of the fitness concept has been investigated and the hierarchy of concepts has been evaluated in different theoretical contexts, starting from the historical beginning of the fitness concept. Definitions were grouped in a broader and a narrower sense: 1) fitness as a set of attributes and abilities and 2) fitness as a way of life, lifestyle and quality of life. The essential categories of the fitness concept were compiled. The change of fitness area and its influence on the society was discussed. By summarizing the analysis of fitness definitions and evaluating fitness according to various theoretical aspects, it can be concluded that fitness is interpreted as sport competition fitness, as an implementation of a healthy way of life and as physical fitness or health-oriented physical fitness. Due to constant change and improvement of the body ideal sometimes it is complicated to participate in the process of improving health, also achieving it requires a lot of energy and time. People don't understand where is the difference between healthy body and fitness body prepared for competition or commercial. Therefore the greater the beauty industry and fitness area becomes, the weaker becomes the human.*

**Keywords:** *fitness, lifestyle, physical condition, quality of life, way of life.*

## Introduction

Fitness area becomes more and more popular all over the world. The essence of fitness has gradually evolved from simple physical fitness to a cultural phenomenon. The second path of fitness development is from the

physical health of a person reflected in a person's readiness to do physical work to the desire to improve their own quality of life.

Despite the great popularity of fitness around the world, it is still unclear as to what fitness is and how people understand it. Everyone understands fitness but nobody can precisely define it (Stearns, 1970). As found in a survey (Maguire, 2008), the question about what people mean when they say „I am fit” or „She is not fit” very rarely leads to a specific answer because everyone defines fitness within the limits of their competence.

That is why the aim of this study was to investigate in depth the essential characteristics of the fitness concept and the area of fitness.

The study is based on 41 literature sources and scientific articles, 8 of which are in Russian and 33 – in English. The essence of the content of the fitness concept has been investigated and the hierarchy of concepts has been evaluated in different theoretical contexts, starting from the historical beginning of the fitness concept. Definitions were grouped in a broader and a narrower sense: 1) fitness as a set of attributes and abilities and 2) fitness as a way of life, lifestyle and quality of life. The essential categories of the fitness concept were compiled.

### Review of literature and discussion

The American term *fitness*, which dates back to the 20<sup>th</sup> century and has become popular today, is widely used in such fields as management, sociology, sport, medicine, biology, and it includes physical activity, recreation, rehabilitation, education (Сайкина, 2008) (see fig.1). However, the understanding of its essence varies.

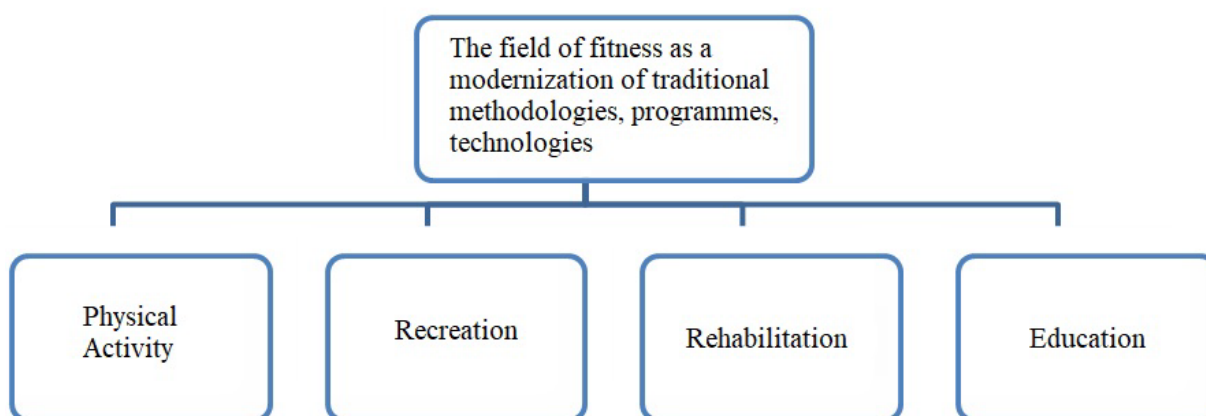


Figure 1 *Components of the Fitness Field* (source: Сайкина, 2008)

This can be explained by the fact that the phenomena described by the word *fitness* are different. In American society, fitness is viewed and understood in a much broader sense than in Latvia or other European countries. In Latvia, the word *fitness* does not have one definition, it is understood as physical fitness and ability to perform a particular activity, as a person's desire to be healthy and improve their quality of life or competitive sport.

Nowadays, the term *fitness* is often used to mark such categories as competitive sport fitness, health fitness to improve many aspects of quality of life, as well as to describe body shape and size, or more specifically – appearance (Maguire, 2008) and physical fitness. Fitness is omnipresent in North American culture – in sport, health, fashion, etc. (Petersen, 2007). Commercialization of athletes has increased (Heywood & Dworkin, 2003), and a moral panic has developed about the epidemic of obesity (Duncan, 2008), which also contributes to the public interest in fitness. On the other side exercise addiction and 'fitspiration' because of media influence on the public is a big problem in the area of fitness (Hill et al., 2015). There is no understanding and balance between what does it mean to be physically active for health and to be addicted to healthy lifestyle because of aggressive promotion of fitness for commercial purposes. People don't understand where is the difference between healthy body and fitness body prepared for competition or commercial (Slater et al., 2017; Boepple et al., 2016; Hill et al., 2015). The field of fitness and health is turning into a billion dollar industry which offers a huge range of services and products and it is not so easy to choose the right for each of person (Blood, 2005; Bordo, 1993; McIrvin Abu-Laban & McDaniel, 1995; Shilling, 2003; Maguire, 2008).

Fitness as a competition sport is not meant for everyone, as any other sport it requires acquisition of specific abilities and skills and observance of the lifestyle. It includes discipline, a specific daily regime, a strict diet and workout plan according to periodization, regular check-ups with a sports doctor, etc. Nowadays, most people perceive this sport as simple and suitable for everyone. Due to unqualified specialists in the field of fitness, many people who are not ready for this sport are prepared for it in a very short time, thus damaging their functional, psychological and physical condition. That is why it is very important to understand that fitness as a sport and fitness as a healthy way of life differ in terms of the goal, tasks and process.

The essence and goal of competition sport fitness is to participate in competitions, step on a stage, form the correct body proportions according to the particular category as regulated by the competition requirements (*IFBB Rules for Bodybuilding and Fitness*, 2014), obtain posing skills and health; there, each athlete has their own goal, possibilities, perception, needs and interests. Therefore, the values differ.

In the book „*Body Panic: Gender, Health and the Selling of Fitness*”, Shary L. Dworkin and Faye Linda Wachs write that fitness for women has historically been associated with body reduction, endurance of the cardiovascular system, stretching exercises, while fitness for men has been associated with gaining muscle mass, weight lifting and competition. In other words, men tend to increase the upper part of their bodies, while women – to reduce the lower part of their bodies. (Dworkin & Wachs, 2009; Betz & Ramsey, 2017).

Currently fitness is undergoing a rapid change of trends with fitness programmes for women now including weight lifting, buttocks muscle training, high intensity loads. There are competitions where women compete in teams with men, together lifting weight bars, weight balls, dumbbells, throwing big car tires, and women are proud of the big weight they are able to lift. Women want to be strong, dominant, want to prove their equality (Boepple et al., 2016).

By analysing the essential characterization of the fitness concept found in literature, fitness is viewed in the study as:

1) a set of attributes and abilities – as in *to be fit* – ‘to be physically fit, in a good physical form’, or as in *physical fitness*, i.e. physical fitness, focused on specific attributes and abilities or health necessary for the performance of a specific task; for example, fitness is a set of attributes that relates to a person’s ability to perform physical activity (Caspersen et al., 1985); fitness is the general state of health and well-being, the ability to meet specific requirements in sport or everyday life (Malina, 2010); fitness is one of the most important indicators of work capacity, which is the ability to fulfil a task and achieve a specific goal without excessive fatigue, without harming oneself or others (Sharkey & Gaskill, 2009); fitness is the ability to safely and efficiently carry out simple, as well as specific requirements in everyday life without excessive fatigue so that there is still energy for rest and recreation events (Hoeger & Hoeger, 2006); fitness is a state of physical and physiological attributes, which shows the risk of obtaining premature illnesses and is related to sedentary lifestyle (Bouchard & Shephard, 1994); fitness is the balance of physical, mental and social attributes that provides the necessary reserves, which provide the ability to live in harmony with the environment in everyday life without an excessive physical and mental load (Travis & Callander, 1990) etc.;

2) a way of life, lifestyle and quality of life – as a life-influencing factor that includes the desire to improve health and quality of life and that includes not only physical fitness, but also a broader range of characteristics; for example, fitness is a healthy, active, beautiful and attractive lifestyle associated with life success and youth (Паффенбаргер & Ольсен, 1999); fitness is a way of life that provides an opportunity to maintain and strengthen health, balance the emotional state, improve the physical form and promote an active lifestyle

(Лисицкая & Сиднева, 2002); fitness is a cultural phenomenon of the 20<sup>th</sup> century and the desire to improve the quality of life to an optimal level, which includes social, psychical, mental and physical components (Howley & Frenks, 1998); fitness is a way of life that includes physically mental activity aimed at regulating the psychical and mental state (Kravitz & Robergs, 1993).

By evaluating the essential characterization of the concept of fitness as a set of attributes and abilities, it can be concluded that any fitness definition may also include components related to health and/or physical activity. The components of fitness and physical fitness overlap and form components of the state of physical health. According to the definitions, a health-oriented physical fitness is the body of innate and acquired morphological and functional properties of the organism (Рогинский, 1963) and the ability to perform daily activities without excessive fatigue, which reduces the risk of prematurely developing a hypokinetic illness (Hoeger & Hoeger, 2006) or illnesses caused by immobility (Vanhees et al, 2005; Pate, 1988), and reflects the readiness and adaptation of the body system functions for the performance of a particular activity (Быков, 2009). Being in a good physical form means to be healthy, but it is impossible to be healthy if the person is not in a good physical form, which depends on the person's lifestyle.

In order to understand the essence of the concept of fitness as a way of life, lifestyle and quality of life, it is necessary to understand the hierarchy of these concepts. The determinants of a person's way of life are not only objective factors such as work or studies, family life, social life, cultural affiliation and behavioural habits, but also subjective factors that are described as a person's satisfaction with their way of life, which forms based on a person's knowledge and confidence. The understanding of a way of life is formed by four categories:

- 1) economic – standard of living,
- 2) sociological – quality of life,
- 3) sociopsychological – lifestyle,
- 4) socio-economic – living habits (Возьмитель, 2000).

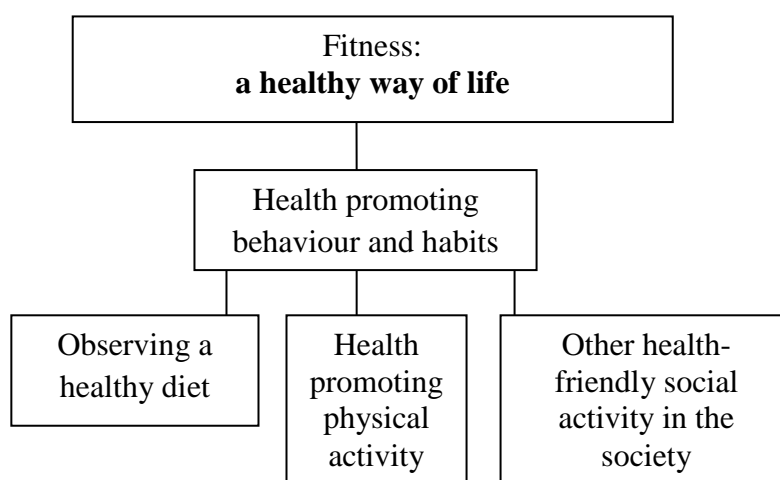
Thus, lifestyle is one of the categories of a way of life. Lifestyle is evaluated according to a person's habits of spending their leisure and work time, their way of organizing everyday life, behaviour type, values, taste and other factors (Ефимов, 1982).

Quality of life is another category of a way of life, which is the satisfaction of an individual's values and interests as goals and needs with updating the person's abilities or lifestyle (Emerson, 1985).

Therefore, a healthy way of life is behaviour and habits that positively affect health and it includes:

- 1) observing a healthy diet (Bailey et al., 2013; Ильинский, 1996; Bourdieu, 1980; *WHO Regional Committee for Europe at its forty-eighth session, Copenhagen, September, 1998*),
- 2) health promoting physical activity (Hutson, 2012; Shilling, 1991; Ильинский, 1996; Bourdieu, 1980; *WHO Regional Committee for Europe at its forty-eighth session, Copenhagen, September, 1998*),
- 3) other social activities in society (Shilling, 1991), which is an additional indicator of a healthy way of life – characterisation of environment and social life.

By evaluating the essence of the fitness concept as a way of life, lifestyle and quality of life and by analysing the hierarchy of the way of life concept it can be concluded that fitness is a healthy way of life and includes the implementation of health promoting behaviour and habits (see fig.2).



*Figure 2 Structure of Fitness as an Implementation of a Healthy way of life*

It can be assumed that fitness as an implementation of a healthy way of life involves improving the quality of life as a health promoting behaviour with a tendency to improve one's well-being and lifestyle as a development of new habits for health promotion. It can be concluded that in fitness as an implementation of a healthy way of life there is no place for harmless training programmes and overload, strict diet plans or use of steroids to get a desired body.

Recently there have been rapid changes in people's attitude towards fitness and in conversations about it. Knowledge of exercises, health, well-being, obesity, body mass index, calories, nutrition, vitamins, minerals, fats, proteins, carbohydrates, etc. is now important in everyday life. In the field of fitness,



people are encouraged to pay attention not only to their bodies, but also to health, calling for the purchase of services and products of the fitness and health industry. It is no longer fashionable for fitness enthusiasts to use tobacco and alcoholic products, or to visit nightclubs. The so-called turn to a healthy lifestyle has happened. However, in spite of all this, there is still an epidemic of immobility and obesity in the world (WHO, 2014) and on the other side exercise addiction or eating disorders.

Due to the obesity crisis, the beauty ideal is becoming more and more equal to the health ideal, a beautiful body means a healthy organism. If people look good, then they also feel good (Duncan, 2008; Markula & Pringle, 2006).

The correlation between suggestions on health improvement and the beauty ideal confirms suspicion that to look good (an ideal body) and to feel good (a healthy body) is the same. This is why a person's health can also be assessed by the body's visual characteristics – body mass and body composition.

Good health has become a visible sign, which is evidenced by a slim, athletic body. However, in some cases the body mass is a poor indicator of the health state (Zanker & Gard, 2008).

In North America, obesity has become the opposite of fitness (*fatness – fitness*) (Scott-Dixon, 2008). Some authors believe that obesity is associated with laziness, lack of control, unruliness, mental problems (Bordo, 1993; Petersen, 2007). The essence of marketing in the field of fitness is: if a person does not look good, then they cannot feel good because they are not in a good shape; this encourages people to buy products and services, thus developing this area.

The blend of health and beauty complicates a human's participation in the process of improving health of the society because the ideal of a body is constantly changing and improving; achieving it requires a lot of energy and a lot of time. The greater the beauty industry and fitness area becomes, the weaker becomes the human.

## Conclusions

By summarizing the analysis of fitness definitions and evaluating fitness according to various theoretical aspects, it can be concluded that fitness is interpreted as sport competition fitness, as an implementation of a healthy way of life and as physical fitness or health-oriented physical fitness.

The essence and goal of competition sport fitness is to participate in competitions, step on stage, form the correct body proportions according to the particular category as regulated by the competition requirements, obtain posing

skills, each athlete has their own goal, possibilities, perception, needs and interests. Therefore, the values differ.

By evaluating the concept of fitness as physical fitness, it can be concluded that the components of fitness and physical fitness overlap and form components of the state of physical health. Any definition of fitness may also include components related to health and/or physical activity.

Fitness as an implementation of a healthy way of life includes health promoting behaviour and habits – observing a healthy diet, health promoting physical activity and other health-friendly daily social activities in society. It can be assumed that fitness as an implementation of a healthy way of life involves improving the quality of life as a health promoting behaviour with a tendency to improve one's well-being and a lifestyle as a development of new habits for health promotion.

Due to constant change and improvement of the body ideal sometimes it is complicated to participate in the process of improving health, also achieving it requires a lot of energy and time. People don't understand where is the difference between healthy body and fitness body prepared for competition or commercial. Therefore the greater the beauty industry and fitness area becomes, the weaker becomes the human.

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# SVARCELŠANAS SPECIĀLI SAGATAVOJOŠIE VINGRINĀJUMI STIENA CELŠANAI UZ KRŪTĪM REZULTĀTU PAAUGSTINĀŠANAI

## *Weightlifting Sports Special Preparatoru Exercises of Barbel Lifting for Increasing Weightlifting Clean Exercise Results*

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**Abstract.** *Improvement of weightlifters technical skills and special physical qualities involves use of different instrumental control methods, which are necessary for obtaining biomechanically accurate quantitative parameters of the athlete's movement structure. Such control, using biomechanical methods, allows us to substantiate the parameters of the exercise techniques for competitions and to identify factors that affect the effectiveness of the movement activity. Our research aim was to evaluate the effect of non-standard barbell lifting exercises on results of weightlifting competition. The study subjects were healthy 15 weightlifters. The assessment of dynamic parameters was done before and after the set of exercises by using non-standard weightlifting bar using FITRO Dyne Premium (Slovakia). The maximum muscle strength dynamics was performed by the REV 9000 Technogym (Italy) isokinetic dynamometer, along with the registration of muscle biopotentials (EMG). Data was analyzed using Excel statistics 3.1. After ascertaining experiment with a set of exercises with an non-standard barbell lifting on clean exercise, the dynamic parameters of the controlled barbell lifting on weightlifting clean exercise (standard performance) were improved.*

**Keywords:** *barbell speed, clean and jerk, peak torque, power, time, weightlifting.*

### **Ievads**

#### ***Introduction***

Svarcelāju tehniskās meistarības un speciālas fiziskas īpašības vadības procesa pilnveidošana ir saistīta ar dažādu instrumentālo kontroles metožu pielietošanu, kas nepieciešama, lai iegūtu biomehāniski precīzus kvantitatīvus

sportistu kustību struktūras parametrus (Campos, 2006; Garhammer, 2001). No mūsdienu vadības teorijas ir zināms, ka vadības procesa veiksmīgai īstenošanai ir jāzina: kontrolējama objekta patreizējais stāvoklis; tā kontrolējama objekta stāvoklis, kura šo objektu nepieciešami pārnest; likumi, pēc kuriem funkcionē kontrolējamais objekts, kas ļauj prognozēt pie konkrētas kontrolējamas iedarbības objekta uzvedību (Фуряев, 2017). Tāda kontrole, pielietojot biomehāniskas metodes, ļauj pamatot sacensību vingrinājumu tehnikas parametrus un noteikt faktorus, kas nosaka kustību darbības efektivitāti. Ir nepieciešami novērtēt sportista tehniskas meistarības līmeni, priekš tā ir jāiegūst informāciju par analizēto sporta vingrinājuma biomehāniskajiem parametriem. Treneris to dara galvenokārt subjektīvi, labākajā gadījumā balstoties uz kvalitātes rādītājiem. Instrumentālās metodēs ļauj objektivizēt procesu par informācijas iegūšanu un pāriet no kvalitatīva uz kvantitatīvo biomehānisko parametru novērtējumu. Sportista tehniskās meistarības līmeņa novērtējums, kas tradicionāli tiek veikts, izmantojot dažādus biomehāniskos parametrus. Reģistrējot un nosakot kvantitatīvus parametrus, speciālisti parasti salīdzina iegūtos parametrus ar pieņemtajām normām. Pašas normas var veidot ar dažādiem veidiem. Sportista konkrēta biomehāniska parametra sasniegums, pildot sporta vingrinājumu un ir mērķis sporta vingrinājuma izpildes tehnikas korekcijā. Biomehānisko rādītāju izmaiņu dinamiku ir iespējams izsekot, izmantojot dažādas instrumentālās metodes. Lai ātri noteikt šo rādītāju nozīmīgumu un novērtētu to atbilstību noteiktajām vērtībām ir jāizmanto speciāli izstrādātas informācijas sistēmas, kuru pamatā ir mūsdienu tehniskie skaitliskie līdzekļi. Svarīgs elements sportista kustības tehnikas novērtēšanā ir viņa kustības mikro struktūrā. Pētot mikro struktūru ir iespējas saglabāt nepieciešamo līmeni un uzlabot sportista tehniskās prasmes. Apspriežot sporta veida kustības tehnikas pilnveidošanas procesu, eksperti vairāk kārt ir uzsvēruši, ka tas ir kontrolējams process. Tas ir īsi aprakstīts šādi: treneris saņem informāciju par veiktas darbības raksturlielumiem, analizē to un aicina sportistu ievest izmaiņas vingrinājuma izpildes tehnikā. Papildus objektīvajai informācijai ir dažādas instrumentālas metodes, kas sniedz papildus informāciju par sportista veikto darbu, par sporta vingrinājuma biomehāniskajiem parametriem un ir paredzēta galvenokārt treneriem. Raksturojot sportista tehnisko meistarību, speciālisti visvairāk pievērš uzmanību biomehāniskajiem parametriem, kas raksturo konkrēto sporta vingrinājumu. Ar to informē sportistu par rādītājiem un kā tos izmainīt, lai koriģētu analizējamā sporta vingrinājuma izpildes tehniku.

Šajā publikācijā izskatām jautājumu par sportista kustības izpildes tehnikas pielāgošanu, kas ļauj izmantot svarcelšanas stieņa elastīgas īpatnības, ceļot stieni uz krūtīm. Svarcelšanas sporta sacensību vingrinājumu izpildes tehnika pēdējos gados tika pētīta ļoti intensīvi, bet tomēr literatūra ir maz pētījumu par svarcelšanas stieņa elastīguma īpatnībām, ceļot stieni uz krūtīm ar dažādiem

svariem un ar dažādu svarcēlāju kvalifikāciju izpildījumu. Medvedevs A. (Медведев, 1990) atzīmē, ka rīka elastīgas deformācijas enerģija, kura tika uzkrāta sākuma kustību fāzes būtiski palielina kustību izpildes efektivitāti citas kustību fāzes. Acīmredzot, ceļot svarcelšanas stieni uz krūtīm racionālas tehnikas rezultātā atlēts aktīvi pielieto stieņa elastīgas deformācijas rekuperatoru enerģiju kā ārējo papildinājumu, kas lielākoties nosaka kustību gala rezultātu (Хасин, 2017). Mūsu darba mērķis bija svarcelšanas stieņa celšanas kustības kinemātikas uz krūtīm ietekmes izvērtējums uz sacensību rezultātiem.

## Metodika Methods

Ekspērimētā piedalījās 15 svarcelšanas pārstāvji (eksperimentālā grupa), kuru treniņu stāžs svarcelšanā vidēji ir  $2,5 \pm 0,5$  gadi, vidējais atlētu vecums ir  $20 \pm 1,4$  gadi. Auguma garumu noteicam ar antropometra palīdzību, vidējais atlētu augums ir  $178 \pm 4,5$  cm. Ķermeņa masa tika noteikta ar elektroniskiem svariem SENSOR SBS60115BK (Vācija), vidējā ķermeņa masa ir  $81 \pm 4,6$  kg. Pētījumu laikā tika pielietots firmas "ELEIKO" (Zviedrija) svarcelšanas stienis un stienim tika pievienots FitroDyne Premium (Slovākija), kas savukārt ir pieslēgts pie datora sistēmas. FitroDyne Premium ir uz datortehnoloģijām bāzēta ierīce, kura radīta atlētu kustību dinamisko parametru (jaudas (W), spēka (N), ātruma (cm/s), paātrinājuma ( $m/s^2$ ), laika (ms) digitālajam atspoguļojumam. Pirms un pēc eksperimenta tika veikta testēšana. Testēšanas laikā subjekti veica kontroles vingrinājumu–svarcelšanas stieņa celšanu uz krūtīm vienu atkārtojumu ar maksimālu rezultātu (skat. 1.att.).



1.attēls. *Konrolvingrinājums svarcelšanas stieņa celšana uz krūtīm*  
Figure 1 *Weightlifting clean control exercise*

Pētījumā tika pievērsta uzmanība maksimālajam un vidējiem kontroles vingrinājuma kustību jaudas parametriem, kā arī maksimālam un vidējam

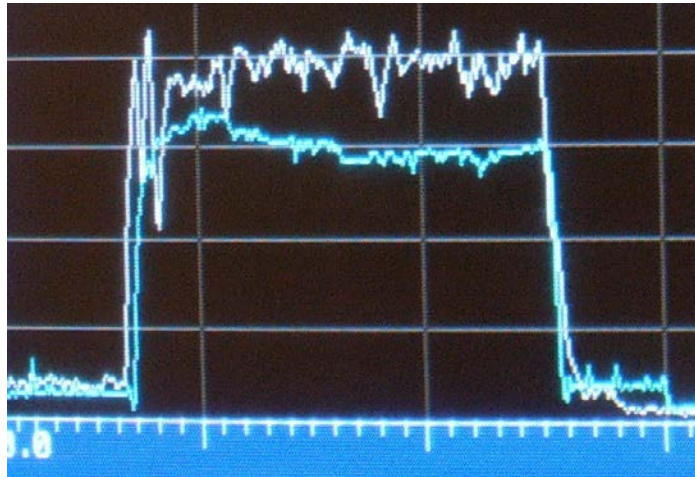
ātrumam, maksimālam un vidējam spēkam. Pēc maksimāla rezultāta reģistrācijas FitroDyne Premium sistēma piedāvā individuālo treniņu apjomu kontroles vingrinājumā, kā arī tika veikta muskuļu maksimāla spēka testēšana uz izokinētiska dinamometra REV 9000 (Technogym, Itālija). Apakšstilba ekstensoru muskuļu grupu maksimālais spēks tika mērīts izometriskajos apstākļos sēdus. Leņķis starp rumpi un augšstilbu sēdus stāvokli bija  $120^{\circ}$  (skat. 2.att.).



2.attēls. Maksimālā muskuļu spēka noteikšana izometriskā režīmā  
*Figure 2 Control of maximal muscle isometric contraction*

Tika izstrādāts protokols, lai ierobežotu un izolētu faktorus, kas izraisa straujas nestacionāras situācijas. Testēšanas protokolā ietilpa piecu minūšu augšstilba muskuļu izstiepums, piecu minūšu iesildīšanās ar brīvām kustībām, trīs minūšu speciālā iesildīšana uz izokinētiskās ierīces REV 9000. Pēc tam sekoja testēšana izometriskos apstākļos ar dominējošās ekstremitātes augšstilbā muskuļu maksimāli spēcīgu sasprindzinājumu ceļa locītava  $90^{\circ}$  leņķi. Sasprindzinājumu ilgums bija trīs sekundes un trīs atkārtojumi, starp atkārtojumiem bija vienas minūtes atpūta (skat. 3.att.).





3.attēls. *Interferencētā EMG un dinamogramma pie patvaļīgas muskuļu kontrakcijas izometriskā režīmā*

Figure 3 *EMG and dynamogram in isometric contraction*

Saskaņā ar Farina (2006) datiem muskuļu spēka izpēte dinamiskajos un izometriskajos apstākļos noteikti jāpārlicinās par atbilstošiem apstākļiem, kādos var uzskatīt, ka EMG signāli ir relatīvi stacionāri. Elektromiogrāfiskajai apstrādei mēs izvēlējamies labāko atkārtojumu no trim iespējamajiem. Elektrodi tika novietoti uz ādas pēc literatūra sastopamajām rekomendācijām (Basmajian, 1980), ievērojot muskuļšķiedru garenvirzienu. Ar elektrodu palīdzību tika reģistrēti augšstilba ekstenzoru muskuļu biopotenciāli. Elektromiogrāfiskais signāls tika padots no subjekta uz elektromiogrāfu TELEMG BTS (Itālija) ar optisko šķiedru palīdzību. Signāls elektromiogrāfā tika desmitkārtīgi palielināts un novadīts caur frekvenču filtru (200 Hz). Lai ierobežotu neprecizitātes, signāls tika iztaisnots (attīrīts) un integrēts (10 ms). Pielietotie bipolārie elektrodi bija 10 mm diametrā ar fiksētu attālumu starp elektrodiem – 20 mm. Elektromiogrāfiskais faktors tika apstrādāts, izmantojot iztaisnota un integrētā signālā laukuma amplitūdu. Analīzei, vadoties no rekomendācijām, tika izmantoti absolūtie rezultāti (Basmajian & Blumenstein, 1980; Mayer, Smith, Keeley, & Money, 1985; Sondeberg & Cook, 1983).

Treniņu process tika veikts ar intervāla treniņu metodi un atkārtojuma metodi un tika pielietoti 8 svarcelšanas speciāli sagatavojošie vingrinājumi svarcelšanas stieņa celšanai uz krūtīm rezultātu paaugstināšanai. Treniņu process norisinājās 3 reizes nedēļā pa 4 atkārtojumiem 5 piegājieniem un ar 60%-70% svara no katra atlēta individuālā maksimālā rezultāta. Šis konstatējošais eksperimenta process ilga 8 nedēļas un treniņu plāns bija izstrādāts mikrociklā, kurā tika iekļauti trīs monocikli, kas veidoja mezociklu. Pirmo četru mikrociklu laikā tika pielietots 60% svara apjoms no katra atlēta individuālā maksimālā rezultāta, bet nākamajos četros mikrociklos tika pielietots

70% svara apjoms no katra atlēta individuālā maksimālā rezultāta. Tika sastādīts vingrinājumu kopums no 8 svarcelšanas speciāli sagatavojošiem vingrinājumiem stieņa celšanai uz krūtīm rezultātu paaugstināšanai: svarcelšanas stieņa celšana uz krūtīm no platformas, standarta stāvoklī; svarcelšanas stieņa celšana uz krūtīm no platformas nestandarta stāvoklī; svarcelšanas stieņa celšana uz krūtīm no zemajiem paliktņiem nestandarta stāvoklī; svarcelšanas stieņa celšana uz krūtīm no augstajiem paliktņiem nestandarta stāvoklī; svarcelšanas stieņa celšana uz krūtīm no augstajiem dubultu paliktņiem nestandarta stāvoklī; svarcelšanas stieņa celšana uz krūtīm kārienā zem ceļiem stāvokļa nestandarta stāvoklī; svarcelšanas stieņa celšana uz krūtīm kārienā no ceļiem nestandarta stāvoklī; svarcelšanas stieņa celšana uz krūtīm kāriena virs ceļiem nestandarta stāvoklī. Rezultāti, kas tika iegūti eksperimenta laikā tika apstrādāti datorprogrammā Excel Statistika 3.1. Tika aprēķināta Stjudenta kritērija teorētiskā vērtība un noteikts pieaugums (“ir statistiski ticams” vai “nav statistiski ticams”) (Dravnieks, 2004).

## Rezultāti *Results*

Svarcelāju sportistu sacensību kustības dinamisko parametru optimizācijai palietojām vingrinājumu kopumu ar akcentu uz svarcelšanas stieņa elastīgo deformāciju, kā ārējo papildinājumu. Tika veikta ciklisko izometrisko kontrakciju kontrole ar EMG un DG palīdzību un tika izolēta katra kustību cikla fāze un bija novērtēti attiecīgie biomehāniskie parametri. Viena no galvenajām prasībām attiecībā uz svarcelšanas stieņa celšanu uz krūtīm tehnisko izpildījumu ir saikņu saglabāšana starp sportistu biokinemātiskam ķēdēm, balstu (platforma) un svarcelšanas stieni visas pirmajās kustības fāzēs (Медведев et al., 1990) Eksperimenta sākuma iegūtie rezultāti liecina, ka sportistu vingrinājuma izpildes tehnika prasa būtiskus uzlabojumus. Sportisti pilnībā nerealizē svarcelšanas stieņa elastīgas īpatnības un savu kustības potenciālu. Eksperimenta dalībnieki uzrādīja kontroles vingrinājuma izpildījuma (svarcelšanas stieņa celšana uz krūtīm) jaudu P (W) pirms vingrinājumu kopas pielietošanas  $709 \pm 4,8$  W, un pēc vingrinājumu kopas pielietošanas jaudas līmenis bija  $824 \pm 2,4$  W, kas par  $115 \pm 2,4$  W ir vairāk par 14 % nekā pirms eksperimenta ( $p < 0,05$ ).

Veicot testēšanas uzdevumu eksperimentālas grupas svarcēlājiem izometriskajā režīmā, reģistrējot muskuļu sasprindzinājumu ar maksimālo spēka izpausmi (skat. 1.tab.) mēs konstatējām īpatnības, kas ir raksturīgas svarcēlāju muskuļu sasprindzinājuma (kontrahēšanas) fāžu periodiem (iniciācijas fāzei un sasprindzinājuma pieaugšanai, sasprindzinājumā saglabāšanas fāzei) pirms un pēc eksperimenta.

1.tabula. *Muskuļu sasprindzināšanās parametri (n=15)*  
 Table 1 *Contraction parameters of weightlifters muscles (n=15)*

Parametri	LSL (s) EMG		LSL Dg (s)		SP (s)		tp (s)	
	Pirms	Pēc	Pirms	Pēc	Pirms	Pēc	Pirms	Pēc
X±Sx	0.22±	0.21±	0.30±	0.25±	0.09±	0.06±	0.35±	0.30±
	0.01	0.02	0.05	0.03	0.02	0.02	0.02	0.09

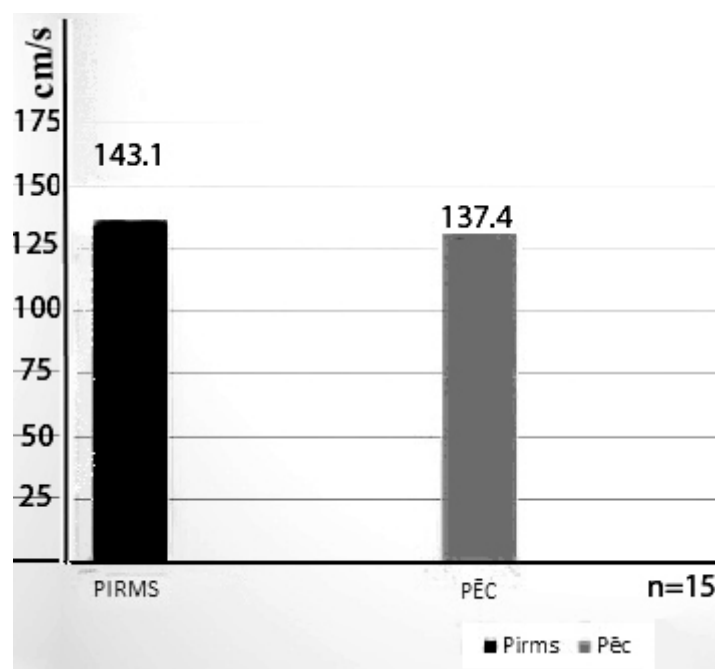
Parametri	Fp (Nm)		Fp rel (Nm/kg)		Fmax (Nm)		Fmax rel (Nm/kg)	
	Pirms	Pēc	Pirms	Pēc	Pirms	Pēc	Pirms	Pēc
X±Sx	80±	101±	0.9±	1.24±	2.66±	3.28±	3.28±	3.72±
	5.3	3.5	0.007	0.06	3.00	0.03	0.03	0.08

*Emg* – elektromiogramma, *Dg* – dinamogramma, *LSL* – latentais sasprindzināšanās laiks, *SP* – slēptais periods, *tp* – dinamogrammas pirmā “pīķa” laiks, *Fp* - dinamogrammas pirmā pīķa spēka moments, *Fp rel.*, -dinamogrammas pirmā “pīķa” relatīvais spēka moments, *Fmax.* – maksimālais spēka moments, *Fmax* – maksimālais relatīvais spēka moments

Tas parāda, ka pirms eksperimenta pēc bioelektriskās aktivitātes tiek novērots viļņveidīgs muskuļu spēka momenta (*Fp*) pieaugums, bet pēc eksperimenta šis viļņveidīgs pieaugums jau ir mazāk izteikts. Sākumā pēc pirmā impulsa elektroaktivitātes amplitūda samazinās, reizēm pat notiek īslaicīga elektroaktivitātes izzušana un šeit tika novērota muskuļu spēka momenta samazināšanās (*Fp*). Pēc eksperimenta uzreiz pēc pirmā “pīķa” sasniegšanas novērojama muskuļu spēka momenta palielināšana un impulsu biežums uz dinamogrammas (*Dg*) atbilst impulsiem uz elektromiogrammas (*Emg*) un to intervāls ir no 25 ms līdz 40 ms. Spēka momenta pieauguma laikā novērojama biopotenciālu amplitūdas paaugstināšanas impulsos ( $p < 0,05$ ), tā kļūst augstāka arī intervālos starp impulsiem, līdz ar to elektromiogrammas sadalīšanās nav izteikta.

Pētāmā muskuļa bioelektriskās aktivitātes amplitūda ar maksimālo izometrisko kontrakciju ir daudz lielāka nekā vingrinājumu izpildes laikā (Farina, 2006). Šis fakts ļauj secināt, ka muskuļi, kas nodrošina pētāmā vingrinājuma izpildi, neīsteno maksimālu spēku vingrinājuma realizācijas procesā (Mayer et al., 1985). Mums izdevās palielināt muskuļu spēka līmeni, vienu no parametriem, kas nodrošināja kontroles vingrinājuma izpildi, pielietojot vingrinājumu kopumu ar nestandarta disku stāvokli uz svarcelšanas stieņa (diski atrodas tuvāk stieņa galiem). Eksperimenta beigās muskuļu spēka parametri svarcelšanas stieņa celšanas uz krūtīm laikā palielinājās no  $636 \pm 4,7$  N līdz  $832 \pm 2,1$  N ( $p < 0,05$ ). Parasti muskuļu spēku var definēt kā muskuļu spēju pārvarēt ārējo vai iekšējo pretestību vai pretoties tai. Fizioloģiskie traucējumi, kas traucē muskuļu spēka attīstīšanai un izraisa muskuļu nogurumu,

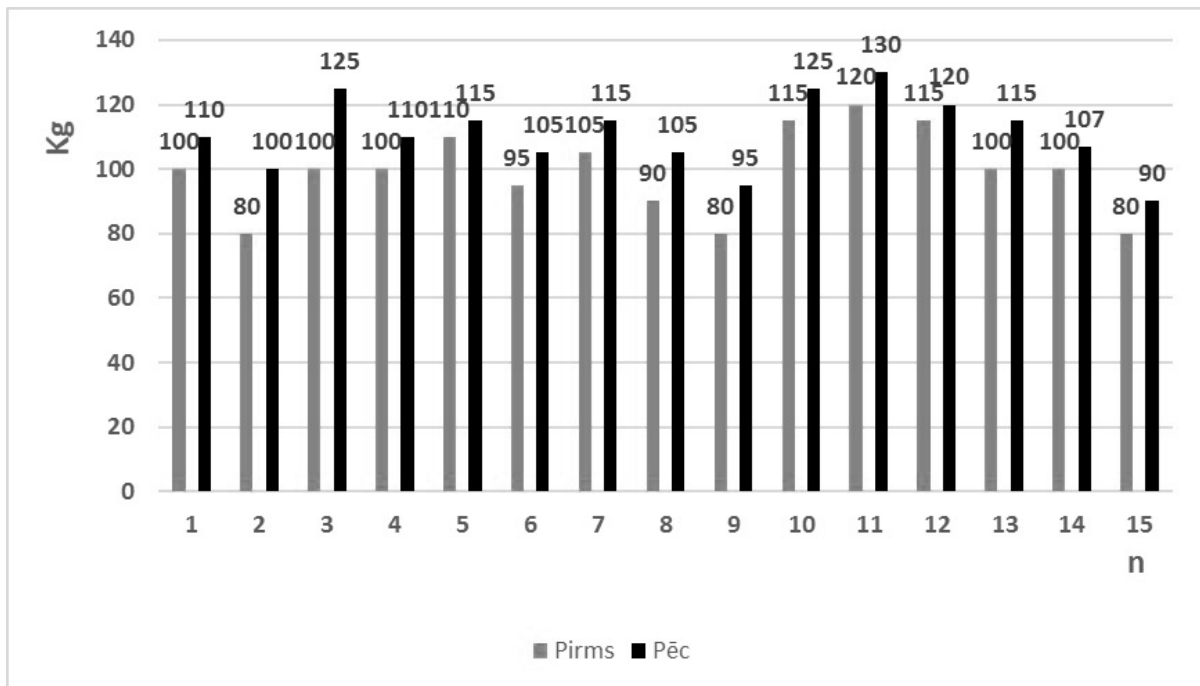
variē no metabolītu uzkrāšanās muskuļu šķiedrās līdz iespējamai nepareizai CNS (Centrālā Nervu Sistēma) signāla izveidei (Enoka & Duchateau, 2008). Tādēļ galvenais EMG pētījumā uzdevums mums bija pareizi identificēt šādam parādībām saistīto eklektisko izpausmi. Izometriskajās muskuļu kontrakcijās bioķīmisko blakusproduktu uzkrāšanās muskuļos ir galvenā spēka samazināšanas un noguruma parādība un tā rada nestacionāros mioelektriskos signālus, piemēram, jaudas frekvences spektra mērogā (Basmajian & De Luca, 1985). Šī mioelektriska signāla uzvedība tiek dēvēta par nestacionāri lēnu, ņemot vērā, ka EMG signāls dažu sekunžu laikā var saglabāt tā raksturīgās īpašības (Bonato, Roy, Knafitz, & De Luca, 2001), pēc kura jaunā muskuļu šķiedru grupa sāk mainīt signālu īpašības (Farina, 2006).



4.attēls. Svarcēlāju ātruma radītāju izmaiņas mijiedarbojoties ar rīku pirmajā grūšanas paņēmienā kustības struktūrā

Figure 4 Speed parameter changes of weightlifters in the process of interaction between structure of the first clean and jerk method

Svarcēšanas stienā vertikālā kustības ātruma izmaiņas rāda (4. attēls), ka pirms eksperimenta kustības ātrums bija  $143 \pm 0,1$  cm/s, bet pēc eksperimenta kustības ātrums bija zemāks par 5% un sasniedza  $137 \pm 0,4$  cm/s ( $p > 0,05$ ). To var paskaidrot šādi: svarcēlāji pēc eksperimenta ceļ stieni uz krūtīm attīstot optimālo rīka ātrumu.



5.attēls. Sacensību vingrinājuma pirmā kustība grūšana rezultātu dinamika (n=15), (p<0,05)

Figure 5 The results dynamics in the first movement in the structure of competitive – the clean and jerk (n=15), (p<0,05)

Svarcēlāju sportistu sacensību vingrinājuma pirmā kustība grūšana rezultātu uzlabojums pēc eksperimenta sastādīja 10,2 %. Tā, piemēram, par 5 kg rezultātu uzlaboja trīs atlēti, par 7 kg uzlaboja viens atlēts, par 10 kg uzlaboja septiņi atlēti, par 15 kg uzlaboja trīs atlēti, par 20 kg viens atlēts (5. attēls).

Iepriekš minētie fakti par ilgāku aktivitātes periodu un lielāku elektromiogrammas amplitūdu pētāmajā muskuļu grupā, kā arī biomehānisko parametru uzlabošanu stieņa celšanas uz krūtīm laikā dod pamatu domāt par sportistu veiktās kustību darbības efektivitātes un ekonomiskuma uzlabošanas adaptācijas procesā, pielāgojoties sarežģītai muskuļu darbības koordinācijai. Šajā gadījumā lietderīgāk iekļaut treniņu procesa svarcelšanas stieņa celšanu uz krūtīm vingrinājumus ar svarcelšanas disku izvietojumu pie stieņa galiem. Ar tādu rīka stāvokli sportists var veikt stieņa celšanu pēc trieciņa darbības programmas ar eksplozīva spēka maksimālo izpausmi un vairāk izmantot svarcelšanas stieņa elastīgas īpašības.

## Secinājumi Conclusion

Sportista fiksācija, ceļot stieni uz krūtīm, vēl ekstremālākas stieņa deformācijas līmeņos norāda uz sportista spēcīgo balstu uz platformas un spēcīgo stieņa fiksāciju svarīgākajā uzrāvienā fāze. Stieņa deformācijas pieaugums bez tā sekojoša samazinājuma stieņa uzrāviena laikā var būt ka rezultāts savlaicīgai pacelšanai uz kāju pirkstgaliem, elkoņu locītavu nesaliekšanai un savlaicīgai ķermeņa iztaisnošanai. Lai izmantotu stieņa elastīgās deformācijas īpatnības ir nepieciešams apmācīt sportistus kustību prasmēm ar stieni, kas ļauj izmantot elastīgas deformācijas enerģiju, lai uzlabotu rezultātu. Mūsu gadījumā tika pielietoti vingrinājumi ar svarcelšanas stieņa celšanu uz krūtīm, kur stieņa ripas bija izvietotas uz stieņa galiem. Tā rezultātā tika uzlabota kontrolvingrinājuma kustību jauda (W) par 14% ( $p < 0,05$ ), kustību spēka (N) parametri tika uzlaboti par 24% ( $p < 0,05$ ), kustību izpildījuma ātrums (cm/s) samazinājās par 4,2% ( $p < 0,05$ ), muskuļu maksimālais izometriskais spēks (Nm) palielinājās par 12% ( $p < 0,05$ ) Svarcēlāju sacensību vingrinājuma pirmā kustība grūšana rezultātu uzlabojums pēc eksperimenta sastādīja 10.2% ( $p < 0,05$ ).

## Summary

Improvement of weightlifters technical skills and special physical qualities involves use of different instrumental control methods, which are necessary for obtaining biomechanically accurate quantitative parameters of the athlete's movement structure. Such control, using biomechanical methods, allows us to substantiate the parameters of the exercise techniques for competitions and to identify factors that affect the effectiveness of the movement activity. Research aim was to evaluate the effect of non-standard barbell lifting exercises on results of weightlifting competition. The assessment of dynamic parameters was done before and after the set of exercises by using non-standard weightlifting bar using FITRO Dyne Premium (Slovakia). The maximum muscle strength dynamics was performed by the REV 9000 Technogym (Italy) isokinetic dynamometer, along with the registration of muscle biopotentials (EMG). Such control, using biomechanical and electromiography methods, allows us to substantiate the parameters of the exercise techniques for competitions and to identify factors that affects the effectiveness of the movement activity. These set of exercises with an non – standard barbell lifting on clean exercises of their components are developed in order to improve the technique of the exercises and introduce the exercises into the sports practice. It was established that the effective realization of movements can be achieved by using different movements structures of the barbell. Obtained data was compared with both the model parameters and the previously obtained individual biomechanical parameters of the athlete. Afterwards the analysis

of technical errors in the movement structure of the athlete during the performance of the particular exercise was done. Coaches in these circumstances should take these facts into account when planning training process of weightlifters, including exercises by using non – standard weightlifting bar.

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# IZAICINĀJUMI UZ VĒRTĪBĀM BALSTĪTA KOMPETENČU MODEĻA IZVEIDĒ NEATLIEKAMĀS MEDICĪNAS PERSONĀLAM

## *Challenges to Made Values-Based Competence Model for Ambulance Personnel*

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**Abstract.** *The purpose of this paper is to clarify and analyse the understanding of the values for Ambulance personnel, to compare and integrate it with the system of competencies used in the performance assessment and evaluation of professional competence. The results of State Emergency Medical Service ambulance personnel's survey in the 2018 are analysed in the research. The results obtained Ambulance personnel's different understanding of the importance of organization's values and its impact in management, staff attitude and work performance. The results of the survey have showed that Ambulance personnel has contradictive understanding of system of values. Their personal values are respect, compassion, care, ethics, honesty, trust, however for their professional work they recognise teamwork, professionalism, safety, etc. as very important values.*

**Keywords:** *ambulance personnel, attitude, competence, skills, values.*

### **Ievads**

#### ***Introduction***

Personāla vadībā visā pasaulē arvien vairāk aktualizējas jautājums par vērtību sistēmu uzņemumā, uz vērtībām balstītas stratēģijas izveidi un kompetenču moduļu izveidi amatu grupām, kas izmantojamas personāla vadības procesos – atlasē, novērtēšanā, mācību un attīstības vajadzību noteikšanā. Vērtību nepieciešamības aktualitāti nosaka arī nereti novērojamā medicīnas personāla attieksme un izturēšanās pret pacientu akūta medicīnas personāla trūkuma apstākļos. Individīda vērtību sistēma kā kompetenci un attieksmi veidojošs faktors apskatīta vairāku autoru darbos, norādot, ka organizācijas panākumi balstās uz indivīda vērtībām un vēlmēm (Zammuto, 1984; Tregunno, Barnsley, & Murray, 2004). Autores iepriekšējos pētījumos analizējušas Latvijas Neatliekamās medicīniskās palīdzības dienesta ārstniecības personāla zināšanu, kompetences un



profesionālisma novērtēšanas metodiku un iespējas (Dambe, 2013a, 2013b; Dambe & Atstāja, 2013a, 2013b), to saistību ar darba sniegumu, tā novērtējumu un personāla attieksmi pret to. Neatliekamās medicīnas ārstniecības personālam novērtējamās kompetences ir atšķirīgas atbilstoši amata saturam, vērtējot tādas kompetences kā: komandas darbs, ētiskums un rūpes par kārtību, precizitāti un kvalitāti, ārstniecības atbalsta personālam, brigādes vadītājam papildinot ar patstāvību un atsaucību (Dambe & Atstāja, 2015). Katrai kompetencei ir dota definīcija un skaidrojums snieguma vērtējumam, kā arī izstrādāta kompetenču vārdnīca (Kompetenču vārdnīca, 2011). Analizējot definētās vērtības neatliekamās medicīnas personālam citās valstīs, piemērā, ASV, Lielbritānija, Jaunzēlande, Ķīna, autores konstatēja, ka noteiktās vērtības ir atšķirīgas.

Pētījuma mērķis ir noskaidrot neatliekamās medicīnas personālam (NMP) nozīmīgās vērtības un no tām izrietošās kompetences. Mērķa sasniegšanai analizētas definētās vērtības dažādās Neatliekamās medicīnas institūcijās pasaulē. Pētījumā izmantotās metodes ir empīriskā teorētisko aspektu un labās prakses pētīšana dažādās neatliekamās medicīnas institūcijās, un neatliekamās medicīniskās palīdzības dienesta Rīgas reģionālā centra personāla vērtību analīze, balstoties uz aptaujas datiem.

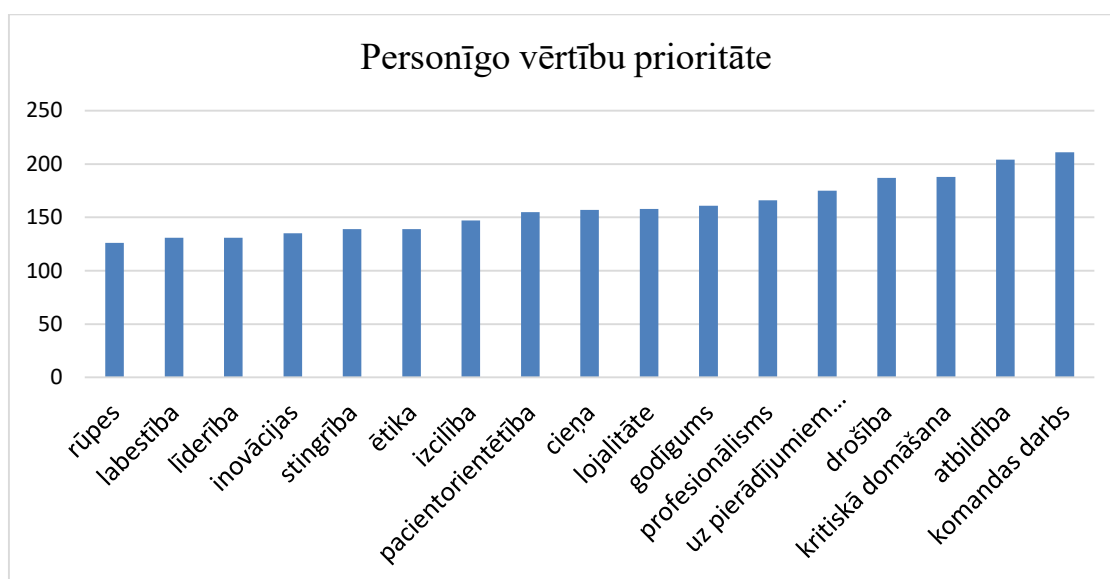
### **Materiāls un metodika** *Materials and Methods*

Lai noskaidrotu Neatliekamās medicīnas darbinieku viedokli par viņuprāt būtiskajām vērtībām viņu dzīvē un darbā, autores izstrādāja aptaujas anketu ar jautājumiem par vērtību nozīmību. Parasti uzņēmumos tiek definētas trīs līdz piecas vērtības. Zonnefelds (Zonneveld, Driessen, René, Stüssgen, & Minkman, 2018), veica empīrisku pētījumu, analizējot biežāk autoru publikācijās pieminētās vērtības, un koncentrējās uz 23 vērtībām. Autores, analizējot dažādas ārzemju neatliekamās medicīnas izglītības iestāžu un struktūrvienību mājas lapās definētās vērtības, atlasīja 17 biežāk noteiktās vērtības. Tika izveidota aptaujas anketa, izmantojot Likerta skalu un brīvās izvēles jautājumus, lai noteiktu NMP dienesta Rīgas reģionālā centra ārstniecības personāla vērtību skalu. Aptaujā tika lūgts izveidot no 17 piedāvātajām vērtībām: rūpes, labestība, līderība, inovācijas, stingrība, ētika, izcilība, pacientorientētība, cieņa, lojalitāte, godīgums, profesionālisms, uz pierādījumiem balstīta lēmumu pieņemšana, drošība, kritiskā domāšana, atbildība un komandas darbs, noteikt piecas sev svarīgākās vērtības, 5 nozīmīgākās neatliekamās medicīnas darbā, tad katrai no minētajām vērtībām piešķirt nozīmīgumu 8 ballu skalā, kur 1 ir mazsvarīgi, bet 8 ļoti nozīmīgi. Tāpat respondentiem tika lūgts norādīt kādos personāla vadības procesos pēc viņu domām vērtību sistēma izmantojama.

Aptauja veikta 2018.gada decembrī un 2019.gada janvārī, izmantojot nevarbūtīgās izlases ērtuma metodi (Geske & Grīnfelds, 2006). Aptaujā piedalījās 171 respondents, no kuriem 4,2% respondentu strādā NMP dienestā mazāk kā gadu, 43,7% līdz pieciem gadiem, 16,9% 5-10 gadus, 35,2% strādā vairāk kā desmit gadus. 79% respondentu bija sievietes, 21% vīriešu. 11% aptaujāto bija ārsti, 73% ārsta palīgi, 13% medicīnas studenti, kas strādā NMP dienestā, un 3% operatīvā medicīniskā transporta vadītāji. Aptauja tika izplatīta programmā visidati.lv, nosūtot saiti e-pastā un *whatsapp* grupās NMP dienesta Rīgas reģionālā centra arodbiedrības biedriem. Dati apstrādāti SPSS programmā. Respondenti procentuāli raksturo NMP brigādes proporcionālo profesionālo sadalījumu, ir 34% no Rīgas reģionālajā centrā nodarbināto NMP brigāžu personāla skaita un iekļauj visas nodarbināto vecuma grupas.

## Rezultāti Results

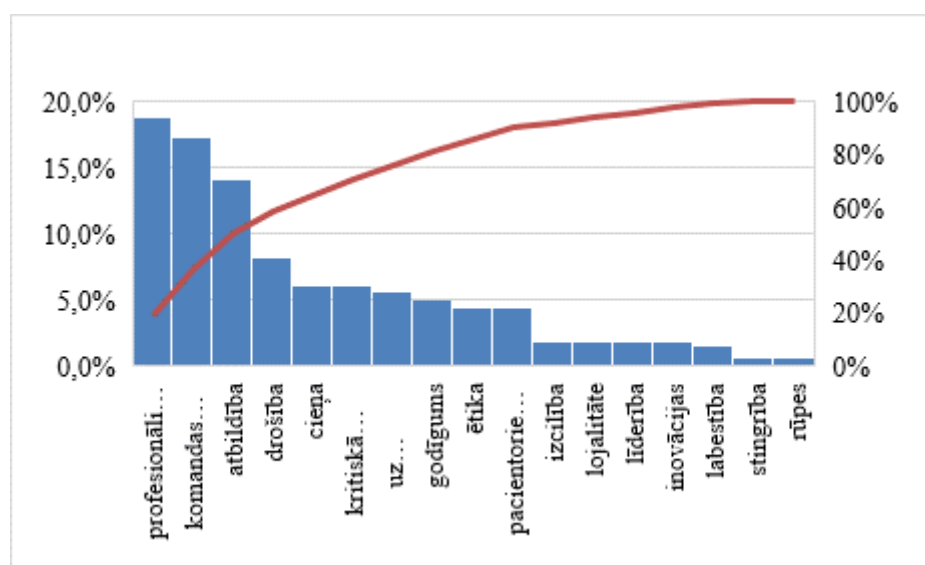
Analizējot aptaujas rezultātus, autore konstatē, ka Neatliekamās medicīnas personāla noteikto vērtību skala atšķiras no sagaidītā, skat. 1. attēlu. Vieta nosaka atbilžu varianta nozīmīguma pakāpi. Augstāko vietu iegūst visnozīmīgākais atbilžu variants. Punkti ir visu respondentu izvēlēto vietu summa attiecīgajam atbilžu variantam. Svarīgākais atbilžu variants ir tas, kurš ieguvis mazāko punktu skaitu, rūpes, labestība, līderība, utt. Komandas darbs, kas neatliekamās medicīnas brigādei ir ārkārtīgi nozīmīgs, personīgo vērtību skalā palicis kā mazsvarīgākais faktors.



1.attēls. Respondentu atbildes uz jautājumu par sev nozīmīgo vērtību prioritāro sadalījumu (autoru veidots)

Figure 1 The answers of most important values for respondents (by authors)

Atbildot uz jautājumu “Ja jums būtu jāizvēlas vērtības Neatliekamās medicīniskās palīdzības dienestam, kuras tās būtu?”, autores konstatē, ka respondentiem vienotības nav, 18,8% uzskata cieņa, 55% - komandas darbs, 45% - atbildība, 26% - drošība, 19% cieņa un kritiskā domāšana, skat. 2. attēlu. Vērtību attēlošanai izmantota Pareto skala, lai parādītu datu visnozīmīgākos faktoros un katra faktora relatīvo daļu attiecībā pret kopsummu.



2.attēls. Respondentu atbildes uz jautājumu par NMP dienestam nosakāmajām vērtībām (autoru veidots)

Figure 2 The answers of most important values for Ambulance personnel (by authors)

No respondentu atbildēm redzams, ka pašreizējā darba snieguma izpildes novērtēšanas sistēmā iekļautās kompetences – ētika un rūpes par kārtību un precizitāti (Dambe & Atstāja, 2015; 2012.gada 10.jūlija Ministru kabineta noteikumi Nr.494) respondenti neuzskata par vērtībām. No esošajā novērtēšanā iekļautajām 45% respondentu ir nozīmīgs ir komandas darbs.

Vērtējot vērtību nozīmīgumu pēc Likerta skalas, atbildot uz jautājumu “Lūdzu norādiet vērtības nozīmību Jūsu ikdienas profesionālajā darbā pēc nozīguma, augstāk novērtētās vērtības ir: profesionālisms- 90% ļoti svarīgi un svarīgi, atbildība – 87% ļoti svarīgi un svarīgi, komandas darbs – 84% ļoti svarīgi un svarīgi, kritiskā domāšana – 87 % ļoti svarīgi un svarīgi, cieņa – 76% ļoti svarīgi un svarīgi, drošība 75% ļoti svarīgi un svarīgi. Autores uzskata, pētījuma aktualiāte ir apstiprinājusies, jo tādas vērtības kā godīgums, lojalitāte, izcilība, labestība, ētika, rūpes, kam būtu jābūt medicīnas darbinieka prioritāšu sarakstā, ieguvušas salīdzinoši maz gadījumos vērtējumu ļoti svarīgi un svarīgi: Izcilība – 31%, labestība 32%, lojalitāte 37%, godīgums 68%, stingrība – 22%, līderība 30%, ētika 51%, rūpes 1%, inovācijas 45%, uz pierādījumiem balstīta lēmumu

pieņemšana – 71%, pacientorientētība 58%. Tajā pat laikā respondenti atzīst, ka ka vērtību pieeju var izmantot gan personāla atlasē 22%, personāla darba snieguma novērtēšanā 21%, personāla attīstībā 33% un profesionālās atbilstības novērtēšanā 24%. Izmantojot vārdu mākoņu veidošanas metodiku (<https://worditout.com/>), aktuālās vērtības, kas jāattīsta esošajiem un topošajiem neatliekamās medicīnas darbiniekiem tika apkopotas vērtību vārdu mākonī, skat. 3. attēlu.



3.attēls. *Vērtību vārdu mākonis (autoru veidots)*

Figure 3 *Cloud of values words (by authors)*

## Diskusija

### Discussion

Cilvēkresursu vadības teorijās aizvien vairāk tiek runāts par vērtību definēšanas un iedzīvināšanas nozīmi organizācijās, uz vērtībām balstītu stratēģijas izveidi un darbinieku personīgo vērtību un organizācijas vērtību saskaņotību. Vestvūds norāda, ka ir emocionāli sarežģīti veiksmīgi integrēt praksē pretrunīgas personīgās un profesionālās vērtības (Westwood, Griffin, & Hay, 2013; Gill, 2013; Fletcher, 1991; Dufourg, Goldstein, & Botha, 2017, Kim et al., 2017). Liangs, uzskata, ka medicīnas nozare kopumā neveido tradicionālu iekšējo filozofiju tādā pašā veidā, kā veiksmīgos uzņēmumos, taču gados vecākie ārsti noteikti apgalvos, ka medicīnas augsti intelektuālais raksturs neļauj vienkāršot pamatvērtības, kas ir medicīnas prakses pamatā. Tomēr visām efektīvām organizācijām ir pamatvērtību infrastruktūra, kuras dalībniekiem ir jāievēro un jāatbalsta par katru cenu. Viņa definētās piecas galvenās ārsta vērtības ir: izcilība, labestība, lojalitāte, stingrība un godīgums (Leung, 2012). Izcilība balstās sasniegumiem klīniskajā praksē, diagnostikas metožu precizitāti, pārbaudītu pieeju izmantošanu un lēmumu pieņemšanas efektivitāti. Tās pamatā ir intelektuāla zinātkāre, labi attīstīta loģika un kritiskās domāšanas prasmes. Tikpat būtiska ir spēja īstenot rīcības plānus, kurus nosaka klīniskās vadlīnijas, un tehniskās prasmes. Svarīgs ir līdzsvars starp apdomīgu un agresīvu rīcību.

Labestību Liangs saista ar mediķa profesijas mīlestību pret cilvēkiem. Lielisks ārsts, neskatoties uz vēlmi pamācīt, vai būt ciniskam, nekad nezaudē mīlestību pret saviem pacientiem. Labestība ir cilvēces pamatvērtība un tā ir primārais dzinulis ārsta misijai. Mūsdienu ārsta gadījumā līdzjūtība atspoguļo emocionālo saikni ar pacientu, neraugoties uz birokrātiju, dokumentiem un laika trūkumu, un šis savienojums ir galvenais dziedināšanas pamats (Leung, 2012).

Lojalitāti Liangs saista ar komandas darbu, draudzību, atbalstu un citu aprūpes personu, piemēram, medicīnas māsu vadīšanu. Lojalitāte atspoguļo ārsta kā mentora cieņu, apņemšanos palīdzēt kolēģiem ieraudzīt kļūdas un labot tās. Stingrība un godīgums, kas arī ir mūsdienu ārsta pamatvērtības. Integritātes pamatā ir uzticība, un uzticību nevar nopelnīt bez konsekventas godīguma apliecināšanas. Liangs uzskata, ka mūsdienu ārstiem jābūt visām šīm lietām. (Leung, 2012). ASV Vašingtonas Medicīnas institūta pētījumā par veselības aprūpes komandas darba principiem un pamatvērtībām (Mitchell et al., 2012) galvenais uzsvars likts uz komandas darbu un vērtībām. Definētas piecas personīgās vērtības, kas raksturo visefektīvākās veselības aprūpes speciālistu grupas: godīgums, disciplīna, radošums, pazemība, rūpes. Savukārt vairākos ASV veiktajos pētījumos, analizējot klīniku darbības efektivitāti un kvalitāti, lai noteiktu galvenās vērtības, veiktas aptaujas vairākām ieinteresētajām grupām – pacientiem, administratoriem un mediķiem (Tregunno, Barnsley, & Murray, 2004) pacienti par galvenajām vērtībām uzskatīja pieklājību, saziņu un atsaucību, administratori uzskatīja par svarīgāko personāla kompetenci, klientu izpratni un sadarbību, bet medicīnas personāls – kvalitātes rādītājus, personāla kompetenci un pacienta rezultātus. Analizējot minētos rādītājus, tiek secināts, ka administratīvajiem vadītājiem vide, kurā cieņa, pieklājība un ieklausīšanās ikvienā tiek uztverta kā attiecību pamatvērtības (Tregunno et al., 2004). Analizējot neatliekamās medicīnas struktūrvienību mājas lapās publicētās vērtības, ASV ārstu koledža (*American College of Physicians*) kā vērtības norādījusi izcilību, cieņu, labestību, profesionālismu un atbildību (ACEP Mission Statement, 2003), savukārt Harboras medicīnas centrs (Core Values, 2019) par vērtībām uzskata: atbildību, pacientu apkalpošanu, izcilību, integritāti/ētiku, cieņu, komandas darbu un pacientorientāciju. Sandjego klīnika (Sharp Health Care's Mission, Vision and Values, 2019) definējusi sekojošas galvenās vērtības: integritāte, rūpes, drošība, inovācijas un izcilība. Dalhausas Universitātes Neatliekamās palīdzības nodaļa (Mission Vision & Values, 2019) definējusi sekojošas vērtības: integritāte, uz pierādījumiem balstīta lēmumu pieņemšana, atbildība, aizstāvība, sadarbība, kritiskā domāšana un profesionālisms. Savukārt Amerikas Neatliekamās medicīnas koledža vērtību skalā uzsver kvalitāti – kvalitatīvu aprūpi, kvalitatīvas zināšanas un pilnveidošanās iespējas, vadību, utml (ACP Core Values, 2003).

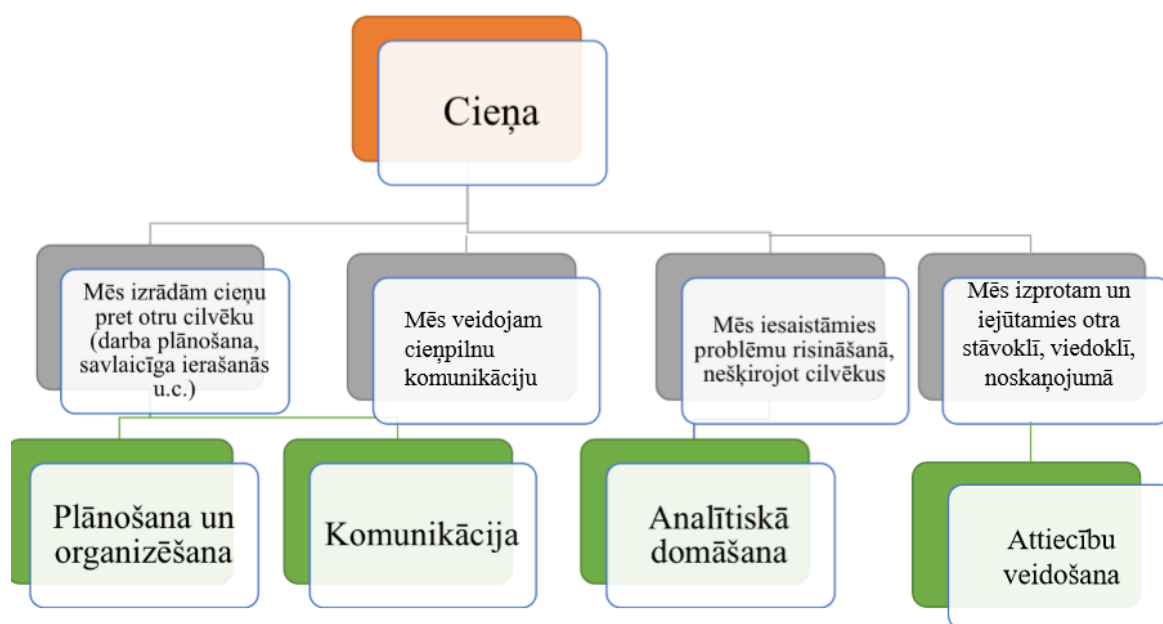
Profesore Ancāne norāda: “Jautājums par ētiku medicīnā ir jautājums par vērtībām sabiedrībā. Vārds "ētika", atvasinot no grieķu *ēthos*, savā dziļākā būtībā nozīmē – paradums, paraža. Pirms runājam par attiecībām starp ārstu un pacientu, neizbēgami nākas skart jautājumu par attiecībām starp sabiedrību un ārstu. Savas vērtības neesam sakārtojuši. Neesam atzinuši, ka veselība un līdz ar to arī cilvēki, kuri palīdz mums to uzturēt vai uzlabot, ir vērtība. Sabiedrība veselību, tāpat kā izglītību, savā vērtību skalā ir nolikusi ļoti zemā vietā” (Ancāne, 2014).

Haligans (Halligan, 2008) norāda, ka mūsu gadsimta problēma ir, ka vairāk intereses mediķi pievērš zālēm un ārstēšanai nekā attieksmei pret pacientu. Viņš, pamatojoties uz 2008.gada pētījumu, norāda, ka “pacienti par galvenajām vērtībām uzskata laipnību, rūpes, labu komunikāciju, godīgumu, uzticamību un uzticēšanos. Šīs attieksmes un īpašības, kas balstītas uz nozīmīgām personiskajām vērtībām, ir mazinājušās līdz ar zinātniskās medicīnas attīstību. Neskaitāmās sistēmas un procesi, kuru ievērošana kļūst svarīgāka par komunikāciju un rūpēm par pacientu.” Komes, par 21.gadsimta ārsta kompetencēm uzskata līderību, vadības prasmes, sistēmu teoriju un analīzi, starpdisciplinārās mācības, medicīnas ekonomiku, veselības politiku un likumdošanu, komandas vadību, empātiju, īpaši darbā ar pacientu, laika organizēšanas prasmes un emocionālo inteliģenci (Combes & Arespachaga, 2012).

Zonevelds norāda, ka jēdzieni “vērtība” un “vērtības” biežāk tiek minēti veselības un integrētās aprūpes literatūrā un praksē, galvenokārt saistībā ar kvalitātes noteikšanu, profesionālās uzvedības vadīšanu un sadarbības saskaņošanu. Interpretējot šos jēdzienus, ir svarīgi apzināties, ka vērtība un vērtības tiek izmantotas kā dažādas koncepcijas ar atšķirīgu nozīmi, kuras var definēt kā nozīmīgus uzskatus, principus vai uzvedības standartus, atsaucoties uz vēlamajiem mērķiem, kas motivē rīcību (Zonneveld et al., 2018).

Aplūkojot vērtības veselības aprūpes nozarei ir redzama profesionālu un ētisku kodeksu tradīcija, kas nosaka vērtības, principus un kvalitātes standartus attiecībā uz profesionālo uzvedību. No vērtībām veidojas rīcība un kompetence. Vērtību kaskadēšanas paraugu skatīt 4. attēlā.

Viena no visbiežāk rakstā minētajām un jebkuras sadarbības pamatā nozīmīgākajām vērtībām ir cieņa. Balstoties uz 4. attēlā redzamo modeli, iespējams no vērtības “cieņa” attīstīt sagaidāmo darbinieka rīcību un amatā demonstrējamās prasmes, tālāk definējot kompetences. Līdzīgi definējot un iedzīvinot pārējās vērtības organizācijā, iespējams veidot uz vērtībām balstītu stratēģiju, kompetenču modeli, ko efektīvi izmantot personāla vadības procesos. Vērtību nozīme atzīta arī integrētās aprūpes literatūrā un praksē (Goodwin, 2013). Neskatoties uz to, ka literatūrā un praksē arvien vairāk tiek pievērsta uzmanība vērtībām, joprojām trūkst informācijas par organizāciju faktiskajām vērtībām un to definīcijām.



4.attēls. *No vērtības attīstošās kompetences un prasmes (autoru veidots)*  
Figure 4 *The competencies and skills developed by values (by authors)*

### Ierobežojumi *Limitations*

Veidojot respondentu aptauju, netika respondentiem papildus sniegtas vērtību definīcijas, kas iespējams, nerosināja respondentus aizdomāties uz atsevišķu vērtību nozīmību neatliekamajā medicīnā. Vēlams veikt pakalpojuma saņēmēju aptauju par pacientiem būtiski nozīmīgām vērtībām. Veidojot un iedzīvinot vērtības NMP dienestā, jāturpina personāla izglītošanas darbs par vērtībām un to saistību ar kompetenci un darba sniegumu.

### Secinājumi *Conclusions*

Kā rāda pētījuma rezultāti, gan analizētajos literatūras avotos, gan neatliekamās medicīnas struktūrvienību un izglītības iestāžu mājas lapās atrodamā informācija liecina, ka organizācijām noteiktās vērtības ir atšķirīgas. Aptaujas rezultāti rāda, ka NMP dienesta personālam nav vienotas izpratnes par vērtību nozīmīgumu, un ne personīgās, ne profesionālās vērtības netiek saistītas ar darbības snieguma novērtēšanu un izveidoto kompetenču modeli. Ņemot vērā, ka veselības aprūpes darbiniekiem būtiski nozīmīgas vērtības ir cieņa, labestība, rūpes, godīgums un ētika, NMP dienesta vadībai jādomā par organizācijai nozīmīgo vērtību noteikšanu, vērtību sistēmas iedzīvināšanu, un uz vērtībām

balstīta kompetenču modeļa izstrādi. Autores nešaubās, ka attīstot vērtību sistēmu darbiniekos, samazināsies personāla mainība un uzlabosies darba sniegums.

### **Pateicība** **Acknowledgments**

Autores izsaka pateicību Neatliekanās medicīniskās palīdzības dienesta Rīgas reģionālā centra arodorganizācijas vadītājam Genādijam Rusanovam un ārsta palīgam Rafaelam Ciekuram par palīdzību aptaujas anketu izplatīšanā un respondentu piesaistīšanā.

### **Summary**

The aim of the paper is to analyse the system of values for Ambulance personnel and the system of values of the educational institutions for emergency medicine in order to prepare proposals of creating system of values for Ambulance personnel in Latvia. In the end of 2018, a survey of 171 responders - Ambulance personnel in Riga - was carried out, where employees were asked to evaluate the importance of 17 most often used values around the World in emergency medicine, using Likert scale. The results of the survey have showed that Ambulance personnel has contradictive understanding of system of values. Their personal values are respect, compassion, care, ethics, honesty, and trust, however, for their professional work they recognise teamwork, professionalism, safety, etc. as very important values.

Authors assume that research should be continued by making surveys of patients, to find out values that could be relevant for Ambulance personnel and further could be used as the basis for Values-based Competence Model for Ambulance personnel.

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# PERSPECTIVES OF USING ATHLETICS MEANS FOR IMPROVING THE LEVEL OF PHYSICAL HEALTH OF STUDENTS

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**Abstract.** *The research aimed at improving the level of physical health with the priority use of athletics exercises. Anthropometric and physiological examinations, methods of determining the level of physical health, methods of mathematical-statistical processing of data were used. A sample of 17–19-year-old students (226 males and 252 females) from Ukrainian universities was tested. The experimental group consisted of 31 males and 33 females, in the control group included 32 males and 31 females. The interventional program consisted of three main units: running, speed-strength and strength activities. The results of scientific research show that only a little part of students had high or higher than the average health. A positive effect through the priority use of athletics means on the parameters of the respiratory, cardiovascular and muscular system both in males and females of EG was established. During the experiment, the level of physical health has grown from the average to above the average in EG students. Among females, 9.1% showed higher than average health level, and 3.2% of males showed a high level, while at the beginning of the experiment there were no students with such levels.*  
**Keywords:** *athletics means, physical development, physical health, students.*

## Introduction

Preserving and improving population health, prolonging the period of active healthy life, reducing premature mortality and increasing the average life expectancy are recognized among the priority tasks of the Strategy for Demographic Development. The problem of research and evaluation of motor activity modes remains crucial since motor activity is among the main factors

determining mortality and morbidity among population, the level of health and quality of life (Bucksch, 2005; Muenning & Woolf, 2007; Bergier et al., 2018).

The studies (Pavlova, Vynogradskyi, & Tulaydan, 2013; Korol, 2014) showed that most of the first-year students from the Uzhorod University (74.3%) belong to the main medical group, that is, they are apparently healthy. But 17.3% already suffer from a variety of diseases, and nearly 2% are exempt from PE classes, or have a disability or are essentially ill. According to the research, the majority of the 1-st and 2-nd-year students from Volyn region of Ukraine belongs to the main medical group (Savchuk, 2011). At the same time, 15–20% of young people already have some deviations in their health condition. The research results of research (Pavlova, Nalyvayko, Vynogradskyi, Okopnyi, & Kit, 2018) showed that the average level of health indicators have 37.2% of students, lower than the average – 20.4%, low – 13.2%, higher than average – 15.6%, high – 12.0%.

Present-day scientific literature is characterized by a large number of publications on the study of the nature of health, the criteria for its evaluation, and the state of health of young people (Apanasenko & Dolzhenko, 2007; Яремко, Вовканич, Гриньків, & Павлова, 2013; Korol, 2014; Ortenburger et al., 2017; Боднар et al., 2018). However, it is very difficult, and sometimes impossible, to compare the results of research, because they are done using different methods, with different age groups under study. Among the examples of such practice is using different parameters (somatic health, morphofunctional indices, the number of diseases per year and the number of days absent because of illness, health self-assessment survey) to evaluate of physical health. At the same time, the issues of ways to attract young people to physical education, to improve physical fitness and health remain unresolved.

The problem of research and increasing of motor activity modes remains relevant, since motor activity is one of the main factors determining health and the level of physical and mental condition of population (Pate, Ross, Dowda, Trost, & Sirard, 2003; Fedewa & Ahn, 2011; Marttinen, Fredrick III, & Silverman, 2018; Román, Vallejo, & Aguayo, 2018). The only way out is to increase the daily motor activity and to include special aerobic exercises of moderate intensity (Haskell et al., 2007; Sallis, Carlson, & Mignano, 2012).

The research objective has been to increase the level of physical health with the priority use of athletic exercises.

## **Methodology**

A sample of 17–19-year-old students (total n=478, 226 males, and 252 females) from Ukrainian universities was tested.

Anthropometric research methods were used to determine the body length, weight, chest circumference. Professional medical scales were used to determine

the body weight. Height was measured with a stadiometer, chest circumference – with a measuring tape. The vital lung capacity was measured by means of spirometry.

The muscle strength was evaluated with a carpal dynamometer.

The Erismann index (chest proportion index) was calculated by Formula 1.

$$EI = CC - 0.5 \times H, \quad (1)$$

where EI – Erismann index,  
CC – chest circumference,  
H – height

For males, if the index is in the range from 0 to +5.8 cm for males – it corresponds to the normal development of the chest, and the normal range for females is from 0 to +3.3 cm. If the index is less than 0, then the chest is considered to be narrow if more than 0 – wide.

The heart rate, the systolic and diastolic blood pressure were measured to study the parameters of a cardiovascular system. Three readings were taken at a 5-minute interval for blood pressure measurement and then a mean value was calculated; all the readings were taken in sitting position and on the left arm.

Evaluation of general health level was realized with the G. Apanasenko's method (Apanasenko & Popov, 1998; Pavlova et al., 2018). It is calculated according to anthropometric data, muscle strength, heart rate, and blood pressure etc. The general result was obtained in the points, and the levels were determined from low to high. The general assessment for high level of health is 16–18 points, higher than average level – 12–15 points, average level – 7–11 points, lower than average level – 4–6 points, low level – less than 3 points. Safe health levels begin from 14 points.

Participants of the interventional program were randomly selected from the sample. Each participant voluntarily provided written informed consent before participating. This research was approved by the ethics committee on human experiments in Lviv State University of Physical Culture.

The experimental group consisted of 31 males and 33 females, the control group included 32 males and 31 females. Stated age of all students at the beginning of the experiment was 18 years. The students of the experimental group (EG) were trained under a proposed interventional program with the priority in application of athletic exercises, the control group (CG) was trained according to the current state education program for students (Raevsky, Tretyakov, & Kanishevsky, 2003). PE classes for EG and CG were scheduled twice a week. The general health level was assessed in all participants before and after one year of classes.

The interventional program consisted of three main units: running, speed-strength and strength activities (Table 1). Running activities involved long-distance race, moderate running, running of segments (from 300 m to 800 m). The speed-strength unit included jumping exercises with a combination of running, and running exercises with a combination of strength exercises (squats, static exercises, load exercises). Each exercise in the unit had to be repeated 3–4 times. Jumping exercises included: running with jumps, jumping, and jumping in a squat, which were performed after running exercises. The strength unit included exercises on machines, with the weight of own body and exercises with medicine balls.

The characteristics of subjects were analyzed by mean value (M), mean square deviation (m), a coefficient of variation (V). After testing the normality of data using the Shapiro-Wilk test, intra-group changes in general health level indices were determined using a paired t-test. Additionally, nonparametric Wilcoxon test was used for abnormally distributed data to assess intra-group differences. For all tests, statistical significance was assumed when  $p < 0.05$ .

*Table 1 The structure of the interventional program*

Units	Athletic means	Duration	Number of repetitions	Heart rate, beats/min
Aerobic endurance	Running of segments (300–800 m)	3–5 min	3–4	140–160
	Cross running (2–5 km)	8–23 min	–	150–160
Strength training	Exercise with a subjects	8–12 sets	3–4	150–160
	Exercise with a partner	8–12 sets	3–4	150–160
	Load exercises	6–8 sets	3–4	160–170
Speed-strength training	Jumping exercise	8–10 sets	–	160–170
	Running for short distances (30–200 m)	10–30 s	2–3	170–180
	Load exercises	4–6 sets	2–3	160–180

## Results

Analyzing the initial results of research on the physical development of students, the average height index for male students was  $175.9 \pm 6.3$  cm, while no significant changes were observed in the indices of students from the first to the third year ( $p > 0.05$ ). According to the obtained values of Erismann index, more than a half (60.0%) of males have a proportional chest, 36.2% have a wide one and only 3.8% of examined have a narrow chest. Among females, a proportional chest was found in 33.6%, a narrow chest – in 40.2% and a broad chest was found in 26.2% of females.

In terms of cardiac heart rate in a state of rest, it should be noted that students' average values corresponded to 75.4±7.1 beats/min for male and 82.3±7.2 beats/min for females (Table 2).

Table 2 *Indices of physical development of students*

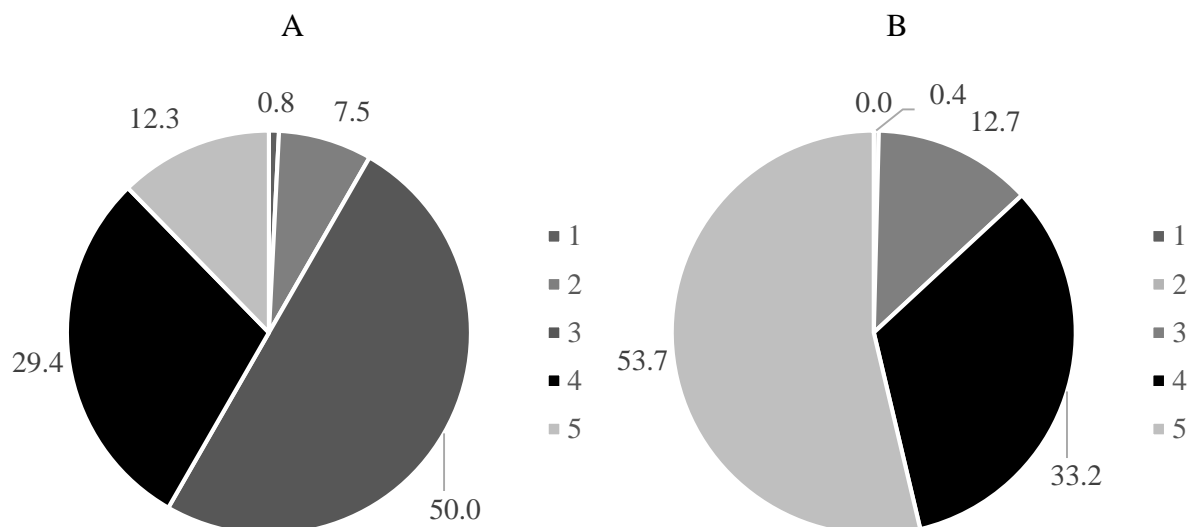
Indices	M±m (V)	
	Males, n=226	Females, n=252
Height, cm	175.9±6.3 (3.6)	169.3±4.9 (2.9)
Body weight, kg	67.5±6.1 (9.1)	59.9±4.6 (7.7)
Chest girth, cm	93.4±3.40 (3.7)	86.2±5.5 (6.4)
Erismann index, cm	5.4±2.0 (36.8)	1.5±0.8 (35.1)
CHR, beats/min	75.4±7.1 (9.4)	82.3±7.2 (9.3)
Systolic blood pressure, mmHg	123.5±8.0 (8.7)	97.8±10.1 (9.1)
Diastolic blood pressure, mmHg	78.6±6.6 (8.7)	63.8±8.8 (12.2)
Lungs capacity, ml	3396.2±470.2 (8.7)	2101.1±227.9 (8.8)
Dynamometry, kg	31.4±6.3 (13.5)	19.4±3.5 (15.5)

Indices of blood pressure among students were within the normal range.

The results of lungs capacity are within the range of 3396.2±470.2 ml (males) and 2101.1±227.9 ml (females). According to the results of dynamometry, the strength index among males corresponds to a satisfactory level for this age group. However, among females, this index is below the norm and corresponds to an unsatisfactory level.

The majority of males (50.0%) possessed the average level of health (Figure 1). These data were typical only for 12.7% of females. Practically no participant had a high level of health indices. Higher than average health indices were observed only in 7.5% of males and 0.4% of females. The low-level parameters had every third participant (29.4% males and 33.2% females).

By analyzing the tendency of general assessment of physical health of males in EG we revealed statistical changes ( $p < 0.01$ ) (Table 3). During the experiment, EG males improved from lower than average level of physical health to the average one, and CG males had significantly stable health indices ( $p > 0.05$ ), but physical health of males in this group corresponds to below the average. As it can be observed, statistical intergroup differences in the level of physical health of males were revealed ( $p < 0.01$ ). Females of EG and CG experienced a probable improvement in the indices ( $p < 0.05$ ) and, on the whole, the indices corresponded to the below the average level.



**Figure 1 The amount (%) of students with different level of physical health:**  
 1 – high; 2 – higher than average; 3 – average;  
 4 – lower than average; 5 – low  
 A – males (n=226), B – females (n=252)

**Table 3 Evaluation of general health level**

Level of physical health	EG		pEG	CG		pCG
	At the beginning	At the end		At the beginning	At the end	
Males						
Low, amount of students (%)	51.6	6.5		40.6	40.6	
Lower than average, amount of students (%)	38.7	22.6		43.8	31.3	
Average, amount of students (%)	9.7	64.5		15.6	28.1	
Higher than average, amount of students (%)	–	3.2		–	–	
High, amount of students (%)	–	3.2		–	–	
General assessment of health, points	3.06±2.34	7.84±3.03	0.005	3.56±2.93	4.13±2.02	0.44
Females						
Low, amount of students (%)	60.6	21.0	0.007	67.7	58.1	
Lower than average, amount of students (%)	21.2	36.3		25.8	29.0	



Average, amount of students (%)	18.2	33.6		6.5	12.0	
Higher than average, amount of students (%)	–	9.1		–	–	
High, amount of students (%)	–	–		–	–	
General assessment of health, points	3.20±1.02	6.12±1.90	0.007	3.32±1.85	5.01±2.3	0.04

### Discussion

An assessment of the functional state of body and its reserve capacities is important for determining the effectiveness of physical education classes (Bucksch, 2005; Pavlova et al., 2018). A good functional state can be considered as a prerequisite for high physical working efficiency and the potential ability of the body to adapt to physical activity. What is more, students’ physical fitness and body functional state are highly correlated with the quality of life (Pavlova et al., 2013). Physical activity provides different physical and mental health benefits; however, adolescents do not mainly meet the recommendation of at least 60 minutes per day of moderate or vigorous physical activity (Sallis et al., 2012).

The data show that most female students have a disharmonious physical development of the chest (Боднар et al., 2018). It is likely that the reason for the significant lagging of the indices of chest physical development of female from those of male is due to less developed muscles of the upper shoulder girdle and less physical activity in their free time (Pavlova, Vynogradskyi, Kurchaba, & Zikrach, 2017).

According to the results of dynamometry, the strength index among males corresponds to a satisfactory level for this age group. However, among females, this index is below the norm and corresponds to an unsatisfactory level. Physiologically, females have lower strength abilities than males, and especially muscles of the upper shoulder girdle.

Having analyzed the cardiovascular system of students in terms of cardiac heart rate in a state of rest, it should be noted that students’ average values indicating signs of tachycardia, which is significantly expressed among females (82.3±7.2 beats/min). Indices of blood pressure, the lungs capacity correspond to the satisfactory level among male students and were within the normal range. As to the female students, the results of blood pressure indicate hypotonic symptoms.

We have observed that the physical state of students was low, our results are comparable with the study (Borras, Herrera, & Ponseti, 2017), in which the data indicate the need to increase the physical level of Spanish youth.

Experts have proved (Apanasenko & Popov, 1998) that for the development of functional abilities of cardiovascular and respiratory systems, running exercises

of different volumes and intensity are recommended. Research results (Dukh & Lemeshko, 2016) suggest that running at 30 m distance is the most effective means for normalizing the difference between systolic and diastolic blood pressure ( $r = -0.618$ ) in 18–19-year-old females, and cyclic exercises of large volumes at that age should be used to improve general efficiency. The relation between aerobic exercise and students' cognitive health and in particular creative potential has been shown (Román et al., 2018). Aerobic exercises have been shown to produce specific physiological changes in brain and positively affect cognitive performance (Best, 2010).

Besides, exercises aimed at the development of dynamic force and strength endurance allow effectively improving the mechanisms of physical activity perception and recovery of the body after it (Blair, Cheng, & Holder, 2001). According to the result of the meta-analytic procedure (Hausenblas & Fallon, 2006) persons engaged in physical training had a higher body satisfaction, and exercise intervention participants reported a more positive body image post-intervention compared to the non-exercising control group.

Analysis of general indices of somatic health showed a positive growth, both in EG and in CG in the process of PE activities. At the beginning of the experiment, almost a third of females in both groups were characterized by unsatisfactory levels of somatic health. According to the results of studies (Chen, Kim, & Gao, 2014; Buková, Zusková, Szerdiová, & Küchelová, 2017), most indicators of the morphofunctional state of students demonstrate a tendency to reduce their opportunities. The results of our study suggest that the lowest health indicators are: respiratory and cardiovascular system indices. In the third year the males' adaptation of the cardiovascular system to physical activity reduced ( $p < 0.05$ ), whereas significant differences of females during 3 years of study were observed ( $p > 0.05$ ). Among the surveyed, a half (50.0%) is characterized by stress adaptation mechanisms of the cardiovascular system (Dukh & Lemeshko, 2016). During medical examination of first-year students was installed that 36–62% have problem of health condition. Nearly 14–21% of students could be classified as the special medical group, 12–18% as the preparatory group, 58–65% belong to the main medical group (Боднар et al., 2018).

In the course of the experiment, we have identified a positive effect of the means of athletics. The percentage of low-health students has decreased substantially in the EG by 51.6% to 6.5% (for males) and 60.6% to 21.0% (for females). The number of males and females of EG with average health increased significantly. In CG, the percentage of males with a satisfactory level of health has doubled.

We should note that in the course of the experiment and after its completion, there was a significant increase in the number of females with average health indices, which indicates the positive impact of athletics means. The results of

health assessment in CG indicate a decrease in the percentage of females with below the average health level by almost 10%.

### Conclusions

The results of scientific research indicate a tendency to decrease in the level of health and physical fitness of students. Only a small part of students had high or higher than average health. According to the results of the experiment, the positive effect through the priority use of athletics means on the parameters of the respiratory, cardiovascular and muscular system in both males and females of EG was established. During the experiment, the level of physical health has grown from the average to above the average in EG students. Among females, 9.1% showed higher than average health level, and 3.2% of males showed a high level, while at the beginning of the experiment there were no students with such levels. The number of students in CG with average health level has doubled, which indicates the positive impact of systematic physical activity.

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# GAIT PARTITIONING WITH SMART SOCKS SYSTEM

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**Abstract.** *Gait is a very complex movement, involving the central nervous system and a significant part of the skeletomuscular system. Any disease that is affecting one or more of the involved parts will reflect in the gait. Therefore, gait analysis has been studied extensively in the context of early disease diagnostics, post-operation rehabilitation monitoring, and sports injury prevention. Gait cycle phase partitioning is one of the most common gait characteristic analysis methods, which utilizes the cyclical nature of human gait. Pressure sensitive mats and insoles are considered the gold standard, but some inherent limitations of these methods urge researchers to seek for alternatives. One of the proposed alternatives is Smart Sock systems, which contain textile pressure sensors. The main limitation of Smart Sock systems is the limited number of sensors, thus complicating gait phase partitioning by these systems. The present paper describes gait phase partitioning using plantar pressure signal obtained by a Smart Sock system. Six-phase partitioning was achieved, including such gait phases as initial contact, loading response, mid stance, terminal stance, pre-swing and swing phase. Mean gait cycle time values obtained from the experimental data were in accordance with the ones found in the literature.*

**Keywords:** *gait analysis; gait phase partitioning; Smart socks.*

## Introduction

Human gait is a complex movement involving almost all body, including skeletal, muscle and neural systems. Any problem with one of the involved systems could affect the gait, and, therefore, the gait can be used for analyzing the performance of the body in sport (Santuz, Ekizos, & Arampatzis, 2015) and medicine. In medicine gait analysis has been used for post-surgery recovery evaluation (Selles, Formanoy, Bussmann, Janssens, & Stam, 2005) and for early detection and evaluation of such diseases as Parkinson disease (Mileti et al., 2017), multiple sclerosis, cerebral palsy (Zhang, Lu, Uswatte, Taub, & Sazonov, 2014), and gait pathologies (Chen, Huang, & Xu, 2008). Gait partitioning is a

widely accepted gait feature analysis and evaluation method that analyses the gait by separating the gait cycle in several functional phases. The number of phases can vary from two (stance and swing phase) to up to eight phases, namely initial contact, loading response, mid stance, terminal stance, pre-swing, initial swing, mid swing and terminal swing (Taborri, Palermo, Rossi, & Cappa, 2016).

Much research has been done for developing different methods of gait partitioning. Force sensing mats and pressure insoles are considered the golden standard due to the accuracy of the measurement they provide, however, lately in the majority of studies accelerometers, gyroscopes and inertial measurement units (IMUs) have been employed (Taborri et al., 2016). This is due to the relatively high cost of the former, which makes them unsuitable for adoption in small clinics or for personal use. On top of that, limitations such as small active area and strictly indoor application of force sensing mats, and impact on the gait measurement for sensing insoles (Kong & De Heer, 2009) encourage researchers to explore other tools. Accelerometers, gyroscopes, and IMUs, alone or in combination, constitute nearly 70% of all research in the field, with the majority of the remaining being optoelectronic systems, foot switches and pressure insoles (Taborri et al., 2016). Accelerometer, gyroscope, and IMUs based systems, however, require rather accurate positioning on the body or a special calibration procedure to decrease the positioning error as the result is calculated from known sensor positions in space (Taborri et al., 2016). Moreover, these sensors, if not well attached, could shift the position during an impact movement such as running. On top of that, several sensors have to be placed on the body for best performance, thus greatly increasing the complexity of positioning.

Smart Socks system is a relatively new approach to gait analysis and is not yet widely used in clinical practice. Smart Socks system contains several smart textile pressure sensors incorporated directly in the socks during the manufacturing process from roughly the same material as the rest of the sock. Such systems are relatively cheap and simple to manufacture but they lack readily available methods for clinical use. It can be considered a simplified version of pressure sensitive insoles, where the limitations have been solved at the expense of decreased sensor count and resolution. The main disadvantage, however, is the absence of methods for analysis of the plantar pressure obtained by these systems.

This paper presents a method for gait cycle partitioning by application of plantar pressure measurement obtained by Smart Socks system. Six-phase partitioning was achieved, including initial contact, loading response, mid stance, terminal stance, pre-swing, and swing. The partitioning is limited to six phases due to the fact that swing sub-phases cannot be distinguished with plantar pressure measurement systems alone as that requires information about knee flexion and the angle of the tibia with respect to the ground (Joshi, Lahiri, & Thakor, 2013). An experiment was performed to verify the feasibility of the developed method,

where the plantar pressure measurement was obtained for three participants during normal gait. Gait partitioning was applied to the obtained measurement and the result was compared to the standard values obtained from the literature. Full gait partitioning algorithm description is given in this paper and the results and their implications are discussed.

## **Materials and Methods**

This paper presents a novel gait partitioning method using smart socks system. According to this method, first, the plantar pressure of the foot while walking is obtained by textile sensors. Then the measurement is processed to recognize individual steps and extract temporal parameters, and finally, the gait phase information is calculated from the measurement.

### *Hardware*

Smart Socks system used in this study contains five textile pressure sensors that are incorporated directly into the socks during the manufacturing process from special conductive yarns, two sensors under the heel, one sensor in the lateral side of mid-foot and two sensors under the metatarsus (Fig. 1). These conductive yarns create loops that are forced together when an external pressure on the sensor is created thus generating electric shortcuts in the sensor, which in turn lower the electrical resistance of the sensor. As a result, the conductivity of a textile sensor is directly proportional to the applied pressure on the sensor. The conductive lines in the sock, which link sensors with the contacts, were produced of the second type of conductive yarn that has lower electrical resistance compared to the yarn that was used for sensor manufacturing.



*Figure 1 Smart Socks system with 5 textile sensors*



Snap connectors were attached to the end of the connecting lines on the lateral side above the ankle for electrical connections of the data acquisition box (Fig. 2). The data acquisition box measured the resistance of textile sensors through a voltage divider circuit at approx. 25Hz rate and sent it to the computer through a Bluetooth connection, where it was received, synchronized, interpolated to 40 samples per second and saved to a file by a dedicated program made in LabVIEW. Post-processing of the saved measurement was performed in Matlab.



Figure 2 Smart Socks system with the data acquisition box

### Data Processing

Gait phase partitioning in this study was performed in Matlab software according to the following algorithm. First, the measurement from each sensor was filtered with a zero-phase digital low pass filter to remove any noise present in the signal. Next, local normalization was performed for each signal according to the equation:

$$u'_i = \frac{u_i - \min_{a \leq i \leq b} u_{[a,b]}}{\max_{a \leq i \leq b} u_{[a,b]} - \min_{a \leq i \leq b} u_{[a,b]}}, \quad (1)$$

where  $u_i$  – the  $i$ -th measurement  
 $a$  – the first index of the normalisation window  
 $b$  – the last index of the normalisation window

Normalization is required to eliminate the difference in sensitivity between sensors. Sensitivity variation between sensors is an inevitable limitation of textile sensors, which results from the materials used in the manufacturing process and the variability of the manufacturing itself. This, however, was not a significant issue for this respective application as only temporal parameters are required for gait phase partitioning. After normalization, the average of the signal from two

sensors located on the heel was calculated and assigned to a new signal describing the pressure variation on the heel, while the same was done for two metatarsal sensors to produce a signal for the pressure variation under the toe. These two signals were employed for gait phase partitioning.

The six calculated phases included the initial contact, loading response, mid stance, terminal stance, pre-swing, and swing phase (Fig. 3). The initial contact is the moment when the foot of reference, for which the parameter is calculated, contacts the ground. In normal walking gait, this initial contact is done by the heel, although entire foot or toe contact can happen in patients with pathological gait pattern. According to the gait partitioning algorithm described in this study, the initial contact time is registered, when the combined heel signal value falls below the threshold value, which was selected 0.5 (from trial and error) (Fig. 4).

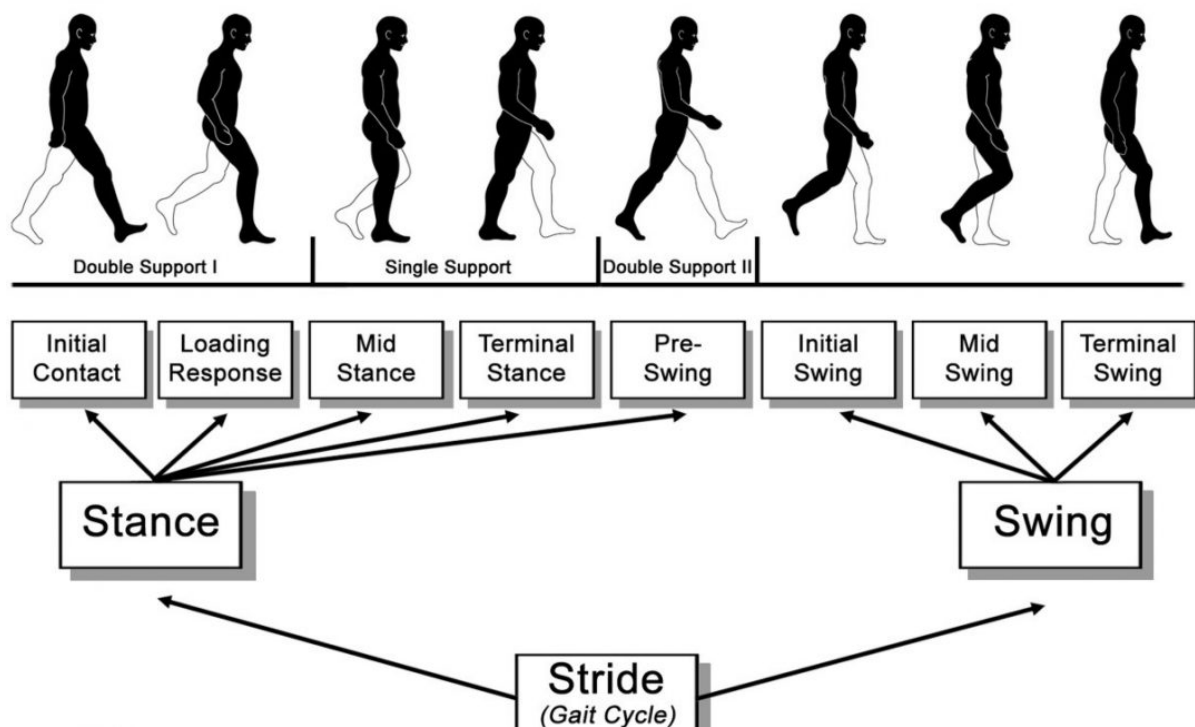
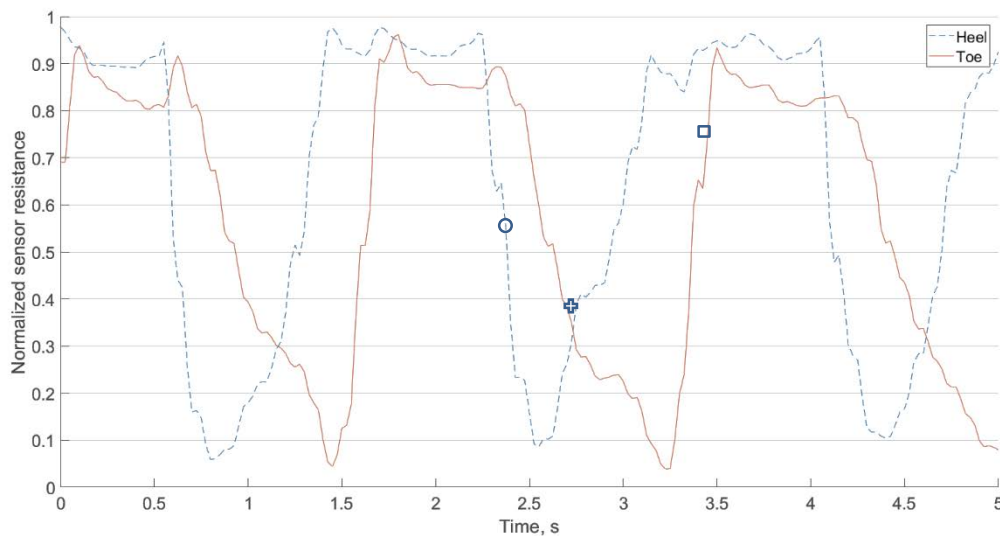


Figure 3 **Phases of the gait cycle**  
 (Stöckel, Jacksteit, Behrens, Skripitz, Bader, & Mau-Moeller, 2015)

The loading response (LR) begins with the initial contact of the reference foot and concludes with the contralateral toe off moment. Toe off moment in this study was calculated as the moment when the combined toe signal raised above a threshold of 0.7 (from trial and error).



*Figure 4 Sensor signal example, heel touch (circle), flat foot (cross) and toe raise (square) detection moments are shown*

The mid-stance (MS) phase begins with the contralateral toe off moment and concludes with the moment when the center of gravity is directly above the reference foot. In this study, the endpoint of this phase was assumed to be the moment when the toe signal and the heel signal were closest in value, as it is the moment when the pressure moves from the heel region to the metatarsus and toes.

The terminal stance (TS) begins with the center of gravity above the reference foot and concludes with the contralateral heel contact with the ground or initial contact. Finally, the pre-swing (PS) phase lasts from the contralateral initial contact until the toe rise of the reference foot from the ground. As it can be seen, all five stance phases are calculated from three temporal events of each foot, namely heel strike, flat foot and toe off, but measurements from both feet are required for gait phase partitioning.

## Results and Discussion

A gait partitioning method for gait phase calculation has been proposed in the present study that uses feet plantar pressure measurement, obtained by Smart Socks system. An experiment was performed for evaluation of the feasibility of the proposed method, where the plantar pressure of three participants was acquired with the Smart Socks system described above and processed according to the proposed method. Each participant used two types of shoes, casual and sports shoes, to analyze the effect of the footwear on the measurement. The difference between casual and sports shoes typically is in the shape and material, where sports shoes generally are more conforming to the foot, with one of the major differences being a more prominent supinator, which supports the foot and

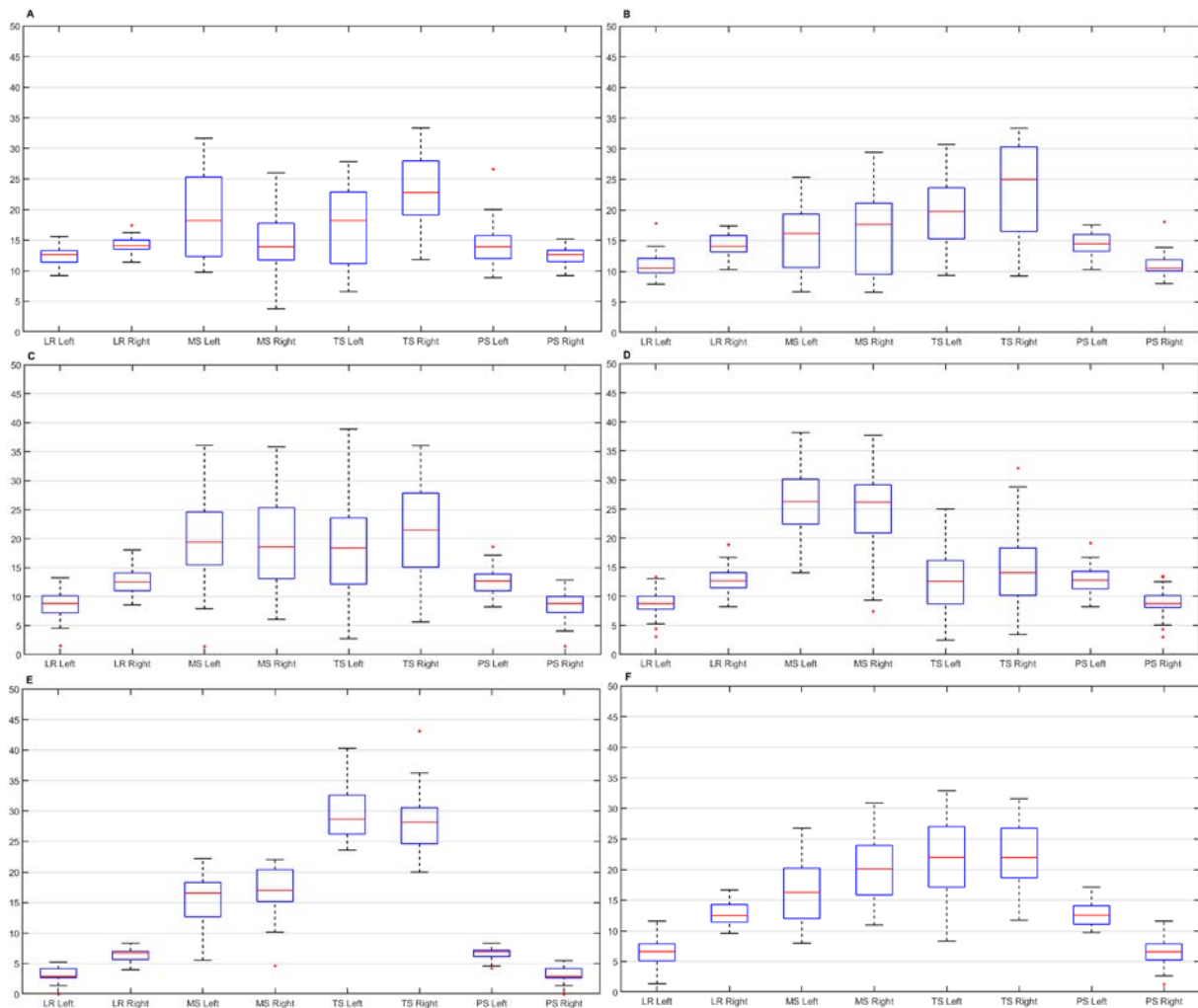
puts extra pressure on sensors. The summary of the measurement is given in the table below (Table 1) together with the range of typical values for each phase found in the literature (Perry & Burnfield, 2010).

**Table 1 Experimental result, mean percentage of the phase from the total gait cycle and the standard deviation, the number after the dot for volunteer number means casual (1) or sports shoes (2)**

Left foot													
Volunt.	Number of steps	Loading response		Midstance		Terminal stance		Pre-swing		Stance		Swing	
		% of the full step		% of the full step		% of the full step		% of the full step		% of the full step		% of the full step	
		mean	std	mean	std	mean	std	mean	std	mean	std	mean	std
1.1	25	12.39	1.67	18.78	6.63	17.29	6.09	14.55	3.70	62.83	2.49	37.17	2.49
1.2	21	11.20	2.05	15.50	5.00	19.96	5.38	14.47	1.83	61.12	1.66	38.88	1.66
2.1	88	8.59	2.15	20.10	6.46	18.41	7.13	12.63	2.04	59.74	2.28	40.26	2.28
2.2	78	8.75	2.05	26.36	5.37	12.55	5.45	12.83	1.98	60.49	2.00	39.51	2.00
3.1	24	3.07	1.20	15.80	4.08	29.36	4.03	6.71	0.97	54.93	1.81	45.07	1.81
3.2	42	6.55	2.20	16.31	4.82	21.77	6.00	12.88	1.93	57.52	3.95	42.34	3.06
Right foot													
1.1	25	14.20	1.29	14.26	5.38	22.99	6.00	12.45	1.59	63.90	2.09	36.10	2.09
1.2	21	14.25	1.79	16.05	6.99	22.95	7.53	11.22	2.02	64.46	1.62	35.54	1.62
2.1	88	12.59	2.05	19.01	7.87	21.26	8.12	8.65	2.19	61.51	2.46	38.49	2.46
2.2	78	12.82	1.95	24.83	6.31	14.65	6.21	8.86	2.01	61.15	1.93	38.85	1.93
3.1	24	6.37	1.19	16.75	4.13	28.14	4.98	3.06	1.22	54.33	2.79	44.94	1.66
3.2	42	12.86	1.83	20.15	5.00	22.24	5.02	6.58	2.22	61.83	2.92	38.10	2.45
Reference		10-12%		18-20%		18-20%		10-12%		60-62%		38-40%	

It should be noted that the typical value range has only suggestive nature as it is widely recognized that there is a significant difference between individuals and even feet of the same person due to the asymmetry (Herzog, Nigg, Read, & Olsson, 1989). The results for each participant individually are also depicted in Fig. 5.

From the data given in the table, it can be seen that the stance phase time is in a close agreement with the expected 60% of the full gait cycle. The exception is participant 3 with casual shoes (Table 1, entry 3.1), which could be explained by poor placement of socks on feet. This is further supported when analyzing this particular measurement phase by phase. As can be seen, loading response and pre-swing values are significantly lower than normal, which could be caused by sensor shift in dorsal (heel) direction. This is a typical problem when putting on shoes, which makes the sock to be pulled more on the foot, thus altering the placement of sensors.



**Figure 5** The calculated percentage of the full step for each phase (figures A, B, C, D, E and F correspond to Table 1 rows 1.1, 1.2, 2.1, 2.2, 3.1 and 3.2 respectively, left column – casual shoes, and right column – sport shoes)

As it can be seen from the data in Table 1, the difference between measurement with casual and sports shoes for the first two participants was rather low for the double support phases (loading response and pre-swing), and for the total stance phase time. On the other hand, the highest variance was for the midstance and terminal stance phases. These two phases are separated by the moment of foot-flat when the center of mass is directly above this foot. In the developed algorithm, this moment is detected when the signal from front sensors (toe pressure signal) is closest to the signal from rear sensors (heel pressure signal). In sports shoes, the pressure on sensors can be affected by the supinator, and therefore the foot-flat moment is not exactly when the signals of front and back are equal.

A considerable step to step variation in separate phase result can be seen in Fig. 5. Although this is to be expected, considering the nature of walking and keeping the balance, care should be taken when analyzing separate steps. The greatest variance was observed for the midstance phase and terminal stance phase also called the single support phases. The sum of these phases has a significantly lower difference between shoe types than if these phases are compared separately (approx. 0.4-1.7% for combined single support phase compared to up to 1.8-12.4% for the sum of separate phase difference). Therefore, the calculation of the moment for foot-flat must be improved by additional information, such as the signal from the fifth sensor or by using the Step Vector algorithm developed by the authors of this article previously especially for Smart Socks systems.

A significant cause for error in the calculation can be a low sampling rate for the measurement. The sampling rate for data used in this study was 40 samples per second, with 25ms time between two measurements. This means that a single sample error can give up to 2.5% error to the calculation of the time for an event if the full step cycle is 1s or even more for shorter steps. This issue can be solved by using faster data acquisition electronics.

## **Conclusions**

This paper presented a novel gait partitioning method using Smart Socks system. To evaluate the proposed method, plantar pressure measurement for normal walking gait was obtained for three participants. The experiment was performed with two type footwear, casual shoes, and sports shoes to evaluate the effect of the footwear on the measurement. Despite the limited sampling rate and other possible error sources, such as the position of socks on the foot during the experiment, calculated gait phase parameters in most cases were in accordance or close to the values found in the literature.

For future work, additional study is necessary to compare findings with an established reference. This future study will be performed with improved electronics to achieve a better sampling rate and a wider population sample.

## **Acknowledgments**

This work has been supported by the European Regional Development Fund within the Activity 1.1.1.2 “Post-doctoral Research Aid” of the Specific Aid Objective 1.1.1 “To increase the research and innovative capacity of scientific institutions of Latvia and the ability to attract external financing, investing in human resources and infrastructure” of the Operational Programme “Growth and Employment” (No. 1.1.1.2/VIAA/1/16/153).

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## ANALYSIS OF THE SELF-REPORTED PHYSICAL ACTIVITY QUESTIONNAIRES INDICATORS

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**Abstract.** “Global action plan on physical activity 2018–2030” emphasizes the need for weekly moderate physical activity for ensuring human health. Physical activity can be measured by a variety of objective and subjective methods, but one of the prerequisites for understanding the connection between active lifestyle and health certainty that the measuring instrument measures the feature for which it has been created and that it can be used in many countries. The goal of the research is to determine the correlations between measurement properties of fitness club clients’ self-reported physical activity indicators in the Global Physical Activity Questionnaire (GPAQ), International Physical Activity Questionnaire (IPAQ), European Health Interview Survey-Physical Activity Questionnaire (EHIS-PAQ), and to evaluate their concurrent validity. Methods: participants (volunteers) were 70 fitness club visitors (age 18-79). This research is preparative part for the further research of the project “European Physical Activity and Sports Monitoring System (EUPASMOS)”. The type, involvement and amount of physical activity was determined by the GPAQ, IPAQ and EHIS-PAQ adapted into Latvian. The research results showed that questionnaires allowed to determine the respondents’ physical activity indicators in and out of fitness club activities. Statistically significant correlations were determined between indicators obtained in all physical activity questionnaires applied in the research ( $p < 0.05$ ). This confirms that all three physical activity determination questionnaires can be used for physical activity research in Latvian environment.

**Keywords:** GPAQ, IPAQ, EHIS-PAQ concurrent validity, measurement properties, physical activity.

### Introduction

Today’s dynamic rhythm of life, the ever-increasing mental and physical loads, combined with hypodynamics and harmful habits, have become human health problems and predisposing factors to the reduction of life expectancy in the world’s leading countries (Kohl, 2012). The significance of physical activity in promoting human physical and mental health has been scientifically proven;



however, despite the efforts to promote populations' movement activity, scientists note that many inhabitants prefer to watch physical activities but do not engage in the process themselves (Cardinal, 2016). Based on recommendations by the World Health Organization (WHO), it is advised to those who have come of age to have at least 150 minutes of weekly moderate intensity physical activity. In contrast, statistics for 2016 show that 20% of men and 27% of women have indicated low levels of physical activity, even reaching up to 55% for seniors (WHO, 2017).

The modern urbanization process contributes to the reduction of people's physical activity, as the amount of green spaces is reduced in cities due to the increase of building density, which also affects the physical activity frequency of inhabitants. The question of which measuring instruments are optimally suited for physical activity determination and research, their reliability and validity in a particular cultural environment has become more topical in a global context (Baumeister et al., 2016; Wanner et al., 2017; Helmerhorst et al., 2012; Van Poppel et al., 2010; Craig et al., 2003), as well as comparative studies of various physical activity determination instruments are actively being carried out in the world (Raask et al., 2017; Rivière et al., 2016; Bull et al., 2009). The goal of the research is to determine the correlations between measurement properties of fitness club clients' self-reported physical activity indicators in the GPAQ, IPAQ and EHIS-PAQ questionnaires and to evaluate their concurrent validity. Methods: research participants were 70 fitness club visitors (volunteers) aged from 18 to 79. The concurrent validity of the physical activity determination questionnaires GPAQ, IPAQ and EHIS-PAQ adapted into Latvian was determined.

### **Research Methodology**

This research is preparative part for the further research of the project "European Physical Activity and Sports Monitoring System (EUPASMOS)". The research used GPAQ, IPAQ, EHIS-PAQ questionnaires to collect information on the respondents' physical activity types and aspects promoting participation in physical activity. Respondents were asked to fill out a self-completion questionnaire. The questionnaires were filled up at the same time.

Research respondents – clients (volunteers) of fitness clubs in Riga (n=70), of which 30 were men (42.9%) and 40 were women (57.1%) aged from 18 to 79. The average age of respondents was 25.8 years. By using questionnaires, an informative basis was obtained on the correlations between physical activities of fitness club visitors. A survey of population's health factors was conducted with the EHIS-PAQ (European Health Interview Survey-Physical Activity Questionnaire). The questionnaire consists of several sections: individual and household characteristics; health-impacting module; questions about physical

activity; movements; rest and leisure physical activities. In total, the questionnaire consists of 19 questions. IPAQ (International Physical Activity Questionnaire) has two variants: the short one (IPAQ short) and the long one (IPAQ long), the research analysed both variants. The IPAQ short questionnaire consists of 7 questions: questions about voluminous, moderate physical activity; movements and sitting. The IPAQ long variant consists of 27 questions, which are divided into 5 parts: physical activity during work duties; movements; house work; household maintenance; caring for the family; rest, sport and physical activity in leisure; the time spent sitting. GPAQ (Global Physical Activity Questionnaire) is a 16-question questionnaire divided into 4 sections: activity at work; movement to and from different locations; leisure activities; sedentary behaviour. Concurrent validity is characterized by the Pearson correlation coefficient. The most important criterion is the statistical significance of the correlation coefficient. The research also identified weak statistically significant correlations, and this article analyses statistically significant ( $p < 0.05$ ) close or moderately close correlations. The results were processed using the Statistical Package for the Social Sciences (SPSS) version 23.0.

## **Research Results**

**By analysing statistically significant correlations between the content indicators of the EHIS-PAQ and IPAQ (short) questionnaires**, moderately close correlations were determined. The question “How many days in a usual (typical) week do you walk at least 10 minutes without a rest?” shows a moderately close positive correlation with the question “In how many days (during the last 7 days) have you walked for at least 10 minutes without a rest?” ( $r = .533$ ;  $p < 0.01$ ). Both questionnaires analyze the question of respondents’ movement on foot. There is a negative correlation between the question “How many days in total in the last 12 months have you not attended work for health reasons?” and the question “In how many days (during the last 7 days) have you walked for at least 10 minutes without a rest?” ( $r = -.454$ ;  $p < 0.05$ ), which leads to the conclusion that the more days the respondents do not go to work due to health problems, the less they moved on foot.

**The correlation analysis between the indicators of the EHIS-PAQ and IPAQ (long) questionnaires** showed a positive close correlation between the question “What is your employment status in your main job?” and the question “Are you currently employed?” ( $r = .749$ ;  $p < 0.01$ ), where the employment status is closely related to whether or not the respondent is employed. There is a negative moderately close correlation between the question “How many days in total in the last 12 months have you not attended work for health reasons?” and the question “How much time (in the last 7 days) “did you walk from one place to another?”

( $r=-.637$ ;  $p<0.01$ ). The more days the respondents skip work due to health problems, the less they moved on foot. Respondents' walking for more than 10 minutes is related to moving around the workplace. From this it can be concluded that for some respondents, physical activities related to walking are promoted by work conditions, which motivate them to move more, not by their leisure time ( $r=.523$ ;  $p<0.01$ ). There is a positive close correlation between the question "How many days in a usual (typical) week do you ride a bicycle for at least 10 minutes without a rest?" and the question "In how many days (in the last 7 days) did you ride a bicycle for at least 10 minutes without a rest, moving from one place to another?" ( $r=.719$ ;  $p<0.01$ ), both questionnaires analyse answers to the question on respondents' movements with a bicycle.

**Correlations between indicators of the EHIS-PAQ and GPAQ (short questionnaires).** There is a negative moderately close correlation between the gender of the respondents and the question "How many days a week do you usually perform moderate intensity activities as part of your work?" ( $r=-.581$ ;  $p<0.01$ ), which shows that the respondents – men do moderate intensity activities less often as part of the work to be done.

There is a positive moderately close correlation between the question "What is your legal family status?" and the question "Do you perform high intensity sport, physical activity (fitness) or leisure (entertainment) activities that lead to a sharp increase in breathing or heart rate (for example, running or football) continuously for at least 10 minutes?" ( $r=.568$ ;  $p<0.01$ ).

Respondents who are not married are mostly engaged in high intensity sport physical activity. There is a negative moderately close correlation between the question "How many days in total in the last 12 months have you not attended work for health reasons?" and the question "How much time per day do you usually spend in moderate intensity sport, fitness or leisure (entertainment) activities?" ( $r=-.538$ ;  $p<0.05$ ). Respondents, who spend less time doing moderate intensity sport, fitness or leisure activities, fall sick more often. There is a positive moderately close correlation between the question "How many days in total in the last 12 months have you not attended work for health reasons?" and the question "How much time do you usually spend sitting or sleeping each day?" ( $r=.540$ ;  $p<0.01$ ). Respondents, who spend more time sitting or sleeping, fall sick more frequently. Between the question "What is your height without shoes?" and the question "How many days per week do you usually perform moderate intensity activities as part of your work?", a positive moderately close correlation ( $r=.541$ ;  $p<0.01$ ) was found. There is a negative moderately close correlation between the question "What is your weight without clothes and shoes?" and the question "How much time a day do you usually spend in moderate intensity sport, fitness or leisure (entertainment) activities?" ( $r=-.560$ ;  $p<0.01$ ). Respondents with lower body weight spend longer periods of time engaging in moderate intensity physical

activity. From this it can be assumed that if the respondent devotes more time to moderate intensity physical loads, their body weight decreases.

**The correlations between the content indicators of the IPAQ (short), IPAQ (long) questionnaires were determined.** There is a positive moderately close correlation between the question “How much time on one of the last 7 days did you spend performing very hard physical work?” and the question “How long did you usually perform very hard physical activities in any of the last 7 days?” ( $r=.649$ ;  $p<0.01$ ). There is a positive moderately close correlation between the question “How much time on one of the last 7 days did you spend performing moderately intensive physical work?” and the question “How long did you usually perform moderately hard physical activities in any of the last 7 days?” ( $r=.634$ ;  $p<0.01$ ). Both questionnaires ask similar questions about moderately intensive physical work. There is a positive moderately close correlation between the question “In how many days (in the last 7 days) did you walk for at least 10 minutes without a rest, moving from one place to another?” and the question “In how many days (in the last 7 days) did you walk for at least 10 minutes without a rest?” ( $r=.682$ ;  $p<0.01$ ). Both questionnaires analyse similar content. There is a positive moderately close correlation between the question “How much time during one of these days did you walk, moving from one place to another?” and the question “For how long did you usually walk on any of these days?” ( $r=.610$ ;  $p<0.01$ ). There is a positive close correlation between the question “How much time on any of the last 7 days did you spend performing very hard physical work in the garden or in the backyard?” and the question “How long did you usually perform very hard physical activity on any of the last 7 days?” ( $r=.746$ ;  $p<0.01$ ). The more time the respondent spends performing very hard physical activity in the household (garden or backyard), the more time the respondent spends performing very hard physical activity and vice versa. There is a positive moderately close correlation between the question “How much time on any of the last 7 days did you spend performing moderately intense physical work in the garden or in the backyard?” and the question “How long did you usually perform very hard physical activity on any of the last 7 days?” ( $r=.514$ ;  $p<0.05$ ). The more or less time the respondent performs moderately intensive physical work in the garden or in the backyard, the accordingly longer or shorter is the total time spent in very hard physical activity. There is a positive close correlation between the question “How much time on one of the last 7 days did you spend performing moderately intensive physical work in the garden or in the backyard?” and the question “How long did you usually walk on any of these days?” ( $r=.738$ ;  $p<0.01$ ). The longer the respondents perform moderately intensive work in the garden or in the backyard, the longer time they spend walking. There is a positive moderately close correlation between the question “How much time did you spend walking during leisure on one of these days?” and the question “How long did

you usually walk on any of these days?” ( $r=.543$ ;  $p<0.01$ ). Both questionnaires ask similar questions about the time the respondent spends walking, thus, they correlate with each other. The correlation shows the tendency that the more time the respondent spends walking during leisure, the greater the total time the respondent spends walking. There is a positive moderately close correlation between the question “How much time on one of the working days (in the last 7 days) did you spend sitting?” and the question “How long did you usually perform moderately hard physical activity on any of the last 7 days?” ( $r=.574$ ;  $p<0.01$ ). The longer the respondents perform moderately hard physical activity, the longer time they spend sitting after that. There is a positive moderately close correlation between the question “How much time did you spend sitting on one of the holidays (in the last 7 days)?” and the question “How much time did you usually spend sitting on any of the work days (in the last 7 days)?” ( $r=.543$ ;  $p<0.01$ ). Both questionnaires ask similar questions about the time the respondents spend sitting, thus, they correlate with each other.

**Correlation analysis between the indicators of the IPAQ (short), GPAQ questionnaires** also provides insight into their interrelations. There is a positive moderately close correlation between the question “Does your work include high intensity activities, which cause a sharp increase in breathing or heartbeat frequency (for instance, carrying or lifting heavy loads, digging or building) for at least 10 minutes without a rest?” and the question “How much time did you usually spend sitting at any work day (in the last 7 days)?” ( $r=.511$ ;  $p<0.05$ ). Analysis showed correlation between high intensity work and the time that the respondent later spends sitting. There is a positive weak correlation between the question “Does your work include high intensity activities, which cause a sharp increase in breathing or heartbeat frequency (for instance, carrying or lifting heavy loads, digging or building) for at least 10 minutes without a rest?” and the question “How long did you usually perform very hard physical activity on any of the last 7 days?” ( $r=.474$ ;  $p<0.05$ ). If the respondent in the first question has answered that at work they perform high intensity activities, then the second question shows an increase of the time to perform very hard physical work. There is a positive weak correlation between the question “How much time a day at work do you usually spend in moderate intensity activities?” and the question “How long did you usually perform moderately hard physical activity on any of the last 7 days?” ( $r=.491$ ;  $p<0.01$ ). There is a positive correlation between the question “How many days a week do you usually walk or ride a bicycle for at least 10 continuous minutes to get to and from different places?” and the question “On how many days (in the last 7 days) did you walk for at least 10 minutes without a rest?” ( $r=.478$ ;  $p<0.01$ ). Both questionnaires ask similar questions, thus, they correlate with each other. There is a positive weak correlation between the question “How much time a day do you usually spend walking or riding a bicycle

to move around?” and the question “For how long did you walk on any of the last 7 days?” ( $r=.479$ ;  $p<0.01$ ). There is a positive weak correlation between the question “How much time a day do you usually spend in high intensity sport, fitness or leisure (entertainment) activities?” and the question “On how many days (in the last 7 days) did you perform very hard physical activity, such as weightlifting, digging, aerobics or fast cycling?” ( $r=.427$ ;  $p<0.001$ ). There is a negative correlation between the question “Did you perform moderately intensive sport, physical activity (fitness) or recreation (leisure) activities, which cause a slight increase in breathing or heartbeat rate continually for at least 10 minutes (for example, fast walking, cycling, swimming, volleyball)?” and the question “For how long did you usually perform moderately hard physical activity on any of these days?” ( $r=-.407$ ;  $p<0.01$ ). There is a positive weak correlation between the question “How much time per day do you usually spend in moderate intensity sport, fitness or leisure (entertainment) activities?” and the question “For how long did you usually walk on any of these days?” ( $r=.470$ ;  $p<0.01$ ).

**Correlation analysis between indicators of the IPAQ (long), GPAQ questionnaires.** There is a positive close correlation between the question “How many days a week do you usually perform high intensity activity as part of your work?” and the question “On how many days (in the last 7 days) did you perform very hard physical work, for example, weightlifting, digging, heavy construction work, climbing stairs?” ( $r=.860$ ;  $p<0.01$ ). The physically more difficult work is done by the respondents, the higher the intensity. There is a positive close correlation between the question “How much time a day do you usually spend in high intensity activities at work?” and the question “How much time on one of these days did you spend performing very hard physical work?” ( $r=.783$ ;  $p<0.01$ ). The research found a positive close correlation between the question “How much time a day do you usually spend in high intensity activities at work?” and the question “How much time on one of these days did you spend performing moderately intensive physical work in the garden or in the backyard?” ( $r=.708$ ;  $p<0.05$ ). There is a close correlation between the question “How many days a week did you usually perform moderate intensity activities as a part of your work?” ( $r=.700$ ;  $p<0.01$ ). There is a positive close correlation between the question “How many days a week do you usually walk or ride a bicycle for at least 10 minutes without a rest to get to and from different places?” and the question “On how many days (in the last 7 days) did you walk for at least 10 minutes without a rest, moving from one place to another?” ( $r=.724$ ;  $p<0.01$ ).

## **Discussion**

The WHO Global Strategy foresees the need for improvements in the health surveillance system for collecting data on population’s physical activity in all

countries. Determining the validity of various physical activity detection tools is an important pre-condition for further monitoring of population's physical activity.

The international study (Craig et al., 2003) has demonstrated that reliable and valid physical activity data can be collected by the IPAQ instruments in many countries and this study also identified statistically significant correlations between indicators of all physical activity questionnaires (GPAQ, IPAQ (S), IPAQ (L) and EHIS-PAQ). The highest number of correlations is between the IPAQ (L) variant and GPAQ – 82 correlations, including 5 close correlations ( $0.7 < r < 0.99$ ) and 13 moderate correlations ( $0.5 < r < 0.69$ ), while the rest are weak correlations. The lowest number of correlations is between IPAQ (S) and GPAQ – 22 correlations. These include 1 moderate correlation ( $0.5 < r < 0.69$ ) and the rest are weak correlations ( $0.2 < r < 0.49$ ). Concurrent validity of GPAQ was assessed using IPAQ, overall, the results showed an acceptable level of association (0.45 to 0.57) (Bull et al., 2009).

The results of the study show that these instruments are ready for use to compare population estimates of physical activity. However, in order to prove that the test measures the trait for which it was created, it is necessary to determine not only the concurrent validity, but also the criterion validity (Helmerhorst et al., 2012) by comparing self-reported levels of physical activity with an objective assessment captured by an accelerometer.

## Conclusions

There are statistically significant correlations between the content indicators of all three physical activity questionnaires, but most moderate and strong correlations were determined between IPAQ (short) and IPAQ (long) ( $p < 0.05$ ).

**Between EHIS-PAQ** indicators and IPAQ (short), IPAQ (long) and GPAQ (short) forms, 12 moderate and strong correlations ( $p < 0.05$ ) were found:

**With the IPAQ (short)** variant, there are two moderate statistically significant correlations. Both questionnaires analyse the question of respondents' walking ( $r = .533$ ;  $p < 0.01$ ); and a correlation between the number of days skipped at work due to health problems and the amount of walking ( $r = -.454$ ;  $p < 0.05$ ). With the **IPAQ (long)** variant, there are three strong and 1 moderate correlation ( $p < 0.05$ ). The employment status is closely to whether the respondent is employed ( $r = .749$ ;  $p < 0.01$ ). The more days the respondents skip work due to health problems, the less they walk and vice versa ( $r = -.637$ ;  $p < 0.01$ ). Physical activity related to walking is related to the type of leisure time activity ( $r = .523$ ;  $p < 0.01$ ). There is a correlation between the question indicators that analyse cycling ( $r = .719$ ;  $p < 0.01$ ). With the **GPAQ (short) variant**, there are six moderate correlations ( $p < 0.05$ ). There is a moderate correlation between the average

intensity activities as part of work and gender ( $r=-.581$ ;  $p<0.01$ ). Between high intensity sport physical activity and family status ( $r=.568$ ;  $p<0.01$ ). Between illness frequency and average intensity physical activity ( $r=-.538$ ;  $p<0.05$ ). Between the number of illness cases and the time spent sitting or sleeping ( $r=.540$ ;  $p<0.01$ ). Between average intensity daily load and respondents' height indicators without footwear ( $r=.541$ ;  $p<0.01$ ) and weight indicators without clothing and footwear ( $r=-.560$ ;  $p<0.01$ ).

**Between IPAQ (short) and IPAQ (long)**, there are 10 moderate and strong correlations ( $p<0.05$ ). There is a correlation between the time spent performing very hard physical work and hard physical activity ( $r=.649$ ;  $p<0.01$ ); there is a correlation between moderate intensity physical work and moderately hard physical activity ( $r=.634$ ;  $p<0.01$ ), between walking ( $r=.682$ ;  $p<0.01$ ), as both questionnaires analyse similar content. Walking on one of the days and how it is in everyday life ( $r=.610$ ;  $p<0.01$ ). There is a correlation between performing hard physical work in the garden or in the backyard and the time spent in the same period of time performing hard physical activity ( $r=.746$ ;  $p<0.01$ ) and moderate physical activity ( $r=.514$ ;  $p<0.05$ ). Between performing moderate physical intensity in the garden or in the backyard and walking ( $r=.738$ ;  $p<0.01$ ). Walking in free time is related to the total walking time ( $r=.543$ ;  $p<0.01$ ). The time spent sitting during work time is related to the amount of moderately hard physical activity ( $r=.574$ ;  $p<0.01$ ), as well as to the amount of time spent sitting ( $r=.543$ ;  $p<0.01$ ).

**Between IPAQ (long) and GPAQ**, there are five close correlations ( $p<0.05$ ). There are correlations between answers to the question about how many days a week high intensity activities are performed, as part of work and the performed hard physical work ( $r=.860$ ;  $p<0.01$ ), as well as if on one of these days very hard physical work is performed ( $r=.783$ ;  $p<0.01$ ), with moderately intensive physical work in the garden or in the backyard ( $r=.708$ ;  $p<0.05$ ), with average intensity activities as part of work ( $r=.700$ ;  $p<0.01$ ). There is a correlation between the weekly time spent riding a bicycle and walking ( $r=.724$ ;  $p<0.01$ ).

**Between IPAQ (short) and GPAQ** five correlations have been found ( $p<0.05$ ). High intensity activities as part of work correlates with performing hard physical work ( $r=.860$ ;  $p<0.01$ ). High intensity physical activities at work and very hard physical work on one of the days ( $r=.783$ ;  $p<0.01$ ), as well as with moderately intensive work in the garden or in the backyard ( $r=.708$ ;  $p<0.05$ ). There is correlation between question indicators related to average intensity activities as part of work ( $r=.700$ ;  $p<0.01$ ). There is also correlation between the respondents' answers to cycling and walking ( $r=.724$ ;  $p<0.01$ ).



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# INFORMATION NEEDS OF DIGESTIVE TRACT SURGERY PATIENTS BEFORE AND AFTER THE SURGERY: AN EXPLORATORY STUDY OF WESTERN LITHUANIA

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**Abstract.** *The aim of this study was to describe the information needs of patients undergoing gastrointestinal surgery in Western Lithuania. Methods. This data were collected from patients of three Klaipeda city hospitals performing digestive tract surgeries in January – March 2015. The interview responses (n = 86) were analyzed inductively with thematic content analysis. Results. The interview revealed lack of information about disease, treatment and nursing care. The participants expressed fear and worries about their forthcoming surgery, anesthesia, pain, the ways of pain management, possible complications and their prevention as well as the future concerning their disease in general. Conclusions. The results show that the participants had not got enough information about treatment, nursing, anesthesia, rehabilitation, wound care or about post-surgery period. Instead they felt fear and anxiety. The participants were not included into treatment and nursing processes. According to the participants' responses, the information needs were different before and after the surgery. Lack of information prevents patients from acting self-dependently in their care. Practice implications. Patient oriented approach to patient education and innovative ways of information delivery are needed in Lithuanian nursing care of patient's having a gastrointestinal surgery.*

**Keywords:** *digestive tract surgery, information needs, patients' education.*

## Introduction

Information has a distinct value to operative care from the perspective of both the patient and the professional. The communication between professionals and patients has been changing and now the trend is to give increasing responsibility to the patient (Weiner, 2012). Understanding the information helps

the patient to make treatment decisions, supplement information or advice provided by a health professional, self-manage his health or health conditions, troubleshoot symptoms, provide a second opinion, modify health and lifestyle behaviors, enhance interactions with healthcare providers, decide if a visit to the doctor is necessary, choose a health care provider, prepare for consultation, clarify or validate information received from another source, increase knowledge of the disease or medical condition, identify underlying causes of a condition, seek alternative treatment options, take charge of one's life, or seek emotional support (Ramsey, Corsini, Peters, & Eckert, 2017).

For patients it is crucial both before and after an operation to have the relevant information, so that they can act in their own care and feel empowered (Poland et al., 2017). Individuals with different diseases seek information about their specific situation, illness, treatment plan, alternative treatment, and prognosis (Ramsey, Corsini, Peters, & Eckert, 2017).

Information provided for patients is important for patients' empowerment and enablement because it helps to create supportive environment, to develop personal skills (Schmidt et al., 2015) and to strengthen patient's sense of control and self-efficacy (Lavery, Dixon, & Millett, 2015). It is important to notice that patients' needs are specific to their individual clinical situation and patients with different diseases have different desires for information about their disease and their treatment which may influence the way they manage their long-term disease (Ramsey et al., 2017). A lot of studies (Salz et al., 2014; Papadacos et al., 2015; Søndergaard et al., 2013) have been carried out to learn about information needs of patients with cancer.

Digestive tract diseases and digestive tract surgeries are increasing due to food quality, eating disorders and unhealthy eating habits (Conceição, Utzinger, & Pissetsky, 2015). Fast way of life, eating in haste, unsuitable choice of products, and constant stress and tension are some of the reasons why the number of people having digestive troubles has been increasing (Yau & Potenza, 2013).

There are no current guidelines to support the information delivery of digestive tract surgery patients in Lithuania. Hence, there is a need to explore the information needs for these patients in order to provide better communication and enable individuals to manage their illness.

The aim of this study was to find out what the informational needs of patients undergoing digestive tract surgery in Western Lithuania are.

## **Methods**

In 2013 a pilot research was performed in three hospitals of Klaipėda city the purpose of which was to find out if the patients who were to undergo digestive tract surgery lack information about treatment and nursing. Participants over 18

years old (n = 52) participated in the interview during their hospitalization.

The results of the pilot study were that the patients lack knowledge about care and treatment; and that they would like to be included in the processes of care and treatment. The participants felt that they were not included in their care plan process. They wanted to have the opportunity to take part in nursing planning and treatment. The participants needed more information about their disease, symptoms management and self-care at home after surgery. A great part of participants wanted to be included in the processes of nursing and treatment, and they also wanted to receive the information in writing. According to the pilot study data, the participants had not received enough information after digestive tract surgery: the research was carried out to ascertain what type of information the patients need before and after the surgery (Šakienė, Istomina, & Salantera, 2014). A topic list was created based on this pilot study.

The data for the main study were collected in 3 hospitals of Klaipeda city in the period between January and March, 2015. The inclusion criteria for the participants were as follows: age 18 or above, the time before or after digestive tract surgery, able to understand, speak, read and write in Lithuanian or English. All together 86 patients participated in the interview during their hospitalization. The topic list (formed in the pilot study) covered information needs about treatment, the surgery itself, nursing, anesthesia, nutrition, rehabilitation, wound care, physical activity, fear and anxiety. Participants responded to a structured interview based on the topic list.

In the data analysis, the answers were divided into the following categories: information concerning oneself, concerning fear and anxiety, and information concerning the surgery and care. The interview responses were analyzed inductively with thematic content analysis. The main issue was to describe the logic in how categories, subcategories and themes were abstracted, understood and connected to the aim and each other. Respondent answers were grouped into subcategories of “time” in which the following questions were attributed: how long the surgery will take, when the surgery will finish and other questions connected with time. In the subcategory “technique” the questions connected with surgery technique was attributed, i.e. in which way the surgery will be performed, if there will be a wide surgery cut, how many sutures there will be, if it is a complicated surgery, etc. In the subcategory “being, feeling” there were the questions connected with fear, anxiety, i.e. if it is a dangerous surgery for one’s age, if the patient will feel pain after the operation, if the patient can die during the surgery, etc. The questions of the subcategory about “time”, “technique” were attributed to the information concerning the surgery and care, the questions of subcategories “being, feeling” were attributed to the category of fear and anxiety, while the questions which emphasized oneself, i.e. what medicine the patient will have to take, how to prepare oneself for the surgery and others were attributed to

the category concerning oneself.

The used coding unit was either a word or a phrase. The coded responses were divided into meaning units after thorough reading of the codes. The meaning units were then divided to sub themes and further gathered under themes (Creswell, 2013).

The approval of Ethical Committee of Klaipeda University and the permission of Heads of Klaipeda City hospitals to perform the study about “Patients information needs before and after digestive tract surgery” were obtained in 2013.

The participants were informed about the research and assured that their refusal to participate in the research would not affect their nursing, care or treatment in any way. They were also informed that they could withdraw from the study at any time if they wished. The information accumulated was processed confidentially so that the data was not disclosed at any stage of the research to anyone outside the research group.

## Results

In total 86 patients participated in the main study. Their age ranged from 18 to 89 and 57 per cent of them were female and 43 per cent were male. Three quarters of the respondents lived in urban areas and the rest lived in rural areas. Three main themes were formed from the participants’ answers: information concerning oneself, concerning fear and anxiety and information concerning the surgery and care. The results are highlighted in Table 1.

*Table 1 Patients’ information needs concerning digestive tract surgery*

<b>DURING THE SURGERY</b>		
<b>Information concerning oneself (subcategory feeling, being)</b>	<b>Fear and anxiety of the future (subcategory being , feeling)</b>	<b>Information concerning the surgery and care (subcategory time, “technique”)</b>
Pain <ul style="list-style-type: none"> <li>• what the pain is like</li> <li>• if I get pain medication</li> <li>• what kind of medication I get for pain</li> <li>• if I will feel pain during the surgery</li> <li>• how long the pain will last</li> </ul>	<ul style="list-style-type: none"> <li>• if I will wake up</li> <li>• if I will experience pain</li> <li>• if I can tell when I am in pain during the surgery</li> <li>• what the odds of dying are</li> <li>• if I am too old for safe surgery</li> <li>• if I will get information</li> <li>• if my life is in danger</li> <li>• who will inform me</li> </ul>	Surgery technique <ul style="list-style-type: none"> <li>• how long it takes</li> <li>• who will operate me</li> <li>• what the risks and complications are</li> <li>• will there be sutures</li> <li>• what type the sutures are</li> <li>• what will be operated</li> <li>• if I get a stoma</li> <li>• how big the stoma</li> </ul>

		<ul style="list-style-type: none"> <li>• what part of my digestive tract will be removed</li> <li>• what the surgery technique is</li> <li>• will I get anesthesia</li> <li>• will there be drains</li> <li>• why the stoma is needed</li> <li>• if surgery is safe</li> <li>• if the anesthesia is safe</li> </ul>
<b>RECOVERY AFTER THE SURGEY</b>		
<b>Information concerning oneself</b>	<b>Fear and anxiety of the future</b>	<b>Information concerning the surgery and care</b>
Pain <ul style="list-style-type: none"> <li>• how much pain is normal</li> <li>• if the pain medication is effective</li> <li>• how to take the medication</li> </ul>	<ul style="list-style-type: none"> <li>• how much the recovery will cost</li> <li>• if I have to buy anything</li> <li>• if I will get a pain medication prescription</li> <li>• if it is possible to learn self-care</li> <li>• how my life changes</li> <li>• what factors cause death after surgery</li> <li>• what complications are dangerous</li> </ul>	<ul style="list-style-type: none"> <li>• how long the recovery period is</li> <li>• what the possible complications are</li> <li>• if my condition renews after the surgery</li> <li>• how likely it is for the cancer to spread</li> <li>• if the stoma will last forever</li> <li>• what the size of the wound is</li> <li>• if the drains are going to stay</li> <li>• where the dressings for the wound will be changed</li> </ul>
	Own actions <ul style="list-style-type: none"> <li>• what I can do to prepare myself for the surgery</li> <li>• when I can get up after the surgery</li> <li>• how I should prepare myself for the recovery</li> <li>• if I should buy any equipment</li> <li>• if I can prevent the possible complications</li> <li>• what my nutrition should be like</li> <li>• how I can take care of my wound</li> <li>• when I can take a shower</li> <li>• what is forbidden for me</li> </ul>	

Participants were mostly anxious to get general information about the surgery itself, i.e. how long it will take, how the doctor will performed it, what the surgery technique is, and what complications may occur. Pain was a matter of great concern for the individuals before the surgery as well as after. The participants wanted to know what the pain would be like, if they would experience pain at all, if they will get pain medication, what type of medication it would be,

etc. These issues may cause stress before the surgery. The participants felt fear and anxiety about experiencing pain, about odds of dying, if the operation would be complicated, if their life was danger, if the anesthesia was safe or if they would wake up, etc. Many of these questions were repeated by the participants. At the same time the participants were interested only in a very narrow scope of their own actions. They expressed only two main concerns: what they could do to prepare themselves for the surgery and when they would get up after the surgery.

The participants' needs were oriented to get information about the surgery procedures and nursing care related to anesthesia. The participants did not have enough knowledge about anesthesia. They were afraid of not waking up, of feeling pain, they were afraid of the influence of anesthesia on their health in the future, and that it could shorten their lifetime. The participants were afraid to speak and/or behave strangely under anesthesia. The results showed that the information needs about anesthesia were different before and after the surgery. Before the surgery the participants wanted to know what kind of anesthesia would have applied to them, if they would feel pain during the surgery, how they would know that they were feeling pain, if they would not wake up while under the surgery, if anesthesia was harmful for health, what type of anesthesia would be used, what complications might occur, if there was a possibility to choose the type of anesthesia.

After the surgery the participants' information needs were: how anesthesia affected their health, if they spoke during the surgery, what was their behavior like while under the anesthesia, if anesthesia really shortens one's lifetime, and what type of anesthesia was used.

After the operation the participants had both short-term and long-term concerns. Individuals were worried about the wounds, the length of the recovery period, possible complications, the possibilities of the illness to renew, and the possibilities of getting cancer.

The pain issue was also a matter of concern after the surgery. The participants were worried about how much pain is normal, if they will get pain medication prescription, and if the pain medication is effective. All these questions caused fear and anxiety about possible complications, factors that can cause death after the surgery, about changes in life, about the learning the self-care, and the costs of the recovery.

The scope about one's own actions was much wider in the post-operative period. The participants of the research shared their concern about the ways they could prepare themselves for the recovery, the equipment they should purchase, the nutrition, and taking care of the wound.

## **Discussion**

This study revealed that the participants had a wide variety of information needs both before and after the surgery. Before the surgery the needs concentrated on the operation, pain and issues that caused fear and anxiety, but very little on one's own actions. After the operation the information needs shifted to cover one's own actions, but still there were information needs about pain management, issues that caused fear and anxiety and issues concerning the operation and care. It might be that having more information would be helpful to diminish patients' fear and anxiety.

The unmet information needs during the discharge can contribute to poor patient outcomes and readmission, it is critical that clinical staff and nurses accurately identify patients' information needs and find ways to meet these needs. Awareness of the patient's met and unmet expectations should enable staff to understand the patient's perspective and improve communication.

Rogers (2011) notes the provision of additional written information on surgery might lead to a better understanding of the problem and might thus improve patient satisfaction with the care provided. The danger is that satisfaction about information received is improved but with no evidence of improved recall of knowledge. Therefore, responding to patients' needs for information should include certain mediators. The concept of information behavior is helpful to understand patients' information needs in relation to patients' characteristics that enable to foresee the added value (i.e. patient's enablement) in delivering information.

Patient information must be personalised and made understandable. This can improve self-preparation and participation in the own recovery. Special needs must be addressed early and followed up (Samuelsson, Klarin, Lökk, Gunnarsson, & Iwarzon, 2018).

The participants of this study were able to verbalize their concerns about going home with a wound. Concerns about discharge may help to direct patient teaching in preparation for discharge. Educational material for patients could include the most common concerns, as well as ways to avoid misinformation about wound care. Discharge teaching needs to begin early so that patients feel they have adequate time to learn and ask questions.

Ramsey et al. (2017) found that information related to a specific illness or disease was the most common type of information sought by patients. Our research was oriented to evaluate the needs for information of patients dealing with digestive tract surgery. We found it important to aim our study to a narrow field of participants' with digestive tract surgery. This way we received targeted information about the issues that are relevant to this exact group of patients.



### **Strengths and limitations of the study**

This descriptive study has some limitations and strengths. They can be viewed from the perspectives of credibility, dependability, conformability and consistency as well as transferability (Bernard, 2012). The credibility was established by using a research team that has knowledge about the care of digestive tract patients and patient education. The established topic scheme that was used might have guided the respondents to choose the topics that were on the list and hence to diminish the credibility. However, based on the responses the topics were not limited only to the topics of the interview. Dependability was supported by describing the analysis process and giving an example of it in the methods section. However, the translation of responses into English might be mistaken and some information might have been lost during the translation process. Conformability and consistency were strengthened by using a second opinion in forming the analysis themes. Transferability of the results is limited. Patient education practices differ from country to country, and it is obvious that the patients' knowledge needs also differ. The results of this study might apply to Lithuania but even in that case the transferability can be questionable. Even so, this study gives important information about the information needs of the studied group of patients and can guide future research.

### **Conclusions**

The participants lacked information about treatment, nursing, anesthesia, rehabilitation, wound care and about post-surgery period because of which it is possible to assume they feel anxiety. The participants did not receive enough information and they were not included into treatment and nursing processes. The information needs of the participants were different before and after surgery. The benefits of additional information might comprise increased patients' involvement in decision-making and their ability to cope with stressful circumstances during the diagnosis, operation, and post-operative phases, adaptation to a diet and a stoma, It might contribute to patients' anxiety, relief, reduction in mood disturbances, and better communication with family members.

### **Practice implications**

The participants lacked information about their treatment. Knowing what questions are important to the patients the medical staff could prepare information leaflets, educational plans or something else where the patients will get answers to the most frequent questions they are anxious about.

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## A CRITICAL STUDY OF INTERVENTIONS TO INCREASE PHYSICAL ACTIVITY OF CHILDREN

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**Abstract.** *During the last decades, the physical activity (PA) of children decreased. Outdoor games have been replaced by the activities indoors that require less physical exercise and involve spending more time on sedentary behaviours. This article discusses not only the possible consequences of physical inactivity but also the possibilities of increasing PA. Related to this is the need to learn lessons from previous interventions to increase PA. The aim of this study is to critically investigate the interventions to increase PA of children. In order to reach this aim, the review and analysis of the scientific literature were carried out. The review has revealed that intervention can include educational programmes, new or improved policies, environmental improvements, or a health promotion campaign. The interventions that include several strategies are usually the most effective and result in a long-term change. They can be implemented in a variety of environments, including communities, workplaces, schools, healthcare and religious organizations. Those that involve a number of forms and multiple strategies are most effective. Physical education intervention programmes are increasingly recognized as a means of encouraging PA among children. Such programmes aim to expand the attractive environment for PA; reduce children's obesity; increase their physical capacity, and emphasize the importance of a systematic approach to increasing family and community engagement in the overall school physical activity programmes.*

**Keywords:** *children, physical activity, intervention*

### Introduction

During the last decades, scientists pointed out that the active activities of children at their leisure time are more often replaced by less physically active activities indoors playing games on a computer or a mobile phone (Grund et al., 2000). Besides, children are more often taken to school by car or go by bus instead of walking or cycling. Therefore, concern rises over the physical activity (PA) of children. Recent studies show that 66.6 per cent of adolescents are inactive (López-Sánchez et al., 2018). In addition, a similar percentage (66.4 per cent) of primary schoolchildren are not physically active (Rutkauskaite & Bukauske, 2016).

Studies revealed that the deficiency of PA is a risk factor for many diseases (Booth, Roberts, & Laye, 2012; Lee et al., 2012). The analysis of children's leisure time ascertains that schoolchildren's health is getting worse every year, with only one-third of healthy children coming to the first grade (Stukas, Kalibatiene, Vingras, Dobrovolskij, & Savickaja, 2011). Primary schoolchildren do not only lack sufficient PA and spend too little time outdoors but also suffer from disorders such as increased nervousness, flatfoot and spinal distortion (Stukas et al., 2011). Systematic reviews also revealed that sedentary behaviour of schoolchildren is related to unfavourable body composition, higher cardio metabolic risk scores, and lower fitness (Carson et al., 2016). Meanwhile, sufficient PA is positively associated with physical, psychological, social, and cognitive health of children (Donnelly et al., 2016; Poitras et al., 2016).

Scientists note that it is important to engage children in PA as early as possible in their development (El Rayess, Gandhi, & Mennillo, 2017). The attention is drawn to the fact that children spend about 1300 hours a year at school (Adkins, Bice, Heelan, & Ball, 2017). Therefore, the school should ensure the children a sufficient level of PA for their consistent personal development. For this reason, the educational environment of the school is increasingly becoming a target for PA interventions (Burns, Fu, & Podlog, 2017). Therefore, it is not only the results of various intervention programmes used to promote PA of children's but also the content and improvement possibilities of such programmes are important. Moreover, the development of new innovative PA intervention programmes requires a careful analysis of previous programmes.

The aim of this study is to critically investigate the interventions to increase PA of children. In order to reach this aim, the first step was to explore the importance of the context for an intervention programme to be applied and, secondly, review and summarize the selected intervention programmes.

### **The concept, complexity and contextuality of the interventions that encourage PA**

In general, the concept of intervention can be defined as a combination of elements or strategies of a programme to promote a change in behaviour or health improvement among individuals or population. Intervention can include educational programmes, new or improved policies, environmental improvements or health promotion campaigns. Interventions that involve several strategies are usually most effective and lead to long-term changes. Interventions can be implemented in a variety of environments, including communities, workplaces, schools, healthcare organizations, religious organizations or homes.

Increasingly, while evaluating the effectiveness of interventions, the importance of the context is emphasized, which allows investigating the processes

of the implementation of an intervention. The context may explain why certain aspects of intervention do not work and reveal the reasons why an intervention has different effects at different locations. According to P. Hawe, interventions may sometimes not work because they are not adapted to the circumstances in which an individual or a community lives (Hawe, 2015).

Therefore, the context is crucial for planning (or creating) appropriate intervention health programmes and assessing their effectiveness. In recent years, while investigating the effectiveness of health promotion interventions, researchers increasingly focus on the context and its potential impact on the effectiveness of the intervention itself (Shoveller et al., 2015). It has been noticed that different contextual variables are taken into account when evaluating health promotion intervention programmes. Such relevant variables as *the geographic location, the social and structural features of the context, social stratification, cultural norms, traditions, the stereotypes based on gender, ethnicity or age* have been identified, and *the need to assess how the context may affect the implementation of the intervention* is emphasized (Fast, Shoveller, Small, & Kerr, 2013). Emphasizing the importance of the context, Hawe (2015) argues that the impact of the programme is a very complicated and complex phenomenon that is influenced by both the intervention itself and the complexity of the context, and their interaction. The complexity enhances unpredictable effects, which requires a new approach to modelling and explaining the impact of interventions and their differences. The results of the intervention should be interpreted taking into account the dynamics of the whole system in which the intervention takes place and combining different variables and their changes.

To sum up, it can be noted that the context and the complexity of the intervention should be taken into account at all stages of the intervention: planning and implementing it, evaluating its impacts, explaining the differences, and planning its improvement. Therefore, it is important to assess the interaction between the intervention and the context. All context variables can be grouped into three broad context groups, that is the socio-political, community and local context, which are relevant while developing health promotion programmes, assessing their effectiveness as well as explaining the differences (Shoveller et al., 2015).

## **Methodology**

The sources that analyze the theories of physical activity and the educational PA intervention programmes were searched for in the databases *Pubmed, EBSCO, Scholar Google, and the Electronic Catalogue of the Lithuanian University of Health Sciences*. The keyword combinations used for search included *physical activity, educational PA intervention programmes, PA motivation, PA theory, the*

*effectiveness of the intervention of educational PA.* The scientific articles were selected taking into account the following criteria: 1) they analyze the theories and attitudes that explain physical activity; 2) the implemented educational PA intervention programmes were based on relevant theoretical provisions that explain physical activity; 3) the complexity of PA intervention programmes.

### **Children's physical activity intervention programmes and their peculiarities**

While promoting schoolchildren's PA, physical education intervention programmes are increasingly recognized (Zarrett, Abraczinskas, Cook, Wilson, & Ragaban, 2018). Intervention programmes aim to expand the amount of PA; reduce children's obesity; increase physical capacity. They emphasize *the importance of a systematic approach* to increasing family and community involvement in overall school PA programmes.

While analyzing the programmes promoting the PA of schoolchildren, it is appropriate to pay attention to the components that are important to the effectiveness of the programme including the motivational climate; the physical and psychological security; the optimal development of PA skills; an effective physical preparation; a possibility to choose an appropriate structure of PA; a possibility to form positive social relationships (peers, parents, teachers), and providing a support that encourages PA (Schenker, 2018; Zarrett et al., 2018).

The time spent at school plays an important role. The environment changes, the social network is different and the agenda varies. One of the main reasons for the lack of children's physical activity is the lack of time, huge learning load, unwillingness to exercise, the lack of support, and the peculiarities of the school environment and culture. School sports and physical culture traditions, the community engagement and support as well as the development of infrastructure can create favourable or not environment for PA (Deliens, Deforche, De Bourdeaudhuij, & Clarys, 2015).

Promoting internal motivation is one of the key factors for greater PA. Therefore, some of the intervention programmes are oriented towards promoting the enjoyment and pleasure in PA. It is worth mentioning the programmes such as Sports, Play, and Recreation for Kids (SPARK), Middle School Physical Activity and Nutrition (M-SPAN), Born to Move, Sports Education Model, etc. The study of the interventional PA promotion programmes that aimed at increasing children's emotional satisfaction in PA reveals that they can be effective in increasing their engagement in PA (Burns et al., 2017). Such programmes are more effective for the children with a light or moderate level of PA. Children are more likely to engage in PA when they feel satisfied. Moreover, the emotional satisfaction during PA is associated with long-term PA. The

SPARK and Sports Education Model programmes are based on the independent decision of a schoolchild regarding PA rather than the decisions of teachers or trainers. This creates a sense of autonomy and, therefore, leads to long-term impacts of intervention.

The structured fitness programme Born to Move was designed to increase children's enjoyment and engagement in PA by providing all of them with an opportunity to participate regardless of their level of skills. In addition, the programme sought to improve health. In the classroom, music and songs were played to enhance the enjoyment experienced. It has been revealed that within 6 weeks the level of pleasure alongside with the level of PA increased from light to moderate, which can be considered to be a medium to high impact of the intervention (Fairclough et al., 2016). The motivational constructs such as independence, perceived competence and pleasure have a complicated but significant interrelationship that can affect the ability to engage in PA (Cairney et al., 2012). Therefore, in order to increase schoolchildren's emotional satisfaction, it is necessary to use long-term stimuli of emotional joy (interest in activities, honours, the joy of communication, and etc.). However, attention should also be paid to the variables related to the nature of the PA itself (for instance, the type of an activity, the variety of PA forms); the social support, beliefs in efficacy, and attitudes towards PA, which may all influence PA enjoyment levels (Burns et al., 2017). Therefore, while applying and developing new programmes that encourage PA, it is advisable to promote the experience of pleasure during PA.

Since the feeling of pleasure by the participation in an activity is important for promoting schoolchildren's PA, no wonder that some of the PA intervention are based on the self-determination theory. It emphasizes two types of environment, the one that supports autonomy and another that controls (Ryan & Deci, 2000). The environment supports autonomy in case the interpersonal style of the persons with a certain power (that is an educator, parents) considers the perspective of an individual. Besides, the environment supports autonomy when such persons clearly explain why a certain behaviour is important. The explanation and understanding, that is providing positive feedback, can help understand the direction and enhance the sense of competence (Ryan & Deci, 2000). Finally, the environment that supports autonomy satisfies the need for independence by providing choices through personal communication using a neutral language (for instance, using the verbs such as "you could" rather than "should") (Deci, Eghrari, Patrick, & Leone, 1994). Meanwhile, a controlling environment prevails when two of the three important factors that comprise an autonomous environment (justification, choice, or perspective) are absent from the environment, and the power-holders (teachers, parents) do not provide meaningful explanation, use pressure in communication (for instance, use "have to" instead of "should") and/or force their approach (Deci et al., 1994).

Only a few interventions that were based on self-determination theory will be discussed. Vansteenkiste, Simons, Soenens, and Lens (2004) sought to increase schoolchildren's participation in the Taibo programme that encourages PA by short, convincing remarks highlighting the benefits of Taibo while creating an autonomous or controlling environment. The results obtained revealed that the environment that supported the autonomy enhanced children's understanding of the support of independence, the autonomy of motivation and participation in PA. The effectiveness of the programme ranged from low to medium (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). However, the researchers did not evaluate the degree of the impact that the changes in children's behaviour outside the school.

Chatzisarantisa and Haggerb (2009) compared the effectiveness of two interventions in both the school environment and at leisure time. The first was the intervention that supported autonomy by using all of the required components such as the explanation of actions, feedback, options and recognition of the difficulties related to PE classes. The second was the intervention that supported autonomy less, that is only a logical explanation of actions and the feedback were used. The results revealed that the schoolchildren better understood the teachers whose interpersonal style of communication was supporting. They felt more motivated to be independent and more self-motivated. Therefore, it is not only the activity itself but also the explanation of the motives to be PA as well as feedback that is important while promoting children's PA. Meanwhile, under control, children's perception regarding the support of autonomy and motivational styles have not changed over time. Schoolchildren failed to change their understanding of autonomy and motivational orientation because personal feelings and perspectives were not recognized, and in the context of autonomy nobody talked about motivation and there was no feedback (Chatzisarantisa & Haggerb, 2009).

In the context of health education, the Ecological Model is discussed. The Ecological Model originated from the science of biology and is based on the interaction between the organism and the environment. Having introduced this model in the fields of behavioural and public health sciences, the focus was on the nature of the individual's interaction with the physical and socio-cultural environment (Stokols, 1996). The main difference between the eco-model and other widely used behavioural theories that focus on individual characteristics, skills and the impact of the immediate social environment (family, friends) is that it also involves a wider context, that is the community, organization, or political environment (Glanz, Rimer, & Viswanath, 2015). It is worth mentioning one of the intervention programmes of the project 4 PREVIENE that was designed to increase children's PA through an active cycling to/from school strategy (Chillón, Evenson, & Vaughn, 2011). This intervention involved school, family and community activities mainly focusing on individual factors such as children's



perception (perception of the safety of travelling to school) and attitudes (independence or motivation to walk).

The activities were organised in the classroom as well as in the neighbourhood of the school. Alongside with these activities, active cycling to/from school was promoted and its advantage was emphasized. Besides, during the intervention, additional encouraging information (as text or images) by WhatsApp messages was sent to families. The aim was to explain the most important ideas related to the achievements of active cycling to school as well as mental and physical health of a child. Moreover, throughout the intervention, teachers tried to encourage possible lifestyle changes using positive enhancement (for instance, children's walking to school together) as a motivational strategy. The purpose of this enhancement was to remind the children to go actively to and from school. The results revealed that the children and parents assessed the increase in PA of children and the motivation to continue this PA rather subjectively.

The Comprehensive school PA programme is based on the Whole-of-School Approach (Centeio, Erwin, & Castelli, 2014) for the whole school to improve youth's PA. The Comprehensive school PA programme model is based on five main areas: high level quality physical education classes as the basis (for instance, by emphasizing knowledge, skills and the provision to be physically active throughout life); the PA itself during the classes; before and after school PA programmes (for instance, active transportation and sports clubs); staff participation (for instance, staff health promotion programmes including PA as a priority result), and family and community engagement (for instance, active family trips, the school as a community PA centre) (Moore et al., 2017). Such interventions are often focused on increasing the physical movement of the school by expanding, developing, or enhancing existing opportunities in all aspects of the intervention (Beets et al., 2016). The interventions that include only a few components of the PA have been identified to be less effective (Russ, Webster, Beets, & Phillips, 2015).

It is worth noting the use of information technologies in intervention programmes. Although playing games on a computer or mobile phone are associated with the occupation that is barely PA, the new technologies can be exploited to encourage the PA. Various new technologies are more attractive to children than adults. For instance, PA can be promoted at schools by applying video games. Interactive games encourage children to be PA by using arms, legs or whole body movements. Such games illustrate the movements of various sports or other activities of daily life. An interactive video game is closely related to the reality, and playing such a game results in stimulation of active daily habits (Maddison et al., 2001). It has been ascertained that playing interactive games improves eye-hand coordination, agility and many other motor skills that require

physical features (Latham, Patston, & Tippett, 2013). In addition, while playing these games, arms and legs are used actively. Moreover, while playing in virtual environments, there is less risk of injury than while engaging in traditional PA (Schwebel & McClure, 2010). It has also been stated that interactive games can improve children's PA by consuming much more energy than sitting in one position and playing simple electronic games (Graves, Ridgers, & Stratton, 2008).

The analysis of the research experience (Evans, Abrantes, Chen, & Jelalian, 2017; El Rayess et al., 2017; Lind et al. 2018; Zarrett et al., 2018; Howie, Daniels, & Guagliano, 2018; Tercedor et al., 2017; Centeio et al., 2014; Moore, 2017; Glanz et al., 2015; Chatzisarantisa & Haggerb 2009, etc.) allowed distinguishing the following directions of the school intervention programmes meant to promote children's PA and the forms of the PA: *the PA before school; the PA in the classroom; the PA during breaks; the coordination of after-school PA programmes; increasing the engagement of teachers; the participation of family members; the promotion of the community sports practice and games; the engagement of parents; the encouraging influence of the peers regarding PA, organizing inter-school sports events and competitions*. The focus should be laid on the motivational constructs such as emotional satisfaction, the experience of joy and success, autonomy, and perceived competence.

## Conclusions

The study revealed that intervention can include educational programmes, new or improved policies, environmental improvements, or a health promotion campaign. The interventions that include several strategies are usually the most effective and result in a long-term change. They can be implemented in a variety of environments, including communities, workplaces, schools, healthcare and religious organizations. Those that involve a number of forms and multiple strategies are most effective. Physical education intervention programmes are increasingly recognized as a means of encouraging PA among children. Such programmes aim to expand the attractive environment for PA; reduce children's obesity; increase their physical capacity, and emphasize the importance of a systematic approach to increasing family and community engagement in the overall school physical activity programmes.

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# THE EVOLUTION OF FOUCAULT'S REASONING ON PATHOLOGY

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***Abstract.** This paper is an attempt to theoretically describe the development and transformation of the ideas of French philosopher Michel Foucault whose work on body, disease and mental illness provide a basis for an advanced approach in the philosophy of medicine. The aim of the research is to understand on the basis of the theoretical review of Foucault's works and secondary literature the evolution of the reasoning on pathology in different works by the French author. In the first part of the paper we describe how Foucault came to the idea that psychiatric and organic must be treated as completely different. In the second part, we add more sociocultural context and discuss Foucault's ideas in the perspective of developing modernity.*

***Keywords:** body, disease, gaze, ideology, medicine*

## Introduction

In the late 1940ies and early 1950ies, during his studies and early lecturing at the *École Normale Supérieure* the famous French poststructuralist philosopher Michel Foucault was deeply interested in history of psychology, but also the clinical psychology and psychiatry of his time. It was the time before he started his structural analysis of society and before his different "archaeologies", when he (shortly a member of the Communist party) developed his view on mental illness in the work that was first entitled "Mental Illness and Personality" that included also a part on Pavlov's reflex theory. Back then Foucault's theoretical approach was based on phenomenology and was inspired by his professor Maurice Merleau-Ponty and Martin Heidegger. He believed in unity and experience of personality. But until next edition and success of this work, Foucault's ideas changed. He developed a renewed version of the book with a new title "Mental Illness and Psychology" and with another view with no integrity of personality.

The aim of this paper is to reconstruct the evolution of the reasoning on pathology in different works by Michel Foucault. We used as a method the

hermeneutic interpretation of the Foucault's texts and secondary literature in connection to wider cultural, social and historical context.

### **Literature review**

Foucault's analysis of mental disorders shows that the historical evolution of the medical discourse as a whole (and psychiatric knowledge particularly) is rooted in "mythology" of organic pathology: psychiatric knowledge and organic hypothesis both do the distribution of symptoms by pathological groups and try to isolate large pathological units by using the same methods. And behind this unified methodology there are two postulates about the nature of the disease:

1. Initially it is postulated that the disease is essence, specific unity and all the symptoms are presenting it.
2. At the same time disease is dependent on them and to some extent independent from them. In psychiatry it describes the schizophrenic basis lurking behind obsessive symptoms and talks about masked delirium and the presence of manic-depressive psychosis in manic crises or depression episodes. In his most early work Foucault claims that concept "mental illness" is simply the wrong use of metaphor borrowed from organic pathology domain. He writes: "My aim is to show that mental pathology requires methods of analysis different from those of organic pathology and that it is only by an artifice of language that the same meaning can be attributed to "illnesses of the body" and "illnesses of the mind"" (Foucault, 1987, 10).

Foucault does not deal with the problems of the origin of medical discourse, just as he is not interested in the history of the concept of disease. This is unfortunate, since the most ancient nosological (nowadays: the branch of medical science dealing with the classification of diseases) treatises (Hippocrates, Galen, Avicenna) could not be treatises on medicine in our understanding, and even could not be tractates on diseases in general. They could only be descriptions of certain pathologies within the existence of the human organism.

Medicine in general like those early nosological tractates' claims to gain knowledge about human. And the most ancient object of consideration of medicine is the human body.

The body is given to medicine only as a sick body i.e. body with pathology, since medicine has nothing to say about a healthy body, and only a disease allows medicine to exist. That is, it turns out that a living and healthy body for medicine does not exist at all, because medicine cannot say anything about it while remaining medicine.

It can be assumed that the body appears to be the surest way to localize pain, that is, the body appears in discourse only as a place to designate and describe

pain (the question “Where does it hurt?” replaced the question “What's wrong with you?” that could be the main question of psychiatric knowledge), that is understood by the term "localization".

Along with this biased view about the presence of the specific nature of the disease, and as if in order to compensate for such super-abstraction- another notion is introduced – one of naturalistic postulate; which describes a disease as a natural specie behind the polymorphic volumes of each taxonomic group as the unity of the species: so, early dementia appears as a species characterized by a return to earlier forms of natural evolution and having hebephrenic, catatonic or paranoid invariants.

Thus, if parallelism existed between the psychic and organic branches of psychopathology, then this occurred not only by the reasoning on the presence of a certain idea of human integrity and psycho-physiological parallelism, but also due to recognition of both of these two postulates concerning nature of the disease.

If mental illness appears in the medical discourse by using the same conceptual methods as in the description of organic life and psychological symptoms' analysis tend to share common ground and connect in the same manner as organic then it is because there is tendency to treat the disease (mental or organic) as natural entity that manifests itself through the specific symptoms. Those two forms of pathology, therefore, have no real unity. This pseudo-unity arises only via the help of these two postulates and abstract parallelism. Therefore there is conceptual problem of human psycho- somatic integrity that persists.

This problem directed the study of pathologies to new methods and new concepts. The concept of organic and psychological unity leads to the rejection of those postulates that turn the disease into a specific essence. The disease ceases to be independent reality and refuses to play the role of the natural species or foreign body behind symptoms or organism itself. On the contrary, respect is given to the general reactions of the individual that are located between the sickness processes and general functioning of the body. Disease no longer fit between them like an autonomous reality. It is impossible to continue think about illness as an abstract gap or residue in individual becoming sick.

In the second edition of the Foucault's book "Maladie mentale et personnalite" (The Mental Illness and Personality) the title appears slightly changed to "The Mental Illness and psychology". In this newest version concept "natural species" is substituted with “botanical species” This “botanical view” is the echo of Foucault's stay in Uppsala, where he was writing "The History of Madness"- book that made him famous, and in free time used to walk near the house of Karl Linnaeus, located near Uppsala.

The treatment of madness as a botanic gaze appears in "The History of Madness", where it indicates that in the 18th century, approach "described by botanists order becomes an organizing principle for the world of pathology as a



whole; diseases are no longer distributed in the space of the mind itself and in accordance with its order. The idea of this “botanic garden”, where to accommodate along with various kinds of plants also various types of pathologies, belonged to the wise and divine providence" (Foucault, 2006, 188). He does not leave this topic and in later lectures on "Psychiatric Power," where he recalls the psychiatric hospital of the 19th century “The place of diagnosis and classification, botanical greenhouse in which the types of diseases are distributed as if in a large vegetable-ground ...” (Foucault, 2007, 402).

Most medical scientists are concerned with the fact that in psychiatry - the main diagnostic method is the clinical method and not the laboratory method. That implies the subjectivity of observation that is incompatible with positive science and opens a vast space for fantasy and commerce (which, in particular, brings it closer to psychology).

For Foucault in his work "The Birth of Clinic" (Foucault, 1976) where he examines the origins of medical discourse and the historical construction of clinical method- "body" and "disease" are two concepts that complement each other. That is, if we define a disease as a certain pathology of the body, then we will not be able to identify the body, but the most interesting thing is different: if we define the body as the location of the disease, then the disease will be indefinable for us. Some discourses, in particular those that Foucault implies, have as their goal the attainment of some positive knowledge. Therefore, Foucault believes that a positive discourse about the body is intended to simply objectify pain.

### **Research results and discussion**

Michel Foucault is, of course, one of the most careful observers - a serious investigator of rationality, forms of consciousness, mind and its inversion - madness. Distinguished Russian philosopher Vladimir Bibihin in his work "The new renaissance" writes about Foucault who warned, that it is so hard to restore some of the renaissance world feelings. It needs to break, as a plaster mask on ones' own face, the usual mechanisms of manipulative thinking (the concept introduced for this phenomena by Foucault based on his mentor Jean Hyppolite's Hegelian interpretation of “objective” is "apparatuses") through which the outer world feels like an object collector. No research, no restoration of historical accuracy, no science progressed Foucault more than anything, neither rehabilitation of insanity and sex, nor criticism and reform of the medical and prison system itself, but a very personal thing: “First of all, but afterwards - inviting others, experience in going through certain historical content, in our present existence... it is to test our modernity to such an extent that it comes out of this experience transformed” (Trombadori, 1981, 21; Quoted as in Бибихин,

1998, 152). Not to philosophize, but to "experience a direct, personal experience of being" by studying logically-rational constructs only to "divide them" and through them, behind the frames, to mute in the alarming expansion of pre-categorical life. Such a frontier experience should also "distinguish" the subject, "take it out of yourself" (Bartolommei, 1983, 48; Quoted as in Бибихин, 1998, 153). Foucault analysed the discourse-personal ideological mechanisms - to better understand the primacy of the unique, unprotected, direct feeling. Human is surviving animal, *animal experiens*. Far from experience, resilient here and now, everything is abstract and deafening. It is criminal to suppress the life of the vulnerable by the plans of trust or even the hope of saving the soul in the future. What the minute of existence will bring is also valuable; for the purpose is gathered in that which is unexpectedly revealed to mind and heart. "Each experience is the decisive experience in which we, as we say, are lost in salvation or salvation; the third is not given" (Бибихин, 1998, 153). It is, in this case, that it is about to make it visible and pronounced. It is possible that this is what he has in mind when he warns us: "We must place ourselves, and remain once and for all, at the level of the fundamental spatialisation and verbalization of the pathological, where the loquacious gaze with which the doctor observes the poisonous heart of things is born and communes with itself" (Foucault, 1976, XII).

Foucault begins his hermeneutical analysis of the subject in the work "The Hermeneutics of the Subject" (Фуко, 1991) with a glimpse into the history of philosophy: Plato's "Alkibiados" dialogue focuses on caring for himself (*epimeleia*) - an element characteristic of Greek and Roman philosophical thought. This principle involves three aspects - the view of the world, the view of yourself, and the activity (most often - transformative) that the subject carries out with himself. In a platonic sense, the *epimeleia* is, first and foremost, the concern for its divine and immortal soul, where ascetic corporeal self-discipline is important.

Corporeality is what gives the opportunity to start talking about the body, that is, to introduce the body into one or another discourse. Or otherwise, corporeality is a place for the body in discourse, that is, corporeality determines when it is appropriate to talk about the body.

In his "The Hermeneutics of the Subject", Michel Foucault indicates that the paradigm shift that characterizes modernity is one in which thinking becomes separated from the transformation technologies of self, or where mastery of the world no longer directs self-evolving changes in the cognitive subject. Postmodernism, according to the vast majority of cultural and identity studies, proves to be rationally rigid prescriptions in a system built for modernity in opposition frameworks, thus describing self as flexible, open, socially constructed and constantly changing entity, often freely interacting with the external physical

and social environment, including the requirement to return to "roots" and traditions.

In describing the subject's hermeneutics, Michel Foucault specifically releases a Cartesian paradigm shift that introduces new times, or modernity, when the cognition is separated from the technology of self-transformation, or when the path of truth cognition no longer leads to self-transformation. In modernity, as the era of the new subject and the relationship of truth, knowledge accumulates in an objectivized social process, where the subject acts in one direction, because the truth no longer interacts with the change of the subject's existence.

In the description of the ascetic practice of self-creation within modernity in Foucault's question, "What is Enlightenment?" refers to the Baudlaire postulates the difference between a psycho-geographically floating *flâneur* and a dandy: "Being modern does not mean accepting itself as a stream of abandoned outgoing moments; it means to perceive yourself as a complex and difficult-to-develop object: it is called bodybuilding "dandysme" in that time". (Fuko, 1996, 169) Dandy in a solipsistic manner forms his own individual subjectivity in mass society (modernism), while *flâneur* is already part of a liquid modernity of flows where subjectivity dissolves on the trajectory of motion.

In turn, Foucault claims that in postmodern existence the standard of living is what used to be the object of criticism for stoic philosophers: Seneca's *stultitia* is 1) openness to external influences, non-critical perception, confusion of objective notions with experiences and other subjective elements; 2) Rods are the one who is scattered over time and allows himself to be seduced, captivated, he has left his life in the air and does not move his will to any purpose. Such a life flows in a selfless and unconscious way - that is, without will, constantly changing its direction. The will is not absolute, but is dependent on changes in perceptions, occasional events and tendencies. In turn, absolute and free will is a desire without inertia and laziness. Relative, limited and fragmented variable will is separated from self as it is ideal: it is *stultitia*.

From the Hegelian idea of the philosophy of conscientious "time spirit" (*Zeitgeist*) and the philosophy of the whole mental paradigm, the concept of "total conception of ideology" of Karl Manheim (Mannheim, 2013) grows out of importance in the "false consciousness" problem. Speaking of total ideology (as opposed to partial), it comes when an epistemological approach is analysed, its objective structure forming its internal structure, in the expression of Manheim - when the "morphological" or structural-analytical "relationship of social existence and cognition forms" is revealed. In contrast, the study of partial ideology is "functionalization at a psychological level". The latter deals with psychology of interest and social psychology because the subject's (both collective and individual) ideas are viewed as functions of his social existence. The study of total ideology does not take place on a psychological but epistemic level, i.e.

encompassing the specifics of the existing level of society development. The total ideology of this research is essential as the cultural landscape of successive phases of capitalist development, or Max Weber's "ethos", which is different, for example, in a consumer society or an information economy. Foucault like Karl Manheim speaks of "total conception of ideology" in the structuralist terms as specific forms of rationality or historically changing episthemes. According to Foucault, who introduced the "historical a-priori" construct in the changing systems of reasoning, that forms various discourses differently in each epoch linking "Words and Things" ("Les Mots et les choses" (1966) - the title of the one of his most popular books translated into English as "The Order Of Things. An Archaeology Of The Human Sciences" (Foucault, 1970)) the relation between the visible and invisible— which is necessary to all concrete knowledge— changed its structure, revealing through gaze and language what had previously been below and beyond their domain. A new alliance was forged between words and things, enabling one to see and to say (Foucault, 1976).

The turning point of the epistemic shift (for Manheim: "total conception of ideology") is the Great French revolution, which results in the normalization of change, innovation, transformation and even revolution in the modern political arena. Political ideologies are just one of the ways in which this socio-psychological normalization - the emergence of human sciences itself - following the "archaeology of human sciences" initiated by Michel Foucault illustrates the change of these episthemes.

Since most of Foucault's legacy is devoted to the thematisation of the mentioned "to see and to say" problem, medicine is a fairly convenient example of the localization of this problem. Medicine is a kind of field where the gaze is identical with the act of appointing meaning, the body is the place where the image is identical with the word, where you can talk about the visible, the body is only a tool for speaking, something that gives rise to conversation, making conversation possible in general. This does not mean that one can speak only with the help of the body in the vocal-phonetic aspect, but the body itself provides a certain alphabet, something to which signs can be attributed: "The gaze is no longer reductive, it is, rather, that which establishes the individual in his irreducible quality. And thus it becomes possible to organize a rational language around it" (Foucault, 1976, XIV).

In the analysis of medical gaze that forms the clinical method Foucault involves the semiotic attributes of signified/signifier as well as dramatization theory: "Eighteenth century transcribed the double reality, natural and dramatic, of disease, establishing the truth of a corpus of knowledge and the possibility of its application. A happy, calm structure, in which a balance was struck between the Nature-Death system, with visible forms taking root in the invisible, and the Time-Outcome system, which anticipated the invisible by means of a visible

mapping out (*repérage*). Both these systems existed for themselves; their difference is a fact of nature to which medical perception adapted itself, but which it did not constitute. The formation of the clinical method was bound up with the emergence of the doctor's gaze into the field of signs and symptoms. The recognition of its constituent rights involved the effacement of their absolute distinction and the postulate that henceforth the signifier (sign and symptom) would be entirely transparent for the signified, which would appear, without concealment or residue, in its most pristine reality, and that the essence of the signified - the heart of the disease - would be entirely exhausted in the intelligible syntax of the signifier" (Foucault, 1976, 92).

### Conclusions

Before his fame that came with the book "The Birth of Clinic" first book by Foucault "The Mental Illness and Personality" illustrates the transition of the author from phenomenological approach to the structuralism in the analysis of pathology. From the first edition he takes on the very idea that the pathology can not be conceptually used in description of mental phenomena. But later the view of the person is changed to the more socially and relationally based concept – an outcome of his structuralist and, later, poststructuralist analysis.

In his later philosophical works throughout his life, Foucault is trying to understand and interpret the subject in the world - in the direct experience and social and cultural context - and place it in the vocabulary of philosophical writings. From the direct experience to the thinking that involves rigid opposition between subject and object and visible and invisible, and no longer directs self-evolving changes in the cognitive subject in the modern era, and further to the postmodern conceptualizations of the self as flexible, open, socially constructed and constantly changing entity, interacting with the external physical and social environment – the writings by Michel Foucault follow the path of the evolution in thinking on pathology.

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# SPECIĀLĀ ARTISTISKUMA KOMPOZICIONĀLĀ UN MUZIKĀLĀ KOMONENTES MĀKSLAS VINGROŠANĀ

## *The Compositional and Musical Components of Special Artistry in Rhythmic Gymnastics*

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**Abstract.** *Rhythmic gymnastics is an Olympic sport. Competitive composition in rhythmic gymnastics should not only meeting the requirements of the physical abilities, but being technically perfect and expressively performed by a gymnast as well. Describing the expressiveness of rhythmic gymnast's performance, the term "special artistry" is used. Special artistry in rhythmic gymnastics means artistry of compositional content, artistry of rhythmic gymnast, shown by athlete during performance of competition composition and gymnast's artistic abilities, influencing aesthetical effect of composition performance. The evaluation of judges at competitions often has a subjective character that is why the actual task of research is to make the expert assessment more objective. Particular investigation in general focuses on possible solutions to make alternative judging. Thus special artistry generally is viewed in 4 components – technical, aesthetical, compositional and musical. This paper is focused only on compositional and musical components of special artistry, headlining creation, build and content of composition, its execution and compositional and musical skills of the gymnast. The aim of the research is to define and to classify competition composition determining components criteria and exponents of special artistry in rhythmic gymnastics. To develop this research there was used the meta-analysis of scientific literature, using researches of the top rhythmic gymnastics, art and music specialists from one data base, with further creation of thematic typology of elements. In total there were screened 961 sources of which 107 qualified and 25 were chosen for further research. Investigating chosen data sources by the appropriated search terms, as a result 15 criteria and 104 exponents in compositional component, and 5 criteria and 4 exponents in musical component of special artistry in rhythmic gymnastics were determined and classified according to the selected structure of special artistry components in rhythmic gymnastics.*

**Keywords:** *artistry; components of special artistry in rhythmic gymnastics; rhythmic gymnastics.*

## **Ievads** ***Introduction***

Mākslas vingrošana ir daļa no olimpiskās sporta ģimenes, tādēļ tai būtu jāattīstās pēc visiem olimpiskajiem likumiem. Olimpiskie sporta veidi ir augstākie sasniegumi, rekordi un priekšnesumi. Mūsdienu publika un tiesneši sagaida no sportistēm sarežģītu, aizraujošu un skaistu sniegumu.

Mākslas vingrošanā kompozīcijai jābūt veidotai vadoties pēc horeogrāfijas, drāmas, kompozīcijas struktūras un noformējuma likumiem, atbilstot vingrotājas fiziskajai un tehniskajai sagatavotībai, izskatam, vecuma īpatnībām un emocionalitātei. Kompozīcijai izvēlētajam muzikālajam pavadījumam jāatbilst mākslas vingrošanas tehniskajām prasībām, kā arī harmoniski jāatbilst kompozīcijas raksturam, idejai un vingrotājai.

Estētiskums ir raksturīgs jebkuram sporta veidam kā cilvēka fiziskās dabas pilnīguma izpausme. Taču tādos sporta veidos kā mākslas, sporta un estētiskā vingrošana, kā arī citos tehniski estētiskajos sporta veidos estētiskuma pakāpe ir maksimāla pat šo sporta veidu noteikumu līmenī (Терехина, Винер, Турищева, & Плеханова, 2008). Jāatzīmē arī tas, ka mākslas vingrošana pašreizējā attīstības līmenī aug atbilstoši vispārējām sporta attīstības tendencēm. Mūsdienu mākslas vingrotājas ir sasniegušas tādu tehniskā izpildījuma līmeni, ka pasaules spēcīgākās vingrotājas spēj demonstrēt patiesi virtuozu kompozīcijas izpildījumu. Ja balstītos tikai uz kompozīcijas tehnisko izpildījumu, tad šādiem priekšnesumiem nebūtu tik liela estētiskā vērtība. Augstākie sportiskie sasniegumi mākslas vingrošanā ir sacensību kompozīciju ar priekšmetu artistiskais izpildījums mūzikas pavadījumā ar maksimālu koordināciju, lokanību, atsperīgumu, līdzsvaru, vestibulāro noturību un virtuozu priekšmeta pārvaldīšanu.

Šobrīd daudzas vingrotājas tehniski precīzi izpilda sarežģītas kombinācijas, un viņu meistarības vērtēšana kļūst arvien grūtāka, tāpēc pieaug tieši izpildījuma artistiskuma nozīme vērtēšanā. Mākslas vingrošanā sacensību kompozīciju izpildījuma vērtēšana nav atkarīga no objektīvi novērtējamiem fiziskiem lielumiem, bet gan no subjektīva tiesnešu vērtējuma, kā rezultātā rodas nepieciešamība izstrādāt precīzākus kritērijus vingrotāju izpildījuma meistarības vērtēšanai (Терехина et al., 2008).

Lai aprakstītu mākslas vingrotājas izpildījuma izteiksmīgumu, ir pielietots jēdziens “speciālais artistiskums”. Speciālais artistiskums mākslas vingrošanā ir kompozīcijas satura artistiskums, mākslas vingrotājas artistiskums, ko sportiste parāda sacensību kompozīcijas izpildījuma laikā, un vingrotājas īpašības, kuras ietekmē kompozīcijas izpildījuma estētisko efektu.

Mākslas vingrošanas vidē un speciālajā literatūrā ir sastopams liels daudzums nestrukturētas informācijas un dažādas pieejas artistiskumu raksturojošo kritēriju klasificēšanai. Pētījumā speciālais artistiskums mākslas



vingrošanā tiek apskatīts kā daudzdimensionāls raksturlielums, kurš sastāv no vairākām komponentēm, radot vienotu izpratni par artistiskuma būtību.

Pētījumā tiek detalizēti apskatītas sacensību kompozīciju noteicošās komponentes, t.i. kompozicionālā un muzikālā.

Pētījuma mērķis ir noteikt un klasificēt speciālā artistiskuma sacensību kompozīciju noteicošo komponentu kritērijus un rādītājus.

Lai īstenotu mērķi, tika izvirzīti sekojoši uzdevumi:

- 1) noteikt speciālā artistiskuma sacensību kompozīcijas kompozicionālās komponentes kritērijus un rādītājus un klasificēt tos atbilstoši izvēlētajai speciālā artistiskuma komponentu struktūrai mākslas vingrošanā;
- 2) noteikt speciālā artistiskuma sacensību kompozīcijas muzikālās komponentes kritērijus un rādītājus un klasificēt tos atbilstoši izvēlētajai speciālā artistiskuma komponentu struktūrai mākslas vingrošanā.

Veicot pētījumu, ir izmantota zinātnisko rakstu meta analīze no vienas datu bāzes un elementu tematiskās tipoloģijas veidošana. Ar meta analīzi un padziļinātu zinātnisko rakstu pētīšanu ir noteikti artistiskuma kompozicionālās un muzikālās komponentu kritēriji un rādītāji. Veidojot elementu tematisko tipoloģiju, kritēriji un rādītāji ir klasificēti atbilstoši speciālā artistiskuma komponentu izvēlētajai struktūrai mākslas vingrošanā.

### **Speciālā artistiskuma būtība mākslas vingrošanā** *The essence of special artistry in artistic gymnastics*

Mākslas vingrošana ir olimpiskais sporta veids, kurā vingrotājas sacenšas tehniski nevainojamā un izteiksmīgā kombināciju izpildīšanā ar virtuozu priekšmetu pārvaldīšanu mūzikas pavadījumā. Tas ir sporta veids, kurā vingrotājas kustībām ir jābūt precīzi saskaņotām ar muzikālo pavadījumu, kas no sportistēm prasa augstu kustību izteiksmīguma, dejiskuma, muzikālo spēju līmeni (Кузьменко, Фахриева, & Болдырева, 2017). Mākslas vingrošanā cīņa par uzvaru nav tik acīmredzama, tādēļ, atšķirībā no komandu sporta spēlēm, vingrotājai ir ievērojami grūtāk pievērst un noturēt skatītāju uzmanību. Mākslas vingrošanas gadījumā skatītāju interesi nodrošina divi faktori – vingrotājas darbību saturs un sacensību kompozīcijas kvalitatīvs izpildījums (Карпенко & Румба, 2013). No iegūtas informācijas var secināt, ka ne tikai kompozīcijas skatītāmība, bet arī sportiskais rezultāts lielā mērā ir atkarīgs no vingrotāju prasmes radīt tēlu un nodemonstrēt to tehniski nevainojami, virtuozī un artistiski.

Artistiskuma izpausmes specifikai tehniski estētiskajos sporta veidos ir savas īpatnības. Piemēram, mākslas vingrošanā ar artistiskumu saprot pilnību, pabeigtību, dinamiskumu, izteiksmīgumu, izpildījuma īpatnību gan atsevišķos

elementos, gan kompozīcijā kopumā. Izpildījuma izteiksmīgums mākslas vingrošanā izpaužas kustību atbilstībā mūzikas raksturam un mūzikas emocionālajam vēstījumam kustībā. Mūzikas atveidošana kustībā ir saistīta ar mūzikas kustību interpretāciju, kustību niansēm, kuras spēj pilnā mērā nodot muzikālā pavadījuma raksturu un kompozīcijas iecerī. Artistiskums no vienas puses tiek noteikts ar iekšējo pārdzīvojumu bagātību, bet no otras – ar kustību kultūru (Райнхардт & Попова, 2016).

Artistiskuma būtība mākslas vingrošanā ir saskaņota ar artistiskuma būtību mākslā kopumā, kā arī mūzikā un dejā. Artistiskums muzikālajā mākslā ir mūziķa prasme skaņās izteikt savu dvēseles stāvokli, savas domas un jūtas caur dvēseliski personisko kontaktu ar izpildāmo skaņdarbu (Буаттыра, 2011). Patiess artistiskums muzicēšanā paredz dziļas zināšanas par māksliniecisكو uztveri, daudzpusīgu interpretāciju, kas nodrošina piekļuvi adekvātai izpratnei par notīs iekodēto autora ideju (Майковская & Буаттыра, 2012). Savukārt, dejotāja artistiskums ir noteikts kā personības integratīva īpašība, kura paredz pozitīvu horeogrāfisko pieredzi, kas ir balstīta uz zināšanām, prasmēm, spējām, motivējošām vērtību orientācijām un dzīves pieredzi. “Dejotāja artistiskums” ir sarežģīts, daudzšķautņains, komplekss jēdziens. To pašu var teikt arī par artistiskumu kopumā (Цепляева, 2009). Vingrotāja, tāpat kā mūziķis vai dejotājs, atveido izvēlēta skaņdarba ideju un kompozīciju kopumā.

Mākslā un tehniski estētiskajos sporta veidos artistiskums izpaužas divos aspektos – saistībā ar mākslas darba veidošanas īpatnībām un saistībā ar mākslas darba skatāmību (Кабеева & Плеханова, 2009). Mākslas vingrošanā šis mākslas darbs ir sacensību kompozīcija, kuru vingrotāja demonstrē sacensībās, attiecīgi – to ierobežo sacensību noteikumi, laiks, laukuma izmēri un elementu skaits, kas nosaka visa vingrojuma vērtību. Vingrotājai dinamiskā kompozīcijā minūtes un trīsdesmit sekunžu laikā uz 13×13 metru paklāja mūzikas pavadījumā ir jāatklāj tēls (Терехина, Крючек, Медведева, & Зеновка, 2014).

Pamata faktori, kuri nosaka kompozīcijas skatāmību, ir sportistu meistarība un profesionālisms, virtuoza elementu izpildīšana un priekšmeta pārvaldīšana, muzikālais noformējums, tērps, priekšmets. Katrs no šiem elementiem ir cieši saistīts ar citiem un dod savu artavu māksliniecisكو tēla veidošanā (Кудашова, & Венгерова, 2018).

## **Metodoloģija** *Methodology*

Meklējot zinātniskos rakstus pēc atslēgas vārda “artistiskums” (“артистизм”), kopā tika izskatīti 483 raksti, no kuriem pēc nosaukumiem un anotācijām tika atlasīti 83 raksti, kuri ir publicēti laika posmā no 2004. līdz 2018.gadam. Detalizēti izpētīt atlasītos rakstus par izteiksmīgumu un

artistiskumu vingrošanā, artistiskuma būtību un komponentēm vingrošanā, mūzikā un mākslā, kā arī kompozīcijas sastādīšanas principiem un secību mākslas vingrošanā, turpmāk tika analizēti 19 raksti, kuri ir publicēti laika posmā no 2007. līdz 2017.gadam.

Meklējot zinātniskos rakstus pēc atslēgas vārda “mākslas vingrošana” (“художественная гимнастика”), kopā tika izskatīti 478 raksti, no kuriem vadoties pēc virsrakstiem un anotācijām, tika atlasīti 24 raksti, kuri ir publicēti laika posmā no 2006. līdz 2018.gadam. Veicot dziļāku atlasīto rakstu izpēti, turpmāk tika analizēti 6 raksti par kompozīcijas sagatavoību mākslas vingrošanā un par estētiskuma un artistiskuma rādītājiem tehniski estētisko sporta veidu sacensību un priekšnesumu kompozīcijās, kuri ir publicēti laika posmā no 2009. līdz 2018.gadam.

## Pētījuma rezultāti

### *Results*

Speciālajā artistiskumā kopumā ir izdalītas 4 komponentes: 2 vingrotājas personību noteicošās komponentes – tehniskā un estētiskā, un 2 sacensību kompozīciju noteicošās komponentes – kompozicionālā un muzikālā.

Artistiskums mākslas vingrošanā ir ne tikai vingrotājas tehniski nevainojams un estētiski izteismīgs sacensību kompozīcijas izpildījums, bet arī kompozicionālais un muzikālais priekšnosacījumi mākslas priekšnesuma radīšanai un augstvērtīga sportiskā rezultāta iegūšanai sacensībās.

Var uzskatīt, ka izdalītā speciālā artistiskuma kompozicionālā komponente ir nozīmīga, jo kompozicionālajai sagatavoībai ir būtiska nozīme vingrotāju vispārīgajā sportiskās sagatavošanas sistēmā. Kompozicionālā sagatavošana ir sacensību un sportiski māksliniecisko kompozīciju sastādīšanas un pilnveidošanas process mākslas vingrošanā un citos tehniski estētiskajos sporta veidos (Карпенко, Савельева, & Румба, 2009).

Pētījumā ir analizēti dažādu autoru darbos noteiktie artistiskuma kritēriji un rādītāji mākslas vingrošanā, citos tehniski estētiskajos sporta veidos un mākslā, un klasificēti atbilstoši speciālā artistiskuma komponentu izvēlētajai struktūrai mākslas vingrošanā.

Kompozicionālā komponente ir apskatīta trīs aspektos: sacensību kompozīcijas artistiskums, sacensību kompozīcijas izpildījuma artistiskums un mākslas vingrotājas kompozicionālais artistiskums (1. att.). Tādejādi kompozicionālās komponentes artistiskuma kritērijus un rādītājus var klasificēt detalizētāk, pievēršot uzmanību ne tikai kompozīcijas izpildījumam, bet arī pašas kompozīcijas artistiskumam, kā arī akcentēt mākslas vingrotājai nepieciešamās artistiskās prasmes, lai izpildītu sacensību kompozīciju augstā līmenī.



1.attēls. *Speciālā artistiskuma kompozicionālā komponente mākslas vingrošanā*  
Figure 1 *Compositional component of special artistry in rhythmic gymnastics*

Turpmāk ir analizēts katra speciālā artistiskuma kompozicionālās komponentes aspekta saturs. Treknrakstā attēlos atspoguļoti speciālā artistiskuma kompozicionālās komponentes artistiskie kritēriji un zem tiem uzskaitīti katra kritērija artistiskie rādītāji mākslas vingrošanā, bet ar cipariem ir norādīti attēlā redzamo kritēriju un rādītāju autori (1.Румба, 2007; 2.Терехина, Винер, Турищева, & Плеханова, 2008; 3.Протасова, 2008; 4.Кабаева & Плеханова 2009; 5.Цепляева, 2009; 6.Терехина, Винер, Плеханова, & Кабаева, 2009; 7.Гарькина, 2009; 8.Мазена, 2010; 9.Плеханова & Кабаева, 2010; 10.Плеханова, 2010; 11.Буаттура, 2011; 12.Предеина, 2011; 13.Майковская & Буаттура, 2012; 14.Майковская & Буаттура, 2013; 15.Терехина, Крючек, Медведева, & Зеновка, 2014; 16.Горячева, Анцыперов, & Березина, 2016; 17.Мостовая, 2016; 18.Коричко, 2017; 19.Кузьменко, Фахриева, & Болдырева, 2017; 20.Кудашов, Кудашова, & Венгерова, 2018).

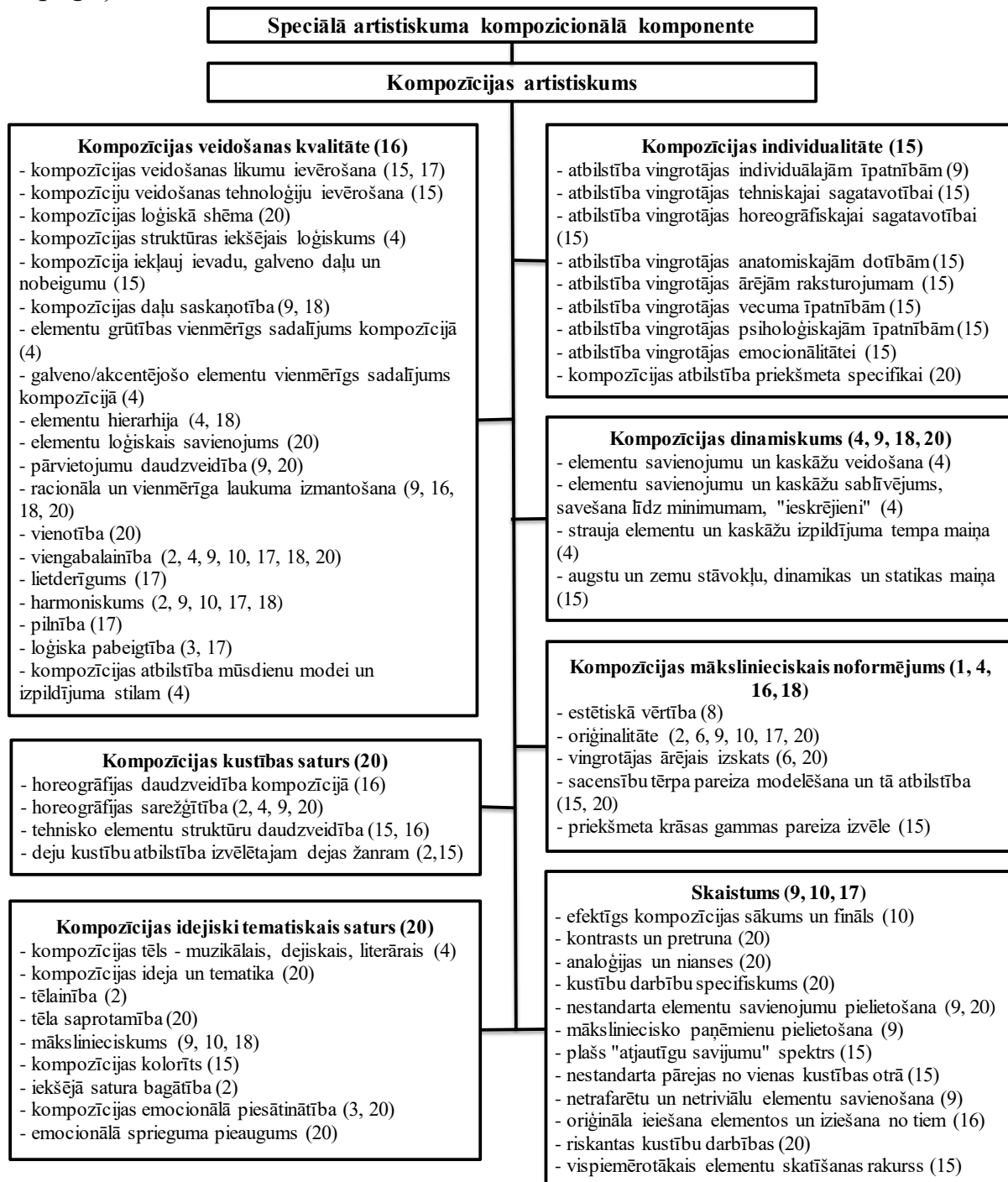
Mākslas vingrošanas kompozīcijai piemīt dažādas īpašības, kuras nosaka tās skatāmību, estētisko vērtību un vingrotājas novērtējumu sacensībās.

Sacensību kompozīcijas izveidošanas process ir komplicēts un tiek īstenots vairākos posmos: sagatavošanas, izveidošanas un korekcijas posmos. Sagatavošanas posms paredz vingrotājas sagatavotības un individuālo īpatnību dažādu aspektu izvērtēšanu. Kad kompozīcijai ir muzikālais, dejiskais vai literārais tēls, ko talantīgi, spilgti un pārliecinoši parāda vingrotāja, kompozīcija kļūst skatāmākā un tiek augstāk novērtēta sacensībās (Кабаева & Плеханова, 2009).

Kompozīcijas tēla radīšana notiek kompozīcijas izveidošanas posmā un ietver sevī stāsta, sižeta izklāstīšanu, kuram jānorisinās uz laukuma, un kas vingrotājai jāizstāsta ar dažādiem izteiksmīguma līdzekļiem. Ļoti liela nozīme tēla radīšanā ir pareizai grūtības un skaistuma elementu izvēlei, ko pārvalda vingrotāja, kā arī kompozīcijas sastādīšanas likumu ievērošana, kas paredz racionālu vingrotājas pārvietošanos pa laukumu, izdevīgāko elementu pārskata rakursu izvēli, oriģinālu elementu savienojumu iekļaušanu, dažādu kompozīcijas dinamiku pastiprinošu paņēmieni pielietošanu. Kompozīcijas tēla radīšanā liela uzmanība ir jāpievērš vingrotājas ārējam izskatam, un ir jāpanāk, lai visas tā

sastāvdaļas savstarpēji saskaņojas (Терехина, Крючек, Медведева, & Зеновка, 2014).

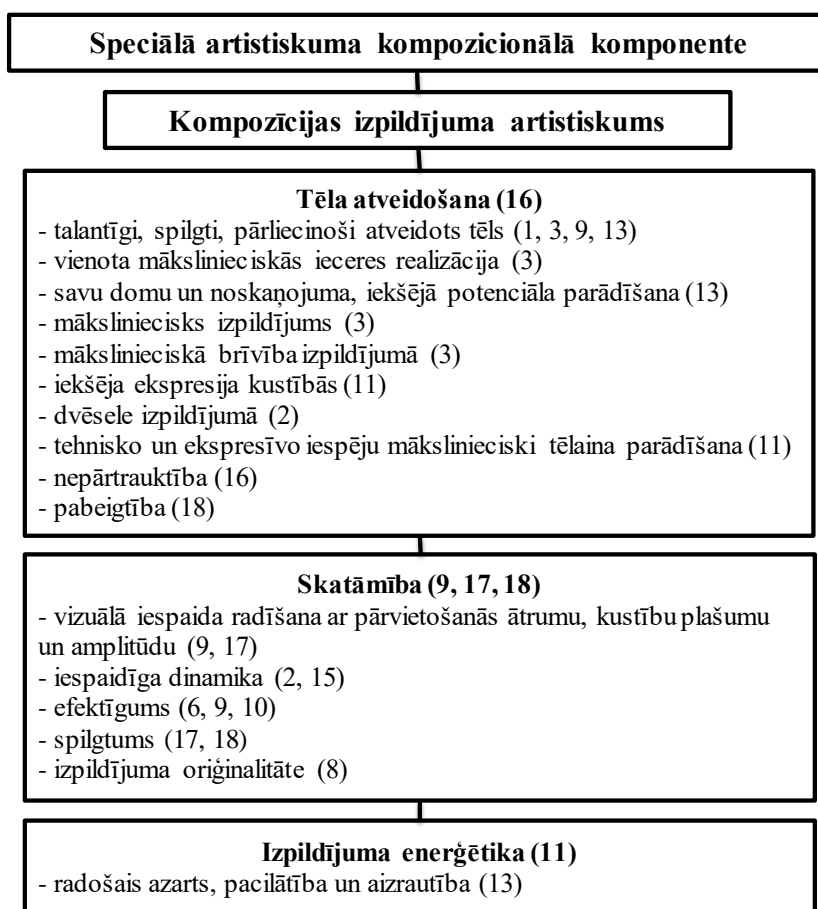
Mākslas vingrošanas sacensību kompozīcijas artistiskie kritēriji un rādītāji atspoguļoti 2. attēlā.



2.attēls. Mākslas vingrošanas sacensību kompozīcijas artistiskie kritēriji un rādītāji  
 Figure 2 Artistic criteria and exponents of rhythmic gymnastics competition composition

Kompozīcijas izpildījumam tiek pievērsta liela uzmanība kompozīcijas izveidošanas korekcijas posmā. Šajā posmā tiek sasniegti visu izpildījuma meistarības sastāvdaļu (kompozīcijas sarežģītība, elementu izpildījuma kvalitāte, izpildījuma izteiksmīgums) realizēšanas mērķi, lai veidotu oriģinālu un skatāmu kompozīciju. Jo tikai pilnīga harmonija starp mūziku, horeogrāfiju, nevainojamu un neatkārtojamu izpildījumu un vingrotājas ārējo izskatu, sacensību tērpu un priekšmetu, rada spēcīgu iespaidu.

Mākslas vingrošanas kompozīcijas izpildījuma artistiskuma kritēriji un rādītāji atspoguļoti 3. attēlā.



3.attēls. *Mākslas vingrošanas sacensību kompozīcijas izpildījuma artistiskuma kritēriji un rādītāji*

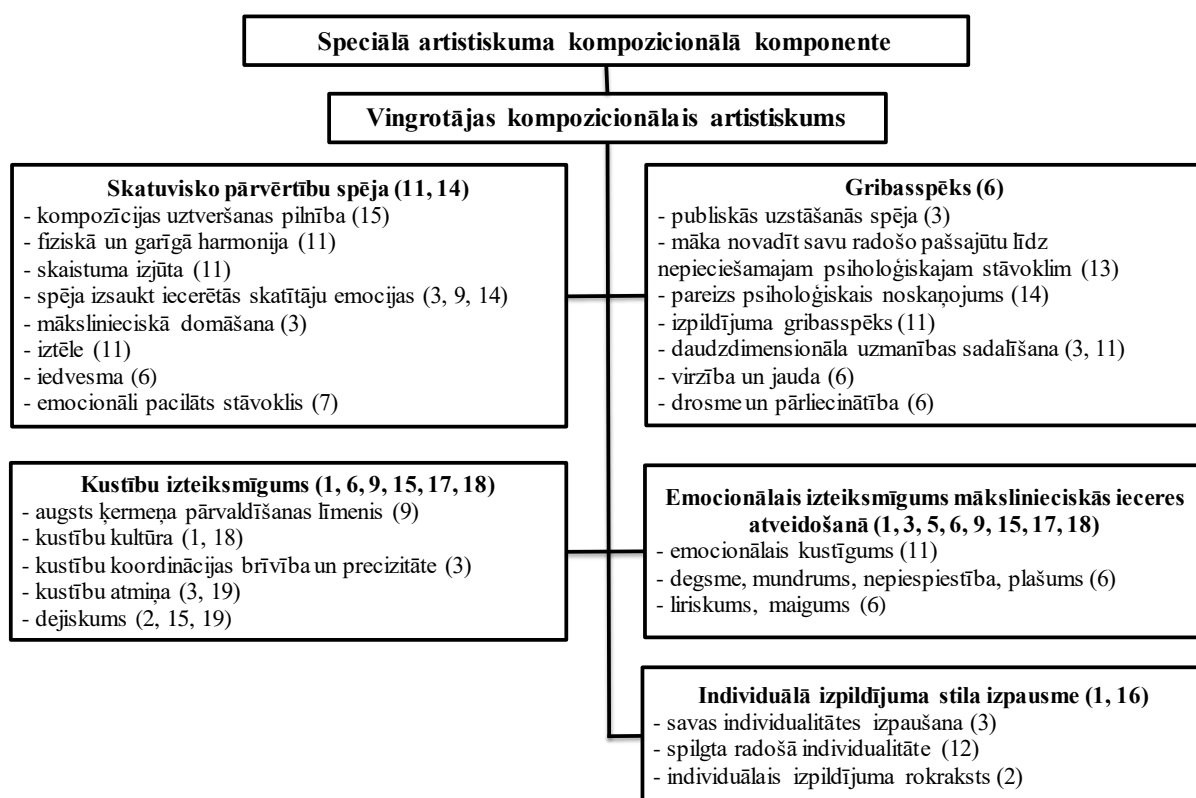
Figure 3 *Artistic criteria and exponents of rhythmic gymnastics competition composition execution*

Mākslas vingrotāja izpilda kompozīciju un rada tēlu, kuru nosaka muzikālais pavadījums un kompozīcijas ideja (Терехина, Крючек, Медведева, & Зеновка, 2014). Tikai sportistes ar augstu kustību kultūras līmeni ir spējīgas sacensību

kompozīciju izpildīt viegli un nepiespēti, dinamiski un izteiksmīgi (Горячева, Анцыперов, & Березина, 2016).

Mākslas vingrotājas kompozicionālā artistiskuma kritēriji un rādītāji atspoguļoti 4. attēlā.

No iegūtajiem rezultātiem var secināt, ka kompozīcija, līdzīgi pašam artistiskumam, ir sarežģīts, daudzdimensionāls raksturlielums, un tās artistiskuma kritēriju un rādītāju detalizēta apskatīšana ļauj dziļāk izprast kompozīcijas estētisko būtību un sastādīšanas principus.



4.attēls. Mākslas vingrotājas kompozicionālā artistiskuma kritēriji un rādītāji

Figure 4 Artistic criteria and exponents of rhythmic gymnast compositional artistry

Pētījumā rezultātā speciālā artistiskuma muzikālajā komponentē ir noteikti artistiskuma kritēriji un rādītāji mākslas vingrošanā, citos tehniski estētiskajos sporta veidos, mākslā un mūzikā, un, līdzīgi speciālā artistiskuma kompozicionālajai komponentei, klasificēti atbilstoši speciālā artistiskuma komponentu izvēlētajai struktūrai mākslas vingrošanā.

Muzikālā komponente ir apskatīta trīs aspektos: kompozīcijai izvēlēta paša muzikālā pavadījuma artistiskums, artistiskums izpildījumā ar muzikālo pavadījumu un vingrotājas muzikālais artistiskums (5. att.). Tādejādi muzikālās komponentes artistiskuma kritērijus un rādītājus var klasificēt detalizētāk,

pievēršot uzmanību ne tikai izpildījumam muzikālajā pavadījumā, bet arī paša muzikālā pavadījuma artistiskumam, kā arī akcentēt mākslas vingrotājam nepieciešamas artistiskās prasmes, lai izpildītu kustības atbilstoši kompozīcijai izvēlētam muzikālajam pavadījumam.

Muzikālā pavadījuma izvēle un tā tehniskais noformējums ir viens no sarežģītākajiem un atbildīgākajiem kompozīcijas sastādīšanas aspektiem. Muzikālajam pavadījumam ir jāatbilst mākslas vingrošanas prasībām, ir jābūt kvalitatīvi tehniski noformētam un labi uztveramam. Muzikālajam pavadījumam ir arī jāatbilst vingrotājas individuālajām īpatnībām – ārējam izskatam, vecumam, sportistes tehniskajām un emocionālajām iespējām, izteiksmīguma līmenim, kā arī muzikālajām zināšanām (Карпенко, Савельева, & Румба, 2009; Терехина, Крючек, Медведева, & Зеновка, 2014).

Mākslas vingrotājas kustībām, izpildot kompozīciju, jābūt izpildītam atbilstoši kompozīcijai izvēlētam muzikālā pavadījuma struktūrai, tempam, ritmam un niansēm. Šādu muzikālo kompozīcijas izpildījumu var panākt tikai vingrotāja ar augsti attīstītām muzikālajām un ritmiskajām spējām.



5.attēls. *Speciālā artistiskuma muzikālā komponente mākslas vingrošanā un to aspektu artistiskie kritēriji un rādītāji*

Figure 5 *Musical component of special artistry in rhythmic gymnastics and artistic criteria and exponents of its aspect*

Balstoties uz iegūtajiem rezultātiem var secināt, ka mūzikai ir liela nozīme ne tikai spilgta kompozicionālā tēla radīšanā, bet arī vingrotājas muzikālo, ritmisko un izteiksmīguma spēju attīstīšanā un pilnveidošanā.



## Secinājumi Conclusions

Iegūtie pētījuma rezultāti liecina, ka mākslas vingrošanas sacensību kompozīciju noteicošais speciālais artistiskums ir daudzšķautņains raksturlielums, kas sevī ietver:

- 1) mūsdienīgas, pēc kompozīcijas sastādīšanas likumiem izveidotas, vingrotājas personībai un sagatavotības līmenim atbilstošas, mākslinieciski noformētas, horeogrāfiski daudzveidīgas, dinamiskas, emocionāli piesātinātas, tēlainas un muzikālas **kompozīcijas saturu**;
- 2) talantīgu, pārliecinošu, tēlainu, skatāmu, pacilātu, aizrautīgu un muzikālu **kompozīcijas izpildījumu**;
- 3) **vingrotājas artistiskās kompetences**, kuras nepieciešamas spilgtam kompozīcijas izpildījumam – spēja pārvērsties un izsaukt iecerētās emocijas tiesnešos un skatītājos, kustību izteiksmīgums, muzikalitāte un ritmiskums.

Sacensību kompozīciju mākslas vingrošanā nosaka divas speciālā artistiskuma komponentes – kompozicionālā un muzikālā.

1. Speciālā artistiskuma kompozicionālajā komponentē mākslas vingrošanā, pielietojot meta analīzi un padziļinātu zinātnisko rakstu pētīšanu, kopā ir noteikti 15 kritēriji un 104 rādītāji. Veidojot elementu tematisko tipoloģiju, noteiktie kritēriji un rādītāji ir klasificēti atbilstoši izvēlētajai speciālā artistiskuma komponentu struktūrai mākslas vingrošanā, t.i. trīs aspektos – sacensību kompozīcijas artistiskums, sacensību kompozīcijas izpildījuma artistiskums un mākslas vingrotājas kompozicionālais artistiskums.  
Kompozīcijas artistiskumu raksturo 7 kritēriji – kompozīcijas veidošanas kvalitāte; kompozīcijas kustības saturs; kompozīcijas idejiski tematiskais saturs; kompozīcijas individualitāte; kompozīcijas dinamiskums; kompozīcijas mākslinieciskais noformējums; skaistums, un 62 rādītāji, kuri raksturo artistiskuma kritērijus. Kompozīcijas izpildījuma artistiskumu raksturo 3 kritēriji – tēla atveidošana; skatāmība; izpildījuma enerģētika, un 16 rādītāji. Mākslas vingrotājas kompozicionālo artistiskumu raksturo 5 kritēriji – skatuvisko pārvērtību spēja; kustību izteiksmīgums; gribasspēks; emocionālais izteiksmīgums mākslinieciskās ieceres atveidošanā; individuālā izpildījuma stila izpausme, un 26 rādītāji.
2. Speciālā artistiskuma muzikālajā komponentē mākslas vingrošanā, pielietojot meta analīzi un padziļinātu zinātnisko rakstu pētīšanu, kopā ir noteikti 5 kritēriji un 4 rādītāji. Veidojot elementu tematisko tipoloģiju, noteiktie kritēriji un rādītāji ir klasificēti atbilstoši izvēlētajai

speciālā artistiskuma komponentu struktūrai mākslas vingrošanā, t.i. trīs aspektos – kompozīcijai izvēlētajā muzikālā pavadījuma artistiskums, artistiskums izpildījumā ar muzikālo pavadījumu un mākslas vingrotājas muzikālais artistiskums.

Kompozīcijai izvēlētajā muzikālā pavadījuma artistiskumu raksturo 2 kritēriji – mūzikas izvēle kompozīcijai un mūzikas izmantošana, kurus, savukārt, raksturo 2 rādītāji; izpildījuma muzikālajā pavadījumā artistiskumu raksturo 1 kritērijs – muzikāli horeogrāfiskais veselums un 2 rādītāji; un mākslas vingrotājas muzikālo artistiskumu raksturo 2 kritēriji: muzikalitāte un ritmiskums.

Pētījuma rezultātā noteiktie un klasificētie speciālā artistiskuma kompozicionālās un muzikālās komponentu kritēriji un rādītāji ir informatīvi un tie ir jāņem vērā tiesnešiem mākslas vingrotāju izpildījuma meistarības vērtēšanā, bet to struktūrai ir nepieciešama praktiskā pielietojuma aprobācija.

### Summary

The results of the study conclude that the special artistry, defining the competition composition in rhythmic gymnastics, is a multidimensional characteristic that includes:

- 1) ***the content of*** contemporary, created according to the composition laws, corresponding to the personality and preparedness level of gymnast, artistically designed, choreographically diverse, dynamic, emotionally saturated, imaginative and musical ***composition***;
- 2) talented, compelling, imaginative, spectacular, elated, enthusiastic and musical ***performance of composition***;
- 3) ***artistic competencies of gymnast***, required for a vivid performance of the composition – the ability to convert and summon the intended emotions to judges and spectators, the expressiveness of movements, musicality and rhythmic skills.

The competition composition in rhythmic gymnastics is determined by two components of special artistry – compositional and musical.

1. Special artistry is considered in three aspects in the compositional component – the artistry of the composition, the artistry of the execution of the composition and the compositional artistry of gymnast.

The compositional artistry is characterized by 7 criteria – quality of the composition, individuality of the composition, movement content of the composition, dynamics of the composition, ideologically thematic content of the composition, artistic design and beauty of the composition, as well as 62 exponents. The performance of composition is characterized by 3 criteria – image reproduction, spectacularity and performance energy and 16 exponents. Compositional artistry of rhythmic gymnast is characterized by 5 criteria – the ability of stage transformations, moral-volitional qualities,

movement expressiveness, emotional expressiveness in the reproduction of artistic idea and demonstration of individual performance style and 26 exponents. Thereby compositional artistry is characterized by 15 criteria and 104 exponents.

2. In the musical component, special artistry is considered in 3 aspects – the artistry of the musical accompaniment chosen for the composition, the artistry in the execution with musical accompaniment and the musical artistry of gymnast.

The composition of the musical accompaniment chosen for the composition is characterized by 2 criteria – the choice of music for composition and the use of music and 2 exponents. Execution with musical accompaniment is characterized by one criterion – musical choreographic as whole and 2 exponents. Musical artistry of gymnast is characterized by 2 criteria – musicality and rhythm. Thereby compositional artistry is characterized by 5 criteria and 4 exponents.

As a result of the research, the determined and classified criteria and exponents of the compositional and musical components of the special artistry should be taken into account by judges in the assessment of the execution mastery of the rhythmic gymnasts, but their structure requires the approbation of the practical application.

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# INFLUENCE OF A 6-WEEK MIXED BALLISTIC- PLYOMETRIC TRAINING ON THE LEVEL OF SELECTED STRENGTH AND SPEED INDICES OF THE LOWER LIMBS IN YOUNG FOOTBALL PLAYERS

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**Abstract.** *The development of muscle power should be taken into account in soccer training. The aim of this study was to evaluate the influence of a 6-week of mixed power training on the level of the motor skills of the lower limbs of young soccer players. The training was conducted during the starting period. The study included twelve 16-18-year-old players who regularly participated in specific soccer trainings and played in regional competitions. Their basic anthropometric features were measured. The assessment of the power of the lower limbs was carried out using two jump tests: CMJ and SJ. The maximum anaerobic power was calculated and was expressed in relation to body weight and lean body mass. In addition, Drop Jump tests were performed from three different heights on the basis of which RSI reactive strength index were calculated. On completion of the training program an increase in the level of the results of all the tests was observed: SJ (cm) (cohen's d: 0.43), CMJ (cm) (cohen's d: 0.33), SJP<sub>max</sub> (W/kg) (cohen's d: 0.43), CMJP<sub>max</sub> (W/kg) (cohen's d: 0.30), SJP<sub>max</sub> (W/LBMkg) (cohen's d: 0,57), CMJP<sub>max</sub> (W/LBMkg) (cohen's d: 0,44), RSI 0,2 (cohen's d: 0,59), RSI 0,3 (cohen's d: 0,45), RSI 0,4 (cohen's d: 0,58). An additional six-week ballistic-plyometric training program, used as a supplement to the basic training plan during the start period, resulted in an increase in the motor skills of the lower limbs of young soccer players. The application of combined ballistic and plyometric training methods helps to improve the strength and speed potential of young soccer players.*

**Keywords:** *ballistic-plyometric training, maximal anaerobic power, RSI, soccer*

## Introduction

Soccer is a dynamic muscular work discipline, dominated by acyclic movement activities. Short-term efforts of maximum intensity and high intensity are intertwined with moderate and low intensity efforts (Bompa, Zajac,

Waśkiewicz, & Chmura, 2013). During a game of soccer, players perform a large number of movement activities such as: hitting the ball, slides, sprints with and without the ball, jumps and changes of running direction (Bangsbo, Mohr, & Krustup, 2006). Strength and speed capabilities, understood as the anaerobic power and muscle strength, are crucial in the context of the high level of fitness preparation in many disciplines (Stec, Pilis, Witkowski, Pilis, Michalski, & Zych, 2018). In football, muscle strength, agility, speed and special endurance are indicated as the most important motor determinants of sports performance (Bompa & Buzzichelli, 2015).

In terms of strength and speed preparation, the main areas of training interaction in soccer are maximum power and muscle strength (Bompa & Buzzichelli, 2015). In sports practice there are many methods of developing muscle strength and power. In this study a combination of ballistic and plyometric methods was used to increase muscle power levels. Plyometric training based on skip forwards, jumps, and leaps using the phenomenon of stretch shortening cycle (SSC) is conducive to increasing the level of muscle strength and power (Chu & Myer, 2013). Ballistic exercises consist in performing a dynamic motor activity (throw, jump, sprint) with the use of external or self-resistance. The player must generate a level of muscle strength/power to overcome self-resistance or the resistance of the equipment (e.g. medicine balls) with maximum possible acceleration. Ballistic training induces positive adaptation in the following areas: FT fibre recruitment, intramuscular coordination and the frequency of muscle cell stimulation (Bompa & Buzzichelli, 2015).

In the light of specialist literature, it can be asserted that in recent years numerous studies have been carried out on the effectiveness of various types of muscle strength and power training in soccer players. Scientific research pertains to sprint exercises, combinations of strength exercises with and without equipment or plyometric exercises (e.g. Mujika, Santisteban, & Castagna, 2009; Chelly et al., 2010; Wong, Chamari, & Wisløff, 2010; Meylan & Malatesta 2009). However, an analysis of the available literature indicates lack of studies on the influence of mixed ballistic-plyometric training with medicine balls on the level of motor skills of the lower limbs of young soccer players (U-19).

Thus, it seems justified to scientifically verify the rarely used muscle power training methods which can easily (and considerably cheaply) be used in working with young soccer players. The aim of the study was to assess the effect of a 6-week ballistic training combined with plyometric training with the use of medicine balls on the level of the development of selected strength and velocity indices of the lower limbs in young footballers. Experimental training was conducted during the start period, as an addition to specialist (tactical-technical) trainings.

### Material and methods

Twelve players of calendar age between 16 and 18 took part in the research, attending classes at the soccer academy. The research was carried out during the start period in September-October 2018. The players surveyed participated in 90-minute trainings, 4-5 times a week and played one championship match every week. The respondents had at least 4 years of training experience.

Experimental ballistic-plyometric training was conducted twice a week (on Mondays and Thursdays) for a period of six weeks (Table 1). The players participating in the classes were divided into 3 groups of 4 players each. 30 cm high athletic fences, spaced every 0.90 m, and 5 kg medicine balls were used in the training. The experimental training consisted in a series of exercises in which the player would first perform a series of jumps from the squat combined with an upward throw of the ball from a previously prepared starting position, and would next perform a series of back throws of the medicine ball, in which the starting position was the squat. The interval between each successive exercise was about 25 seconds, and between each series – 60 seconds. As the third task, the player performed a series of sprints with a medicine ball in his hands. During the running exercises, the participants performed 15-metre-long runs (lasting about 3 seconds), after which they rested for about 60 seconds (work-rest ratio being 1:20). The fourth task to be performed by the player consisted in a series of 5 jumps, holding the medicine ball in the hands, keeping contact time with the ground as short as possible. The duration of the exercise was about 5 seconds, and the interval between successive series was 60 seconds (work-rest ratio being 1:15). Between successive series there were breaks of about 60 seconds, in accordance with the recommendations of Lentz and Dawes (2015).

*Table 1 Experimental training program (series x repetitions)*

week	medicine ball back throw	a jump from a squat position with a medicine ball throw	a 15m sprint with a medicine ball (sum of repetitions)	jumps with a medicine ball over 30 cm high fences
1	2x6 & 3x6	2x6 & 3x6	x2 & x3	2x5 & 3x5
2	3x6	3x6	x3	3x5
3	3x6	3x6	x3	3x5
4	4x6	4x6	x4	4x5
5	4x6	4x6	x4	4x5
6	5x6	5x6	x5	5x5

In the first week of the experiment, during the first training classes 2 series of exercises were carried out, during the second training 3 series of exercises were carried out, and in the following weeks the series progression presented in Table



1 was applied. During the implementation of individual exercises, the players were all the time verbally encouraged to do their best at working out.

Before and after the beginning of the training program, measurements of somatic features and motor skills of the lower limbs were taken. Somatic measurements of body height (BH), body weight (BW), lean body mass (LBM), percentage of adipose tissue (FM) in the body weight were included in the scope of the study. Somatic measurements were performed with the use of an anthropometric, in accordance with ISAK standards (Marfell-Jones, Olds, Stewart, & Carter, 2006). The measurements of body tissue components were carried out with the use of TANITA model BC-730 scales. Measurements of motor efficiency of the lower limbs included: measurement of the height of the SQUAT JUMP after a 3-second stop (90 degrees of knee joint flexure) (SJ), measurement of the COUNTERMOVEMENT JUMP height with upper limb swing (CMJ), a series of DROP JUMP tests (jumps from a height of 20, 30 and 40 cm), on the basis of which reactive strength index (RSI) based on the McClymont formula were calculated:  $RSI = h/t$ , where h stands for jump height (m), t stands for depreciation and rebound time (s) (Bober et al., 2007). On the basis of SJ and CMJ tests the maximum anaerobic power of jumps was calculated using Sayers et al. equation (1999):  $P_{max} = 60.7 \times \text{height of jumps (cm)} + 45.3 \times \text{body weight (kg)} - 2055$ . Power results were expressed in W/kg and W/LBMkg. Measurements were carried out using the Optojump system (Microgate, Italy).

In the statistical analysis of the collected data, after the evaluation of the normality of the distribution of variables with the Kolmogorow-Smirnov test, the following were calculated: basic descriptive statistics in order to describe the study group; the Student's T-test for dependent samples in order to assess the diversity of the level of development of the examined somatic and functional features of the players before and after the implementation of the experiment. Standard thresholds for arithmetic mean differences proposed by Cohen (d) (Hopkins, Marshall, Batterham, & Hanin, 2009) were used in the evaluation of the effect size (ES).

## **Results**

Table 2 presents basic descriptive statistics characterizing the somatic structure of the players under examination. The results of the measurements of body height, body weight, body fat percentage and lean body mass are presented. Table 3 shows descriptive statistics characterizing the motor efficiency of the lower limbs of the players under observation in both research periods and the significance of differences that were recorded between the level of the development of this skill before and after implementation of the training experiment. On the basis of the presented results, it can be concluded that

statistically significant differences in average SJ parameters occurred (p=0.008, ES: 0.43), SJ<sub>Pmax</sub> [W/kg] (p=0.011, ES: 0.43), SJ<sub>Pmax</sub> [W/LBMkg] (p=0.003, ES: 0.57), RSI 0.2 (p=0.003, ES:0.59), RSI 0.3 (p=0.032, ES:0.45), RSI 0.4 (p=0.004, ES: 0.58). In the case of other motor variables, an increase in the level of efficiency development was also observed; however, the changes were not statistically significant.

*Table 1 Statistical characteristics of somatic variables of the players under examination*

Period/variables	1		2	
	x	sd	x	SD
BH [cm]	177.07	6.74	177.20	6.83
BW [kg]	67.28	5.44	68.30	5.45
FM %	10.66	2.69	11.48	2.40
LBM [kg]	60.08	4.72	60.43	4.60

*Table 2 Statistical characteristics of the motor efficiency indicators of the lower limbs of the players under observation*

Period/variable	1		2		p-value	ES (Cohen's d)
	x	sd	x	sd		
<b>SJ [cm]</b>	<b>35.17</b>	<b>4.38</b>	<b>37.11</b>	<b>4.56</b>	<b>0.008</b>	<b>0.43</b>
CMJ [cm]	42.25	5.09	44.11	6.07	0.105	0.33
<b>SJ<sub>Pmax</sub> [W/kg]</b>	<b>46.60</b>	<b>3.93</b>	<b>48.33</b>	<b>4.05</b>	<b>0.011</b>	<b>0.43</b>
CMJ <sub>Pmax</sub> [W/kg]	53.08	4.81	54.66	5.64	0.114	0.3
<b>SJ<sub>Pmax</sub> [W/LBMkg]</b>	<b>52.16</b>	<b>3.97</b>	<b>54.63</b>	<b>4.64</b>	<b>0.003</b>	<b>0.57</b>
CMJ <sub>Pmax</sub> [W/LBMkg]	59.38	4.59	61.75	6.16	0.057	0.44
<b>RSI 0.2</b>	<b>1.50</b>	<b>0.34</b>	<b>1.74</b>	<b>0.43</b>	<b>0.003</b>	<b>0.59</b>
<b>RSI 0.3</b>	<b>1.57</b>	<b>0.34</b>	<b>1.74</b>	<b>0.42</b>	<b>0.032</b>	<b>0.45</b>
<b>RSI 0.4</b>	<b>1.59</b>	<b>0.37</b>	<b>1.81</b>	<b>0.41</b>	<b>0.004</b>	<b>0.58</b>

## Discussion

The basis for effective actions of a player during a game of soccer is highly developed special movement skills, which in turn are conditioned by a high level of the development of motor skills: strength, speed, endurance, coordination. Traditional motor training of a soccer player used to be mainly focused on the development of their aerobic endurance, marginalizing their anaerobic preparation in the aspect of short-term strength and speed efforts. Today's soccer requires that endurance training be subordinated to strength and speed training and that attention be paid to the quality of exercise rather than quantity. Currently, a priority can be observed in the implementation of speed training, strength training with high performance dynamics, neuromuscular training, which are

primarily based on anaerobic muscle effort. Such training activities enable the player, during a direct sports competition, to achieve greater efficiency in such activities as acceleration, shooting, jumping or sliding (Chmura, Chmura, & Ciastoń, 2008).

Bompa & Buzzichelli (2015) assert that the most important goals of strength training for soccer players should be to increase the level of maximum strength and muscle power. Recently, soccer players with different levels of training, age and performance, among many methods of power trainings often used and scientifically verified, have been using the plyometric method (e.g. Kobal et al., 2017; Michailidis et al., 2018, Negra et al., 2018; Beato, Bianchi, Coratella, Merlini, & Drust, 2018). As mentioned in the introduction, in the light of analysis of the literature available, no newer studies were found concerning ballistic training or a combined ballistic training with plyometric training in soccer players (with medicine balls). Plyometric training has long been recognised as effective in developing muscle power (Newton & Kraemer, 1994). However, its safe use is subject to certain requirements in terms of health, calendar age, strength or stabilization of the trunk. According to Bompa et al. (2013) or Davies et al. (2015), a player should have such a level of strength of the lower limbs that they can lift a weight equal to 1.5 of their body weight from the squat. Therefore, if the above requirements are not met, other methods of power training should be sought. It can be stated that the ballistic-plyometric method (i.e. a combination) with the use of medicine balls, based on easy, spatially and temporally structured motion, can be successfully used as a substitute for the plyometric method.

The results of our own research demonstrate efficiency of the use of ballistic-plyometric training in order to shape the strength and speed of the lower limbs of footballers. The SJ test is known to allow for determining of the possibility of generating the so-called general power of the lower limbs and to provide information on the concentric efficiency of muscle work, while the CMJ test is known to inform about the efficiency of muscle performance in the slow stretching system (slow SSC) (Martinez, 2017). Maćkała et al. (2015) claim that at the beginning of a sprint, the ability to generate high values of strength/power in the concentric work of the lower limb muscles is conducive to achieving high speeds during acceleration. As a result of the experiment, significant changes in the efficiency of SJ jumps and in the level of the power generated by the muscles involved in these jumps were observed in the players under examination. Power and its changes over time were characterized with indicators expressing its size in relation to body weight and lean body mass. These indicators show that the power of muscles (straightening the hip and knee joints) in concentric work was significantly improved during the experiment. The results of CMJ tests also improved, but the range of the changes was smaller and statistically insignificant. The lack of significant changes was probably due to the fact that the training

program did not include exercises that would be similar in terms of movement structure to a shoulder swing jump (in which the SSC cycle occurs). Two experiment exercises consisted in throwing the ball in a jump from the squat and throwing the ball back; thus the main emphasis of the lower limbs performance during the exercise was focused on the concentric phase – straightening of the knee, hip and ankle joints (preparation of the position and then explosive straightening of the lower limbs combined with throwing the ball). Since the results of various jumping attempts are positively correlated with the kinematic parameters of sprint running (Maćkała et al., 2015) and since jumps are typical manifestations of speed abilities (Szopa, Mleczo, & Żak, 1996), it can be asserted that as a result of the training applied, the speed capabilities of the players under examination improved (in the scope of short-term sprint efforts). Moreover, in the Maćkała et al. study (2015) there was a positive correlation between the distance of the medicine ball back throw (one of the exercises used in this study) and the time and speed of running at a distance of 10 meters. Therefore, it seems that medicine ball exercises (throws, jump throws) can be successfully used to shape the speed efficiency (increasing muscle power levels) of young soccer players.

Newton and Kraemer (1994) affirm that the majority of explosive movements make use of the phenomenon of stretching and then shortening muscles in order to accelerate the body or a limb. Martinez (2017) states that jump-down tests with a rapid upward bounce make it possible to assess the specific strength of a jump (the so-called fast SSC). Reactive strength indexes (RSI) can be used to assess the level of explosive force in the lower extremities. McClymont's formula (Bober, Rutkowska-Kucharska, Pietraszewski, & Ćwiczenia, 2007) has been used in this study. The value of RSI depends to a large extent on the time of contact with the ground (the values of the index increase significantly, with shorter contact time) (Bober et al., 2007). In the experimental training only one exercise was used, which was characteristic of the plyometric method: jumping over 30 cm fences with a medicine ball in hands. According to Bober et al. (2007), the efficiency of plyometric training, which consists in performing a series of jumps, depends on maintaining the shortest possible time of contact with the ground. During the exercises, the players were encouraged to perform jumps with possibly the shortest contact time between the feet and the ground. The results indicate a significant improvement of all analyzed RSI indicators. In the light of the studies cited by Bober et al. (2007), the observed mean values of RSI indices can initially (before the training cycle) be classified as weak or average (index value 1.5). On the other hand, after the end of the training cycle, the mean values of the indicators increased significantly (Table 2) and approached the upper limit of the range defined as the mean level (indicator 2). Based on the results of their research Michailidis Yiannis et al. (2018) suggest

that the introduction of plyometric exercises of the lower limbs into the soccer players' training plan leads to an increase in their motor skills. The results of our own research confirm the reports of these authors. The use of plyometric exercise (the only one in which a fast SSC cycle was used) in our own study most probably had a direct effect on the improved RSI indices of the players observed. On this basis, it should be concluded that mixed training methods could be used with positive results in training aimed at shaping the strength and speed of the lower limbs in young players. Such tasks and training methods will enable players to achieve an increase in speed and strength potential and a comprehensive adaptation of the body to anaerobic efforts based on explosive muscle work.

Based on the results of our own research, the following conclusions can be drawn:

1. The use of mixed training methods aimed at shaping the strength and speed of lower limb muscles in young soccer players leads to an increase in their efficiency of movements related to the generation of maximum anaerobic power.
2. Compilation of ballistic and plyometric training with the use of medicine balls significantly increases the level of development of the speed potential of young soccer players.
3. The use of a mixed ballistic-plyometric method in training significantly increases the adaptation of the body to efforts based on explosive muscle work.

### **Acknowledgments**

The authors wish to thank coach Daniel Popiela for assistance and participants for their contribution in this study.

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## VECĀKU KOMPETENCE ZĪDAINU PELDINĀŠANĀ SPECIĀLISTU SKATĪJUMĀ

### *Parents' Competence in Infant Floating from a Specialist Perspective*

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**Abstract.** Nowadays activities with the involvement of both children and parents are becoming increasingly popular. There are a variety of such activities, but in this study we focus on infant floating. It is very important how parents feel themselves in such type of lessons and how they are able to perform the exercises with their infants independently and orient themselves in a specific aquatic environment. Parents' competences in infant floating on the whole are often characterised by their insufficient knowledge, skills and practical abilities in maintaining correct and proper behaviour in the aquatic environment. Therefore, the aim of our study is to explore and analyse the assessment of parents' competences in infant floating. Based on the research results it would be possible to develop a more accurate model for the enhancement of the parents' competences required for infant floating and put forward recommendations for improving parents' competences. An assessment survey of the parents' competences in infant floating was conducted from the beginning of September 2017 until the end of October. 33 swimming experts participated voluntarily in the assessment of parents' competences in infant floating. The mean, standard deviation and mode was used to process the numerical data gathered from the responses. The content and statements put forward in the survey questionnaire regarding parents' competences in infant floating were based on scientific concepts. The results of the survey of swimming experts indicate that all of the components proposed by the authors that influence parents' competences in infant floating play a significant role. It could also be surely concluded that at present, the overall level of parental competence in infant floating in the opinion of experts is average. In general, all the surveyed swimming experts are of the opinion that parents should definitely supplement or acquire additional knowledge, skills and abilities in order to increase their level of competences in infant floating in order to be able to effectively apply these competences during independent lessons with their infants.

**Keywords:** parents' competences, infant floating, survey of swimming experts.

## **Ievads** ***Introduction***

Ūdens labvēlīgā iedarbība uz cilvēka organismu ir zināma jau kopš seniem laikiem. Nekādas citas fiziskās aktivitātes nevarēs salīdzināties ar nodarbībām ūdens vidē, jo ķermeņa bezsvara stāvoklis un horizontāla pozīcija palīdz atslogot mugurkaulāju. Biežas kustības tādā stāvoklī palīdz mugurkaulam sajūst pavisam citu slodzi, nekā vertikāla stāvoklī, kurā cilvēks pavada 2/3 no savas dzīves un tas atslogo muguru un sasprindzinājumu starp nervu galiem (Barczyk, Skolimowski, & Zawadzka, 2005). Pie tā visa regulāras peldēšanas nodarbības daudzpusīgi ietekmē cilvēka fizisko attīstību, CNS un elpošanas sistēmas, palīdz stājas uzlabošanai. Lēnas un ritmiskas kustības ūdenī uzlabo asins apgādi un vielmaiņu, stiprina asinsvadu sistēmu (Ahrendt, 1997; Sigmundsson & Hopkins, 2009).

Mūsdienas arvien vairāk popularitātes uzņem aktivitātes, kurās piedalās bērni un vecāki kopā. Tā ir laba iespēja būt kopā, socializēties un veicināt veselīgu zīdaiņa attīstību (Francoise, 2014). Ne vienmēr var atrast laiku, vietu un arī vēlmi darīt to. Tāpēc šeit pamatā var akcentēt bērna vecumu, jo piemērām zīdaiņi nevar patstāvīgi rīkoties bez vecāku palīdzības un klātbūtnes (Meredith, Hicks, & Stephens, 2001). Aktivitātes var būt dažādas, bet šajā rakstā mēs īpašu uzmanību pievēršam peldēšanai. Ūdens vide zīdaiņiem nav sveša, jo aptuveni deviņi mēneši jau bija pavadīti šajās izjūtās (Johnson, 1996). Un, ja ir iespēja apmeklēt nodarbības ar zīdaiņi baseinā, vecāki bieži to izmanto. Šajā procesā ļoti svarīgi ir kā vecāki jūtas šāda veida nodarbībās un kā viņi paši spēj izpildīt vingrinājumus ar zīdaiņi, un orientējās specifiskā ūdens vidē (Ahrendt, 2002; Zhao et al., 2005; Федуллова, 2011).

Daudzi vecāki labprāt vēlas peldināt zīdaiņus, bet bieži vien nepareizi izprot peldināšanas būtību un neprot to atbilstoši īstenot. Nepietiek zināšanu, prasmju un praktisko iemaņu, lai pareizi un atbilstoši rīkotos ūdens vidē, kas kopumā atspoguļojas kā vecāku kompetences zīdaiņu peldināšanā (Stallman, 2014).

Kompetences jēdzienam ir ļoti daudz dažādu skaidrojumu, taču kopumā mēs to varam saistīt ar spējām, pamatojoties uz zināšanām, izvēlēties attiecīgajai situācijai, darbībai atbilstošākos līdzekļus un adekvāti pareizi rīkoties (Koķe, 2003).

Svarīgi palīdzēt vecākiem apgūt pareizas zīdaiņa peldināšanas iemaņas, lai tālāk ar drošības un pārliecības sajūtu var tās pielietot patstāvīgi un turpmākajā bērna attīstības periodā (Meredith, Hicks, & Stephens, 2001; Jovanovich, 2002).

Lai būtu iespējams atrast vecāku kompetences komponentu vājās un stiprās puses zīdaiņu peldināšanā, svarīga loma ir vecāku kompetences novērtējumam peldēšanas speciālistu skatījumā (Stallman, 2014). Tāpēc mūsu pētījuma mērķis



bija vecāku kompetences novērtējuma izpēte un analīze zīdaiņu peldināšanā pēc speciālistu aptaujas.

Pētījuma laikā pastāvēja teorētiska iespēja, ka mūsu sastādītā anketa pēc dažādu autoru atziņām un balstoties uz viņu viedokļiem, par nepieciešamajiem kompetences komponentiem zīdaiņu peldināšanā, varēja būtiski atšķirties ar speciālistu viedokli. Pamatojoties uz šī pētījuma rezultātiem būs iespējams precīzāk izveidot vēlamo vecāku kompetenču pilnveidošanas modeli zīdaiņu peldināšanā un izstrādāt rekomendācijas vecāku kompetenču paaugstināšanai.

### **Metodoloģija** *Methodology*

Veiktā vecāku kompetences zīdaiņu peldināšanā mūsu sastādītā novērtējuma aptauja ļāva mums noskaidrot zīdaiņu peldināšanas speciālistu novērtējumu par kompetences komponentiem zīdaiņu peldināšanā. Vecāku kompetences zīdaiņu peldināšanā speciālistu novērtējuma aptauja tika veikta no 2017. gada septembra sākuma līdz 2017.gada oktobra beigām, kas tika organizēta dažādās Rīgas Veselības centra filiālēs: RVC Ķengaraga filiālē, RVC Imantas filiālē, RVC Bolderājas filiālē un RVC Ilģuciema filiālē.

Vecāku kompetences zīdaiņu peldināšanā novērtējuma aptauja tika ievietota interneta vidē, kur katrs zīdaiņu peldināšanas speciālists savā brīvajā vai vēlamajā laikā varēja tiešsaistē aizpildīt anketu un iesniegt to.

Brīvprātīgi vecāku kompetences zīdaiņu peldināšanā novērtējuma aptaujā piedalījās 33 respondenti (zīdaiņu peldināšanas speciālisti). Pēc anketu apstrādes tika konstatēts, ka 3 anketas ir nederīgas. Galarezultātā tika apstrādātas un izanalizētas 30 anketas. Zīdaiņu peldināšanas speciālisti bija vidēji 40,3±2,8 gadus veci ar vidējo darba stāžu 15,5±2,6 gadi. No aptaujātajiem speciālistiem 94,7% bija sievietes un 5,3% vīrieši. Vecāku kompetences zīdaiņu peldināšanā novērtējuma anketas apgalvojumu saturs balstās uz vairāku autoru zinātniskajām atziņām:

- zīdaiņu peldināšanas nodarbību saturu un to izpratni (Johnson, 1996; Meredith, Hicks, & Stephens, 2001; Ahrendt, 2002; Jovanovich, 2002; Zhao et al., 2005; Sigmundsson & Hopkins, 2009; Федулова, 2011; Francoise, 2014);
- zīdaiņu peldināšanas nozīmi un tās ietekmi uz zīdaiņu veselību (Johnson, 1996; Ahrendt, 1997, 2002; Zhao et al., 2005; Sigmundsson & Hopkins, 2009; Федулова, 2011; Francoise, 2014);
- vecāku nepieciešamajām zināšanām zīdaiņu peldināšanā (Johnson, 1996; Meredith, Hicks, & Stephens, 2001; Ahrendt, 2002; Jovanovich,

2002; Zhao et al., 2005; Sigmundsson & Hopkins, 2009; Федулова, 2011);

- vecāku nepieciešamajām prasmēm zīdaiņu peldināšanā (Meredith, Hicks, & Stephens, 2001; Ahrendt, 2002; Федулова, 2011; Francoise, 2014; Stallman, 2014);
- vecāku nepieciešamajām praktiskajām iemaņām zīdaiņu peldināšanā (Meredith, Hicks, & Stephens, 2001; Ahrendt, 2002; Федулова, 2011);
- drošības ievērošanu uz ūdens zīdaiņu peldināšanā (Ahrendt, 2002; Jovanovich, 2002; Федулова, 2011; Francoise, 2014; Stallman, 2014).

Lai objektīvi varētu izvērtēt sniegtās vecāku atbildes uz anketas apgalvojumiem un veikt matemātisko statistiku, katram anketas jautājumam tika piedāvāti pieci atbilžu varianti, kur katrs no atbilžu variantiem tika izteikts ar punktu vērtību (Raščevska, 2004; Kroplis & Raščevska, 2010). Šādā veidā, ar punktu vērtību, apkopojot atbildes uz anketas jautājumiem un veicot matemātisko statistiku, tika iegūts visu peldēšanas speciālistu vidējais vērtējums skaitļu izteiksmē (punkti).

Anketēšanā iegūtie rezultāti tika apstrādāti ar Latvijas Sporta pedagoģijas akadēmijas profesora J. Dravnieka izstrādāto MS EXCEL pievienojum-programmu „STATISTIKA”, un pamatā tika izmantots statistiskās analīzes variants – aprakstošā statistika (Dravnieks, 2004).

Pētījuma atbilžu kvantitatīvo skaitlisko vērtību apstrādē tika izmantots vidējais aritmētiskais, standartklūda un moda (Dravnieks, 2004; Gaske & Grīnfelds, 2006).

## **Pētījuma rezultāti**

### ***Results***

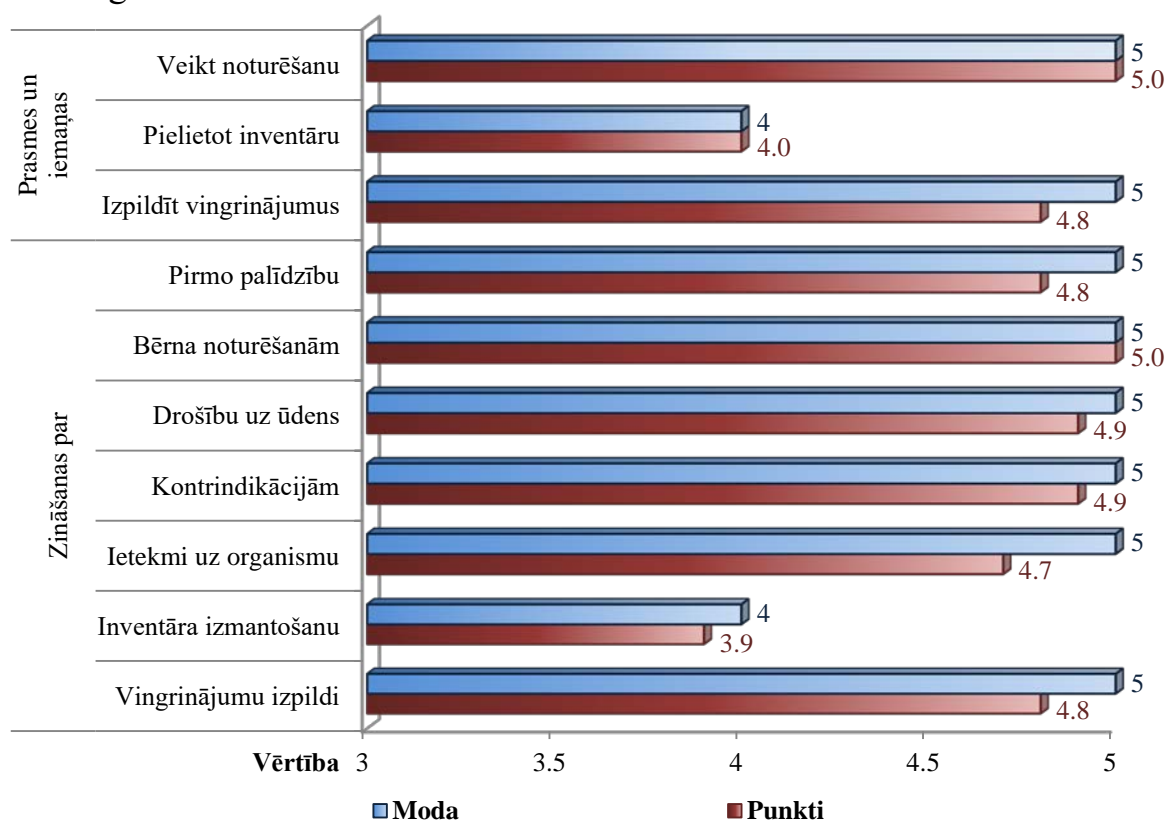
Vecāku kompetences zīdaiņu peldināšanā komponentu nozīmīguma izvērtējums pēc peldēšanas speciālistu aptaujas ir redzams 1. attēlā.

Kompetences komponentu nozīmes novērtējums tika veikts no 1 līdz 5 punktiem, kur 1 punkts – nav svarīgs, 2 punkti – ne tik svarīgs, 3 punkti – vidēji svarīgs, 4 punkti – gandrīz svarīgs, 5 punkti – ļoti svarīgs.

Izanalizējot kompetences komponentu nozīmes vērtējumu pēc speciālistu viedokļa (sk. 1.att.) varam redzēt, ka vienīgā acīmredzamā atšķirība vērtējumā ir ar kompetences komponenta – papildus inventāra un līdzekļu izmantošana, jo gan pie zināšanām, gan pie prasmēm un iemaņām speciālisti šo komponentu novērtēja kā gandrīz svarīgs – 4 punkti, nevis ļoti svarīgs – 5 punkti. Maksimālo svarīguma vērtējumu saņēma komponenti, kas ir saistīti ar kompetences komponentiem par drošināšanu un drošām bērna pozu noturēšanām ūdenī. Tas nozīmē to, ka visi 30 aptaujātie speciālisti vienbalsīgi norādīja, ka tas ir ļoti svarīgs kompetences

komponents, kas būtiski ietekmē vecāku kompetenci zīdaiņu peldināšanā. Pārējo kompetences komponentu nozīmes vērtējums bija robežās no 4,7 līdz 4,9 punktiem, kas kopumā uzskatāms ļoti nozīmīgs un ir tuvu maksimālam vērtējumam.

Apskatot kompetences komponentu nozīmes modas vērtību (sk. 1.att.) varam redzēt ļoti līdzīgu ainu kā rezultātos ar atbilžu vidējiem aritmētiskajiem vērtējumiem punktos. Pēc modas vērtības varam secināt, ka komponentos, kas ir saistīti ar papildus inventāru un līdzekļu izmantošanu (zināšanas, prasmes un iemaņas), modas vērtība ir 4. Tas norāda uz to, ka visbiežāk sastopamā atbilde ir bijusi „gandrīz svarīgs”. Savukārt visos pārējos kompetences komponentos modas vērtība ir 5, kas norāda uz to, ka visbiežākā novērtēšanas atbilde ir bijusi „ļoti svarīgs”.



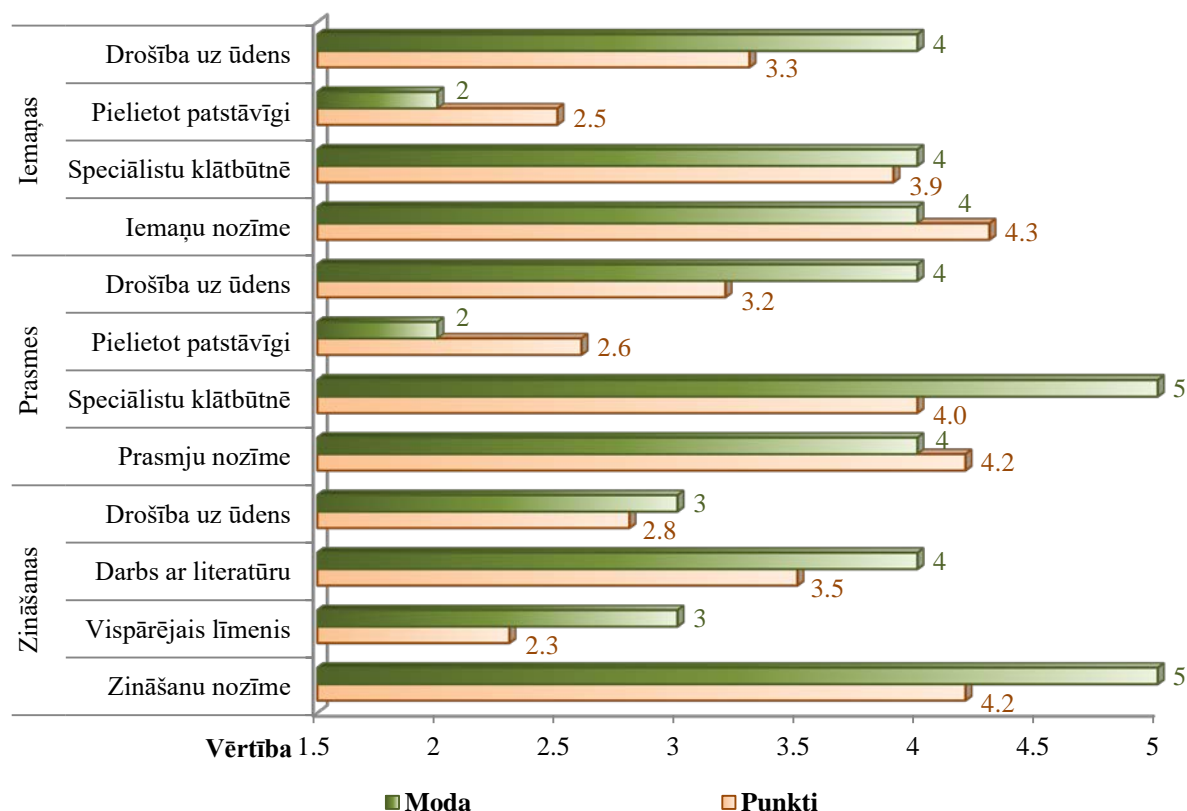
1. attēls. *Vecāku kompetences zīdaiņu peldināšanā komponentu nozīmīguma novērtējums pēc speciālistu viedokļa (n=30)*

Figure 1 *Components and their significance that impact the competences of parents in infant floating according to results of swimming experts survey (n=30)*

Vecāku kompetences līmeņa novērtējums zīdaiņu peldināšanā pēc speciālistu viedokļa ir redzams 2.attēlā.

Vecāku kompetences līmeņa novērtējums zīdaiņu peldināšanā tika veikts no 1 līdz 5 punktiem, kur 1 punkts – vāji, 2 punkti – zem vidējā, 3 punkti – viduvējs, 4 punkti – virs vidējā, 5 punkti – labi.

Izanalizējot vecāku kompetences līmeņa novērtējumu zīdaiņu peldināšanā pēc speciālistu viedokļa varam redzēt, ka kompetences nozīme (iemaņām, prasmēm un zināšanām), kas ir nepieciešama vecākiem, tiek novērtēta augstāk nekā vērtējums “virs vidējā” – 4 punkti, jo zināšanu, prasmju un iemaņu vērtējumi ir no 4,2 līdz 4,3 punktiem. Viszemāk tika novērtētas vecāku vispārējās zināšanas, prasmes un praktiskās iemaņas pielietot tās patstāvīgās zīdaiņa peldināšanas nodarbībās, bez speciālistu klātbūtnes. Vidējie vērtējumi ir robežās no 2,3 līdz 2,6 punktiem, kas ir starp vērtējumiem “zem vidējā” un “viduvēji”. Kompetences komponenti par drošības ievērošanu uz ūdens tika novērtēti kā “viduvējs”, jo vidējie vērtējumi ir robežās no 2,8 līdz 3,3 punktiem. Prasmes un iemaņas pielietot tās patstāvīgās zīdaiņa peldināšanas nodarbībās, speciālistu klātbūtnē tika novērtētas kā “virs vidējā” un vecāku patstāvīgajā darbā ar literatūru par zīdaiņu peldināšanu speciālistu vidējais vērtējums ir 3,5 punkti, kas ir starp vērtējumiem “viduvēji” un “virs vidējā” (sk. 2.att.).



2. attēls. Vecāku kompetences zīdaiņu peldināšanā līmeņa novērtējums pēc speciālistu viedokļa (n=30)

Figure 2 Level of parents' competences in infant floating according to results of swimming experts survey (n=30)

Izvērtējot speciālistu novērtējumu, par vecāku kompetenču līmeni, modas vērtības ir līdzīgas, kā vidējie aritmētiskie rezultāti punktos (sk. 2.att.).

Pēc speciālistu atbildēm viszemākā modas vērtība – 2 ir kompetences komponentēs par prasmēm un praktiskajām iemaņām pielietot tās patstāvīgās zīdaiņa peldināšanas nodarbībās, bez speciālistu klātbūtnes, kas atbilst atbildes variantam „zem vidējā”.

Modas vērtība – 3 ir kompetencēs par vispārējām teorētiskajām zināšanām zīdaiņu peldināšanā un teorētiskajās zināšanās par drošības ievērošanu uz ūdens. Pēc modas vērtības var secināt, ka visbiežākās atbildes šo kompetences komponentu līmeņa novērtēšanā bija atbilde „viduvējs” (sk. 2.att.).

Pie zināšanām – papildus patstāvīgais darbs ar informāciju internetā un literatūrā kā arī prasmju un praktisko iemaņu, kas ir saistītas ar drošības ievērošanu uz ūdens, kā arī prasmju un praktisko iemaņu nozīmei atbilžu modas vērtība ir 4, kas norāda uz to, ka visbiežākās atbildes šo kompetenču komponentu novērtējumā bija atbilde „virs vidējā” (sk. 2.att.).

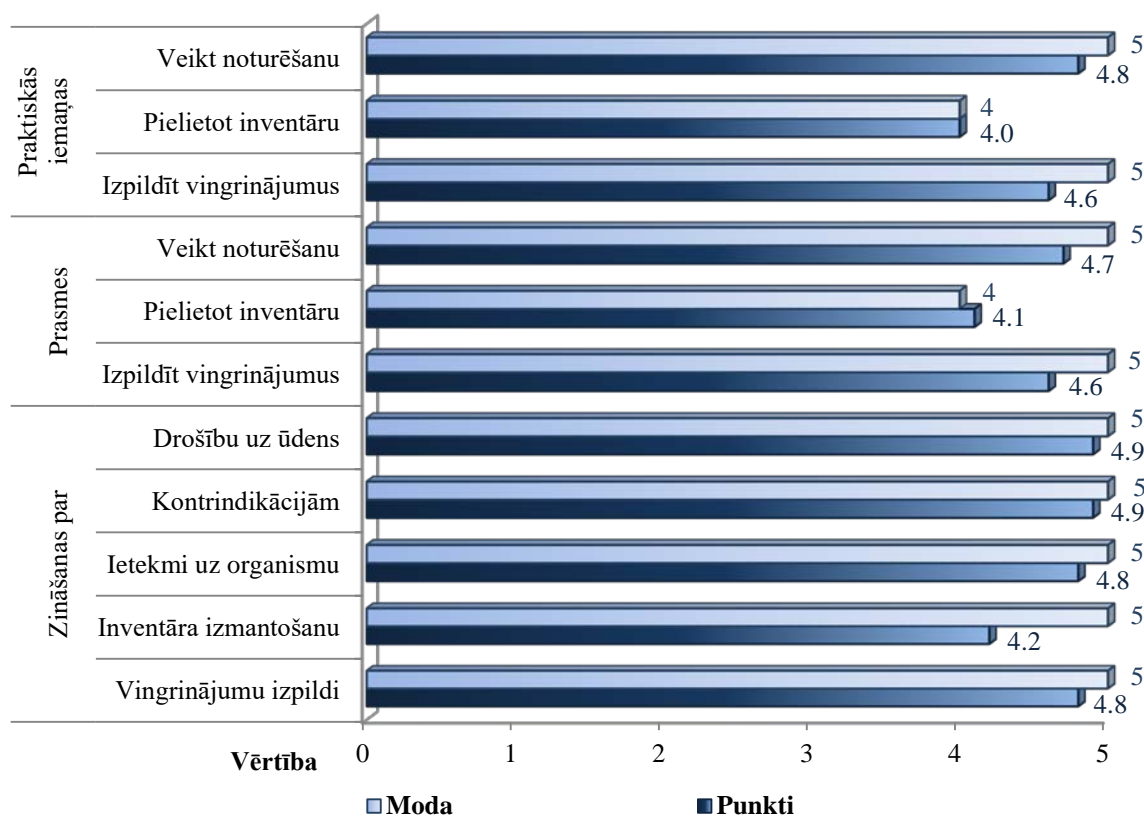
Peldēšanas speciālistu kopējais viedoklis par vispārējo zināšanu un prasmju pielietošanu patstāvīgās zīdaiņa peldināšanas nodarbībās speciālistu klātbūtnē speciālistu pēc modas vērtības ir 5, kas vēlreiz apstiprina to, ka zināšanu un prasmju līmenim ir ļoti liela nozīme (sk. 2.att.).

Papildus apgūstamo vai pilnveidojamo kompetences komponentu nepieciešamību vecāku kompetences līmeņa paaugstināšanai pēc speciālistu aptaujas rezultātiem var apskatīt 3.attēlā.

Izrietot no aptaujas rezultātiem kompetences līmeņa paaugstināšanai tika izveidota skala no 1 līdz 5 punktiem, kur 1 punkts – nē, 2 punkti – drīzāk nē, 3 punkti – minimāli, 4 punkti – drīzāk jā, 5 punkti – jā (sk. 3.att.).

Izanalizējot vecāku kompetences papildus apgūstamos vai pilnveidojamus komponentus, vecāku kompetences līmeņa paaugstināšanai zīdaiņu peldināšanā, pēc speciālistu aptaujas rezultātiem varam redzēt, ka kompetences paaugstināšanai komponentiem (zināšanām, prasmēm un iemaņām), par papildus inventāra un līdzekļu izmantošanu, speciālisti novērtēja ar vērtējumu robežās no 4,0 līdz 4,2 punktiem, kas atbilst vērtējumam “drīzāk jā”. Visi pārējie kompetences komponenti tika novērtēti ar vērtējumu robežās no 4,6 līdz 4,9 punktiem, kas pēc vērtējumu skalas pietuvojās vērtējumam “jā,” ir nepieciešams obligāti papildus apgūt vai pilnveidot (sk. 3.att.).

Izvērtējot vecāku kompetenču līmeņa paaugstināšanas, papildus apgūstamos vai pilnveidojamus, piedāvātos komponentus pēc modas vērtības ir redzams, ka, papildus inventāra un līdzekļu izmantošanas prasmes un praktiskās iemaņas, papildus apgūšanai un pilnveidošanai vairākums speciālistu sniedza atbildi „drīzāk jā”, jo modas vērtība ir 4 (sk. 3.att.).



3. attēls. Kompetences komponentu novērtējums zīdaiņu peldināšanā vecāku kompetences līmeņa paaugstināšanai pēc speciālistu viedokļa (n=30)

Figure 3 Competences components of infant floating in order to improve the level of parents' competences in infant floating according to results of swimming experts survey (n=30)

Savukārt visas pārējās kompetences komponentes, kuras tika piedāvātas papildus apgūt vai pilnveidot, izteikts speciālistu vairākums, ir izteikuši viedokli „jā”. To apstiprina arī modas vērtība, kas šajās atbildēs, par nepieciešamību pilnveidot šīs kompetences komponentes, ir vērtējums 5 (sk. 3.att.).

### Secinājumi Conclusions

No peldēšanas speciālistu aptaujas rezultātiem mēs varam secināt, ka visi mūsu piedāvātie komponenti, kas varētu ietekmēt vecāku kompetenci zīdaiņu peldināšanā, uzrādīja augstu nozīmi. Tāpat mēs varam droši apgalvot, ka šobrīd vecāku kompetences kopējais līmenis zīdaiņu peldēšanā pēc speciālistu novērtējuma ir tikai viduvējs. Kopumā visu aptaujāto peldēšanas speciālistu viedoklis ir tāds, ka vecākiem noteikti būtu jāpapildina vai papildus jāapgūst zināšanas, prasmes un iemaņas, lai paaugstinātu savu kompetences līmeni un spētu efektīvi pielietot savas kompetences patstāvīgajās nodarbībās ar zīdaiņi.

Pēc veiktā pētījuma rezultātiem mēs varam secināt, ka, lai paaugstinātu vecāku kompetences līmeni zīdaiņu peldināšanā, ir obligāti jāpievērš uzmanība šādu galveno komponentu papildus apgūšanai vai pilnveidošanai: zināšanas par vingrinājumu izpildi, par peldināšanas ietekmi uz organismu, par peldināšanas kontrindikācijām, par drošības ievērošanu uz ūdens kā arī prasmes un iemaņas izpildīt dažādus vingrinājumus ūdenī, veikt drošināšanu un bērna noturēšanu ūdenī.

Pamatojoties uz šī pētījuma rezultātiem tagad būs iespējams precīzāk izveidot vēlamo vecāku kompetenču pilnveidošanas modeli zīdaiņu peldināšanā un izstrādāt rekomendācijas vecāku kompetenču paaugstināšanai.

### Summary

There are a variety of such activities, but in this study we focus on infant floating. It is very important how parents feel themselves in such type of lessons and how they are able to perform the exercises with their infants independently and orient themselves in a specific aquatic environment. Parents' competences in infant floating on the whole are often characterised by their insufficient knowledge, skills and practical abilities in maintaining correct and proper behaviour in the aquatic environment. Therefore, the aim of our study is to explore and analyse the assessment of parents' competences in infant floating. An assessment survey of the parents' competences in infant floating was conducted from the beginning of September 2017 until the end of October and was organised at various branches of Riga Health Centre: RHC Kengarags, Imanta, Bolderaja and Ilguciema branch. 33 swimming experts participated voluntarily in the assessment of parents' competences in infant floating. It was found that 3 questionnaires were invalid as they did not follow the proper instructions. As a result 30 questionnaires were finally processed and analysed. The respondents (swimming experts) were on average  $40.3 \pm 2.8$  years old with an average working experience of  $15.5 \pm 2.6$  years. 94.7% of the swimming experts surveyed were women and 5.3% were men. The content and statements put forward in the survey questionnaire regarding parents' competences in infant floating were based on scientific concepts. In order to enable the objective assessment of Parents' responses to the questionnaire and process the statistics mathematically, each question has five variants of responses expressed on a five point scale.

The results of the survey of swimming experts indicate that all of the components proposed by the authors that influence parents' competences in infant floating play a significant role. It could also be surely concluded that at present, the overall level of parental competence in infant floating in the opinion of experts is average. In general, all the surveyed swimming experts are of the opinion that parents should definitely supplement or acquire additional knowledge, skills and abilities in order to increase their level of competences in infant floating in order to be able to effectively apply these competences during independent lessons with their infants.

After research results we could also be surely concluded that at in order to improve the level of parents' competences in infant floating, attention must be paid to the further development or improvement of the following key components: knowledge of performance of exercises, of the impact of swimming on the organism, of contraindications of swimming, of safety procedures to be followed in water; skills and practical abilities of performing various exercises in water, of following safety procedures and safely holding the infant in water.

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## THE REHABILITATION FUNCTION OF SPORT IN A PSYCHOLOGICAL CONTEXT

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***Abstract.** Sporting activity plays an important role in the lives of many people, while at the same time affecting their social functioning. The problem discussed in this paper refers to the psychological context of sporting activity of prisoners, who are people isolated from society and subjected to social rehabilitation. The aim of the analysis presented in this paper is to identify possible relations between sporting activity and personality traits of perpetrators of crimes participating in the rehabilitation process. This problem is socially important as some personality traits may reduce the effectiveness of rehabilitation, while others may contribute to improving the effects of such activities and, at the same time, to positive functioning in the society. An analysis of selected texts relating to the problem revealed that the prisoners who were actively involved in sports had a higher level of emotional stability and extroversion compared to those who did not engage in such activities. Emotional stability is a desirable feature. Although extroversion may be considered a positive trait, it should be approached with caution in the case of prisoners as its high level may, at least in some cases, lead to impulsive or even violent behaviour.*

***Keywords:** criminals, mental life, personality, rehabilitation, social maladjustment, sports.*

### Introduction

The authors of the present study did not conduct research on their own, but they analysed scientific texts relating directly or indirectly to the subject of scientific research, which in this article is the psychological context of sporting activity of prisoners.

Rehabilitation is a measure taken to help socially maladjusted persons, and, in a strict sense, to people who committed crimes. The aim of rehabilitation is to guide a person in order to teach them live with respect for moral norms and legal regulations. Various methods have been used in the rehabilitation, including the rehabilitation through sport, since sport activity can instil many social behaviours in people, and may also have an impact on the psychological life of people. In the

present paper, the psychological context refers to the personality of a person, including the personality traits of the perpetrators of crimes.

Personality, understood as a specific configuration of traits that determine the consistency of behaviours and identity of a person, significantly impacts on the quality of his or her social adaptation. Personality traits are relatively constant, but through psychocorrection, therapy or resocialization, the attempts can be made to modify them. An important area of rehabilitation is sporting activity of socially maladjusted people, and this activity may also impact on the psychological sphere of those serving prison sentences (Jaworska, 2015, 138-140; Marzec, Sarzała, & Woźniak, 2018, 106).

The aim of this paper is to show the rehabilitation dimension of sport in the psychological context, which in this paper is limited to the problems of personality, and thus, in the context of possible modification, if possible, of personality traits in prisoners. The paper presents an analysis of the results of research concerning this area. This is a very important area of research due to the fact that one of the most important aims of social rehabilitation is to make positive changes in social life, psychological life, and personality (if possible) of a socially maladjusted person.

The problem of the role of sport in personality development and upbringing has already been explored in literature (Bogg & Roberts, 2004; Gallagher, Yancy, Denisen, Kuhnel, & Voils, 2013; Jaworska, 2015). Despite documented knowledge on this issue, there is a need for further research in this area. To date, no in-depth analyses have been conducted concerning the rehabilitation effects of sports with a broader consideration for the problems of the potential of modification (at least to a small extent) of personality traits of perpetrators of crimes serving imprisonment sentences.

### **Social adaptation and personality**

Personality plays an important role in the social functioning of a person, because it can largely influence the good or bad adaptation of a particular person to social life. In this paper, personality and its importance constitutes the psychological context of the resocialization function of sport.

It should be emphasized that there are a plethora of scientific theories explaining the concept of personality and its structure. Researchers (Hall, Lindzey, & Campbell, 2004) have presented various personality theories: psychodynamic (psychoanalytic), emphasizing personality structure, emphasizing perceived reality and emphasizing learning phenomenon.

This study will use the concept of Eysenck, approaching personality in terms of the three features: neuroticism, extroversion – introversion, psychoticism (Eysenck, 1960). According to this concept, personality represents a relatively

stable and permanent organization of the character, temperament, intellect and physical constitution of the person, determining adaptation to the environment. Character is understood as a system of voluntary behaviour of a person (will). Temperament means a system of affective behaviour (emotions). Intellect is a system of cognitive behaviour (intelligence). The physical constitution means the system of configuration (arrangement) of the body with the neuroendocrine system (Eysenck, 1960, 2).

This theory of personality is based on the assumption of reactivity of the autonomic nervous system and the speed and persistence of the reaction. In the environmental conditions which are not conducive to adjustment, high reactivity may be associated with the development of neuroticism (emotional instability). Furthermore, the difficulty of using conditional reactions may be related to the development of extroversion. Psychopathic disorders may develop in people with a high level of neuroticism and a high level of extroversion. On the other hand, people with a high psychotic intensity may show a tendency to behave in an antisocial, nonconformist and criminal way (Hall, Lindzey, & Campbell, 2004).

Referring to this theory, two types of extroversion can also be distinguished: the extroversion of good adjustment (clinging to people, social extroversion) and the extroversion of bad adjustment (impulsiveness and lack of self-control). In the situation of extroversion of bad adjustment, the people tend to be impulsive, manifest uncontrolled aggression, do not fear, do not feel guilty, are unable to analyse their inner life and have problems with social adaptation (Pospiszyl, 1985).

For example, Stanik (2013) indicates that the highest index of extroversion and neuroticism is observed in people committing hooligan acts and rape, and the lowest are found in those committing thefts.

Social adaptation may depend on a number of factors, including personality traits that may accelerate or inhibit the process. In the case of perpetrators of crimes, negative traits and their importance in disturbed behaviour should be analysed, with such traits including aggressiveness. Many criminal acts should be regarded aggressive. Sporting activity can also be used to reduce the level of aggressiveness and other negative traits.

Committing violent acts may lead to the formation of negative personality traits. In many cases, criminal lifestyles are developed. In the process of rehabilitation of perpetrators of crimes, modification of personality should be the focus of measures taken, despite the fact that it is a relatively constant structure of human traits (dimensions, factors).

### **Sporting activity in relation to personality**

It is rather difficult to demonstrate an unambiguous effect of physical activity on personality traits. In research conducted both in Poland and abroad, the personality of people practising sports is measured by the features of the Big Five (neuroticism, extroversion, openness to experience, agreeableness, conscientiousness and the previously described dimensions of the Big Three (extroversion, psychoticism, neuroticism).

Previous studies have demonstrated that each dimension in the area of Big Three is correlated with sporting activity (Eysenck, Nias, & Cox 1982). According to the research, people practising sports differ significantly from those not practising any sports in terms of the intensity of all three dimensions of personality (extroversion, psychoticism, neuroticism). A study by (Eysenck et al., 1982) showed that athletes have a higher level of extroversion and psychoticism and a lower level of neuroticism compared to non-athletes.

At the same time, it is worth noting that the trait of the Big Five that was most strongly correlated with sporting activity in most studies was conscientiousness (Rhodes & Smith, 2006; Gallagher, Yancy, Denisen, Kuhnel, & Voils, 2013).

In a study by (Bogg & Roberts, 2004), authors also found significant correlations between the amount of energy expenditure per week during practising sports and conscientiousness, as well as extroversion and neuroticism. However, it should be stressed that the correlation was positive in the case of extroversion and conscientiousness, and negative in the case of neuroticism.

People involved in sports on regular basis are characterized by an above average level of emotional stability and conscientiousness. Athletes are also characterized by higher openness to experience and extroversion than those who do not practice any sport. However, there were no differences in the case of athletes and non-athletes who were not involved in sports in terms of agreeableness (Kajtna, Tusak, Baric, & Burnik, 2004).

In many cases, sports undoubtedly have a positive effect on the psychological life of those who practice it. Therefore sporting activity can also be approached, with due caution, as a method of social support for prisoners.

Sporting activity encourages people to lead healthy lifestyles and it can influence the person's motivation, the structure of mental needs, values or social attitudes. However, sporting activity without proper control can lead to injury or overload to the body. In the case of prisoners, there is also a risk that sporting activity will be treated only as strength training, which in practice may translate into aggressive behaviour and violence in the penitentiary environment.

### **Sporting activity in relation to personality traits of perpetrators of crimes**

Based on the results of previous studies, the attempt can be also made to determine the potential effects of physical activity on the modification (if such modification is possible) of personality traits in prisoners.

Furthermore, it should be noted that sporting activities are widely accepted by prisoners as a form of rehabilitation, regardless of the degree of demoralisation. The most popular sports among prisoners include soccer, basketball, and combat sports, especially boxing (Poklek, 2005). The prisoners are also offered other forms of physical activity, such as Nordic walking, canoeing, and running. There is also much interest in gym training, which requires the presence of qualified coaches, who should help prisoners focus on the physical and mental development rather than merely on the development of strength, which can be used for evil purposes, i.e. against the objectives of rehabilitation (Jaworska, 2015, 139).

Research conducted in 16 prisons in Poland, which covered 249 convicted men aged 22 to 55 years, showed that prisoners who regularly took part in physical activity were characterized by higher emotional stability than prisoners who were not involved in physical activity (Jaworska, 2015, 144). Physically active prisoners achieved higher extroversion scores than prisoners without physical activity (Jaworska, 2015).

Furthermore, it should be noted that high extroversion related to the tendency for searching sensations, being constantly active, the need for changing and challenges, is a relatively permanent factor in the personality of prisoners engaged in sporting activity. Extroverts tend to look for stimuli and behaviours characterised by the lack of inhibition. This tendency may lead to antisocial behaviour. In the case of physically active prisoners, however, this property may turn out to be conducive to the search for other types of (positive) activities such as sport. Furthermore, with reference to the distinction between extroversion and "extroversion of good and bad adjustment", it can be assumed that the extroversion of prisoners practising sport is extroversion of good adjustment, conducive to the development of socially acceptable behaviours and, under conditions of isolation, can represent a form of substitution for aggression (Pospiszyl, 1985).

Sporting activity does not always lead to the integration of personality towards being more prosocial. For example, professional athletes are often characterised by nonconformism and low sensitivity to social norms (Eysenck et al., 1982).

The problem of antisocial behaviour should be considered not only from the standpoint of personality traits, but also in the context of the sociocultural

environment affecting the individual, which is particularly important in the case of perpetrators of crimes.

The rehabilitation function of sport has also been emphasized in psycho-corrective measures used in both prisons and youth detention centres. Sporting activity can help instil social attitudes, contribute to the emergence of new positive interpersonal and group relations, influence the formation of conscientiousness and responsibility, improve strong will (perseverance, motivation), but it can also represent an additional element in stopping inappropriate, or even criminal, lifestyles or a preventive element in the process of combating addictions.

### **Conclusions**

The authors of this paper realize that the problem of scientific research they have taken up should be presented in a more in-depth manner, but the available source material limited the broader approach to the problem. Nevertheless, some conclusions can be drawn from the paper for the practice of rehabilitation of prisoners (and indirectly juveniles from youth detention centres). Sporting activity may be a factor that improves mental functioning of the prisoners if it occurs under conditions of appropriate control. The analysis of selected scientific texts presented in this paper shows, for example, that prisoners' sporting activity can enhance emotional stability and extroversion. While emotional stability should be considered a desirable psychological feature, extroversion is somewhat more questionable, as a high level of extroversion can lead to violent behaviour in prisoners.

In the prison environment, positive functions of sports or recreational activity (relax, playing) are often observed. Sporting activity in prison isolation often plays the role of training to replace aggression. The psychological context of rehabilitation through sport refers to a large extent to personality problems. Many definitions of personality have been used in psychology. For example, it can be treated as a structure of traits (dimensions, factors). Personality traits are relatively constant, but this does not preclude the emergence of at least a tendency towards changes. However, an immediate change is unlikely to be expected. Among the prisoners, the role of the sport can consist in the development of extroversion of good adjustment and reduction in the level of neuroticism. In the case of rehabilitation in the prison environment, in the case of an unfavourable set of basic personality traits, the behavioural tendencies may, through appropriately chosen sporting activity, be redirected towards physical activity and athletic achievements, so that they are not oriented towards criminal acts.

It should be noted that the analysed examinations present only the relations between physical activity and basic personality traits. Furthermore, personality

includes more traits which can perform the function of significant positive reinforcements in the process of social rehabilitation of socially maladjusted people, including those with criminal records. This fact can therefore be used among perpetrators of crimes as an important element of rehabilitation through sport.

It is also worth stressing that imprisonment alone can contribute to personality disorders. Through deprivation, stigmatising and destructive impacts on personality, long-term imprisonment leads to negative effects that may even intensify criminogenic attitudes. Therefore, the development of rehabilitation initiatives in the form of sport-related activity programmes is one of the possibilities of changing the deprivation and frustration conditions of imprisonment.

Physical activity and sporting success can be used not only to satisfy the need for stimulation, prevention of frustration and aggression, but also to inspire the spirit of sports competition and represent a form of activation conducive to individual development and providing opportunities for presentation of one's strengths in a socially acceptable form. Consequently, sporting activities, as a form of rehabilitation, may contribute to changing the perception of former perpetrators of crimes and facilitate their social readaptation, i.e. the process that occurs after they leave prison, i.e. in freedom conditions.

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## ORIENTATION IN A SIGNAL FLOW AND INTELLIGENCE OF CHILDREN WITH AUTISTIC SPECTRUM DISORDERS

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**Abstract.** *The hypothesis was tested that these children may be more effective than their normally developing counterparts when analyzing a signal flow unrelated to speech or social conditions, for example something that is Nature-based or abstract. There were 52 participants in the study: 22 children with autism spectrum disorders, ranging in age from 3.1 to 7.9 years old, and 30 normally developing children, who were 4-5 years old. In order to achieve the goals and objectives the following methodologies were used: the Sally-Anne test; reflexometry; Raven's Colored Progressive Matrices; a parent questionnaire. Results. Out of the 22 preschool children with ASDs, 21 of them had an unformed theory of mind. In the norm group, 80 percent of the children had a formed theory of mind. Mute preschool children with ASDs made fewer mistakes in the simple sensory-motor reactions (of the go-go type). Mute children with ASDs were better at orienting themselves in a sensory flow that was unrelated to speech and social information, which can be considered as a compensatory reaction, given their psychophysical inability to develop normal speech. In mute children with ASDs, the level of nonverbal intelligence was no different from that of the children in the norm group.*

**Keywords:** *autism spectrum disorders, signals flow, reaction time.*

### Introduction

It is accepted without question today that, as L. Vygotsky (1934/1987) asserted, up until about the age of three a child's thinking and language develop more or less autonomously, but at that age they merge and this leads to a powerful surge in the development of both (Byrge, Sporns, & Smith, 2014). There is an overwhelming amount of evidence to back up this idea (Oppenheimer & Kelso, 2015; Santos & Risati, 2015; Baillargeon, Scott, & Bian, 2016). At the same time, psychologists are more and more frequently encountering an astonishing fact: mute children with autism spectrum disorders (ASDs) are on a par with healthy

children in some forms of mental processes and in the level of intelligence that is based on cognitive processes (Frith & Happé, 1994; de Vries & Geurts, 2012).

Research into this phenomenon is significant, above all because the number of such children has grown. Thus, in 2000 it was observed that there were from 5 to 26 children with ASDs for every 10,000 normally developing children, and in 2005 it was found that there was one such child for every 200-300 children with normal development. In the last three years, the number of children with autism spectrum disorders has almost doubled, and now there is one child with ASDs for every 150 healthy children (McPartland, Klin, & Volkmar, 2014; Constantino & Charman, 2016).

This increase in the number of children with ASDs can be seen as a real increase in the number of such children, but also as a result of either improvement or changes in the diagnostic procedures (Gillberg & Fernell, 2014; Leong, Carter, & Stephenson, 2015).

An analysis of the attributes that allow autistic children to have sufficient intelligence without any effective social interaction or proficient language skills (Gallivan, Logan, Wolpert, & Flanagan, 2016; He et al., 2017) makes it possible to speculate that these children may be more effective than their normally developing counterparts when analyzing a signal flow unrelated to speech or social conditions, for example something that is Nature-based or abstract. Analysis of a sensory flow leads to generation of sensory-motor integration, which makes it possible to identify when situations involve conflict and learn how to avoid them (Fotowat & Gabbiani, 2011; Luna, Marek, Larsen, Tervo-Clemmens, & Chahal, 2015; Mišić, Doesburg, & Fatima, 2015).

It is known that children with ASDs are extremely sensitive to external signals, and they very often perceive them as excessive (Green et al., 2013; Gillberg & Fernell, 2014; Case-Smith, Weaver, & Fristad, 2015), which may be associated with a keen mechanism they have for analyzing these signals, and this permits them to find alternative means of adapting to their social environment (Krivischekov et al., 2016; Brascamp, Sterzer, Blake, & Knapen, 2018).

At the present time, a majority of researchers in the field believe evaluation of a person's theory of mind to be a reliable means of establishing a diagnosis of ASDs (Sabbagh, Bowman, Evraire, & Jennie, 2009; Constantino & Charman, 2016). On the premise that theory of mind is a conscious understanding of another person's otherness (Flavell, 2004). It is fair to assume that its formation will go hand in hand or in combination with sensory-motor integration, since comprehension of otherness requires consolidating large amounts of information and extracting the significant characteristics from them (Nikolaeva & Merenkova, 2015; Sinclair, Oranje, Razak, Siegel, & Schmid, 2016; Zashchirinskaia & Nikolaeva, 2018). Studying sensory-motor integration in autistic children presents particular difficulties due to the limitations of their social interaction. For this

reason, there is no data on the connection or lack of the same between these parameters (sensory-motor integration and theory of mind). Moreover, it is essential to examine the level of intelligence in children with ASDs, since an unformed theory of mind and the specific features of sensory-motor integration can be attributed to a low level of intelligence in these children (Nikolaeva, Novikova, & Vergunov, 2018).

## **Method**

Altogether, there were 52 participants in the study: 22 children with autism spectrum disorders, ranging in age  $4.7 \pm 1.1$  years old, and 30 normally developing children, who were  $4.6 \pm 0.9$  years old.

In order to achieve the goals and objectives of our ascertaining experiment, the following methodologies were used.

The developmental level of theory of mind was determined by using the Sally-Anne test, which is also called the “false belief test”. The idea here is very simple: the child is told a story about two dolls, Sally, who has a basket, and Anne, who has a box. The child is informed that Sally puts a ball inside her basket and leaves the room. After that, Anne takes the ball out of the basket and puts it in her box. Sally then returns, and the child is asked, “Where will Sally look for the ball?” The correct answer is considered to be, “In the basket” (Flavell, 2004).

The reflexometry method was applied, and both simple and complex sensory-motor reactions were assessed by means of the ReBos technique (Krivischekov et al., 2016). A singular feature of this technique is that it makes it possible to evaluate a child’s ability to orient themselves in a flow of sensory signals and to assess the quality of their sensory-motor integration. The test consists of two series of signal flows, Series 0 and Series 1. In Series 0, which is a trial run (though, even so, in this study the results were analyzed), the child learns how to take the test, i.e. to press down the space bar every time there is a stimulus to do so. In this series, the stimuli are applied at identical intervals. Series 1 is already a genuine test of the sensory-motor reactions (of the go-go type), but the stimuli here have a fractal structure. We used this structure because it is a really Nature-based one. The child is told to press down on the space bar every time a stimulus is applied. This series is composed of two parts, so it is possible to analyze whether the child has understood that the second part is a complete duplication of the first or not.

Raven’s Colored Progressive Matrices (Raven, Raven, & Court, 2003).

For the 4-8 years old children we used the colored version. The stimulus material was divided into three sets (A, AB, and B) Each task is basically a rectangular-shaped matrix containing different figures and sets of figures that are composed so that they logically form a whole; the elements are arranged

according to a consistent pattern. Each set begins with a relatively easy problem, and then the tasks become gradually more involved. Such a progression can also be observed from one set to the next. All three of the Raven's sets are organized in accordance with the following principles: set A is based on the principle of a correlation of matrices; set AB, on the principle of analogy between pairs of figures; and set B, on the principle of progressive changes in the figures of a matrix.

Set A calls for analyzing the pattern in an image, recognizing the connection between elements in the pattern, and, based on this, identifying a missing element.

Set AB requires examining disconnected elements and establishing analogies.

Set B necessitates understanding the logical principles behind the changes in position of figures from one space to another.

Administering the test involved the following procedure: the experimenter showed a child a card on which a "carpet" and six "patches" were depicted. In order to "mend the carpet," the child had to scrutinize its pattern and the pattern of all the "patches," and then choose the one that fits the pattern of the "carpet." The child designated the number of the missing element in the picture, and it was written down in the protocol.

When processing the results, we tabulated the scores in percentages, and interpreted them in accordance with how frequently a particular score was attained in a given age category.

To determine how much influence the family's status has had on the child's development, a parent questionnaire was used (Nikolaeva & Merenkova, 2017), in which the parents indicated their age, their education, and the presence of other children and relatives who are living with the child. The results of this questionnaire were taken into consideration when the findings from the other tests were being processed.

## **Results**

In Table 1, the children's speech patterns are presented. It can be seen here that among the children with ASDs, the majority were boys (14 out of 22), which corresponds to the distribution of children with ASDs in the population (Nikolskaya et al., 2012; Lerner et al., 2012).

Of the 22 children, 10 spoke in phrases, 8 of them used isolated words and 4 were only able to produce a series of sounds and vocalizations. The diagnosis "mutism" was received by 12 children.

The mean age of the children with ASDs was  $5.5 \pm 1.5$  yr., and for the children who exhibited normal development it was  $5.1 \pm 0.4$  yr.

Only one child with ASDs was able to successfully complete the Sally-Anne test (i.e. to give the correct answer), and this outcome confirms findings derived from sources in the literature (Weitlauf, Sathe, McPheeters, & Warren, 2017). This could mean that theory of mind does not form in such children or that it does so insufficiently. It can also be assumed that it forms only in those children with autism spectrum disorders who have an above-average level of intellectual development. Theory of mind conformed to the developmental norm in 80 percent of the children who showed normal development.

*Table 1 Description of the of children with ASDs*

No	Child's code	Gender	Age (years)	Speech development
1	TB	1	7.9	spoke in phrase
2	AC	0	7.5	spoke in phrase
3	OM	0	6.7	spoke in phrases
4	AK	1	4.4	a series of sounds
5	AO	1	4.1	isolated words
6	KSH	1	4.1	spoke in phrases
7	AB1	0	3.1	isolated words
8	CA	1	4.3	a series of sounds
9	CH	1	4.1	isolated words
10	AO1	1	6.3	spoke in phrases
11	VK	1	7.4	spoke in phrases
12	HC	1	7.7	spoke in phrases
13	MC	0	4.6	isolated words
14	VU	1	5.2	isolated words
15	MC	0	4.5	spoke in phrases
16	VB	0	5.1	isolated words
17	LT	1	5.9	spoke in phrases
18	PP	0	3.1	isolated words
19	BT	0	7.2	spoke in phrases
20	GB	1	5.9	a series of sounds
21	MA	1	6.4	isolated words
22	LC	1	5.2	a series of sounds

An analysis of Table 2 demonstrates that the children in the two groups did not differ in terms of intelligence. And, what is more, when it came to the more difficult tasks (Part B), the children with ASDs acquitted themselves better. One of the children with an ASD, who scored the maximum number of points, went through the test with interest, indicating the number of the task with his fingers and pointing to the answers. He would check to see that the teacher wrote down the right answer, and then proceed to the next task. He performed each task quickly and did not change his answers. Another child, who scored the minimum number of points, carried out each task slowly and reluctantly, one part one day,

the other part the next; he would give a quick answer (gesticulating rather than speaking) and then immediately lose interest in the task. Some other children would likewise carry out a task quickly and with interest, but sometimes they would change their answers. After they were asked what the final answer was, they indicated that it was what they had chosen the second time – this could mean that the children noted and corrected mistakes that had come about as a result of their own inattentiveness.

**Table 2 Comparative analysis of the level of general intelligence in children with ASDs and children of normative development (scores)**

Subjects	A	AB	B
Norm	7.3±1.4	5.0±1.6	3.8±1.9
children with ASDs	6.9±1.9	5.5±2.0	5.4±1.9*

Note: \*= differences between groups for  $p \leq 0.05$  (Student's criterion)

An analysis of the sensory-motor reactions provided extremely intriguing results (Table 3). It turned out that children with ASDs made considerably fewer mistakes when performing both the trial run (Series 0) and the ultimate series (Series 1) of signal flows. Moreover, their reaction time to the stimuli was no different from that of the normally-developing children. The children in this second group did not demonstrate reduced reaction times during the second part of the series, which shows that their intuition did not tell them that it duplicated the first. Children with ASDs, however, had shorter reaction times when carrying out the second part of the task, both during the trial run and during the ultimate series. Consequently, despite the lack of effective interaction with other people, these children are substantially better at orienting themselves in a flow of signals, if it is unrelated to the social environment, and they are better at detecting its structure.

**Table 3 Parameters of simple sensorimotor reaction in children**

Children	Omissions, series 1	Time reaction, series 0, part 1, mc	Time reaction, series 0, part 2, mc	Omissions, series 2	Time reaction, series 1, part 1, mc	Time reaction, series 1, part 2, mc
ASD	1.5±1.4*	485.4±173.9	470.3±150.0	26.1±5.6*	441.0±76.7	405.9±101.5
Norms	3.1±0.9	394.6±63.2	402±79.1	38.2±7.4	440.5±52.7	452.1±56.7

Note: \*-see table 2

According to Table 4, which was based on a regression analysis, the independent variable “theory of mind” has an impact on the dependent variable

“performance of the AB series” on the Raven’s Test: the more highly formed their theory of mind, the worse a child does on the Raven’s Test, although you would expect the opposite.

*Table 4 The influence on the independent variable «theory of mind» on dependent variables*

Dependent variable	R <sup>2</sup>	B	P
Intelligence, seria AB	0.260	-0.509	0.031

In Table 4, the quality of the children’s reactions is assessed according to how many of them were erroneous. It turned out that the older the children were and the higher their level of intelligence, the better they were at performing the tasks.

*Table 5 The influence on the independent variable «the quality of the children’s reactions» on dependent variables*

Dependent variables	R2	B	P
Age	0.326	0.571	0.021
Intelligence, seria A	0.365	0.604	0.000
Intelligence, seria B	0.266	0.516	0,041

### Conclusions

In this study, an attempt was made to resolve the paradox between the unformed speech processes in children with ASDs and their rather high levels of intelligence. Only one of the children in our study who had been diagnosed as having an ASD was able to successfully carry out a test that is aimed at diagnosing the presence of ASDs, the Sally-Anne Test. At the same time, 80 percent of the children with a normal level of development were able to do so. Accordingly, children with an unformed theory of mind participated in our study, and the results illustrate the accuracy of their diagnosis. It turned out that the children with ASDs were no different from the normally-developing children in terms of intelligence. Furthermore, they were even somewhat better at performing the most difficult series of all, the B series.

An analysis of these children’s orientation in a signal flow showed that they are better at intuitively predicting the structure of a sensory flow since they make fewer mistakes when performing both a series with isochronous intervals between stimuli and one in which the signal flow has a fractal structure. It can be assumed that the sensory integration in these children is more highly formed compared to that of the children with normal development. This can be assessed as a

compensatory reaction to the delayed formation of speech as a fundamental means of orientation in the social environment.

### **Findings:**

Out of the 22 preschool children with ASDs, 21 of them had an unformed theory of mind. In the norm group, 80 percent of the children had a formed theory of mind.

Mute preschool children with ASDs made fewer mistakes in the simple sensory-motor reactions (of the go-go type).

Mute children with ASDs were better at orienting themselves in a sensory flow that was unrelated to speech and social information, which can be considered as a compensatory reaction, given their psychophysical inability to develop normal speech.

In mute children with ASDs, the level of nonverbal intelligence was no different from that of the children in the norm group.

### **Limitations**

We have shown that children with autism spectrum disorders are more effective than their normally developing counterparts when analyzing a signal flow with fractal structure unrelated to speech or social conditions. Therefore, it allows them to be more successful in some cognitive processes, even when they have a marked lag in speech development up to mutism. We think at the same time, it is necessary to increase the sample of subjects in the future and, most importantly to understand the reasons for the benefits in analyzing the flow of signals not related to speech and social conditions.

### **Acknowledgments**

The study is funded by Russian Foundation of Fundamental Research, project #18-013-00323a.

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# SMART GLOVE USAGE POSSIBILITY FOR BASKETBALL TRAINING: PROOF OF CONCEPT

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**Abstract.** Nowadays, basketball is one of the most entertaining and popular sports. In the last years, the number of people that are dedicating themselves to basketball has grown rapidly. The increasing number of sportsmen defines the increasing demand to monitor and analyse their performance, hereby granting the possibility to review and evaluate mistakes made within different game phases, which, in turn, would be useful for future training. The present research is the first step to develop a wireless system (Smart Basketball Glove (SBG)) for basketball shot analysis and training. SBG system is based on knitted tension and pressure sensors that were already successfully used in Smart Socks and Smart Shirt applications. These sensors, while embedded into the proposed system's textile part, showed high tactile sensitivity and speed of response and, therefore, demonstrates potential abilities to analyse the wrist and fingers movement and estimate the forces with which fingers interact with the ball during basketball shot. Necessary requirements for data acquisition and transition device of SBG are formulated for further system's development as well.

**Keywords:** basketball, free shot, monitoring, Smart glove.

## Introduction

Nowadays, globally, more than 450 mil. people are playing basketball ("Many people play basketball worldwide", 2018). The increasing number of sportsmen defines the increasing demand in some ways to monitor and analyse their performance, therefore granting the possibility to review and evaluate mistakes made within different game phases, which, in turn, would be useful for future training. Historically there is a wide field of training techniques developed to help a player in gaining an upper hand over the opponent. The victory in basketball game depends on a number of factors, which could be purely physical – stamina, strength, agility or are based on skills – dribbling, shot accuracy, current

situation analysis. Nevertheless, the result of the game is decided by the largest amount of points scored by either of teams. That implies, that shot is one of the most important parts of the game. Its accuracy depends on many factors based on biomechanics of the player during the shooting process which finalizes by wrist and fingers movements. Thus, wrist and fingers movements play key role to provide shot angle, ball speed and rotation and finally determine whether the ball will be in the basket (Zhen, Wang, & Hao, 2015).

Nowadays to increase the effectiveness of a training process systems to monitor biomechanics of basketball players are used.

Most of the systems, that are available in the market at present moment are either expensive/sophisticated or provide too small information to be considered as a reliable source of data to increase the quality of sportsmen performance.

Currently, most popular are time lapse and Motion Capture systems, similar to those used in cinematography (Verhoeven & Newell, 2016). Time lapse is only available in specially organized environment with at least one high FPS camera. Analysis is made after the shot and requires a lot of time due to thorough frame-by-frame review (Hoesl, Mörwald, Burgdorf, Dreßler, & Butz, 2017). Motion Capture systems may provide online movement registration, which allows to analyze the performance of a player at the very same moment, but players must use uncomfortable and complicated system of markers for the whole system to work. There are also non-marker Motion Capture systems, but they need special environment, similar to time lapse technology (Razavian, Greenberg, & McPhee, 2019). The only currently available system in the market that provides some of the features, like shot count, palm flexion angles and arm movement accelerations monitoring is SolidShot® sleeve (SolidShot, California, USA, 2018). This device is based on the functionality of three 3-axis accelerometers, that are positioned evenly on the elastic compressive sleeve, and a microcontroller that collects sensors information. Major flaw of this system is that it does not provide any information on finger movement, that is considered as important as palm flexion during the shot.

The attempts to monitor wrist motion and fingers-ball and palm-ball interaction during the shot were made in studies (Ohnishi, Ryu, Chung, Colbaugh, & Rowen, 1992) and (Hung, Chen, Lin, & Chung, 2017), correspondently. Wrist motion was analysed using custom made electrogoniometer. Fingers-ball and palm-ball interactions were studied using adopted TekScan Grip system. The studies confirmed that monitoring of wrist and fingers motions can essentially increase the efficacy of training process of shooting. Unfortunately, proposed devices are complicated and uncomfortable for broad application in basketball training.

The aim of present paper is to represent a newly developed system that could provide the potential ability of monitoring and analysing the palm and finger movement in real time and includes the finger load-unload sequence as well as flexion durations and angles, that are vital during the basketball training sessions, as well as review the training results later on.

### System design

Before the start of the system design, an opinion poll of six professional basketball coaches was collected, where they implied, that there is a training type, which is used to improve the grip of a ball. Training includes both shooting and dribbling while wearing gloves. Therefore, it was decided to develop monitoring system in the form of a glove.

The first prototype of the designed Smart Basketball Glove (SBG) and position of its sensing array elements are presented at Figures 1a, b.

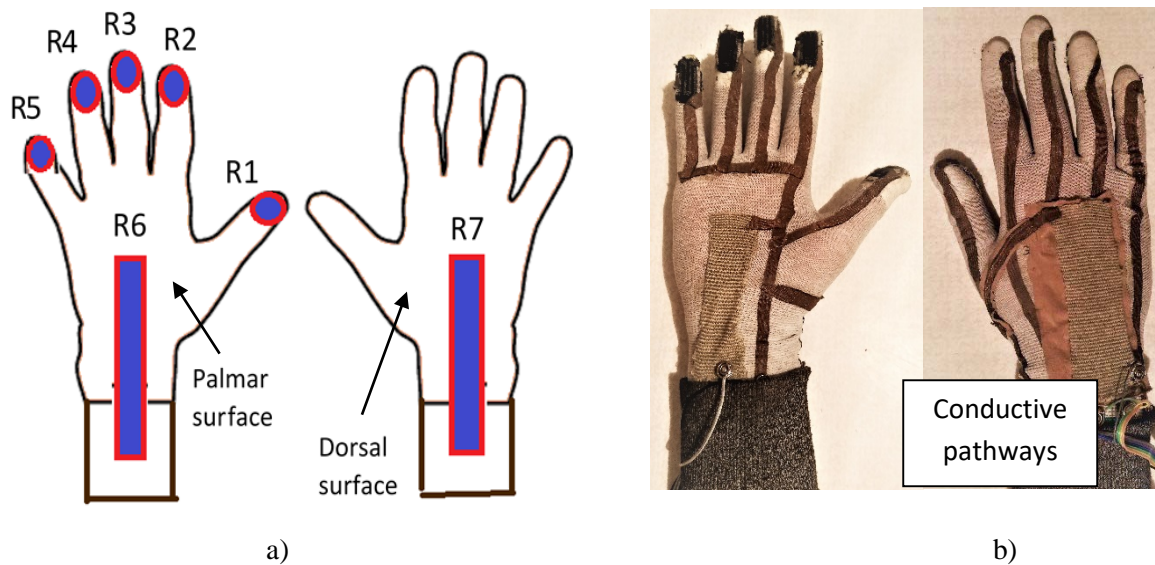


Figure 1 Smart glove design

Proposed system consists of a glove with knitted pressure sensors distributed over the five fingers' third phalanx surface (R1 - R5) and two knitted strain sensors R6 and R7, placed on both palmar and dorsal parts of wrist/palm (Fig. 1a). The sensors are connected by conductive pathways (Fig. 1b) and custom-designed connectors with an electronic device that can collect and transmit data, acquired from sensors, to the data processing device (smartphone or computer).

**Sensors.** Used pressure and strain sensors are an original RTU designed piezoresistive knitted structures (Oks, Katashev, & Litvak, 2014), that are thin, comfortable to use and make no impact on one's movement, when the sensors are

sewn into a piece of clothing: both of them change their electrical resistance with fluctuation of applied load. Wherein electrical resistance of pressure sensors lowers with increasing of the applied load, while electrical resistance of strain sensors increases with the increase of the tension. Both sensor types were previously used in Smart Sock (Oks, Katashev, Zadinans, Rancans, & Litvak, 2016) and Smart Shirt (Semjonova, Vētra, Okss, & Kataševs, 2018) systems.

**Smart glove.** Pressure sensors are sewn onto the glove's fingers on the third phalanx surfaces regions (main pressure points when holding a ball, marked blue - see Fig. 1a), whereas the strain sensors are attached to the glove on palmar and dorsal surfaces of the wrist/palm. Such sensor distribution ensures the coverage of most informative regions of hand, allows to monitor wrist flexion and extension as well as the pressure of fingers, applied to the ball during the shot. The conductive pathways are made by cutting highly conductive stretchable silver coated fabric (Shieldex®) into stripes and attaching the stripes to the glove with dielectric glue. The technology ensured that there is no contact between the conductive pathways or pathways and wearer's skin. Conductive lines ended with the metal male buttons snap connectors, while female connectors were soldered to the lead wires of the data acquisition system.

**Data acquisition system.** The acquisition system used in present research, was similar to the same, applied earlier in "Smart Socks" project (Oks et al., 2016). It included several voltage dividers (one for each sensor) and acquisition device. Dividers had converted resistivity of textile sensors into voltage which was recorded using PC-connected telemetry data acquisition device BioRadio® 150 (Clevemed Inc., Ohio, USA), capable to capture differential voltage signal in the range  $\pm 2V$  over eight channels at sampling frequency up to 800 Hz per channel. Data processing and visualisation software were developed using LabView® platform.

## Methods

Validity and the operation of the designed system was checked first by calibration of sensors. Then tests were conducted by shooting a ball into the basket at different paces to check system's ability to distinguish one shot from another. Some attempts on harvesting data while dribbling have been made as well, demonstrating perspectives for future research.

Sensor calibration was made using weights and goniometer for pressure sensors and strain sensors accordingly. Harvested data were analysed and calibration curves were obtained.

Penalty-type shots were made by a 23 y.o. male, wearing SBG with data acquisition system attached to the throwing arm. Apart from ordinary shots, subject tried to simulate intentionally incorrect shot techniques (wrong palm

position, finger movement, etc.) to distinguish finger and wrist movement tracking capabilities of the system.

Data from sensors R1 – R7 (Fig.1a) were recorded in a form of output voltages from voltage dividers. Then the harvested data time series were compared with visually assessed parameters of a basketball free shot.

Basketball shots data were harvested with 800Hz data gathering frequency.

### Results and discussion

**Calibration.** During the process of calibration, the data were gathered from 3 experiments for each sensor and then averaged. Averaged data were used to create calibration / approximation curves. All of curves have approximation coefficients above 0.97, which can be assessed as a reliable result.

Resulting calibration curves are shown on Figures 2 and 3.

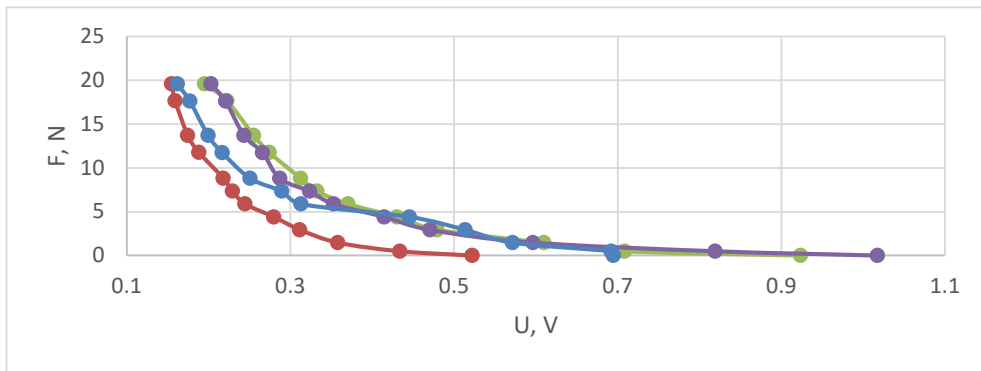


Figure 2 Pressure sensor calibration curves. Red – index finger, blue – thumb, purple – ring finger, green – middle finger

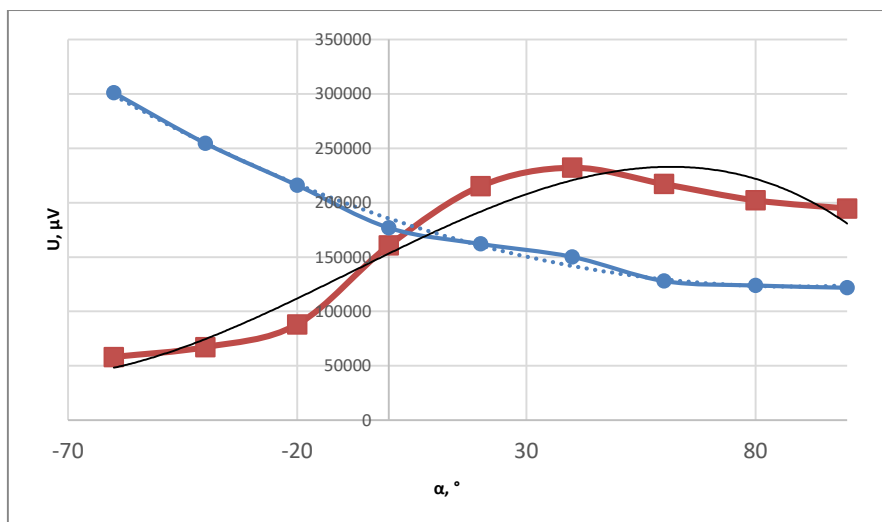


Figure 3 Strain sensors calibration curves. Red – dorsal sensor; blue – palm sensor

**Shot analysis.** The example of data gathered using BioRadio® during single shot is presented at Figure 5. It can be seen, from the figure that the shot is accompanied by decreasing of fingers pressure sensors and increasing of dorsal strain sensor output signals accordingly. That means increasing of finger pressure load and wrist flexion (see Fig. 2). So, SBG qualitatively correctly reflects the biomechanics of lower hand during the shot. Moreover, SBG also provides a clear view on fingers' load sequence, after which the extension-flexion of a wrist occurs. From these data the basketball shot could be divided into 4 phases (A, B, C and D, Fig. 4). Phase A – wrist is in extension, start position for shot to be made; B – thumb pressure sensor signal starts to decrease, which occurs due to increasing of the load that thumb is applying to the ball; C – all the fingers consequently breakaway from the ball; D – wrist flexion after the shot.

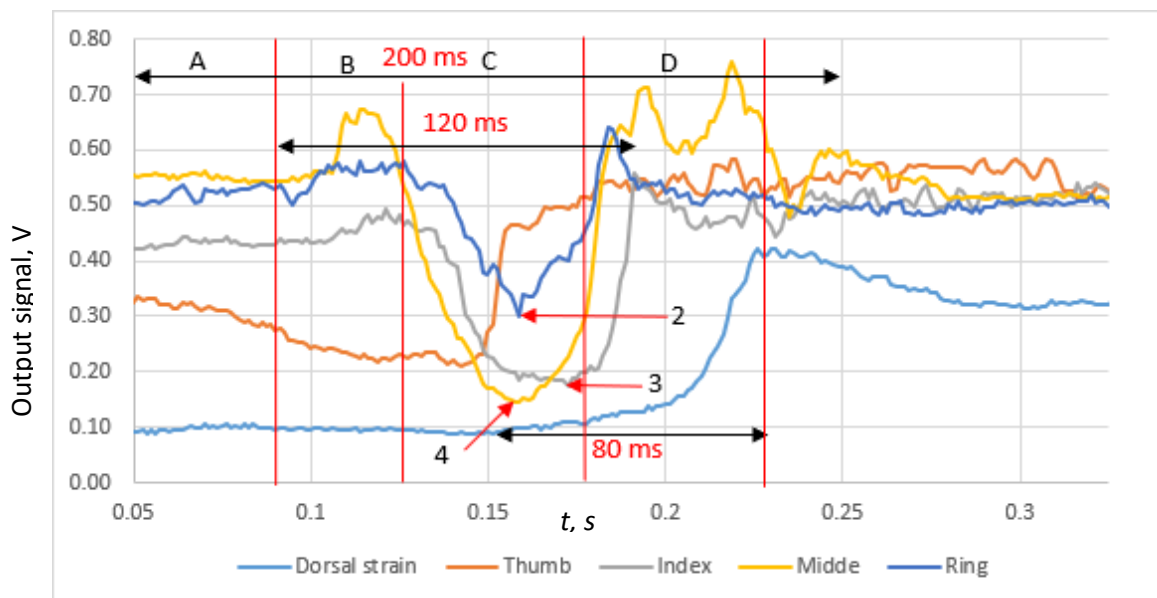


Figure 4 Basketball shot data

The finger sensor load-unload sequence analysis shows that thumb and ring fingers have sharp extremum corresponding to maximal load from these fingers to the ball (points 1 and 2) with following fast unloading period. On the contrary, plots corresponded to index finger and middle finger have “plateaus” in the zones of maximal loading (the middle points of these zones are marked as points 3 and 4). These “plateaus” reflect the most essential contribution of index and middle fingers into the shot process when the ball is rolling over the fingers, which results in spin momentum, that is necessary for accurate trajectory of the shot. Index finger is the last finger, contacted with the ball before the moment of ball’s breakaway from a hand. Obtained results are in accordance to the same received earlier (Hung et al., 2017).



Temporal parameters of wrist extension-flexion phases obtained using data from palm/dorsal strain sensors (see Fig. 5) Application of corresponding calibration curves (Fig. 4) gives the possibility to determine absolute values of wrist angular positions too.

Thus, data analysis confirmed that applied knitted sensors are sensitive and fast enough to monitor finger loading and wrist motion during the shot.

Analysis of gathered data also provided a possibility to distinguish the time length of each of the shot phases: total fingers loading is about 120ms, the “shortest” single finger loading is about 60ms, palm extension-flexion is about 80ms.

Based on received temporal parameters of the shot, the lowest value of data acquisition frequency, necessary for correct monitoring of a shot process, was defined. Using Nyquist-Shannon theorem it was calculated that data harvesting frequency for correct records of basketball shot must be higher than 160 Hz.

The attempt to use SBG prototype device to estimate forces of fingers -ball interaction and velocity of a ball in the moment of breakaway from a hand was made, too.

According to momentum conservation law the following equation can be written:

$$mv_1 - mv_0 = \int_0^t F dt = P, \quad (1)$$

where  $m$  – ball mass ;

$v_0$  – ball initial velocity;

$v_1$  – ball velocity in the moment of breakaway from a hand;

$F$  – total force applied to the ball from the fingers;

$t$  – time of interaction between fingers and the ball during the shot;

$P$  – impulse of the force  $F$ .

Taking into consideration, that initial velocity of the ball is  $v_0 = 0$ , one can get from eq. (1):

$$v_1 = \frac{\int_0^t F dt}{m} \quad (2)$$

Force  $F$  is equal to the sum of partial forces of all five fingers.

$$F = \sum_i^5 F_i$$

The partial forces  $F_i$  can be obtained from data recorded during the shot using calibration curves (Fig. 2).

Figure 5 represents example of total force  $F$  dependence from time  $t$  during the shot, obtained by summation of partial forces from all the fingers.

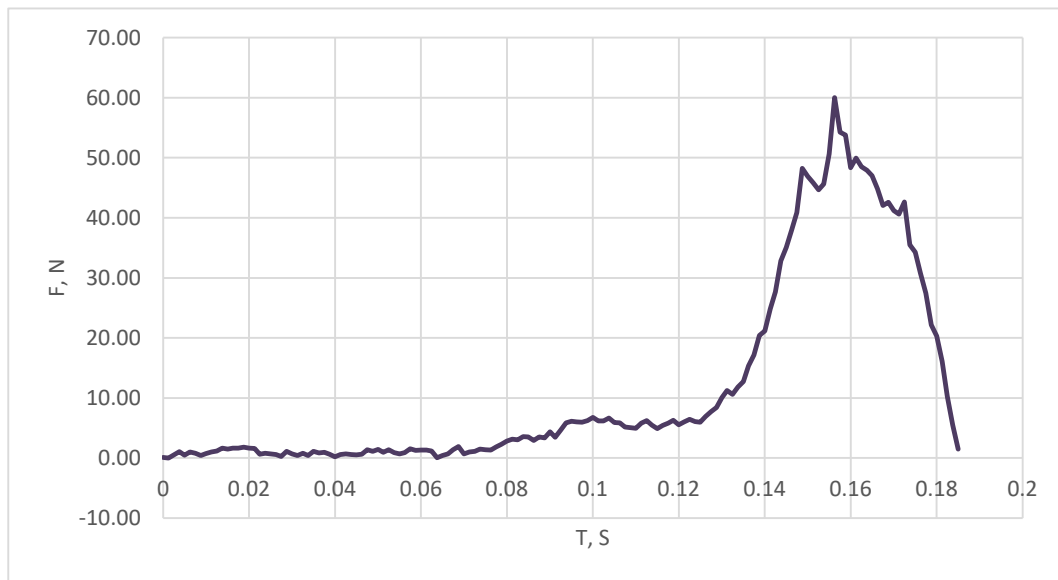


Figure 5 Total force applied to the ball from the fingers during the shot

The value of  $\int_0^t F dt$  was computed by trapezium method. It was obtained:  $\int_0^t F dt = 2.19 \text{ Ns}$ . Taking into consideration that the ball mass is  $m=0.5\text{kg}$ , according to eq. (2), the ball velocity at take-off  $v_1$  is equal to

$$v_1 = 4.39 \frac{m}{s}$$

To compare received value of shot velocity with theoretical one the projective motion theory (Changjan & Mueanploy, 2015) was used. The velocity of the ball for the similar to experimental tests shooting conditions have been calculated. The calculated theoretical value of the ball velocity at take-off was equal to  $5.01 \text{ m/s}$ . So, designed SBG prototype gave underestimated result for forces applied to the ball and correspondently, for the ball velocity.

The possible reason of such underestimation can be explained by follows. Applied finger sensors belong to piezoresistive type of soft pressure sensors. To harvest the correct output signals from such sensors it is necessary to provide uniform load distribution over the whole sensors surfaces. Such type of load exactly was provided within calibration process. During the experimental shot tests the ball had additional rotational movement (due to sequential contact between fingers and the ball to provide the ball spin). Thus, equivalent load of sensors surfaces wasn't uniform which lead to the different conditions of sensors

loading during calibration and shot tests and, therefore, to quantitative error in force and ball velocity estimation. Possible solution of this problem can be using of several sensors with small squares with parallel electrical connection instead of big one which will be tested during future system development.

### Conclusions

1. Developed Smart Basketball Glove prototype gives possibility to control simultaneously the fingers movement sequence and angles of a wrist extension/flexion during the basketball shot.
2. Data analysis showed that total duration of the shot is about 200ms, the time length of the shortest finger loading is about 60ms, the time length of a wrist extension-flexion is about 80ms. To provide successful functionality of SBG its data harvesting frequency must be higher than 160 Hz per channel. It is also vital that SBG's acquisition device must have at least 7 data channels to be able to collect data from 5 finger sensors and 2 strain sensors simultaneously.
3. Present SBG prototype gave underestimated absolute values of fingers-ball interaction forces and shot velocity. New pressure sensor design and/or interaction force correction algorithm must be developed and applied in future SBG version to compensate the error of force estimation.

### Acknowledgements

This research is co-financed by the ESF within the project «Synthesis of textile surface coating modified in nano-level and energetically independent measurement system integration in smart clothing with functions of medical monitoring», Project implementation agreement No. 1.1.1.1./16/A/020

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# HEALTH PROMOTION AND THE EDUCATION SYSTEM

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**Abstract.** *Rapid economic, social, demographic, technological and communication developments in developed countries in recent decades have resulted in the emergence of new threats and health problems for people of all ages. It was necessary to search for new strategies in the protection of population's health, as the existing health problems have been overlapped by new ones. This article deals with issues related to health education, which is an integral part of health promotion. For representatives of various scientific disciplines, it will never lose its relevance, as health care is a kind of investment in building the well-being of the whole society and an important economic criterion.*

**Keywords:** *education system, health, health education, health promotion, health threats.*

## Introduction

Teaching people how to behave in order to avoid diseases and keep the health of has accompanied mankind from the earliest times. Health has been defined for 2,000 years. In European medicine, it began with its "father" Hippocrates. It probably belongs to the ambiguous concepts and every person can understand health in his own way. It is a positive category associated with good quality of life, life energy, physical fitness, development and the ability to live actively. Living is a synonym of well-being, which in WHO's definition of health means a physical, social and mental "alienated state of full health". In all societies and cultures, health is treated as a good and desirable condition for every human being and society.

Results of research carried out by CBOS (Center for Public Opinion Research) in April 2017 on representative groups of adults indicate that the system of Poles' values is quite stable and health has been highly appreciated for many years (CBOS, 2017).

In many international documents published in recent decades addressed to the governments of all states, it is stressed that health is a resource for every human being and a society.

Personal responsibility for health means that a person has a duty to take care of their health and bears moral responsibility for making choices related to their health. This applies first of all to the choice of lifestyle, because irregularities in this area are the cause of many diseases, which implies a burden on relatives or society. According to the CBOS research, the views of Poles on the subject of responsibility for health protection - stable so far - have clearly changed in recent years. Although the conviction that the responsibility to protect health rests mainly on ourselves - we have to take care of our own health (55% of respondents consider it now), but since the last measurement (in 2012), the percentage of opinions that the state and its appropriate authorities should care for citizens' health (an increase from 20% to 41%) (CBOS, 2016).

Social responsibility for health has been understood as providing people with access to medical care and treatment until recently.

Nowadays, this responsibility is associated with activities in the field of disease prevention and health promotion, such as e.g. sanitary control, air pollution, ensuring food safety, preventing the use of psychoactive substances, proper city planning, transport, taking care of health in the workplace or health education (Resnik, 2007).

### **Health education**

Health education has a long tradition and it grew out of medical science, mainly hygiene and social medicine, and the leading role was played by doctors until the 1970s. The change in approach to health and factors conditioning them, and especially the development of health promotion has caused significant changes in the concept of health education.

There is no universal, commonly accepted definition of health education, but for practical purposes, it can be assumed that health education is a planned, diverse activity for maintaining, improving and strengthening one's own health and other people's as well.

The most characteristic changes include:

- holistic approach to health, with a clear emphasis on psychosocial health,
- de-medicalization of health education and involvement in its programming and implementation of representatives of social sciences,
- shifting the accents from the transfer of knowledge to shaping health skills (including life skills - psychosocial skills (Woynarowska, 2001) and competence to action (Jensen, 1994),
- transferring accents from teaching to learning.

Health education is an inseparable, complementary element of health promotion and consists its roots. According to K. Tones and J. Green in the

medical model of health promotion persuasion dominated - urging people to specific behaviours to prevent disease. The model of health promotion aimed at empowering the function of health education is to strengthen people's ability to act for their health and to create conditions in which people learn (and are not taught) about health and disease. The second important function of modern health education is to influence policy-makers because they create public policy and a health-supportive environment.

Health education is an important element of corrective actions, disease prevention and health promotion. The activity of a person in the process of treating diseases increases with knowledge, willingness and understanding. The rapid economic, social, demographic changes, the development of new technologies, communication that has taken place in recent decades have caused the emergence of new threats and health problems of people in all age groups in developed countries. Changes concerning diseases and illnesses occurring in contemporary societies influenced the need to educate people who are ill and to include them in the treatment process (Falvo, 2004). Longer life and aging of the population, dominance of chronic diseases, access to information related to treatment have become the right of every patient to create a space for education.

The goals and expected effects of health education are compatible with health models, with factors determining health, and involvement in health education programs of representatives of social sciences.

In order to achieve a significant improvement in the health of modern societies, multidirectional activities are necessary, which are not limited to treatment methods.

Thus, health promotion, disease prevention and education can be available to everyone. Their costs are borne by the state or local governments.

### **Health promotion and the education system**

In Poland, the systematic development of the idea of health education and health promotion began in the mid-nineties. Health promotion programs are very strongly related to the social environment (system). According to R. Grossmann and K. Scala, *health promotion is an art of intervening in social systems and encouraging them to develop towards healthy environments* (Grossmann & Scala, 1997). These authors emphasize that there is no separate system for health in society (traditional health care is focused on disease) and health should enter every social system. Therefore, the key issue in health promotion is *the setting approach*. The WHO defines a habitat as a place where people live, work and enjoys various benefits. In health promotion, the habitat is a social system (as a whole) that changes to improve and promote the health of all its members.

Education is one of the social systems important for the health of society. Health (understood holistically) should find a place in the politics, tasks and organization of the whole educational system at its various levels. So far, health promotion has found the entry point to the education system at the lowest level of the education system - in schools promoting health. The "Health promoting school" project implemented in 1992-1995 launched a grassroots movement in Poland that adopted the concept and model of creating such a school developed in this project (Woynarowska & Sokołowska, 2000). This movement, despite various difficulties, is still developing. At present, voivodship schools networks promoting health exist in 15 voivodships and include about 1200 schools and kindergartens.

Are physical education teachers interested in creating a health promoting school?

There is no research so far that would provide objective data to answer this question. Observations and own experiences indicate that in most schools physical education teachers do not play a significant role in this area. It should be emphasized that in the teaching standards for master's studies (Annex No. 7 to the Ordinance of the Minister of National Education and Sport, 2003) only in the field of "physical education" in the program content of the subject "health education and environmental protection" a health promoting school was mentioned.

It is widely believed that school health education is an important investment in the health of society and should be part of the health policy of each country. This conviction, however, does not translate into practical measures and in most countries, policy-makers do not treat health education as an important task for the school. At the same time, they represent a traditional approach, identifying health education with knowledge about human somatic hygiene and health. This approach is very distant from the modern thinking described above about health education.

In recent years there have been extremely favourable changes in this area in Poland, which seems to be the result of the development of the movement of schools promoting health. In 1997, for the first time in the history of education in Poland, health education appeared in the core curriculum of general education. In subsequent changes of these foundations in 1999 and 2002, it was maintained as a "health education" educational path in all types of schools (Woynarowska & Sokołowska, 2001). Such location of health education as a cross-curricular program is a common solution in Europe. The Health Promoting School program is being developed in Poland as part of the European Health Promoting School, established in 1992 (from January 1, 2008 - European School of Health in Europe - SHE), as a result of the WHO / EURO agreement, the Council of Europe and the European Commission. Poland became a member of this network in the group of the first seven countries. The program started with a three-year



international pilot project (1992-1995), which was the beginning of grassroots activities of schools, in accordance with the strategy developed in the so-called design schools and networking of these schools at different levels. Activities related to the development and dissemination in Poland of the idea of the Health Promoting School were based on cooperation and support from the ministries of health and education. To ensure further development of the program and the continuation of Poland's affiliation to the European School of Health in Europe, on November 23, 2009, a cooperation agreement was signed between the Minister of National Education, the Minister of Health and the Minister of Sport and Tourism on the promotion of health and prevention of children and youth.

The agreement provides, inter alia: ensuring synergy of activities in the field of health promotion and prevention of children and youth, which are implemented by the parties to the agreement in schools and facilities and in the local environment, including taking action to implement health promotion programs, e.g. School for European Health program.

Currently, there are over 2,000 schools in the network of health promoting schools in all voivodship in Poland. Health-promoting schools plan their work and take action on the basis of five standards of health promoting school:

- Help the school community members (including parents) to understand and accept the concept of a health promoting school,
- Manage health promotion projects,
- Conduct health education of students and employees and strive to increase its quality and effectiveness,
- Create a social climate conducive to: satisfaction with learning and working at school, achieving successes and strengthening the self-esteem of students and employees,
- Create a physical environment conducive to health, safety and well-being of students and employees. Currently 104 schools in Poland belong to the national network. It is an honor for the school and at the same time a commitment to create and disseminate activities aimed at promoting health in its region and to share its experiences with other schools in Poland (MEN, 2018).

## **Conclusion**

The health condition of the population in the modern world is an important determinant of well-being and multidimensional development of every society. In times of broadly understood changes, a fast pace of life, health is still the highest value for every human being. Addressees of all educational programs and activities promoting health are therefore different target groups, highlighted,

among others due to sex, age, education, environment in which they live, the type of work performed or the nature of health problems.

### Summary

It is undeniable that health and education are strongly related. Everyone is responsible for their own health, so they should get information about what harms their health and what helps in maintaining it. Developing knowledge in the field of a holistic health model (physical, mental, emotional, social, spiritual and sexual health), health education as a process lasting throughout life and concerning all people, as well as key skills and competences in developing pro-health attitudes in specific areas (healthy nutrition, physical activity, psychosocial skills, prevention) and environments, promoting a healthy lifestyle and effective implementation of tasks in the area of health promotion, contributes not only to caring for their own and other health but also to co-create.

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# NON – FORMAL PHYSICAL EDUCATION INFLUENCE ON HEALTH RELATED PHYSICAL FITNESS OF CHILDREN

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**Abstract.** *The aim of this study was to develop and implement curriculum of non-formal physical education in school and assess its effectiveness for health related physical fitness of 11-13 year old children. The research was conducted in two stages. In the first stage 51 11-13 year old children participated in a quasi-experiment for two years. Pupils were organized into E (experimental) and C (control) groups. Both groups shared the duration (1 hour) and frequency (twice a week) but were different in their education curriculum. In the second stage 72 pupils (groups A and B) attended in the research from the same schools. The curriculum of the group A was modified and differed from group E, group B - the same as group C. In both stages the focus groups performed four physical fitness tests and BMI was calculated. Group E girls' indices of three tests and boys' indices of all four tests were significantly ( $p < 0.05$ ) higher than young adolescents' from group C. Group A girls' flexibility and aerobic endurance as well as boys aerobic endurance were higher ( $p < 0.05$ ) than pupils from group B. Results suggest that the individualized, diverse, 11–13 years old children hobbies, needs, abilities, physical and functional powers answering non-formal curriculum, which expands knowledge and develops new skills and when various child-activating teaching methods and forms are used, positively influence their health related physical fitness.*

**Keywords:** *children, physical fitness; non – formal physical education.*

## Introduction

Physical fitness conveys many health benefits across the physical, psychological, and intellectual domains. Despite evidence highlighting the positive health effects of physical fitness (Ahlqwist, Hagman, Kjellby-Wendt & Beckuhg, 2008; Mikkellsson et al., 2006; Sacheck & Hall, 2014), children's physical fitness is insufficient (Cerero, Lopez, Suarez-Llorca, Andreu-Cabrera & Rojas, 2011; Gruodytė – Račienė et al., 2017) and has a tendency to decline year by year (Brunet, Chaput & Tremblay, 2007; Fu, Guo & Zang, 2012; Семёнов,

2014; Синявский, Власов & Сергеев, 2009). If this general negative trend continues, it will compromise the well-being of future adults and create a serious economic burden on the society (Venskunas, Emeljanovas, Mieziene & Volbekiene, 2016). Furthermore, there is a common agreement that two components can be recognised in physical fitness – one mainly related to health and the other related to motor skills that pertain more to performance (Fu, Guo & Zang, 2012; Graham, Holt/Hale & Parker, 2007; McArdele, Katch & Katch, 2007). Current discussions of physical fitness are commonly set in a health-related context. Health-related physical fitness (HRPF) components include cardiorespiratory fitness, muscular strength and endurance, flexibility and body composition (Gallahue & Ozmun, 2006; Gruodytė – Račienė et al., 2017; Mikkelsen, et al., 2006).

Physical education lessons (formal education) can result in increasing HRPF, but, as noted Rainer, Griffiths, Cropley, and Jarvis (2015), although schools must be realistic in that physical activity recommendation for children's cannot be met through physical education alone. Outside the formal educational are implemented non-formal education programs, which are planned and designed to improve children's skills and competencies (Committee on Culture and Education European Parliament, 1999). The effectiveness of non-formal physical education (NFPE) usually is measured by analyzing its impact on physical activity (Gortmaker et al., 2012; Lubans & Morgan, 2008), while a little part of the previous literature has regularly focused on the influence of NFPE curriculum on 11-13 year old children health-related physical fitness.

Wanless et al. (2014) implemented 12-week after-school running program for elementary pupils in grades 3 through 6. Program design which was based upon a series of progressive walking/jogging workouts as well as physical activity centred games and activities improved aerobic capacity of the pupils. Carrel et al. (2011) investigated the effects of a 9-month after-school physical activity program on body composition and cardiovascular fitness of elementary school children. The curriculum was modified to encourage student participation. Competitive games were de-emphasized and replaced with lifestyle-focused activities. The activities encouraged physical fitness and fun, and full group participation. These findings suggest that modifications of school physical education curricula and after-school programs toward a fitness emphasis may be an effective vehicle for increasing physical activity and improving cardiovascular health for all children.

However, data with a focus on all HRPF components development through NFPE are lack. Such data are even more limited from longitudinal studies. The following research question was formulated in the present study: What curriculum of NFPE in school can positively influence 11-13 year old children's health related physical fitness?

The aim of this study was to develop and implement curriculum of non-formal physical education in school and assess its effectiveness for health related physical fitness of 11-13 year old children.

## Methods

### Participants

This article presents a part of study, which was implemented in 2006–2013. Overall 1364 5–6 grade pupils and teachers from five Lithuanian towns, located in different regions of the country, took part in research.

Quasi-experiment was carried out in Klaipeda - the third largest city in Lithuania and it was conducted in two stages. In the first stage (academic years 2007–2009) 63 fifth grade student, who took part in NFPE in school, from four schools, were invited to participate in a quasi-experiment. Children were assigned to one of two groups: pupils from two schools were assigned to experimental (E) and pupils from two other schools were assigned to control (C) groups.

Results were analysed only those participants who participated in NFPE permanently for two years. Participants with a physical disability that restricted their ability to implement educational programme, were not eligible to participate in quasi-experiment. 51 young adolescents (50.2% boys) two years took part in a quasi-experiment. At baseline, mean age of the participants was 11.3 years (SD = 0.26). In the experimental group were 29 (62.1% boys), control – 22 (50.0% boys) pupils.

In the second stage (academic year 2012–2013) attended 72 sixth graders ( $M_{age} = 13.00$  years,  $SD = 0.33$ ; 52.2% boys) who second year took part in NFPE in school from the same schools who participated in quasi-experiment (Group A:  $n = 46$ , 54.3% boys; Group B:  $n = 26$ , 46.2% boys) (see Figure 1).

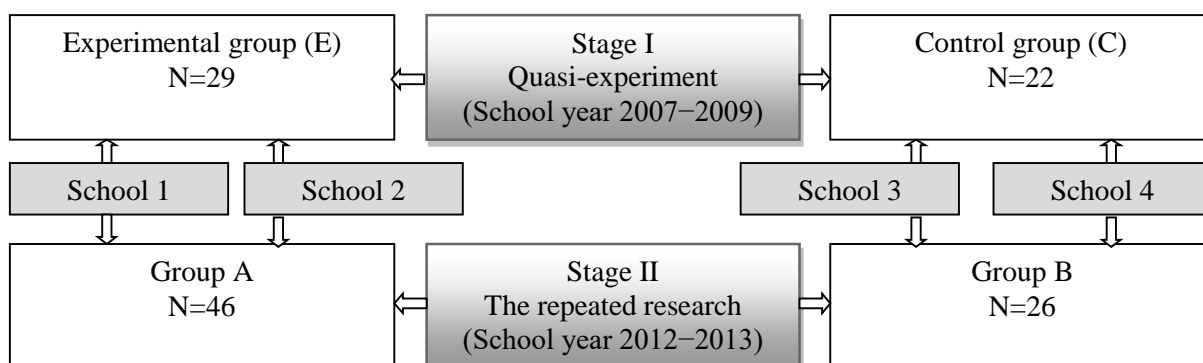


Figure 1 Distribution of young adolescents who participated in the research

## **Instruments**

In the first stage at the beginning (2007-10), in the middle (2008-05) and at the end (2009-05) of the quasi - experiment the HRPF components, that is body composition, flexibility, muscular strength and endurance, and cardiorespiratory fitness, of all study participants were assessed by the physical fitness tests described below.

*Body mass index* of the participants were calculated from their respective height and weight using the relation =  $\text{weight}/\text{height}^2$ . *Height* was measured using roller height meter (Seca, model 206, Germany). The height meter was mounted on the wall and the participants stood erect, barefooted, and looked straight ahead. Before being measured or weighed, pupils were asked to remove their shoes and outer clothing, such as jackets. Height was measured to the nearest half centimetre. *Weight* was measured to the nearest 0.1 kilogram using a calibrated scale (Seca, model 709, Germany) that was zero balanced before each student was weighed.

*Sit and reach* (lower back flexibility). The sit and reach was scored at the most distant point (in cm) reach on ruler with the fingertips. A sit and reach box was specially constructed box with the measuring scale where 23 cm is at the lever of the feet. Each participant was given two trials and the best result was chosen. The student removed his/her shoes before sitting at the test apparatus with the knees fully extended.

*Sit ups in 30 seconds* (abdominal muscle strength and endurance). The sit ups test was scored as the number of sit-ups performed within 30 s period. The adolescent lay down on a mat with knees bent at right angles and hands behind the head. The ankles were firmly held by a partner for support and maintaining the count. The student elbows touched knees during the execution of the test.

*Flexed-arm hang* (upper body strength and endurance). Flexed arm hang was scored the total time in seconds. The participant climbs the ladder to a height so that the chin is level with the bar. Grasp the overhead bar using an overhand grip (palms facing away from body), with the hands at shoulder width apart. On the command, "ready, go," the student removes their feet from the ladder, and timing starts. The student should attempt to hold this position for as long as possible. Timing is stopped when the student's chin falls below the level of the bar or the head tilts backward to enable the chin to stay level with the bar.

*Standing long jump* (explosive leg power). Standing long jump was scored the longest distance jump in centimetres. The participant stands behind a line marked on the ground with feet slightly apart. A two foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forward drive. The student attempts to jump as far as possible, landing on both feet without falling backwards. Two attempts are allowed.

*1 mile walk/run* (cardiorespiratory endurance). 1 mile walk/run was measured in minutes. The participants were instructed to try to keep a steady

speed and finish run as fast as possible. Walking was permitted when the student could not continue running.

During the second stage the pupils of six grades performed the same measurements as their colleagues four years ago.

### Procedures

All children attended Physical education lessons (formal education) 2 times per week. The curriculum was carried out under the Lithuanian general education programs. NFPE in school were held at the end of formal education. Both experimental and control groups shared the duration (1 hour) and frequency (twice a week), but were different in their curriculum. *Experimental group (E)* worked under the curriculum developed by us. Curriculum was grounded in pedagogical and non-formal education literature review, children's needs (672 11-13 year old children took part in questionnaire) and opinion of pedagogues (20 teachers were interviewed) (see Table 1).

Table 1 **Basic Principles of Curriculum**

Source	Basic principles of curriculum
Pedagogical literature review	Integral development of whole the qualities of body, will and mind: incorporating the three domains of learning: cognitive (intellectual), affective (social/emotional) and kinaesthetic (physical).
	Learning is both an individual and a cooperative activity.
	Diversity of educational content
	Every individual have the possibility of practising sport, without discrimination of any kind.
Non-formal education literature review	Principles particularly important for non-formal education: voluntarism, accessibility, individualization, relevance, integrity and positivity.
	Young adolescents activating learning methods: discussions, case analysis, „Mind hedgehog”, arguments „Pros and cons”, „Brainstorm”, learning in groups, etc.
	Various, children hobbies, need, abilities answering content.
11–13 years old children needs	Interesting and useful physical activities.
	Physical and functional capacity corresponding load.
	Safe psychological environment.
Pedagogues opinion	Regular, safe, enjoyable, familiar and unfamiliar physical activities.
	Variety of learning forms: contests, quizzes, trips and excursions, projects, intra-school and inter-school competitions.

In our developed and implemented programme 85% of NFPE curriculum was formed of sessions (content included various sport and cooperative games, adventurous activities, athletics, gymnastics and outdoor activities) and 15% - sport and wellness events (intra-school and inter-school competitions, sport and wellness festivals, contests, quizzes).



Each session was split into 3 parts: (1) a warm –up exercise (10 min), which included exercises for major muscle groups; (2) the main part of the session (40 min), which included exercises to improve various physical qualities; and (3) the final part (10 min) which included flexibility and strength exercises.

During the sessions were not only educated the physical qualities, but also provide the knowledge and integrally formed attitudes of physical activity and physical fitness. The content was diverse and answered children needs, abilities, physical and functional development. Pedagogues were systematically consulted. The curriculum correction was done on the basis of the monitoring classes, discussing with pupils and pedagogues, and analysing results.

*Control group (C)* worked according to NFPE programs developed by teachers and approved by school principals. The curriculum was oriented to preparation for two competitions: relays “Brave, strong, quick” and “Quadrate”.

In the second stage (academic year 2012–2013) the 6th grades from the same four Klaipeda city comprehensive schools participated in the research. Was formed groups A and B.

*Group A:* after implementing quasi - experiment in schools, where experimental educational programme was practiced, the curriculum was modified. The curriculum was oriented towards preparation for competitions and only partly corresponded to children’s’ needs, abilities, physical and functional powers. The traditional physical education methods and forms usually were applied.

*Group B* pedagogues implemented the same curriculum as group C in academic years 2007–2009.

### **Statistical analysis**

Descriptive statistics were calculated (including means (M) and standard deviation (SD)) for each physical fitness component. Dependent t test was used to assess differences between two related groups. Independent t test was used to examine test differences between two independent (E and C), (A and B) groups. For all the tests, statistical significance was set at  $p < 0.05$ . All statistical analyses were performed with the Statistical Package for Social Sciences (SPSS) (version 20.0 for Windows).

### **Research ethics**

The study was approved by Klaipeda University Education Science Doctoral Committee and Department of Physical Education. For all participants was clarified that participation in a research study is voluntary and they may freely withdraw at any time without any type of penalty. After being informed about the nature and steps of the study verbal consent was obtained from all participants. Written voluntary consent was provided by all their parents and/or guardian.

### Results

Descriptive statistics were used to describe the basic features (M and SD) of the data in a study. Table 2 presents research I (2007-10), II (2008-05) and III (2009-05) HRPF results of groups E and C. Table 3 presents repeating research (2013-05) HRPF results of groups A and B. Descriptive statistics presented in Table 2 revealed that in two academic year period groups E results of HRPF improved, however not all results of group C changed positive.

**Table 2 Descriptive characteristics and statistical differences between Experimental (E) and Control (C) groups**

Variable	Research number and date	Girls					Boys				
		Group E (n = 11)		Group C (n = 11)		p	Group E (n = 18)		Group C (n = 11)		p
		M	SD	M	SD		M	SD	M	SD	
Height (cm)	Research I	150.59	8.84	149.73	6.31	0.795	148.86	6.90	150.73	6.51	0.477
	Research II	153.41	8.54	153.00	6.50	0.901	152.25	7.11	154.55	8.18	0.432
	Research III	159.64	7.55	158.55	7.05	0.730	158.78	8.73	161.55	8.17	0.404
Weight (kg)	Research I	45.05	6.47	40.36	6.50	0.106	44.02	16.32	39.50	7.41	0.397
	Research II	46.38	6.84	42.55	7.09	0.211	47.56	16.79	42.77	8.63	0.391
	Research III	50.91	5.59	49.10	7.23	0.517	50.66	19.33	47.05	8.57	0.565
BMI (kg/m <sup>2</sup> )	Research I	19.90	2.65	17.93	2.07	0,066	19.52	5.06	17.27	2.10	0.175
	Research II	19.69	2.22	18.11	2.35	0.120	20.20	5.05	17.75	2.14	0.141
	Research III	20.01	2.12	19.56	2.93	0.682	19.78	5.56	17.90	1.86	0.291
Sit and reach (cm)	Research I	22.45	4.34	20.18	4.49	0.242	15.94	5.91	17.00	4.49	0.615
	Research II	24.27	6.31	18.91	6.16	0.057	16.83	6.82	15.36	3.64	0.457
	Research III	27.00	5.16	17.82	5.10	0.001*	19.94	4.71	13.82	5.23	0.005*
Flexed-arm hang (s)	Research I	6.11	4.78	7.44	6.21	0.576	16.11	12.40	14.55	9.05	0.720
	Research II	9.86	10.57	16.60	17.18	0.281	14.46	11.98	18.31	16.87	0.518
	Research III	10.44	8.70	12.72	15.75	0.677	18.38	14.01	8.41	3.87	0.010*
Sit ups in 30 sec (n)	Research I	24.55	3.42	23.00	3.72	0.322	26.11	4.48	28.00	2.61	0.216
	Research II	26.45	3.70	21.82	5.27	0.028*	26.28	5.37	25.00	3.26	0.432
	Research III	28.64	2.58	23.55	3.75	0.002*	28.33	3.94	24.09	5.05	0.029*

Standing long jump (cm)	Research I	149.45	19.61	155.45	21.96	0.507	156.17	21.90	170.45	10.36	0.053
	Research II	155.27	16.93	159.91	22.50	0.591	163.17	19.99	171.36	8.97	0.144
	Research III	166.55	22.38	162.09	20.47	0.631	177.22	21.66	161.82	24.52	0.103
1 mile walk/run (s)	Research I	685.09	60.26	694.55	74.55	0.747	591.94	68.48	598.64	38.09	0.769
	Research II	638.09	45.34	695.36	109.77	0.134	564.17	66.70	695.40	74.11	0.036*
	Research III	582.36	67.82	694.82	153.82	0.044*	532.39	76.49	700.03	153.05	0.015*

BMI = body mass index; M = mean; SD = standard deviation; \* $p < 0.05$

Dependent t test revealed that during one academic year (2007–2008) group E girls significantly improved abdominal muscle strength and endurance,  $t(10) = -2.313$ ,  $p < 0.05$  and cardiorespiratory endurance,  $t(10) = 5.663$ ,  $p < 0.001$ . Group C girls significantly improved upper body strength and endurance,  $t(10) = -2.236$ ,  $p < 0.05$ . Results of other HRPF components did not significantly change over the first quasi-experiment year.

Over two curriculum implementing years, group E girls significantly improved their indices of flexibility,  $t(21) = -4.048$ ,  $p < 0.01$ ; abdominal muscle strength and endurance,  $t(21) = -4.451$ ,  $p < 0.01$ ; explosive leg power,  $t(10) = -2.892$ ,  $p < 0.05$  and cardiorespiratory endurance,  $t(10) = 9.270$ ,  $p < 0.001$ . Dependent t test revealed that during two years significantly increased group C girls BMI,  $t(10) = -3.228$ ,  $p < 0.01$ . Other differences were not significant.

Table 3 Descriptive characteristics and statistical differences between of A and B Groups (research date: May 2013)

Variable	Girls					Boys				
	Group A (n = 20)		Group B (n = 12)		p	Group A (n = 26)		Group B (n = 14)		p
	M	SD	M	SD		M	SD	M	SD	
Height (cm)	162.15	6.42	165.08	8.43	0.398	160.42	8.42	163.13	9.48	0.391
Weight (kg)	52.70	10.41	52.58	13.31	0.779	50.40	9.63	49.21	9.52	0.730
BMI (kg/m <sup>2</sup> )	20.21	3.52	19.08	3.58	0.381	19.54	2.71	18.33	2.62	0.181
Sit and reach (cm)	25.62	4.61	19.94	4.23	0.001*	18.81	6.47	17.34	7.42	0.418
Flexed-arm hang (s)	8.51	6.72	8.84	9.61	0.901	11.81	9.84	15.63	10.05	0.276
Sit ups in 30 seconds (n)	22.81	4.56	23.14	2.52	0.726	22.81	4.52	23.14	2.53	0.726
Standing long jump (cm)	145.05	23.93	160.29	20.60	0.060	175.29	22.21	173.50	13.05	0.799
1 mile walk/run (s)	634.78	66.76	693.70	73.5	0.021*	596.48	90.18	649.02	121.86	0.003*

BMI = body mass index; M = mean; SD = standard deviation; \* $p < 0.05$

E group boys' HRPF data showed that over one academic years (2007–2008) significantly increased BMI,  $t(17) = -2,179$ ,  $p < 0.05$ ; explosive leg power,  $t(17) = -4.292$ ,  $p < 0.001$  and cardiorespiratory endurance,  $t(17) = 3.981$ ,  $p < 0.01$ . Dependent t test indicated that significantly increased group C boys' BMI,  $t(10) = -2.506$ ,  $p < 0.05$  and decreased abdominal muscle strength and endurance,  $t(17) = 2.331$ ,  $p < 0.05$ . More significant differences did not reveal.

Over two years group E boys' flexibility,  $t(17) = -4.614$ ,  $p < 0.001$ ; abdominal muscle strength and endurance,  $t(17) = -3.688$ ,  $p < 0.01$ ; explosive leg power,  $t(17) = -9.171$ ,  $p < 0.001$ ; cardiorespiratory endurance,  $t(17) = 9.204$ ,  $p < 0.001$  were improved significantly. Group C boys BMI changed significantly,  $t(10) = -2.308$ ,  $p < 0.05$ . Other results of this group boys slightly went down.

The results of independent t test indicated that there were no significant differences between HRPF at the beginning of the quasi-experiment. After one year of intervention group E girls' abdominal muscle strength and endurance was significantly better than group C girls',  $t(20) = 2.389$ ,  $p < 0.05$ . Were not significant differences between other HRPF indices. After two years of the quasi-experiment, comparing the results of groups E and C girls', was established significant differences of flexibility,  $t(20) = 4.200$ ,  $p < 0.001$ ; abdominal muscle strength and endurance,  $t(20) = 3.709$ ,  $p < 0.01$  and cardiorespiratory endurance,  $t(20) = -2.219$ ,  $p < 0.05$ .

Comparing groups E and C boy' results of HRPF was established that after the first intervention year group E boy' results of cardiorespiratory endurance, were significantly better than group boys',  $t(27) = -2.313$ ,  $p < 0.05$ . More significant differences did not reveal. The results of the research III of groups E and C boys' significantly differ in flexibility,  $t(27) = 3.261$ ,  $p < 0.01$ ; upper body strength and endurance,  $t(27) = 2.293$ ,  $p < 0.05$ ; abdominal muscle strength and endurance,  $t(27) = 2.529$ ,  $p < 0.05$  and cardiorespiratory endurance,  $t(27) = -3.163$ ,  $p < 0.05$ .

During repeating research, which was carried out after four years (2013), it was estimated that group A girls' flexibility,  $t(32) = 3.7$ ,  $p < 0.01$  and cardiorespiratory endurance,  $t(31) = -2.440$ ,  $p < 0.05$  as well as boys cardiorespiratory endurance,  $t(32) = -3.220$ ,  $p < 0.01$  were significantly higher than of children from group B.

## **Discussion**

In this study we aimed to assess the effectiveness of developed and implemented non-formal physical education curriculum for health related physical fitness of 11-13 year old children.

One of HRPF components is body composition. World health organization (WHO, 2015) declares that worldwide obesity has more than doubled since 1980.

42 million children under the age of 5 were overweight or obese in 2013. Julia, Van Weissenbruch, Prawirohartono, Surjono, and Delemarre-van de Waal (2008), Raustorp (2010) with the longitudinal researches estimated that the weight of young adolescents increases during the last years. By the data of Gao, Oh, and Shehg (2011) a fifth (20.5%) of 11 years old children have overweight, though 23.7% - obesity. Tutkuvienė and Jakimavičienė (2004) designate that BMI of 11–12 year old boys fluctuate a little, though the bigger change happens at the age of 12–13 years. 11–12 and 12–13 year old girls BMI grows similarly. Growth reference data for 5–19 year old children, offered by WHO (2016), indicate that BMI of 11–13 years old children gradually increases.

Carrel et al. (2011) implemented fitness-oriented program for 9 months (the entire school year): competitive games were de-emphasized and replaced with lifestyle-focused activities (walking, games, station-based activities and snowshoeing). Researchers have identified that school based fitness programs can significantly improve body composition in children. Our research show, that during two academic years, BMI increased remotely only between group's E girls and boys. These differences in group C were significant ( $p < 0.05$ ). The bigger changes of girls' BMI were determined in the second research year, though this index for boys mediates both the first and second year. After four years it was determined that BMI indices of young adolescents are very similar to the research performed in 2009. Group A results did not differ significantly from group B,  $p > 0.05$ .

Research studies show that the phase of early adolescence is favorable for flexibility training. Frolov and Frolov (2009) grounding the results of longitudinal research, performed from 1985, of 1–11 grades pupils physical fitness, state, that in fifth grade pupils' flexibility indices increases significantly. Винокурова and Сахарова (2007) agree with these propositions and emphasize that training pupils flexibility in 5–6'th grades the significant positive changes can be reached. Бабабаши (2007) indicates that the age of 11–12 years is especially beneficial for training girls flexibility.

Investigating young adolescents flexibility was established, that group E results during two years of quasi - experiment increased significantly ( $p < 0.01$ ): the difference of girls flexibility indices between I and III were 4.6 cm,  $p < 0.01$ , boys' – 4.0 cm,  $p < 0.01$ . The flexibility indices of group C of both sexes at the end of the research were worse than at the beginning. The assumption, that the flexibility in control group was not trained enough, can be done.

The research performed after four years revealed, that flexibility results of group A young adolescents were worse, though group B were better than in 2009. However the indices of group A pupils remain higher than group B, though group A and B girls flexibility results differed significantly,  $p < 0.05$ .

Valuing the physical fitness the component of muscle strength and endurance is very important. The muscle strength and endurance in our research was valued by tests *Sit-ups* and *Flexed arm hang*. The indicators of test *Sit-ups* reflect abdominal muscle strength and endurance. The scientists point, that abdominal muscle strength and endurance indices increase in early adolescence, but there is no united opinion about the sensitive periods. Malina, Bouchard, and Bar-Oras (2004) denote that girls natural growth of abdominal muscle strength and endurance gradually increases till age of 14 and then stabilizes, boys – gradually increases from 6 to 13 years, and later the sudden spurt displays. By the data of Матџцин (2002), the indices of test *Sit-ups* especially grow up at age of 11 and 13 for girls and at 13 for boys. However, Yagüe and De La Fuente (1988) accent, that the jump of abdominal muscle strength and endurance indices happens earlier than height spurt, i.e. for girls till 11–12 years, for boys till 13–15 years old. Our research results basically coincide with the received data of Гаврилов, Малинин, and Савенко (2007), Blauzdys and Bagdonienė (2007) and confirm the proposition that this period is favorable for training abdominal muscle strength and endurance: the indices of abdominal muscle strength and endurance of experimental group young adolescents improved similarly the first and second year, and during two academic years the changes of group E girls and boys test *Sit-ups* indices were significant ( $p < 0.01$ ). Noteworthy, that the indices of experimental group abdominal muscle strength and endurance were significantly ( $p < 0.05$ ) better than young adolescents from control group.

The results of group A abdominal muscle strength and endurance in 2013 were worse than sixth graders at quasi - experiment four years ago. The indices of group B remained similar. Comparing groups A and B results, it was determined that the indicators of group A both sexes abdominal muscle strength and endurance were better than group B pupils,  $p > 0.05$ .

Only one test, i.e. *Flexed arm hang*, indices increased in E girls and boys groups during two years of quasy-experiment, however the significant differences did not show up. After four years the results of group A young adolescents upper body muscle strength and endurance were worse than pupils who participated in quasy-experiment. The indices of group C young adolescents were a little higher. Malina, Bouchard, and Bar-Oras (2004) affirm that upper body muscle strength and endurance at this age increases a little. These propositions are based by positive, but statistically not significant alternation of Lithuanian 5–6th grades pupils (Gruodytė-Račienė et al., 2017) and the same age test indices by Blauzdys and Bagdonienė (2007).

The explosive leg power was estimated using test „Standing long jump”. Malina et al. (2004) indicate that explosive leg power of both sexes till 14 years old gradually increases. Матџцин (2002) maintains that the biggest jump of this test indices occurs at the age of 7–9 and 14 years old for girls, 9–11 and 14 years

old for boys. Yagüe and De La Fuente (1998) using the data of longitudinal research draw a conclusion that the jump of explosive leg power indices coincides with height spurt. However the scientists' conclusions about the periods favorable for explosive leg power training are quite contradictory, though all the researchers indicate that it grows at this age.

The data of our research confirms the propositions of scientists, that explosive leg power index of 11–13 years old young adolescents increase. It was determined that in many cases, the significant ( $p < 0.05$ ) changes show up in the second research year and this endorsed the proposition of Yagüe and Fuente (1998), that explosive leg power indices jump coincides with height spurt. During the first experimental year, the explosive leg power indices of group's E girls (11–12 years old) increased averagely 5.8 cm, during the second year (12–13 years old) – 11.3 cm, boys – respectively 7.0 cm and 14.1 cm. The significant result alternation changes in control groups were not estimated, though group C boys standing long jump indices even got worse during the second research year.

Many scientific researchers also prove the positive explosive leg power alternation of young adolescents, only the quantitative expression is different in the particular researches. Vinokurova and Sacharova (Винокурова, Сахарова, 2007) fulfilled the pedagogical experiment and revealed that 5th and 6th grades pupils' indices of standing long jump mediated fractionally. Купцов, Шинкаренко, and Перфильева (2008) appointed that indices of standing long jump of 12–14 year old girls in experimental group increased 19.4%. In experiment done by Malacko and Pejčić (2009), where educational content basis was composed of various sport games, the indices of standing long jump of 11 years old boys in experimental group increased 10.2 cm, in control group – 7.5 cm in one academic year.

The research, implemented in 2013, revealed, that explosive leg power of groups A and B are similar, the results did not differ significantly,  $p > 0.05$ . Compared to 2009 year research results, it was determined that only group's B boys results increased, the indices of explosive leg power were worse in other groups.

The other component of physical fitness is the cardiorespiratory endurance, which according to NASPE (2005) is considered as the leading physiological indicator of good health and physical condition. Karoblis (2005) accents that if the aerobic abilities are not trained till pubescence, then later it is practically impossible to enlarge the indices of cardiorespiratory endurance till proper value. Gallahue and Ozmun (2006) indicate, that the age of 11–13 years is very conducive to train aerobic fitness. Considering the conclusions and guideline of scientists, the special regard in experimental programme was devoted for enlarging the aerobic fitness of young adolescents. Received research data validates the efficiency of used means: in experimental groups of both sexes

pupils' indices of cardiorespiratory endurance significantly ( $p < 0.001$ ) increased and were significantly ( $p < 0.05$ ) better than the control groups. The attention should be fixed on, that the cardiorespiratory endurance indices of group C girls and boys during two academic years decline. This point, that the training of cardiorespiratory endurance was not sufficient in control groups.

After four years the alternation tendencies of cardiorespiratory endurance were the same as the other physical qualities: young adolescents completed the distance of 1610 meters slower than in 2009. The results of test 1610 meters run/walk of group A girls and boys, who participate in NFPE in school, were significantly better ( $p < 0.05$ ) than the pupils of group B.

### **Strengths and Limitations**

NFPE curriculum is grounded not only in literature analysis, but also following 11-13 year old children's questionnaire surveys and interviews with teachers' data. After four years in the same educational institutions, working for the same pedagogues and the involvement of the same age pupils was implemented repeated research. According to the study results it can be assumed that other factors - the educational environment and the teacher's personality - had no significant impact on 11-13 year old children physical fitness changing.

The research has some limitations. First of all, the educational institutions, from which children participated in the quasi-experiment, were selected not in random order, but in criterion order. Besides, only small part of pupils participated in NFPE in school, therefore the sample size in groups E, C and B were little. Despite all these limitations, our research revealed, that qualitative characteristic of non-formal physical education curriculum is very important factor for increasing 11-13 year old children's physical fitness.

### **Conclusion**

Results suggest that the individualized, diverse, 11-13 years old children hobbies, needs, abilities, physical and functional powers answering non-formal curriculum, which expands knowledge and develops new skills and when various child-activating teaching methods and forms are used, positively influence their health related physical fitness.

#### **Conflicts of interests**

The authors declare that they have no competing interests.

#### **Funding**

The study was partially supported by the Research Council of Lithuania.



## Acknowledgement

We are thankful for administration of comprehensive schools, where the researches were performed, and for non-formal education pedagogues for constituted conditions to fulfil the research. We are thankful for all the pupils, who took part in this research.

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## RELIABILITY OF THE DAID SMART SHIRT FOR SHOULDER GIRDLE MOTION ASSESSMENT IN HIGH STRING PLAYERS

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**Abstract.** Smart garment system is efficient for upper body movement monitoring during simple tasks. There is a lack of literature on smart textile garments being reliable for shoulder girdle motion assessment in advanced motor tasks such as high string performance. The aim of the article was to examine the reliability of the DAid Smart Shirt for Shoulder Girdle Motion Assessment during advanced motor tasks such as high string performance. Methods: 14 volunteer violinists aged 18.6 (SD 2.1) with a body mass index 20.05 (SD 2.3) were recruited. The violinists performed a legato bowing task. The DAid smart shirt worked as the assessment tool: a compression garment with textile strain sensors sewn onto it. Cronbach alpha coefficient, Interclass Correlation Coefficient were calculated to assess the within-session test-retest reliability. Results: An excellent and good result test-retest reliability was assessed in 57% of the violinists, for other 43%, the ICC and Cronbach alpha coefficient was less than 0.59. Conclusion: the DAid Smart shirt is reliable for shoulder girdle motion assessment during high string performance. The smart textile garment should be customized and suitable for the body in order to assess shoulder girdle motion during high level or advanced activities such as high string performance.

**Keywords:** high string performance, shoulder motion monitoring, smart Garments.

### Introduction

Musculoskeletal complaints are a frequent, serious and potentially career threatening problem among professional musicians (Kok, Huisstede, Voorn, Schoones, & Nelissen, 2015). The majority of professional musicians suffer from

musculoskeletal complaints affecting their ability to play their instrument (Kok et al., 2015, Kok, Schrijvers, Fiocco, van Royen, & Harlaar, 2018).

Playing high strings like the violin or viola requires an asymmetrical posture and repetitive movements. These two facts are most likely the key contributing factors to PRMD (Performance-related musculoskeletal disorders) in high string players (Horvath, 2010; Blanco-Pinheiro, Di'az-Pereira, Marti'nez, 2015; Schemmann, Rensing, & Zalpour, 2018). In a recent systematic review, the year-prevalence of musculoskeletal complaints in professional musicians ranged between 41% and 93% (Kok et al., 2015).

String musicians have musculoskeletal disorders in 79.6% of the cases and the most frequently affected body parts are shoulders, especially the right side (59.6%) (Abreu-Ramos & Micheo, 2007). In reaction to shoulder pain or in order to unload painful structures, there is a tendency to develop altered movement patterns; this could be observable as shoulder girdle compensatory movements: elevation, upward rotation (Wang et al., 2017). In case of shoulder pain, altered muscle activity is observed, including delayed activation of affected muscles, redistribution of the muscle activity within a muscle as well as redistribution to the synergistic muscles (McCrary, Halaki, & Ackermann, 2016). Correction and assessment of an altered movement pattern is essential in the rehabilitation of shoulder pain (Wang et al., 2017).

A smart garment system is efficient for the upper body movement assessment during simple tasks (Wang, Markopoulos, Chen, & Timmermans, 2017) and the designed DAid Smart shirt can be an objective and convenient device for shoulder motion capture and monitoring during advanced motor tasks such as shoulder motor control exercises and ballet training sessions (Semjonova, Vetra, Oks, & Katashev, 2018). There is lack of sufficient literature on smart textile garments being reliable for shoulder girdle motion assessment in advanced motor tasks such as high string performance.

This study aims to examine the reliability of the DAid Smart Shirt for shoulder girdle motion assessment during advanced motor tasks such as high string performance.

## **Methodology**

The study was designed as an observational experimental study in which all participants were tested by the same observer. Prior to participation, all participants were fully informed about the complete intervention task.

Participants were recruited on a voluntary basis through a researcher from Rehabilitation faculty, Riga Stradins University, Riga, Latvia, and by contacting the director of the Emils Darzins Music School. There were 14 volunteer violinists recruited, the average age 18.6 (SD 2.1) with 3.6 hours as the self-reported playing

hours per day on average (SD 0.7). The violin size was 4/4 (n=12), 7/8 (n=2). The average Body Mass Index indicated was 20.05 (SD 3.2). The body mass index (BMI) was calculated from self-reported weight (kg) and height (m) according to the guidelines of the WHO (World Health Organization) Regional office for Europe (<https://www.who.int/>).

Instrumentation: the DAid Smart shirt was used to assess shoulder girdle motion in the participants during the research task. This smart garment was developed in collaboration between Riga Technical University and Riga Stradins University and with the purpose of posture assessment (Semjonova et al., 2018). The DAid Smart shirt represents a tight shirt with four embedded highly sensitive knitted strain sensors (Oks, Katashev, & Litvak, 2014). Sensor reactions are transferred via sewn electro-conductive lines to an electronic device acquiring data, and then sent via Bluetooth to a computer or tablet. A specific sensor placement provides independence of the sensor reactions to the patient's shoulder elevation-depression movements. ADC 1 – left side shoulder elevation; ADC 2 – right side shoulder elevation; ADC 3 – right side shoulder protraction; ADC 4 – left side shoulder protraction (Fig. 1).



*Figure 1 DAid Smart shirt with named sensors*

The intervention task given to participants was a legato bowing task. The metronome was set to 100 bpm and each bowing covered 4 beats. The subject kept playing until at least 10 complete bowings were acquired. Three repeated intervention measures (Ancillao, Savastano, Galli, & Albertini, 2017) with the DAid Smart Shirt were performed (Fig. 2.).



*Figure 2 Participant with DAid smart shirt during intervention*

Methods for statistical data analysis: descriptive statistical analysis was carried out to describe the study population. To assess the within session test-retest reliability for repeated measure units (mV) during the task, the Cronbach  $\alpha$  coefficient, Interclass Correlation Coefficient (ICC) in SPSS Statistics 22.0 (IBM Corporation, New York, USA) were calculated. Variables were the values of the DAid Smart Shirt in millivolts (mV).

Ethical Statements: participants provided informed consent in a written form for inclusion prior to their participation in the study. The study was conducted in accordance with the Declaration of Helsinki, and the study protocol was approved by the Ethics Committee of Riga Stradins University (183/26.01.2017).

## **Results**

One DAid Smart Shirt was used for all participants, it was not customized and tailored for each individual body. Participants were divided into groups according to their body mass index (BMI) with a small difference ( $SD < 0,5$ ): the BMI of the participants in the 1<sup>st</sup> group ( $n=4$ ) was 19.3 ( $SD 0,2$ ) – normal weight; the BMI of the participants in the 2<sup>nd</sup> group ( $n=4$ ) was 20.9 ( $SD 0,5$ ) – normal weight. For both of these groups, the DAid smart shirt was size fitting. The BMI of the participants in the 3<sup>rd</sup> group ( $n=3$ ) was 23.8 ( $SD 0,5$ ) – normal weight, but the DAid smart shirt was overstretched. The BMI of the participants in the 4<sup>th</sup> group ( $n=3$ ) was 17.4 ( $SD 0,5$ ) – underweight, the DAid smart shirt was too large for their body size.

Only the data from the ACD2 sensor – right shoulder elevation – were analysed. The ACD1 sensor data were not suitable for analysis; there were interaction artefacts between the left shoulder, the sensor and the violin.

After three repeated measures, the results of the first group where the DAid smart shirt was size fitting show excellent values of the ICC and Cronbach’s  $\alpha$  coefficient. ICC values: 0.80 (95%CI 0.78-0.81) – 0.89 (95%CI 0.88-0.90) ( $p < 0.0001$ ). Cronbach’s  $\alpha$  coefficient values: 0.80 – 0.89. The data from the ACD 2 sensor – right shoulder elevation – show the lowest and the highest repeated measure values (mV) during intervention as similar (Fig. 3, Fig. 4, Fig. 5).

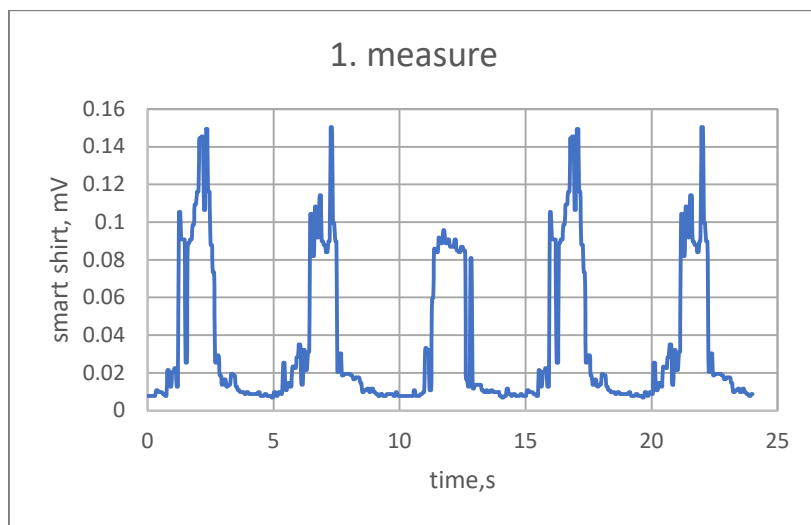


Figure 3 ACD 2 sensor 1<sup>st</sup> measure data

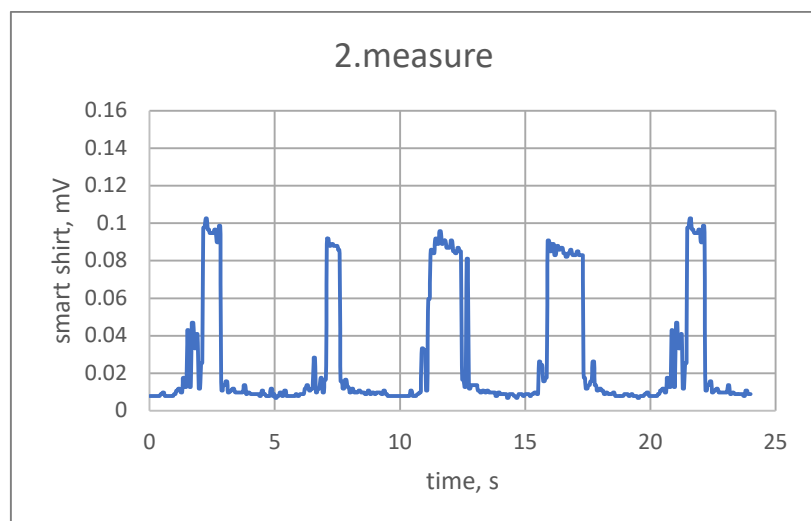


Figure 4 ACD 2 sensor 2<sup>nd</sup> measure data



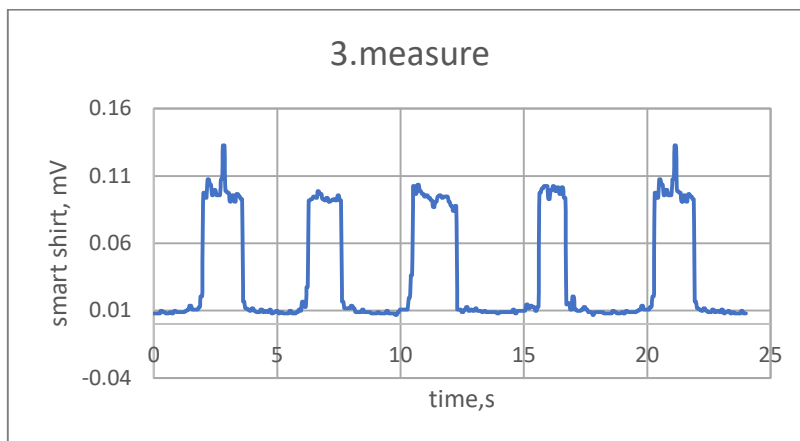


Figure 5 ACD 2 sensor 3<sup>rd</sup> measure data

The results of the second group show good ICC and Cronbach's  $\alpha$  coefficient values. ICC values: 0.61 (95%CI 0.58-0.63) – 0.70 (95%CI 0.68-0.72) ( $p < 0.0001$ ). Cronbach's  $\alpha$  coefficient values: 0.61 – 0.70.

The results of the third group show fair ICC and Cronbach's  $\alpha$  coefficient values. ICC values: 0.41 (95%CI 0.37-0.45) – 0.57 (95%CI 0.54-0.60) ( $p < 0.0001$ ). Cronbach's  $\alpha$  coefficient values: 0.41 – 0.57.

The measuring results of the fourth group show poor ICC and Cronbach's  $\alpha$  coefficient values. ICC values: 0.17 (95%CI 0.16-0.95) – 0.39 (95%CI 0.35-0.43) ( $p < 0.0001$ ). Cronbach's  $\alpha$  coefficient values: 0.17 – 0.39. Within this group, the DAid smart shirt measure values were unpredictable (Fig. 6).

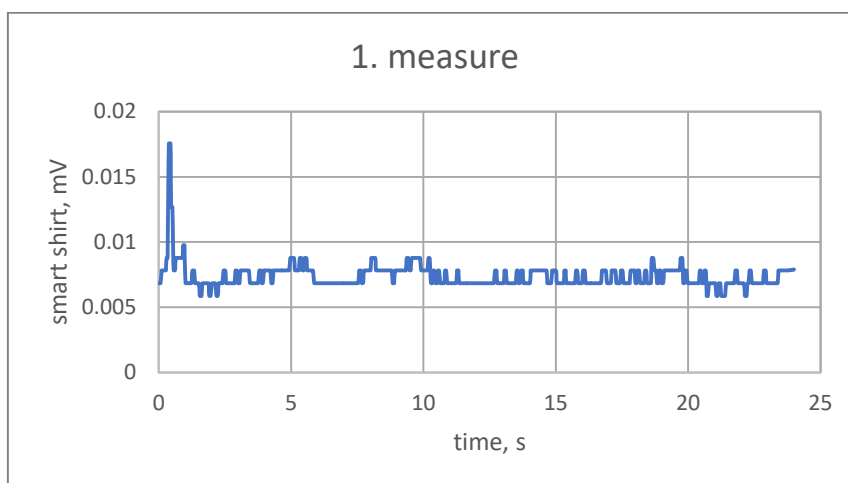


Figure 6 ACD 2 sensor measure within 4<sup>th</sup> group

## **Discussion**

This study was performed to examine the reliability of the DAid Smart Shirt for shoulder girdle motion assessment during advanced motor tasks such as high string performance. The present study revealed that the DAid Smart Shirt should be customized and suitable for individual body types. If the smart shirt is size fitted, then test-retest reliability after three repeated measures shows excellent ICC and Cronbach's  $\alpha$  coefficient values for the right-side shoulder. Another aspect that was also highlighted in the systematic review by Wang et al is that the sensor should be placed in the right location on the body for high accuracy and reliability (Wang et al., 2017).

Playing high strings is a physically highly demanding task (Ancillao et al., 2017), especially for the upper part of the body (Horvath, 2010). For example, in the sports industry when training during advanced motor tasks the load quantification, assessment and evaluation of physical, physiological and technical conditions in real time is of paramount importance for the development of the athlete and the prevention of injuries (Mendes et al., 2016). The recent study and development of rehabilitation technologies creates new possibilities for therapists and patients to support the process of learning a musical instrument or the rehabilitation process after injuries.

Future studies are needed to improve the evaluation of left shoulder movement with sensors in high string performance. The sensor should be able to interact only with the body under the sensor, not with the musical instrument. Also, it would be necessary to evaluate these wearable devices over an extended period of time, in rehabilitation settings in case of a shoulder pain patient, during advanced motor tasks and within therapy sessions.

Several limitations apply to this study. First, the DAid smart shirt was only a one-sized compression garment with sewn textile strain sensors. Second, a small number of participants were involved. Third, the DAid Smart Shirt was not suitable for left shoulder movement assessment, since there was an interaction between the shoulder, the smart shirt and the violin.

## **Conclusion**

The present study shows that the DAid Smart shirt is reliable for the motion assessment of the right-side shoulder girdle during high string performance.

The smart textile garment should be customized and suited for the body type in order to assess the motion of the right-side shoulder girdle during high level or advanced activities such as high string performance.

## Acknowledgement

This research is co-financed by the ESF within the project «Synthesis of textile surface coating modified in nano-level and energetically independent measurement system integration in smart clothing with functions of medical monitoring», Project implementation agreement No. 1.1.1.1. /16/A/020.

**Conflicts of Interest:** The authors declare no conflict of interest.

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## SELF-ASSESSMENT OF COMMUNICATION SKILLS OF HEALTHCARE PROFESSIONALS: A QUANTITATIVE STUDY

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**Abstract.** *Communication and social skills are becoming increasingly valuable in the 21st century. Despite increasing awareness of the importance of communication skills in modern healthcare practice, there is a lack of research that addresses this issue. The aim of this research is to assess the communication skills of healthcare professionals working in Lithuanian healthcare institutions. Respondents (n=1154) were asked to assess their own communication skills using the Interpersonal Communication Skills Inventory. The research revealed that sending clear message skills were the strongest and giving/getting feedback skills were the lowest for most of the respondents, including physicians, head nurses, nurse, nurse assistants, and other personnel. The strongest aspects were that respondents can talk to other people and others seemed to be interested and attentive when healthcare specialists were talking because in conversation they were trying to talk about things of interest to both them and the other persons. The respondents could recognize as well how others were reacting to what they were saying. However, they did not always care how other person feels about the point they try to make. Emotional interaction skills were the lowest for most of the respondents in this study. They saw a tendency to change the subject when other person's feelings enter into the discussion and it was difficult for them to think when they were angry with someone. It was summarized that talking, listening, and emotional interaction skills of the respondents are the areas that need more consistent attention, and giving / getting feedback is the skill that needs much improvement.*

**Keywords:** *communication skills, communication skills self-assessment, healthcare, social skills.*

## **Introduction**

Complex communication and social skills are becoming increasingly valuable in the 21st century (Koenig, 2011). It is argued that advantages of effective communication cannot be emphasized enough (Choudhary & Gupta, 2015) and it must be noted that excellent communication is the expectation of the patients (Hobgood, Riviello, Jouriles, & Hamilton, 2002).

Communication is a two way process which has both verbal as well as nonverbal components. Concentrating more on the verbal content and ignoring the nonverbal means can make communication less effective. A seemingly straightforward communication may become quite challenging due to the complexity of the whole processes involved. This happens because the interaction between a health care professional and a patient are influenced by the feelings (emotions) and thoughts by both the parties which are at different levels surrounded by the social context and the environment where the communication takes place. On the other hand, good communication can improve patient outcome, patient and physician satisfaction (Rajashree, 2011).

Extensive research has shown that no matter how knowledgeable the healthcare professional might be if he/she is not able to open good communication channels with the patient, he/she may be of no help to the latter. Despite this known fact, effective communication with the patient has been found to be sadly lacking (Asnani, 2009).

The situation of communication in contemporary healthcare in Lithuania is still *terra incognita*. The aim of this research is to reveal the level of communication skills of Lithuanian healthcare professionals, indicate the strengths and areas of the communication skills that need improvement.

## **Literature review**

Many researchers argue the importance for healthcare professionals to be able to clearly express themselves, use language the patient can understand, and listen to their patients (Cote & Leclere, 2000).

The research of the communication of the healthcare professionals revealed the factors of communication, those are interpersonal skills, exchange of information, honesty in the relationship, and professionalism (Pereira & Puggina, 2017). These skills include being able to solve complex problems, to think critically about tasks, to effectively communicate with people from a variety of different cultures and using a variety of different techniques, to work in collaboration with others, to adapt to rapidly changing environments and conditions for performing tasks, to effectively manage one's work, and to acquire

new skills and information on one's own (Koenig, 2011; Lum, Dowedoff, & Englander, 2016). Communication skills are not just verbal but encompass the spectrum of nonverbal communications including body language and written communication (Hobgood et al., 2002).

Good communication skills give the possibility to demonstrate the ability to respectfully, effectively, and efficiently develop a relationship with patients and their families, to demonstrate respect for diversity and cultural, ethnic, spiritual, emotional, and age-specific differences in patients and other members of the health care team, to demonstrate effective listening skills and to be able to elicit and provide information using verbal, nonverbal, written, and technological skills, to demonstrate ability to develop flexible communication strategies and be able to adjust them based on the clinical situation, to demonstrate effective participation in and leadership of the health care team, to demonstrate ability to elicit patient's motivation for seeking health care, to demonstrate ability to negotiate as well as resolve conflicts, to demonstrate ability to effectively use the feedback provided by others, etc. (Hobgood et al., 2002).

Interpersonal relationship between professionals and patients uses communication as a basic element, in order to allow the patients to understand their problems and treatment plan (Silva, 2015). The professional that demonstrates communication skills may handle the situations of dealing with patients more effectively (Pereira & Puggina, 2017). George, Rahmatinick, and Ramos (2018) found the evidence that patient-centered communication develops a holistic relationship with the patients.

The good communication skills of healthcare professionals have also been shown to relate to better patient enablement (Pawlikowska, Walker, Nowak, & Szumilo-Grzesik, 2010) and contribute to establishing trust with the patient, the family, and other members of the healthcare team (Hobgood et al., 2002). It has been revealed that patients' satisfaction is directly related to the amount of information provided to them. Patients want information and are more satisfied when they receive it. McGuire et al. found that 63–90% of physicians made no attempt to discover the patient's views and expectations, encourage questions, check understanding, categorize information, or negotiate a treatment plan (McGuire, Fairbairn, & Fletcher, 1986). Effective communication skills also increase patient satisfaction and are associated with improvement in patient compliance, health status, and symptom resolution with a positive influence on patient recall, understanding, better patient adherence, and fewer malpractice suits (Oh, Segal, Gordon, Boal, & Jotkowitz, 2001; Laidlaw, Kaufman, Macleod, Sargeant, & Langille, 2001; Alotaibi, 2018). However, the findings by Wittenberg et al. (2016) demonstrate that lack of preparation to function as a team is a barrier for nurses in communicating about goals of care. Park (2017) implied that healthcare professionals need to make sure that their communication skills are

effective when they communicate with patients, and education programs for healthcare professionals to develop the advanced communication skills would be necessary.

This review indicates that communication competencies are of exceptional importance for effective healthcare, but there are still gaps in communication knowledge and practice.

## **Methodology**

A questionnaire-based survey was carried out with the authorization of Klaipeda University Research Ethics Committee (permission No. 46-SL-1).

Interpersonal Communication Skills Inventory (Learning Dynamics, 2002) was used for self-assessment of communication skills. This Interpersonal Communication Skills Inventory was designed to provide individuals with some insights into their communication strengths and potential areas for development. By answering each question candidly, an individual receives a profile that displays their level of competence in four key communication areas: sending clear messages, listening, giving and getting feedback, and handling emotional interactions. The inventory consists of four scales. Each section contains 10 questions. By answering seldom, sometimes or usually, the participants can get from 0 to 3 points (using the Scoring key) and collect 30 points in each scale.

The interpretation of the results is suggested:

- Scores in the 1 > 15 range indicate areas of the communication skills that need improvement,
- Scores in the 16 > 21 range indicate areas of the communication skills that need more consistent attention, and
- Scores in the 22 > 30 range indicate areas of strength or potential strength.

Reliability analysis was run and the results were good, with Cronbach's Alpha coefficient ranging from .704 to .855 for all the scales.

The questionnaires were distributed among the professionals working in healthcare institutions (primary health centers, hospitals, medical sports centers, and rehabilitation centers) in Lithuania. The data were collected in October - December 2018. 1154 questionnaires were completed by medical doctors, nurses, head nurses, assistants of the nurses, other personnel.

Data from the questionnaire were analyzed using the SPSS version 23.0. Based on the descriptive analyses and Kruskal-Wallis test the following results were found.



## Research results

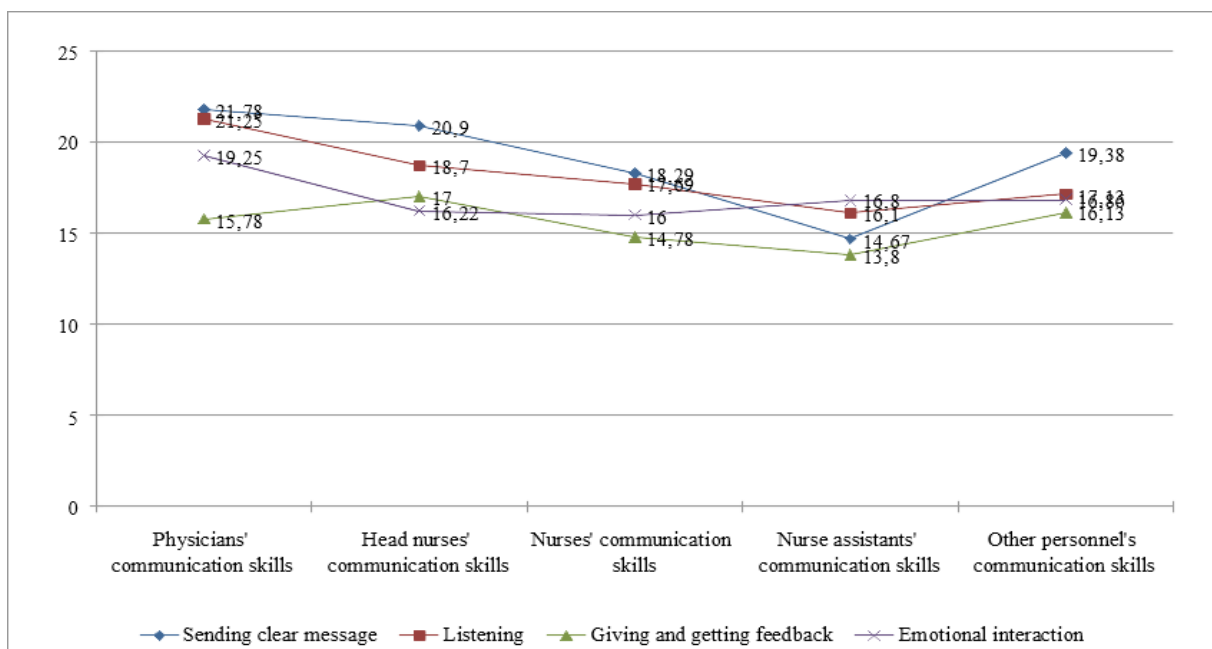
According to the methodology of Interpersonal Communication Skills Inventory, participants could collect 30 points in each scale. The results are shown in Table 1. According to the suggested interpretation it can be summarized that talking, listening, and emotional interaction skills of the respondents are the areas that need more consistent attention and giving/getting feedback is the skill that needs improvement. None areas of strength or potential strength were indicated.

*Table 1 Self-assessment of interpersonal communication skills*

Communication skills	Mean	Min	Max	SD
Sending clear message	18.59	9	27	4.47
Listening	17.82	7	28	4.39
Giving and getting feedback	15.01	7	26	3.91
Emotional interaction	16.36	5	30	5.11

*n=1154*

When comparing the distribution of responses from different professionals, a statistically significant difference was found in the assessment of sending clear message skills ( $p=0.015$ ). However, there was no statistically significant difference in the competencies of medical professionals from different specializations (Figure 1).



*Figure 1 Self-assessment of interpersonal communication skills (means)*

### **Communication skills of different professionals:**

- **Physicians.** Sending clear message skills were the strongest and giving/getting feedback skills were the lowest.

The strongest aspects of sending clear message skills were that physicians were that physicians can talk to other people quite easily and they think that their words usually come out the way they expect (2.66), while others seemed to be interested and attentive when physicians were talking (2.55), and medical doctors can recognize how others are reacting to what they were saying (3.00), because in conversation they were trying to talk about things of interest to both them and the other persons (3.00). However, they did not always care how other person feels about the point they try to make (0.11) and did not try to foster a discussion (1.66).

Analysis of the listening skills revealed that physicians did not avoid asking questions when they did not understand what was said (2.55) and in conversation they let the other person finish talking before reacting to what was said (3.00). However, respondents agreed that in conversation they found themselves paying most attention to facts and details, and frequently missing the emotional tone of the speaker's voice (0.87).

Giving and getting feedback skills were the lowest for this group of respondents. The results showed that physicians find it difficult to disagree with others because they were afraid that others could get angry (0.77). That associates with another aspect that others seemed to get defensive with the way physicians demonstrated disagreement with their point of view (0.88).

The strongest aspects of emotional interaction skills were that physicians can apologize someone whose they may hurt (2.77) and they can admit that they were wrong. However, physicians found it difficult to continue the conversation when someone becomes upset (0.77).

- **Head nurses.** It was revealed that sending clear message skills were the strongest and emotional interaction skills were the lowest for head nurses.

The strongest aspects of sending clear message skills were explaining the things clearly and others seemed to be interested and attentive when head nurses were talking (2.6). Head nurses could recognize how others are reacting to what they were saying (2.80) and in conversation they were trying to talk about things of interest to both them and the other persons (3.00). However, they did not always care how other person feels about the point they try to make (0.10).

The strongest aspects of listening skills were that head nurses were trying to let others talk, tried avoiding interrupting and finishing the sentences for another person (2.60), and let other person finish talking before reacting to what was said (2.33). However, respondents agreed that in conversation they found themselves paying most attention to facts and details, and frequently missing the emotional tone of the speaker's voice (0.70)

Head nurses do not find it difficult to compliment or praise others (2.60) and they can talk about how they feel (2.60). However, respondents agreed that it became uneasy when someone paid them a compliment (0.70).

Emotional interaction skills were the lowest for head nurses. They saw a tendency to change the subject when other person's feelings enter into the discussion (0.60) and it was difficult for them to think when they were angry with someone (0.80). Nevertheless, head nurses were satisfied with the way they handled differences with others (2.6).

- **Nurses.** Sending clear message skills were the strongest and giving/getting feedback was the lowest for nurses.

The strongest aspects of sending clear message skills are that nurses can talk to other people quite interesting and others seemed to be interested and attentive when nurses were talking (2.36), in conversation they were trying to talk about things of interest to both them and the other persons (2.71), and can recognize how others are reacting to what they were saying (2.48). However, they did not always care how other person feels about the point they try to make (0.30).

When in the listener's role, nurses did not tend to finish sentences or supply words for the other person (2.41) and let another person finish talking before reacting to what was said (2.46).

The strong aspect of giving and getting feedback skills is the ease to compliment or praise others (2.16).

However, emotional interaction skills were low for nurses. They saw a tendency to change the subject when other person's feelings enter into the discussion (0.77), it was difficult for them to think clearly when they were angry with someone (0.97), and nurses found it difficult to continue the conversation when someone becomes upset (0.92).

- **Nurse assistants.** The skills of emotional interaction were the strongest and giving/getting feedback was the lowest for nurse assistants.

When in the listener's role, nurse assistants did not tend to finish sentences or supply words for the other person (2.00) and let another person finish talking before reacting to what was said (2.00).

Nurse assistances agreed that it was not difficult to accept constructive criticism from another person (2.00), but it was difficult to talk with someone who hurt the feelings (0.90).

Emotional interaction skills were the strongest for nurse assistants. They responded that they did not get upset when someone disagrees with them (2.20), they could discuss the problem without getting angry (2.00), apologize to someone whose feelings may be hurt (2.20), could admit when they were wrong (2.10), and overall feel satisfied with the way they handle differences with others (2.20). Even then respondents saw a tendency to change the subject when other

person's feelings enter into the discussion (0.70) and it was difficult for them to think when they were angry with someone (0.90).

- **Other personnel.** Sending clear message skills were the strongest and giving/getting feedback was the lowest for the other personnel.

The strongest aspects of sending clear message skills are that other personnel can easily talk to other people and in conversation they try to talk about things of interest to both them and the other person (3.00). Others seemed to be interested and attentive when the respondents were talking (2.5), and participants of the study could recognize how others were reacting to what they were saying (2.5). However, they do not always care how other person feels about the point they try to make and do not try to foster a discussion (0.12).

When in the listener's role, other personnel did not tend to finish sentences or supply words for the other person (2.50).

Giving and getting feedback skills were the lowest for the other personnel. Though it was easy to compliment others (2.75), but others remarked that respondents always seemed to think they were right (0.62).

Analysis of emotional interaction skills showed a tendency to change the subject when other person's feelings enter into the discussion (0.62) and difficulty to think clearly when angry with someone (0.62).

## **Discussion and conclusions**

Summarizing the study, it can be emphasized that many of the authors notice the importance of communication competencies for effective healthcare. The aim of this research was to reveal the level of communication skills of Lithuanian healthcare professionals, indicate the strengths and areas of the communication skills that need improvement.

The research revealed that sending clear message skills were the strongest and giving/getting feedback skills were the lowest for most of the respondents, including physicians, head nurses, nurse, nurse assistants, and other personnel. The strongest aspects were that respondents can talk to other people and others seemed to be interested and attentive when healthcare specialists were talking because in conversation they were trying to talk about things of interest to both them and the other persons. The respondents could recognize as well how others were reacting to what they were saying. However, they did not always care how other person feels about the point they try to make. The study by Fong Ha and Longnecker suggests that many doctors tend to overestimate their ability in communication and not always care about the feelings of the others (2010).

Emotional interaction skills were the lowest for most of the respondents in this study. They saw a tendency to change the subject when other person's feelings enter into the discussion and it was difficult for them to think when they

were angry with someone. However, it is argued that good doctor-patient communication has the potential to help regulate patients' emotions (Arora, 2003).

It should be noted that senior officials, i.e. physicians and head nurses agreed that in conversation they found themselves paying most attention to facts and details, and frequently missing the emotional tone of the speaker's voice.

It can be summarized that talking, listening, and emotional interaction skills of the respondents are the areas that need more consistent attention and giving/getting feedback is the skill that needs much improvement.

The results of the research support the insights of the previous research and show that health care professionals are not born with excellent communication skills, as they have different innate talents. Instead they can understand the theory of good doctor-patient communication, learn and practice these skills, and be capable of modifying their communication style if there is sufficient motivation and incentive for self-awareness, self-monitoring, and training (Fong Ha, & Longnecker, 2010; Lee, Back, Block, & Stewart, 2002; Roter, Hall, & Aoki, 2002). Revealing the gaps in communication skills of the healthcare professionals suggests the objectives for the development of effective communication.

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## MUSIC THERAPY FOR STROKE PATIENTS: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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**Abstract.** *There are numerous trials, showing positive results for using the music therapy for stroke patient rehabilitation. Therefore, summarizing the data from these trials is an actual topic. The objective, of this research, was to summarize the data from trials about the use of music therapy methods and techniques, especially the rhythmic auditory stimulation, for improving of the motor functions for stroke patients, by creating a systematic review of randomized controlled trials, with meta-analysis. The trials were searched in MEDLINE, Cochrane Trial Register and EBSO databases. The trial quality was evaluated by the PEDro scale. 20 randomized controlled trials were included in the systematic review. The meta-analysis for 5 gait outcomes, including gait speed, steps per minute, step length, gait symmetry, Time up and go test, and 7 arm function outcomes, including Fugl-Meyer test, ARAT test, Box and blocks test, Wolf motor function test, Nine hole peg test, shoulder flexion, elbow extension, was conducted. According to the results of the meta-analysis, gait exercises, combined with rhythmic auditory stimulation, provide statistically significant improvement, compared with gait exercises alone. Concerning the use of rhythmic auditory stimulation and other music therapy interventions for arm function rehabilitation, a statistically significant improvement was not detected.*

**Keywords:** *hemiparesis, music therapy, rehabilitation, rhythmic auditory stimulation, stroke.*

### Introduction

According to data from the World Health Organization, each year there are 15 million people who are diagnosed with stroke (World Health Organization, 2018). According to U.S. statistics, 45% of stroke patients after being discharged from hospital return home, 24% go to rehabilitation facilities, while 31% go to social-care institutions (American Heart Association, 2015). Such statistics show the importance of rehabilitation in the treatment of stroke patients. Recovering motor functions, after suffering a stroke, is one of the most important rehabilitation tasks. Increasing number of studies indicate that the music therapy

contributes to the recovery of arm and leg motor functions for stroke patients. However, not all of these studies are considered to be methodologically qualitative, and not all methodologically high-quality studies are compiled in systematic reviews.

Aim of this study was to develop a systematic review with meta-analysis including trials assessing effectiveness of music therapy in alleviating the stroke patient motion disorders. Whereas tasks of the study were to select randomized controlled trials; to evaluate the methodological quality of the trials; to create a systematic review of trials with meta-analysis, comparing the effectiveness of music therapy and standard therapy in reducing stroke effects. The methodological quality and relevance of the trials for inclusion in the systematic review was determined using the PEDro trial quality scale. Randomized controlled trials, with parallel groups, or crossover trials, with sufficient methodological quality, without a restriction on the language of the publication, if the trial had an abstract in English and the trial was published by October 18, 2018, were considered as eligible for inclusion in the systematic review.

The systematic review includes studies about stroke patients with hemiparesis, without age and sex restrictions. The site of brain damage, or time after stroke, were not used as criteria for inclusion.

The systematic review includes trials in which music therapy or music therapy in combination with standard therapy is compared with standard therapy. Intervention could be one of the following music therapy interventions:

- playing a music instrument, under the supervision of a therapist, with an aim to improve fine and gross motor skills;
- gait exercises with rhythmic auditory stimulation;
- arm exercises with rhythmic auditory stimulation.

### **Literature review**

There are several studies that have been carried out to assess the usage of sensor-motor systems (Bradt, Magee, Dileo, Wheeler, & McGilloway, 2010) in a motor function rehabilitation programmes. One of these models - rhythmic auditory stimulation (RAS) for motor function training for stroke patients, has shown significant improvements (Thaut et al., 2007; Schauer & Mauritz, 2003). In this model, rhythm acts as a sensor incentive to induce stability and encourage the organisation of motor control in the nervous system. During the gait exercises, with RAS (using metronome symmetric pulse patterns and incorporating them into music), with certain cycle frequencies, gait improvement (steps per minute, gait symmetry, balance) was observed. The benefits were significantly larger,



compared to other physiotherapy approaches, used in rehabilitation, such as the Bobata approach (Thaut et al., 2007; Schauer & Mauritz, 2003).

Unlike gait patterns, which, are biologically rhythmic and are considered to be controlled by psychological model generators (Whitall et al., 2011), most arm movement functions are performed according to human will and are biologically unrhythmic. To acquire arm and hand function skills, for example, in sports or music, rhythmic stimuli are successfully used to promote the development of motor skills. As well, approaches to motor rehabilitation in neurology, highlighting the need for re-training, have shown good results and are confirmed by neuropsychological studies regarding the long-term potential (Whitall et al., 2011). The usage of rhythmic stimuli is based on direct coordination of motor responses to sensory irritation. The inclusion of periodicity implies that the brain, in addition to making movement during the stimulus phase, also synchronises the duration of the movement with the incentive interval through a period of adaptation, such as the rhythm interval and duration. Rhythm is a potent neurological stimulus, that humans can automatically associate with certain physical movements. The rhythm provides a clear form, with stable time information, that allows the brain to plan and evaluate paretic arm movement and position changes throughout the entire cycle of motion, which in turn provides sense of time and space for movement (Thaut, Kenyon, Hurt, McIntosh, & Hoemberg, 2002). For example, patients with limited volume of joint movement, who have been practicing certain physical rehabilitation exercises at a certain rhythm, often associate rhythm with muscle memory, resulting in a significant increase in patients' ability to perform movement exercises (Thaut et al., 2002; Paul & Ramsey, 1998). Rhythmic auditory stimulation can be used to stimulate hand grip force, fine motor skills, finger agility and hand coordination (Friedman et al., 2014).

## **Methodology**

The trials included in this study were derived from the MEDLINE, Cochrane Trial Register, EBSO (Academic Search Complete and Health Source – Nursing Academic Edition) electronic databases. In addition, the reference lists of the trials, found in the databases, were also checked. The terms music therapy, rhythmic auditory stimulation, rhythmic cueing, auditory cueing, rehabilitation, stroke, cerebral infarction, and their combinations, were used as search keywords. The publications were searched in English. Publications in other languages were evaluated, if an abstract in English was available. The last comprehensive search was conducted on October 18, 2018.

Number of publications found in databases = 449. Number of publications found in reference lists of the trials = 1. Number of publications, after excluding

duplicates = 217. Number of publications checked by abstracts = 217. Number of checked full text publications = 29. Number of included full text publications = 20.

The following outcomes were included in the systematic review and the meta-analyses:

- Gait outcomes (gait speed (GS), steps per minute (SPM), step length (SL), gait symmetry (GSM), Time up and go test (TUPGT));
- Arm function outcomes (Fugl-Meyer motor assessment of the arm (FMA), Action Research Arm Test (ARAT), Wolf Motor Function Test (WMFT), Box and Block Test (BBT), Nine Hole Peg Test (NHPT)).
- Amplitude of joint movements (shoulder flexion (SF), elbow flexion (EF)).

The trials were processed by recording the collected data in special forms, and Physiotherapy Evidence Database (PEDro) scale form (The George Institute for Global Health, 2014) was used to assess the methodological quality of the trial and, consequently, the risk of systematic error, as well as the adequacy of statistical data. An Excel table, with data processing formulas, was used to collect other data.

The following data were collected from the selected trials:

- General information: author; name; source (name, year, number, pages).
- Information on the methodological quality of the trial and the availability of statistical data (according to the PEDro scale): criteria and sources for the inclusion of participants; random allocation of participants to groups; blinding of participants, therapists and assessors; data on participant dropout; statistical comparison of groups and variability of primary outcomes.
- Information about trial participants: diagnosis; number of participants in the experimental/control group; age; sex; stroke type; stroke-affected side; time after stroke.
- information on intervention for the experimental and control group: method; intensity.

The evaluation of the quality of the studies, based on the PEDro scale, was carried out in parallel by two researchers, followed by comparison of results and resolving of differences. Studies included in the systematic review yielded an average of  $5.85 \pm 0.93$  points out of 10 possible. Given that the fifth and sixth criterion of the PEDro scale implies that the participants of the trial and therapists are not informed about allocation of the participants to the groups - a criterion that is difficult to provide, the average trial quality can be assessed as good.

### Research results

The systematic review includes 20 randomized controlled trials, 3 of which are crossover trials. The included trials investigate the use of rhythmic auditory stimulation (12 studies) and playing of music instruments (8 studies) to reduce motion disorders in stroke patients with hemiparesis. The total number of participants was 701, while the number of participants in one trial ranged from 11 to 92. The average age of participants was 61.2 years. 58.8% of participants were male, 41.2% female (approximate data, as 1 trial did not provide the data). The average time after stroke at the beginning of the trial was 23.8 months (approximate data, as in 1 trial the data were given approximately).

Table 1 contains the trial characteristics. Data about trial participants (number, average age, etc.) are provided first for the experimental group (EG), then, after comma, for the control group (CG). If it is a crossover trial, then the data are equal for both groups, and are provided once. If separate data are not available for EG and CG, the data are common for both groups and are provided once.

*Table 1 Trial Characteristics*

<b>Trial</b>	<b>Design</b>	<b>Participants</b>	<b>Interventions</b>	<b>Outcomes</b>
Bunketorp-Käll et al., 2017	RCT	D: hemiparesis; N: 40, 41; Age: 62.7±6.7, 63.7±6.7; Sex (M/F): 23/18, 22/19; Stroke type (I/H/U): 32/9/0, 28/13/0; Paretic side (L/R): 20/21, 18/23; TAS: 32.3±14.1, 36.53±14.63	Rhythm-and-music therapy, Standard therapy	TUGT
Cha, Kim, & Chung, 2014	RCCT	D: hemiparesis; N: 41; Age: 60.8±19.8; Sex (M/F): 24/17; Stroke type (I/H/U): 41/0/0; Paretic side (L/R): 22/19; TAS: 8.68±2.35	Gait test with RAS, Gait test without RAS	GS, SPM, SL
Chouhan & Kumar, 2012	RCT	D: hemiparesis; N: 15, 15; Age: 56.73±5.99, 57.33±5.51; Sex (M/F): 12/3, 12/3; Stroke type (I/H/U): 0/0/15, 0/0/15; Paretic side (L/R): no data; TAS: <3, <3	Gait and arm exercises with RAS, Gait and arm exercises without RAS	FMA
Delden et al., 2013	RCT	D: hemiparesis; N: 19,19; Age: 62.6±9.8, 56.9±12.7; Sex (M/F): 11/8, 16/3; Stroke type (I/H/U): no data; Paretic side (L/R): 11/8, 11/8; TAS: 1.8±1.1, 2.6±1.6	Modified bilateral arm training with rhythmic auditory cueing, Standard exercises	FMA, ARAT
Friedman et al., 2014	RCCT	D: hemiparesis; N: 12; Age: 57.0±30.5; Sex (M/F): 7/5; Stroke type (I/H/U): 41/0/0; Paretic side (L/R): 6/4/2; TAS: 34.6±32.5	Exercises with MusicGlove, Standard exercises	FMA, ARAT, BBT, WMFT

<b>Trial</b>	<b>Design</b>	<b>Participants</b>	<b>Interventions</b>	<b>Outcomes</b>
Grau-Sanchez et al., 2018	RCT	D: hemiparesis; N: 19, 20; Age: 60.1, 62.5; Sex (M/F): 11/8, 12/8; Stroke type (I/H/U): 18/1/0, 14/6/0; Paretic side (L/R): no data; TAS: 65.8, 64.9	Playing keyboard and electronic drums, Standard exercises	FMA, ARAT, BBT, NHPT
Jeong & Kim, 2007	RCT	D: hemiparesis; N: 16, 17; Age: 58.0±7.2, 62.2±8.2; Sex (M/F): 11/5, 12/5; Stroke type (I/H/U): 9/7/0, 11/6/0; Paretic side (L/R): 7/9, 9/8; TAS: 65.2±54.4, 87.5±63.6	Exercises with RAS, No therapy	SF
Luft et al., 2004	RCT	D: arm paresis; N: 9, 12; Age: 63.3±15.3, 59.6±10.5; Sex (M/F): 7/2, 5/7; Stroke type (I/H/U): 9/0/0, 12/0/0; Paretic side (L/R): 6/3, 8/4; TAS: 75.0 (IQR: 37.9-84.5), 45.5 (IQR:22.6-66.3)	Bilateral arm training with rhythmic auditory cueing, Standard exercises	FMA, WMFT
Paul & Ramsey, 1998	RCT	D: hemiplegia; N: 10, 10; Age: 61.8±5.1; Sex (M/F): 11/9; Stroke type (I/H/U): no data; Paretic side (L/R): 8/12; TAS: 3.1±1.7	Playing of electronic drums, No therapy	SF, EF
Raglio et al., 2017	RCT	D: hemiparesis; N: 19, 19; Age: 70.4 ± 8.9, 75.4 ± 7.6; Sex (M/F): 8/11, 8/11; Stroke type (I/H/U): 17/2/0, 18/1/0; Paretic side (L/R): 8/5/6, 5/6/8; TAS: 1.5, 2	Playing of musical instruments, Standard exercises	TUGT
Schauer & Mauritz, 2003	RCT	D: hemiparesis; N: 11, 12; Age: 59.0±12.0, 61.0±12.0; Sex (M/F): no data; Stroke type (I/H/U): 32/9/0, 28/13/0; Paretic side (L/R): 7/4, 5/7; TAS: 1.8, 2.2	Gait exercises with musical motor feedback, Standard gait exercises	GS, SPM, SL
Schneider, Schönle, Altenmüller, & Münte, 2007	RCT	D: arm paresis; N: 20, 20; Age: 58.1±9.9, 54.5±10.2; Sex (M/F): 12/8, 15/5; Stroke type (I/H/U): 16/4/0, 18/2/0; Paretic side (L/R): 10/10, 10/10; TAS: 2.1, 1.9	Playing of electronic drums and piano, Standard exercises	ARAT, BBT
Street et al., 2018	RCT	D: hemiparesis; N: 6, 5; Age: 53.2 ± 21.86, 67.6 ± 18.3; Sex (M/F): 2/4, 2/3; Stroke type (I/H/U): 5/1/0, 3/2/0 Paretic side (L/R): no data; TAS: 19, 13.8	Playing of musical instruments, Standard exercises	ARAT, NHPT
Suh et al., 2014	RCT	D: hemiplegia; N: 8, 8; Age: 61.0±14.5, 70.6±12.4; Sex (M/F): 3/5, 3/5; Stroke type (I/H/U): 5/3/0, 6/2/0; Paretic side (L/R): 5/3, 5/3; TAS: 12.9±9.4, 7.5±7.1	Gait exercises with RAS, Gait exercises without RAS	GS, SPM, SL

Trial	Design	Participants	Interventions	Outcomes
Thaut, McIntosh, & Rice, 1997	RCT	D: hemiparesis; N: 10, 10; Age: 73.0±7.0, 72.0±8.0; Sex (M/F): 5/5, 5/5; Stroke type (I/H/U): 6/4/0, 5/5/0; Paretic side (L/R): 5/5, 5/5; TAS: 0.5±0.1, 0.5±0.1	Gait exercises with RAS, Gait exercises without RAS	GS, SPM, SL, GSM
Thaut, Kenyon, Hurt, McIntosh, & Hoemberg, 2002	RCCT	D: hemiparesis; N: 21; Age: 52.7±13.7; Sex (M/F): 13/8; Stroke type (I/H/U): 19/2/0; Paretic side (L/R): 0/21; TAS: 11.4±52.0	Arm function test with RAS, Arm function test without RAS	EF
Thaut et al., 2007	RCT	D: hemiparesis; N: 43, 35; Age: 69.2±11.5, 69.7±11.2; Sex (M/F): 22/21, 19/16; Stroke type (I/H/U): no data; Paretic side (L/R): 23/20, 19/16; TAS: 0.7±0.4, 0.7±0.4	Gait exercises with RAS, Gait exercises according to Neurodevelopmental therapy /Bobath method	GS, SPM, SL, GSM
Tong et al., 2015	RCT	D: hemiparesis; N: 15, 15; Age: 50.1± 14.8 48.6±14.6; Sex (M/F): 13/2, 13/2; Stroke type (I/H/U): 8/7/0, 7/8/0; Paretic side (L/R): 8/7, 6/9; TAS: 5.4±4.8, 5.3±4.1	Playing music instruments, Playing music instruments without sound	FMA
Whitall et al., 2011	RCT	D: arm paresis; N: 42, 50; Age: 59.8±9.9, 57.7±12.5; Sex (M/F): 26/16, 24/26; Stroke type (I/H/U): no data; Paretic side (L/R): 23/18, 25/25; TAS: 54±49.2, 49.2±62.4	Bilateral arm exercises with RAS, Standard arm exercises	FMA, WMFT
Zondervan et al., 2016	RCT	D: hemiparesis; N: 9, 8; Age: 60, 59; Sex (M/F): 5/4, 5/3; Stroke type (I/H/U): no data; Paretic side (L/R): no data; TAS: 5.33 ± 4.14, 3.17±1.66	Exercises with MusicGlove, Standard exercises	ARAT, BBT, NHPT

**Abbreviations.** *D* – diagnosis; *F* – female; *H* – hemorrhagic; *I* – ischemic; *L* – left; *M* – male; *N* – number of participants; *R* – right; *RCT* – randomized controlled trial; *RCCT* – randomized controlled crossover trial; *U* – unknown; *TAS* – time after stroke (months).

A meta-analysis was conducted for the outcomes measured in at least 2 trials, 12 outcomes in total.

The meta-analysis was performed with Cochrane Collaboration's Review Manager (RevMan) software, version 5.3. All outcomes, included in the meta-analysis, are continuous. The RevMan settings were: inverse variance method, fixed effect analysis model, and the difference in average values as a parameter for the intervention effect. In case of high heterogeneity ( $I^2 > 75\%$ ) for the outcome, the meta-analysis was also performed using a random effect analysis model.

**Gait speed.** A meta-analysis revealed that for the EG, compared to the CG, gait speed increased on average by 10.22 metres per minute (95% CI: 7.46 to 12.98, overall effect  $Z = 7.26$  ( $P < 0.00001$ )). Statistically significant improvement was found in 2 out of 5 trials (Thaut et al., 1997; Thaut et al., 2007), including the trial with the largest number of participants (Thaut et al., 2007), which largely determined the overall result. Since the statistical heterogeneity of the trials was high ( $I^2 = 81\%$ ), a meta-analysis was also conducted using a random-effect analysis model, where the overall effect  $Z = 1.67$  ( $P = 0.09$ ) was not statistically significant.

**Steps per minute.** A meta-analysis revealed that for the EG, compared to the CG, the number of steps per minute increased on average by 12.75 steps per minute (95% CI: 9.25 to 16.25, overall effect  $Z = 7.14$  ( $P < 0.00001$ )). Statistically significant improvement was found in 2 out of 5 trials (Cha et al., 2014; Thaut et al., 2007), which also had the highest number of participants. Since the statistical heterogeneity of the trials was high ( $I^2 = 87\%$ ), a meta-analysis was also conducted using a random-effect analysis model where the overall effect  $Z = 1.78$  ( $P = 0.08$ ) was not statistically significant.

**Step length.** A meta-analysis revealed that for the EG, compared to the CG, the step length increased on average by 0.07 metres (95% CI: 0.02 to 0.12, overall effect  $Z = 2.52$  ( $P = 0.01$ )). Statistically significant improvement was found in 2 out of 5 trials (Thaut et al., 1997; Thaut et al., 2007). Since the statistical heterogeneity of the trials was high ( $I^2 = 81\%$ ), a meta-analysis was also conducted using a random-effect analysis model where the overall effect  $Z = 1.41$  ( $P = 0.16$ ) was not statistically significant.

**Gait symmetry.** The effects of music therapy on gait symmetry compared to the standard therapy were discussed in 4 trials. 3 trials used RAS in combination with gait exercises. One trial (Schauer & Mauritz, 2003) used auditory feedback, allowing a patient to hear the rhythm of his steps in the audio headphones during gait exercises. Standard care included gait exercises, without rhythm. It should be noted that all 4 studies showed a statistically significant improvement for the gait symmetry, but due to the different definitions of the “gait symmetry”, only two trials could be included in the meta-analysis. In these studies, the gait symmetry is defined as the time ratio of two consecutive steps, using the longest time as a divider. In the event of a completely symmetric gait, this ratio will be 1. In a meta-analysis, this ratio was found to have improved on average by 0.12 (95% CI: 0.09 to 0.15, total effect  $Z = 8.68$  ( $P < 0.00001$ )) for the EG compared to the CG. Statistically significant improvement for gait symmetry was found in 1 out of 2 trials (Thaut et al., 2007). The trials were statistically homogenous ( $I^2 = 0\%$ ).

**Time Up and Go test.** The impact of music therapy on the time needed to start and complete walking, compared to the standard therapy, was covered by 2 trials (Bunketorp-Käll et al., 2017; Raglio et al., 2017). A meta-analysis revealed

that the EG performed the test on average 1.45 seconds faster than the CG (95% CI: -1.04 to 3.94, total effect  $Z = 1.14$  ( $P = 0.25$ )). Statistically significant improvement was not found in any of the trials. The statistical heterogeneity of the trials was low ( $I^2 = 11\%$ ).

**Fugl-Meyer motor assessment of the arm.** The effects of music therapy on the functional capabilities of the paretic arm, compared to the standard therapy and measured using the FMA test, are discussed in 7 trials. 4 of them used RAS in combination with arm exercises. In one trial (Friedman et al., 2014), a special device for arm exercises used MusicGlove, which allows a patient to play music using a computer. Standard care included arm exercises, no use of rhythm and special devices. A meta-analysis revealed that the test results were on average 0.76 points worse for the EG compared to the CG (95% CI: -0.95 to -0.57, total effect  $Z = 8.00$  ( $P < 0.00001$ )). Statistically significant improvement in arm function was identified in 1 out of 5 trials (Chouhan & Kumar, 2012). It should be noted that the overall result was almost entirely (98.5% weight) determined by one trial (Whitall et al., 2011). Since the statistical heterogeneity of the trials was high ( $I^2 = 78\%$ ), a meta-analysis was also conducted using a random-effect analysis model, where the overall effect  $Z = 1.55$  ( $P = 0.12$ ) was not statistically significant.

**Action Research Arm Test.** The effects of music therapy on the functional capabilities of the paretic arm, compared to the standard therapy, and measured using the ARAT test, are discussed in 6 trials. One trial (Delden et al., 2013) used rhythmic auditory stimulation in combination with arm exercises. In two trials (Friedman et al., 2014; Zondervan et al., 2016), a special device MusicGlove for arm exercises was used, allowing a patient to play music using a computer. In two trials (Schneider et al., 2007; Grau-Sanchez et al., 2018,) playing of electronic drums and electronic piano was used, in order to train the gross and fine motor skills, respectively. Standard care included arm exercises, with no use of rhythm, special devices and musical instruments. A meta-analysis revealed that the test results were better on average by 1.29 points, for the EG compared to the CG (95% CI: -0.40 to 2.99, total effect  $Z = 1.49$  ( $P = 0.14$ )), but statistically not significant. Statistically significant improvement was not found in any trial. The statistical heterogeneity of the trials was low ( $I^2 = 11\%$ ).

**Box and blocks test.** The effects of music therapy on the functional capabilities of the paretic arm, compared to the standard therapy, and measured using the BBT test, are discussed in 4 trials. In two studies (Friedman et al., 2014; Zondervan et al., 2016), a special device MusicGlove for arm exercises was used, allowing a patient to play music using a computer. In two studies (Schneider et al., 2007; Grau-Sanchez et al., 2018,) playing of electronic drums and electronic piano was used as arm exercises. Standard care included arm exercises, no use of rhythm, special devices and musical instruments. A meta-analysis revealed that

the EG moved on average 2.44 blocks per minute more than the CG (95% CI: 0.26 to 4.61, total effect  $Z = 2.20$  ( $P = 0.03$ )). Statistically significant improvement in arm function were found in 1 out of 4 studies (Friedman et al., 2014), which largely (74.9% weight) determined the overall result. The statistical heterogeneity of the studies was mean ( $I^2 = 56\%$ ).

**Nine Hole Peg Test.** The effects of music therapy on the functional capabilities of the paretic arm, compared to the standard therapy, and measured using the NHPT test, are discussed in 3 trials. Two studies used rhythmic auditory stimulation in combination with arm exercises. In one trial (Zondervan et al., 2016), a special device MusicGlove was used for arm exercises, allowing a patient to play music using a computer. A meta-analysis revealed that the EG performed the test on average 1.65 seconds faster than the CG (95% CI: -2.43 to 5.72, overall effect  $Z = 0.79$  ( $P = 0.43$ )). Statistically significant improvement was not found in any of the trials. The trials were statistically homogenous ( $I^2 = 0\%$ ).

**Wolf Motor Function Test.** The effects of music therapy on the functional capabilities of the paretic arm, compared to the standard therapy, and measured using the WMFT test, are discussed in 3 trials. Two studies used rhythmic auditory stimulation in combination with arm exercises. In one trial (Friedman et al., 2014), a special device MusicGlove was used for arm exercises. Standard care included arm exercises, with no use of rhythm and special devices. A meta-analysis revealed that the EG performed the test on average 0.99 seconds faster than the CG (95% CI: 0.68 to 1.29, total effect  $Z = 6.28$  ( $P < 0.00001$ )). Statistically significant improvement in arm function was identified in 1 out of 3 studies (Whitall et al., 2011), which also almost completely determined the overall result (98.4% weight). The trials were statistically homogenous ( $I^2 = 0\%$ ).

**Shoulder flexion.** The effects of musical therapy on the amplitude of paretic arm motion in the shoulder joint, compared to the standard therapy, are discussed in 2 trials. One trial (Jeong & Kim, 2007) used rhythmic auditory stimulation in combination with arm exercises. In one trial (Paul & Ramsey, 1998), arm exercises were done playing electronic drums. Standard care included arm exercises, with no use of rhythm and musical instruments. A meta-analysis revealed that for the EG, the shoulder bending angle (shoulder flexion) increased on average by 20.69 degrees (95% CI: -1.85 to 43.24, overall effect  $Z = 1.80$  ( $P < 0.07$ )), but the improvement was not statistically significant due to the high distribution of the results. No statistically significant improvement was found in any trial. The trials were statistically homogenous ( $I^2 = 0\%$ ).

**Elbow flexion.** The effects of musical therapy on the amplitude of paretic arm motion in the elbow joint, compared to the standard therapy, are discussed in 2 trials. One trial (Thaut et al., 2002) used rhythmic auditory stimulation in combination with an arm function test. In one trial (Paul & Ramsey, 1998), arm exercises were done playing electronic drums. CG performed the arm function



test without rhythmic auditory stimulation and performed arm exercises without using musical instruments. In a meta-analysis, it was found that, for the EG, compared to the CG, the elbow flexion angle increased on average by 3.53 degrees (95% CI: -2.29 to 9.34, overall effect  $Z = 1.19$  ( $P = 0.23$ )), but the improvement was not statistically significant. No statistically significant improvement was found in any trial. The trials were statistically homogenous ( $I^2 = 0\%$ ).

### **Conclusions and recommendations**

In the trials included in this systematic review, the most commonly used music therapy intervention for experimental group was RAS, in combination with gait and/or arm exercises, and was used in 11 out of 20 studies. In one trial (Schauer & Mauritz, 2003), the intervention used can be regarded as a modification of RAS. The intervention used for the control group was usually a gait and/or arm exercises without the use of rhythm.

RAS is the main intervention that has been used to improve the gait outcomes, and it has been used in 6 out of 7 studies.

When performing a meta-analysis and using a fixed-effect analysis model, for all primary gait outcomes (gait speed, steps per minute, step length, gait symmetry) statistically significant improvement was found, compared to the control group. In cases where high heterogeneity ( $I^2 > 75\%$ ) was observed, the meta-analysis of the outcomes was also performed using a random-effect analysis model. In these cases, the positive trend remained, but with a significant increase in confidence interval, no statistically significant improvement was identified for any of the outcomes.

The RAS was also the main intervention, used to improve the arm function outcomes. RAS was used in 6 out of 13 trials. Other interventions playing electronic drums and pianos, to train the gross and fine motor skills, as well as a special device for finger training - MusicGlove, by which the computer can be used as a music instrument.

A meta-analysis was performed for 7 arm function outcomes. Two outcomes (BBT, WMFT) showed statistically significant improvements for EG, compared to the CG. It should be noted, that the overall result in both cases was almost entirely determined by one trial. In the case of a BBT outcome, it was a trial (Friedman et al., 2014), with 74.9% weight. The MusicGlove device was used in this trial. In the case of the WMFT, it was a trial (Whitall et al., 2011) with 98.4% weight. RAS was used in this trial, in combination with arm exercises.

Four other outcomes (ARAT, NHPT, shoulder flexion, elbow flexion) showed improvement for EG, compared to the CG, but improvement was not statistically significant. In the case of elbow flexion outcome, the overall result

was almost entirely determined by one trial (Thaut et al., 2002), with 96.2% weight. In this trial, RAS was used when testing the arm functions.

For the FMA outcome EG showed worse results compared to the CG. For 4 out of the 7 trials, included in the meta-analysis, RAS was used as a music therapy intervention. The overall result was almost entirely determined by one trial (Whitall et al., 2011), with 98.5% of the weight. This trial used RAS as a music therapy intervention.

From the analysis of the results of the systematic review, we can conclude that gait exercises, combined with rhythmic auditory stimulation, produce better results than exercises without rhythm. It should be underlined that there were statistically significant improvements in the meta-analysis of the outcomes using a fixed-effect analysis model for 4 out of 5 gait outcomes. At the same time, it should be noted that despite the increased number of trials in recent years, dedicated to the use of RAS, both the number of trials and the number of participants are still considered relatively small. Further trials, with a larger number of participants, can contribute significantly to the wider use of this method for the rehabilitation of stroke patients.

Regarding the use of rhythmic auditory stimulation and other music therapy interventions to reduce disturbances in arm functions, this systematic review does not provide unequivocal conclusions. For the majority of outcomes, the use of music therapy interventions contributed to greater improvement than standard care, but these improvements were statistically significant for only a few outcomes. Therefore, in view of both the observed positive trends and the limited number of trials carried out so far, further trials with a higher number of participants could provide a more determined reply about the use of music therapy to reduce arm function disorders in stroke patients.

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## ЗДОРОВЬЕСБЕРЕЖЕНИЕ КАК УНИВЕРСАЛЬНАЯ КОМПЕТЕНЦИЯ ЦИФРОВОЙ ЭПОХИ

### *Health Care As a Universal Competence of the Digital Age*

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**Abstract.** *The research is devoted to the actual problem of health saving/preservation/. The change in the social situation associated with the spread of digital technologies has led to the emergence of new opportunities and new risks in socialization. The high rhythm of life leads to frequent stress. Frequent stress causes disease and anxiety. In such conditions, the competence of health saving becomes important. The research is dedicated to revealing the peculiarities of attitudes to a healthy lifestyle among modern youth. The novelty of the research is to consider health from the standpoint of the concept of wellbeing, which meets the needs of modern youth. The request for wellbeing is reflected in the fact that people are looking for activities, products, services that create an internal balance, despite the employment and fast pace of life. The research was conducted by the method of questioning students of two universities - Yaroslavl state pedagogical University named after K.D. Ushinsky and Riga Stradin University. The study involved 635 people, 315 students from Latvia and 320 students from Russia. The study obtained new scientific data on the desire of young citizens of Russia and Latvia to preserve health. It is revealed that young citizens of Latvia and Russia adequately assess their lifestyle: health-saving behavior of students wishing to maintain health is significantly different from the behavior of students who do not lead a healthy lifestyle.*

**Keywords:** *digital age, health, health care, youth.*

### **Введение**

#### ***Introduction***

Начало XXI века охарактеризовалось началом формирования принципиально новой социо-культурной среды, называемой цифровой эпохой, суть которой заключается в глобальной компьютеризации. С одной стороны это даёт человеку ряд преимуществ: возможности для различных видов мобильности, широкий доступ к информации, новые возможности

для конструирования идентичности; с другой стороны повышает стрессогенность: высокий ритм жизни предъявляет повышенные требования к восприятию, реагированию, скорости принятия решений. Поколения, чья активная социализация проходит в условиях этой реальности, проводят большую часть своей жизни в сети Интернет и не делают различия между жизнью в Сети и вне её, не воспринимают свою идентичность в цифровом и реальном пространстве как нечто обособленное (Palfrey & Gasser, 2008) Данная ситуация актуализирует исследования отношения нового поколения, чья социализация проходит в условиях цифрового общества, к своему здоровью.

В данном исследовании здоровье понимается как сложный, системный по своей сущности феномен, как состояние комплексного физического, ментального и социального благополучия. Вопросы здоровья актуальны во все периоды не только индивидуального развития человека от момента рождения до смерти, но и на поколенческом уровне. В цифровую эпоху здоровье представляет собой чрезвычайно динамическое образование. Современному человеку непросто быть физически, психически и социально здоровой личностью, но только психологически и социально здоровая личность использует адекватные средства регуляции жизнедеятельности.

В современных условиях наблюдается процесс трансформации парадигмы здоровья (психологического и психического) с нозоцентрической на биопсихосоциальную модель с пересмотром роли индивида. Осуществляется переход от конкретного человека как объекта к отношению к нему как к субъекту вместе с его социальным окружением. В данной концепции здоровье трактуется как необходимое условие активной и нормальной жизнедеятельности человека.

В данном исследовании мы исходим из понимания здоровья как состояния комплексного физического, ментального и социального благополучия. Учитывая специфику социализации современной молодежи мы постулируем здоровьесбережение как универсальную компетенцию человека цифровой эпохи.

Целью нашего исследования было выявление особенностей отношения к здоровому образу жизни у современной молодежи. Данная цель достигалась посредством анализа ключевых для представителей поколения цифровой эпохи показателей здорового образа жизни и выявления поколенческих трендов (модных у современной молодежи тенденций) здоровьесбережения.

## Материалы и методы исследования *Materials and methods*

Цифровое поколение социализируется в условиях высочайшей социальной динамики и информационного шума. В результате мозг почти не переходит в режим «покоя» и всегда функционирует в формате активного включения во внешний мир. Социальная ситуация развития современной молодежи характеризуется неопределенностью и вариативностью контекста, что создает несвойственную предыдущим поколениям нагрузку на психику. В результате формируется конфликт между естественными способностями организма человека и новым миром сверхскоростных искусственных систем.

Интернет и связанные с ним технологии перенастроили многие аспекты жизни, включая психическое здоровье. Основной проблемой цифровой эпохи стала угроза психологическому благополучию человека связанная с растущей зависимостью от цифровых технологий и злоупотреблением ими в ущерб двигательной активности и межличностному общению. (Nielsen, 2015). В основе современных тенденций снижения эмоционального благополучия лежат различные факторы, такие как недосыпание, повышение уровня стресса и социального давления, а также дефицит эмоционального общения. Условия и среда, в которых живут сегодня молодые люди, быстро меняются и оказывают негативное влияние на их благополучие (Choi, 2018).

Широкое использование социальных сетей диктует моду на внешний вид и самопрезентацию. Выявлено что тенденция к размещению своих фотографий в социальных сетях предоставляет пользователям регулярные возможности проводить сравнения, связанные с внешностью других, что побуждает молодых людей стремиться к достижению некоторого общепринятого идеала, например к худобе (Fardouly & Vartanian, 2016).

В ответ на стрессогенность социальной среды у современного человека формируется запрос на физическое и ментальное благополучие или *wellbeing* (Rath T. & Harter J., 2010).

Понятие *wellbeing* 'благополучие' очень ёмкое, его аспекты – благополучный образ жизни, непрерывное развитие, спорт, отсутствие вредных привычек, создание баланса между работой и отдыхом, качество окружающей среды, стиль взаимодействия с людьми. Запрос на *wellbeing* находит отражение в том, что люди ищут активности, продукты, услуги, которые создающие внутренний баланс, несмотря на занятость и быстрый ритм жизни.

Среди эффективных программ профилактики и вмешательства для терапии депрессии, тревоги и самоубийств у молодежи, наиболее

распространенным элементом является вовлечение в здоровый образ жизни. Этот подход направлен на улучшение решения проблем благополучия человека, формирование навыков преодоления негативных мыслей и эмоций.

По данным исследования GfK Consumer Life (исследование о жизни потребителей во всем мире, опрос 26 тыс. респондентов в 22 странах мира) с 2014 по 2017 год в мире последовательно наблюдается рост числа людей, которые говорят о том, что стараются сохранять баланс между работой и отдыхом (с 45% в 2014 до 50% в 2017 году), активно ищут продукты и услуги для поддержания здорового образа жизни (с 41% до 44% за 4 года). А о росте общей тревожности говорит увеличивающийся процент людей, кто сообщает о постоянной обеспокоенности вопросами безопасности (с 34% в 2014 до 41% в 2017) (Feld, 2017).

Стремление к нахождению баланса приводит к росту запросов на здоровый образ жизни среди представителей всех поколений. При этом трансформируется само понятие «здоровый образ жизни» - сегодня это не столько фитнес и диеты, сколько гармония состояния души и тела, позволяющая выжить в быстроменяющемся мире.

Концепция *wellbeing* включает множество факторов, но ключевым из них является субъективность. Это означает, что конкретные лица или члены группы (в нашем случае возрастной группы) здоровье и благополучие через призму своего личного опыта, или с точки зрения их группы и её систем. То есть здоровье и благополучие представляет собой психологический опыт, который в большинстве случаев нельзя оценивать объективно. Мы можем анализировать только субъективные оценки тех, кто оценивает свой опыт.

Субъективный фактор включает как познавательный, так и эмоциональный аспекты. Взаимосвязи между когнитивными и эмоциональными компонентами здоровья и благополучия свидетельствуют о том, что на уровне познания, удовлетворение сопровождается чувством внутреннего спокойствия, тогда как неудовлетворенность ощущается как опасность и угроза (Diener, 2000).

Таким образом исходя из понимания здорового образа жизни как компонента благополучия и учитывая субъективную природу данного переживания мы проанализировали представления молодых граждан России и Латвии о их стратегиях здоровьесбережения.

Для анализа использованы результаты исследования, проведенного в 2018 году среди студентов двух гуманитарных университетов России и Латвии: Ярославского государственного педагогического университета имени К.Д. Ушинского и Рижского университета Пауля Страдина.



Студентам предлагалась электронная версия анкеты для самостоятельного заполнения в формате Google form - одного из сервисов, прикрученных облачному хранилищу Google Drive.

Статистической обработке подверглось 635 анкет студентов. Анализ проведен на основе объединенной выборки двух университетов путем сравнения поведенческих характеристик студентов пяти групп, выделенных по самооценке образа жизни. Большинство респондентов девушки (66,7%), что связано с гуманитарной направленностью направлений подготовки, реализуемых в данных университетах. Средний возраст опрошенных студентов 20,6 лет.

### **Результаты и их обсуждение** *Results and discussion*

Анализируя полученные результаты отметим, что молодые граждане как Латвии, так и России единодушно в качестве основных составляющих благополучия жизни отметили: материальное благополучие (92,1% студентов Университета Страдия и 98,3% студентов Университета Ушинского), позитивные эмоции (76,1% латышей и 85,3% россиян) и возможность самореализации (71,2% и 68,6% соответственно). Здоровье в ряду этих факторов составляет лишь шестое место после семейного благополучия и чувства безопасности. Такая ситуация в целом соответствует особенностям юношеского возраста описанных в исследованиях психологов проведенных ранее (Remschmidt, 1994; Axford, 2009; Sabgaida & Sergievskaya, 2011).

При этом пятая часть опрошенных россиян и четверть молодых граждан Латвии считают свой образ жизни здоровым, порядка трети студентов к нему только стремятся (табл. 1). В группе студентов, оценивших свой образ жизни как здоровый, доля лиц считающих свою жизнь благополучной наибольшая, а в группе лиц с нездоровым образом жизни – наименьшая (44,8% против 5,1 % среди латышей и 32,7% против 0% среди россиян). Высокая оценка гармоничности своей жизни также коррелирует с принадлежностью выделенным группам: наиболее высоко оценивают гармоничность своей жизни студенты стремящиеся к здоровому образу жизни (71,1% латышей и 71,9% россиян), меньше студенты с нездоровым образом жизни (57,3% и 34,1% соответственно). Несколько иная ситуация с оценкой безопасности своего образа жизни: наиболее безопасным его ожидаемо называют представители первой группы (79,2% латышской части выборки и 72,3% российской), а вот наименее безопасным считают представители второй группы (33,4% и 45,2% соответственно), видимо

именно ощущение небезопасности мотивирует их стремиться к здоровому образу жизни.

*Таблица 1. Распределение респондентов по пяти группам в зависимости от самооценки образа жизни (%)*  
*Table 1 Distribution of respondents into five groups depending on self-assessment of lifestyle (%)*

Группа	Образ жизни	Латвия	Россия
1	его можно назвать здоровым	24,7	21,1
2	он пока не совсем здоровый, я стремлюсь к здоровому образу жизни	34,8	41,5
3	он такой же, как у большинства моих друзей	23,9	27,3
4	до здорового образа жизни мне далеко	7,2	5,2
5	он, скорее, нездоровый	9,4	4,9

Физическая активность студентов в целом соответствует их оценкам своего образа жизни (табл. 2). Исключение составляет группа 3 – (конформисты), физическая активность которых несколько ниже, чем в 4 группе студентов, которым далеко до здорового образа жизни. Интересно, что гаджеты для измерения активности (фитнес браслеты, трекаеры активности и смарт часы) активно используют представители всех групп, в том числе и те молодые люди, которые не считают свой образ жизни здоровым.

Пищевое поведение молодежи также соответствует их оценкам образа жизни. Стараются употреблять натуральные продукты в среднем по выборке 58,5% студентов из группы со здоровым образом жизни, 46,4% из группы респондентов, стремящихся к нему, 18,6% студентов с нездоровым образом жизни, 19,4% и 19,9% студентов из групп 3 и 4. И наоборот, едят все, что вкусно, 4,9% и 9,9% студентов из первых двух групп, 27,1% студентов с нездоровым образом жизни, 27,0% студентов-«конформистов» и 19,4% студентов, которым далеко до здорового образа жизни. По пищевому поведению студенты группы 3 ближе к студентам с нездоровым образом жизни.

При этом в пищевом поведении, в отличие от других компонентов здорового образа жизни, выявлены существенные различия между респондентами из Латвии и России (табл. 3), что свидетельствует о большей гедонистичности молодых россиян.

Таблица 2. Частота регулярной физической активности в группах студентов с разным образом жизни (%)

Table 2 The frequency of regular physical activity in groups of students with different lifestyles (%)

Виды физической активности	Латвия					Россия				
	1	2	3	4	5	1	2	3	4	5
Утренняя зарядка	33,2	21,8	12,1	8,3	0	37,0	18,3	8,9	5,3	0
Ежедневные прогулки на свежем воздухе, ходьба, бег, велосипед	54,6	43,3	27,1	32,8	25,9	56,1	39,3	22,9	26,7	18,3
Посещение спортивно-оздоровительных секций, клубов	33,2	29,3	17,2	14,0	6,1	37,1	22,6	13,9	11,4	0
Посещение фитнес-центра	25,3	22,8	10,2	13,3	0	21,0	23,9	12,1	10,7	2,9
Значительные физические нагрузки во время каникул	67,8	34,5	11,2	22,3	12,3	59,3	44,2	11,3	18,9	15,1
Использование гаджетов для контроля активности	72,2	78,1	65,2	66,1	51,0	70,8	68,7	62,3	67,4	33,2

Таблица 3. Доля студентов, выразивших готовность вести здоровый образ жизни, в группах с разным образом жизни (%)

Table 3 Share of students who expressed willingness to lead a healthy lifestyle in groups with different lifestyles (%)

Пищевое поведение	Латвия					Россия				
	1	2	3	4	5	1	2	3	4	5
Уменьшить потребление соли	72,1	76,3	23,4	25,5	12,1	52,3	35,8	13,1	5,3	0
Уменьшить потребление сахара и мучных изделий	67,0	65,0	54,0	55,3	45,8	43,3	56,7	32,2	34,1	21,1
Уменьшить потребление жирного мяса, жареного, острого и т.д.	75,8	71,3	36,6	30,0	47,3	54,2	58,9	13,7	15,4	0
Контролировать качество употребляемых продуктов питания, воды и лекарственных средств	67,9	78,6	31,2	36,8	40,2	43,2	51,1	18,9	10,7	0
Придерживаться принципа умеренности во всем	90,2	89,4	72,7	68,4	57,9	82,1	76,2	22,7	24,3	25,6

По распространению вредных привычек (табл. 4) заданный порядок групп соответствует их рангам по частоте лиц, которые не курят (от 98,1% до 1,6%), не употребляют крепкие алкогольные напитки (от 99,2% до 24,7%) и наркотики (от 99,6% до 49,6%) или принципиально не употребляют любые алкогольные напитки (от 32,1% до 0%). Значимых различий по данному признаку в национальных выборках не выявлено.

*Таблица 4. Доля студентов, выразивших готовность к отказу от вредных привычек, в группах с разным образом жизни (%)*

*Table 4 The proportion of students who expressed willingness to give up bad habits in groups with different lifestyles (%)*

Отказ от вредных привычек	Латвия					Россия				
	1	2	3	4	5	1	2	3	4	5
Отказ от курения	98,7	82,1	23,3	20,8	2,3	97,9	85,1	25,2	18,7	0
Отказ от употребления крепких алкогольных напитков	99,3	87,1	28,9	27,1	25,2	99,1	82,9	30,4	25,9	24,3
Полный отказ от употребления алкоголя	34,2	32,1	11,0	10,2	0	30,8	37,8	9,3	9,7	0
Полный отказ от употребления наркотических препаратов	99,8	99,7	76,5	56,9	54,1	99,3	99,5	78,0	58,1	45,2

Таким образом, молодые граждане Латвии и России адекватно оценивают свой образ жизни: здоровьесберегающее поведение студентов из групп 1 и 2, которые считают свой образ жизни здоровым или стремятся к нему, существенно отличается от поведения остальных групп студентов. Полученные данные, в целом, совпадают с результатами ранее проведенных исследований (Al-Amari & Al-Khamees, 2015; Mburu-Matiba, 2015; Przybylski & Weinstein, 2017; Wang, Xing, & Wu, 2013).

Неприятный вывод заключается в том, что даже среди весьма социально-благополучной группы молодежи – студентов университетов, достаточно высока доля лиц, не придерживающихся здорового образа жизни и не нацеленных на это. И в этом плане здоровьеразрушающее поведение студентов из группы «конформистов», считающих свой образ жизни таким же, как у большинства друзей, мало отличается от поведения студентов, осознающих, что они ведут нездоровый образ жизни.

На наш взгляд, основным фактором разрушения здоровья молодежи в цифровую эпоху является снижение двигательной активности. Известно,

что движение определяет не только физическое благополучие, но и способствует увеличению эмоциональной стабильности. Участие в физической активности признается в качестве фактора, способствующего физическому и психическому здоровью, социальному благополучию и познавательной и учебной самодеятельности. Регулярная физическая активность также связана с такими важными последствиями для здоровья, как уменьшение сердечно-сосудистых заболеваний, диабета, депрессии, повышение эффективности когнитивной функции и качества жизни.

Современный человек, лишенный традиционных для предыдущих поколений видов двигательной активности вынужден прилагать отдельные усилия для её организации. Недостаток физической работы многие молодые люди стараются компенсировать курением и злоупотреблением алкогольными напитками, наркоманией, компьютерными играми и другими развлечениями техногенного характера. Поэтому для формирования универсальной компетенции здоровьесбережения молодежи в цифровую эпоху надо применять интерактивные ресурсы образовательных практик (Tarkhanova & Koryakovtseva, 2018).

### **Заключение** *Conclusions*

Проведенное исследование позволило сделать ряд выводов:

Во-первых, здоровьесбережение как социокультурное явление цифровой эпохи требует комплексного подхода и объединяет множество аспектов социальной реальности, каждый из которых важен как для отдельного человека, так и для общества в целом.

Во-вторых, принимая во внимание академические дискурсы, посвященные благополучию, в исследованиях относительно старших поколений большее внимание уделяется взаимосвязи между благополучием и здоровьем. Для представителей зрелых возрастов связь между благополучием и здоровьем является взаимоукрепляющей и взаимозависимой, но такая связь не очевидна для молодежи.

В-третьих, за последние десятилетия произошла смена приоритетов в развитии глобального общества. Стремление к массовому потреблению сменилось стремлением к получению эмоций и нового опыта. Это нельзя не учитывать при исследованиях стратегий здоровьесбережения.

В четвертых, изучение, осмысление и создание здоровьесберегающей среды (образовательной, социальной, приватной) с использованием понятных «цифровому» поколению инструментов и механизмов (продукты и услуги, которые помогают человеку достигать физического и психического благополучия и при этом быть активным и разносторонним)

приведет к возможности существования всех поколений в безопасном и эффективном пространстве.

### Summary

The conclusion of the research:

1. Health care as a socio-cultural phenomenon of the digital age requires an integrated approach and combines many aspects of social reality, each of which is important for an individual and for society as a whole.
2. Taking into account academic discourses on well-being, research on older generations focuses more on the relationship between well-being and health. For adults, the link between well-being and health is mutually reinforcing and interdependent, but it is not obvious to young people.
3. In recent decades, there has been a change of priorities in the development of global society. The desire for mass consumption was replaced by the desire for emotions and new experiences. This should be taken into account when studying health-saving strategies.
4. The study, understanding and creation of a health-saving environment (educational, social, private) with the use of clear "digital" generation of tools and mechanisms (products and services that help a person to achieve physical and mental well-being and at the same time be active and versatile) will lead to the possibility of existence of all generations in a safe and effective space.

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## PRE-START ANXIETY SELF-REGULATION METHODS OF TOP ALPINE SKIERS

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***Abstract.** Alpine skiing is the kind of sport where there is little time for proving athletes' abilities – the number of attempts is so low that each of the smallest mistakes reflects highly on the result of the participant. The aim of this study is to extend the knowledge of psychological preparation in Alpine skiing at a high performance level. This Article presents results of the research, which focused on the relationship between Alpine skier's competition effectiveness and their competition anxiety levels, along with selected methods of emotional condition self-regulation before the start. The research is based on studying the world's top athletes, who participated in an international alpine skiing race at least 6 times per season. The research is based on theoretical materials and empirical investigation, where 86 of the world's top 200 ranked alpine skiers participated in a test and filling out of a questionnaire about their preparation for competition. The obtained results testify that most high-ranking athletes have created their own individual system of psychological skills, which contains both somatic and cognitive means of controlling emotional states. Usually only a few anxiety reduction methods are picked by athletes, depending on their self-evaluated emotional state before a given competition. A link between competition anxiety levels and an Alpine skier's competition effectiveness is generally confirmed. Research results show that top Alpine skiers' competition effectiveness will be better if anxiety levels are low or moderate, and the results will improve if the self-regulation of pre-start emotional states is based on practised adapted breathing, self-inspiration, visualisation and ideomotor methods.*

***Keywords:** alpine skiing, anxiety, competition effectiveness, psychological skills, self-regulation*

### Introduction

In Alpine Skiing, as in any high achievement sport, competitions are an especially important moment for each athlete to prove their abilities. The athlete is being prepared for it from the very first day, so that he or she can display the maximum of their performance right at the needed moment (Perry, 2016). For this reason a very important role is played by psychological preparedness, which is especially important in Alpine Skiing, where the athlete's control of own abilities is shown during the first and only attempt, in a short and concrete span of time,



during which the athlete needs to attain their best result (Taylor, 2000). That is exactly why a very important stage in achieving the desired result is the athlete's preparedness before start, i. e. how the athlete focuses on executing the goals that have been set and how he or she controls own emotional states in practice and especially before competition start (Smith, 2012). The key point for a successful race is to reach athlete's optimal level of arousal.

At the very highest level, each athlete may have their own psychological preparation formula, which may not conform to generally accepted, usual methods of preparation. Consequently, more is being spoken about individualizing self-regulation features, and self-awareness as an important component in athlete's successful performance (Taylor, 2017). Research focused on the dependence of Alpine skiers' competition effectiveness on self-evaluated emotional conditions and selected self-regulation methods before the start.

**Aim of research:** to evaluate the relationship between high class Alpine skiers' competition anxiety, most commonly applied pre-start emotional state self-regulation methods and race effectiveness. Research methods: theoretical – literature analysis; empirical – analysis of competition protocol, SCAT questionnaire, and survey of the athletes about their preferred pre-start emotional state self-regulation methods; statistics.

### **The Theoretical Background**

Nowadays dynamic sport is characterized not only by the impact of high physical loads on the body during training and competitions, but also by heightened psychological tension. Athletes often experience extreme situations during competition, and if they are unable to adapt and overcome those, then stable achievements are unlikely (Weinberg & Gould, 2015). The most important factors of successful competition performance are: the level of athlete's skill and preparedness, athlete's personality traits, conditions of the given competition environment, dominant emotional states, and self-regulation skills (Abele, 2018). The main aim of athletes' psychological preparation is to ensure such psychological state in competitions, which allows the athlete to fully make use of his/her functional abilities and show the best possible competition result. Research has been conducted, whose results give evidence to diverse methods and techniques used by athletes in overcoming anxiety, for example, professional athletes tend to use more physical rather than mental relaxation techniques for coping with competitive anxiety than athletes from recreational and collegiate levels (Kudlackova, Eccles, & Dieffenbach, 2013).

Analysing mountain skiing from a psychological point of view, it is considered a very difficult sport:

- First of all, mountain skiing is a very rigorous sport that requires to accurately combine the sense of time and space through coordination, speed, endurance and the ability to make quick decisions (Petersen, 2004). The shortest Slalom tracks are up to 60 seconds long, during which the athlete has to do about 60 gates. This means that the athlete on the track is in a continuous, fast-paced motion, where every moment has a decision that needs to be made about the right line, power investment, ski angle and other factors that determine the athlete's speed on the track.
- Secondly, there are important biomechanical influences in mountain skiing, which, in combination with external environmental factors (weather conditions, snow quality, track and pavement quality), form a very complex background for the athlete. An incorrectly approached trajectory before a pole often leads to losing speed for the next one, withdrawing it or falling. An incorrect trajectory can often differ from a correct trajectory by just 5 centimetres. For this reason, mountain skiing is a very unpredictable sport where athletes often leave without reaching the finish line.
- Thirdly, in mountain skiing, athletes are often forced to train and participate in competitions under the influence of cumbersome environmental factors: altitude, cold, weather conditions that require a high mental strength and physical effort. All this has to be complemented by one more specific feature of mountain skiing – there will never be 2 identical tracks in the mountain ski race, which means that the athlete will always take the race as the first race on that particular track. That is why mountain skiing requires a specific psychological readiness of athletes, which develops a fast perception of new information and technically correct performance of the task at the first time.

Psychological skill training in mountain skiing is first and foremost aimed at psychological preparation and self-adjustment for the start. A system of psychological skills as close as possible to race conditions is being created and developed (Taylor, 2018). Taking into account the body's reaction and manifestations of anxiety, it is important to create an athlete's psychological training system that can help to strengthen the athlete's physical and mental qualities, as well as improve the athlete's adaptation to changing environment and competition conditions, thus minimizing the worry and energy consumption during the race (Perry, 2016). The most often used methods, techniques and

interventions used in psychological preparation of high performance athletes allow the athlete to evaluate the impact of their personality traits and cognitive condition and processes on the result. It teaches them to relax and concentrate, to deal with negative emotions, to use imagery and visualization, to prepare for the competition and optimize self-confidence, promoting the basic principles of "positive self-talking", to initiate strategies and motivations for setting goals (Gould & Maynard, 2009). In general, athletes and coaches know that psychological preparedness has a huge impact on the outcome of the race, but it was found through polls that during the recovery period, the recuperation of mental skills is used much less frequently than the services of physiotherapists. The brain not only controls the whole body, but also helps to encode and structure all incoming and outgoing information in an appropriate manner for each athlete. That's why the brain would need to be trained just as much as skiing skills or physical fitness (Taylor, 2017).

In preparation for the competition one of the most important indicators of the pre-start emotional state is the competitive anxiety. Athletes under seemingly similar environmental influences can experience signs of pre-start fever, and pre-start apathy and readiness differently, as each athlete has a different personality that perceives and interprets environmental factors differently and experiences them in different modalities of emotion. This determines the need for each athlete to look for personalized formulas and self-regulation methods to optimize his pre-start emotional state (Mischel, 2014). Self-control as the ability to control yourself and your emotions, as well as maintain balance in any situation is one of the cornerstones of successful results and success in sport (Perry, 2014). The ability to deliberately regulate emotional states allows an athlete to eliminate distracting thoughts, raise self-confidence, and maintain focusing ability at an optimal level. There is a wide range of anxiety coping strategies and techniques that generally fall into somatic, cognitive and multimodal anxiety reduction techniques. Research emphasizes that learning and applying mental strategies is closely related to the interpretation of anxiety (Taylor, 2016). It determines the need for individualization of mental strategies and techniques for each high-end athlete in preparation for the race, which we also decided to explore.

## **Methodology**

The criteria for selection of respondents was based on the specificity of alpine skiing and results evaluation in FIS points (FIS, 2017). The chosen research subjects were the world's best Alpine skiers (slalom and descent disciplines):

- aged of 16 years and above;
- who had shown at least 10 results in the previous season and had earned at least 10 FIS world ranking points;

- up until the start of the 2017/2018 winter season had achieved a position in The World TOP30 to TOP200 Ranking.

Qualitative participation in the study was provided by 86 athletes from 24 countries. All participants are athletes of alpine skiing (in slalom and downhill disciplines), ranked between the 38th to 200th place in the world ranking. The best (TOP30) athletes were disregarded because they had won World Cup points that were significantly different from World Ranking Points and would not have equally comparable indicators in the process of calculating skier performance.

In order to determine the athlete's subjective anxiety self-assessment and its manifestations before the start, as well as the more commonly used techniques of emotional regulation, athletes were surveyed about their preferred pre-start emotional state self-regulation methods using the Likert scale

To determine the athlete's level of Anxiety, the Martens Sports Competition Anxiety Test (SCAT) questionnaire was developed, defining an athlete's high, medium and low anxiety level (Martens, 1990).

To calculate race performance scores, the average score for each athlete from all season finals in the slalom was calculated without taking into account the maximum and minimum seasonal FIS scores, which often vary in a large range with a marked offset from the average. 78 mountain skiers in the slalom were selected to evaluate their race performance, where they showed at least 6 results in terms of FIS points in a given season. These mountain skiers ranged from 18 to 30 years old, with an average age of 24, a sports experience of 10 to 25 years, and an average mountain ski FIS experience of 8 years. The results of these slalom skiers were divided into high, medium and low race performance groups. The obtained results were outlined with described statistics.

## **Research results**

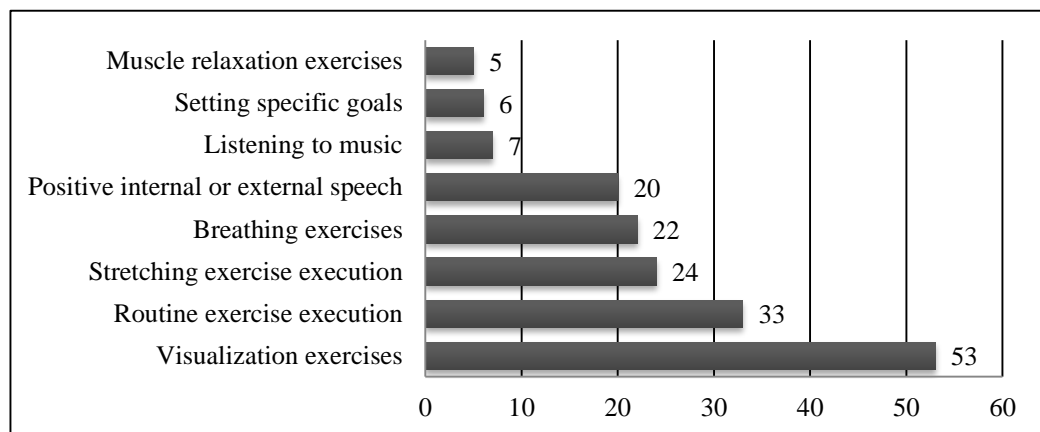
When evaluating the SCAT results of 86 respondents (slalom and downhill athletes), it was noticed that the majority of athletes had a low score, which indicates their high competence. 49 athletes had a medium and 27 athletes had a low anxiety level, while it was high for only 10. Summarizing their responses on subjectively experienced anxiety before start, its manifestation and most commonly used methods for controlling emotional states, it was found that:

- 77% of the respondents believe that they begin feeling anxiety on the day of competition or right before start. Only 5% of alpine skiers said that they started experiencing anxiety on the previous day or earlier, while 18% could not provide a conclusive answer;

- 47% of the respondents said they did experience anxiety during the competitions, while 34% said they did not, and 19% could not provide a conclusive answer;
- 74% of the respondents also regularly used self-regulation methods during training, 16% only used them in certain occasions, and 12% did not use them at all;
- 76% of the respondents had created a pre-start psychological preparation routine, which they applied regularly before each start, 12% had created one and used it in certain occasions, while 12% had not created one.

To break it up, it could be said that 64 out of the 86 athletes included either some psychological preparation elements or a whole array of those in their pre-start preparation, 10 athletes do not use any methods, while 12 athletes would only use them on occasion.

The results obtained on emotion self-regulation methods most commonly used by alpine skiers (slalom and downhill) in their own estimates can be seen in Figure 1. Each alpine skier was allowed to tick several responses, and the most commonly acknowledged ones were visualization exercises (53 times), and pre-start routine (33 times). The next most common ones were somatic anxiety reduction techniques.



*Figure 1 The most frequently used methods of self-regulation by alpine skiers before the start (choice count)*

From the obtained results it can be concluded that in general the use of pre-start psychological preparation methods is quite widespread among high class alpine skiers. They help to both achieve the desired emotional state, and also activate cognitive processes, which help to effectively overcome obstacles set by the track and surrounding environment.

So, how did the athlete's average seasonal race results contrast with the anxiety levels found in the SCAT test? These results were evaluated for slalom only, so that the criteria for evaluating results were maximally homogeneous. Figure 2 shows the relationship between competition anxiety levels of 78 athletes and their competition success rates.

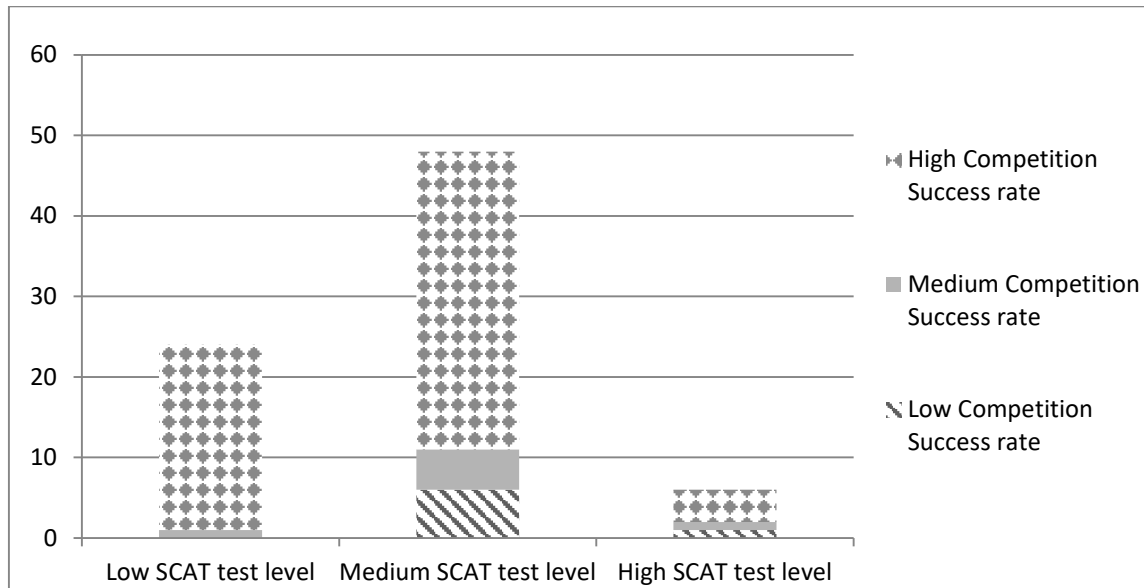
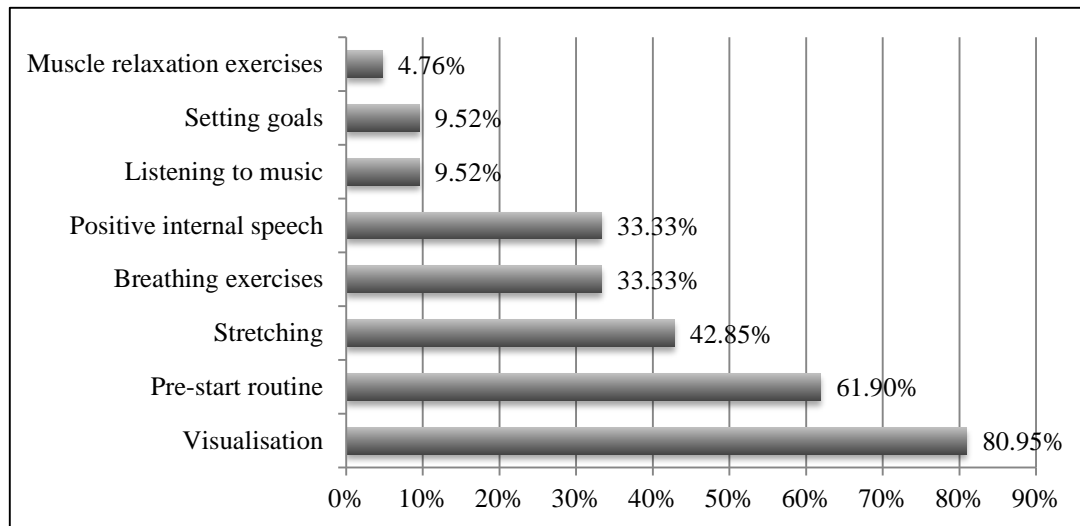


Figure 2 Slalom racer Anxiety level and Competition Success rate (number of athletes)

When looking at the relationship between SCAT test results and FIS points, it can be seen that 95.83% of the 24 respondents, who were determined to have a low competition anxiety level, were also calculated to have a higher occurrence of results, which is below the medium number of FIS points and indicates high achievement. At the same time 87.50% of the 48 respondents, who were determined to have a medium competition anxiety result, most commonly attained competition results around the medium number of FIS points. It is interesting to note that 6 athletes with a high competition anxiety test result still attained high competition results 83% of the time.

When evaluating the competition effectiveness of alpine skiers, it is clearly visible that a correlation exists between an athlete's anxiety indicators and season's competition results. The link between low anxiety levels and stable high competition results of almost all low anxiety athletes is completely understandable. The same can be said about the 48 medium anxiety level athletes, the majority of whom, 37, showed good results. However, 4 out of 6 high anxiety level athletes also showed good competition results, which might be explainable by extremely good emotional self-regulation skills. It was therefore interesting to analyse and compare the most commonly used self-regulation methods among

athletes with diverse anxiety and success indicators. Figure 3 depicts the most commonly used self-regulation methods among athletes with low anxiety levels and high or medium competition success rates. The choices of athletes with medium anxiety levels and high or medium competition success rates were fairly similar.



*Figure 3 Pre-start self-regulation techniques of slalom racers with low anxiety levels and high or medium competition success rates*

A noticeable difference could be observed in the answers of athletes with high anxiety levels and high or medium competition success rates, where several self-regulation methods were being used concurrently. All athletes made use of positive internal and external speech, visualisation and breathing exercises, but the majority did so along with a pre-start routine and muscle relaxation exercises.

### **Conclusions and recommendations**

Alpine skiers make use of several different self-regulation methods, and each athlete picks them in accordance with specific competition environment to suit the individually experienced anxiety level and competition goal that's been set. Among the most commonly used methods one should mention positive internal and external speech, visualisation, breathing exercises, pre-start routine, and muscle relaxation.

Incorporating experience of the sport, and summarizing the results, several recommendations can be given to athletes:

- To self-regulate the pre-start psycho-emotional state for athletes with tendency towards low and moderate anxiety levels it would be desirable to make more use of visualisation, a pre-start routine, stretching,

breathing and positive speech exercises, which have been developed during training and are fully trusted by athletes by the time of competition.

- For athletes with a tendency towards a high anxiety level, it would be advisable to combine several methods for regulating pre-start psycho-emotional levels, and, by testing during training, the most suitable ones for each athlete individually should be picked, to reduce the anxiety level more effectively and reach an optimal emotion state before start. It is worth remembering that often the most crucial time are the 15 minutes leading up to start, and only the most tested and trusted self-methods should be used then rather than spend time frantically performing every possible one.

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**MĀKSLA UN DIZAINS**

*Art and Design*



# INTEGRĒTA MĀKSLAS DARBU KATALOGA „KLUSĀ DABA” NO LATGALES KULTŪRVĒSTURES MUZEJA KRĀJUMA DIZAINS

## *Design of an Integrated Arts Catalogue “Still Life” from the Collection of Latgale Culture and History Museum*

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**Abstract.** Museums of the world store countless artistic values, which are predominantly located in secure storages, looked after and cared for by museum staff. The museum as a democratic institution in the modern situation wants to be the mediator and unifier of communities, making the cultural and historical values available in their collections accessible to people with special needs, including those with vision impairments, thus widening their circle of visitors. The aim of the article: Study the importance of tactile perception in ensuring accessibility of artistic works to people with vision impairments and analyse the acquired results of the arts catalogue “Still Life” supplemented with tactile images usage in the museum educational programs. The research results were obtained using theoretical research methods: study, analysis and assessment of scientific and journalistic literature, which reveals the essence of the problem, as well as the reflection of personal experience.

**Keywords:** Integrated arts catalogue, Latgale Culture and History Museum, still life, graphic design, tactile graphics, vision impairment.

### **Ievads**

#### **Introduction**

Muzeji pasaulē glabā neskaitāmas mākslas vērtības, kas lielākoties atrodas drošās glabātuvēs, tiek muzeja darbinieku pieskatītas un aprūpētas. Bez šaubām, neviens pat vislielākais pasaules muzejs fiziski nevar izlikt publiskai apskatei visus mākslas darbus, kas ir tā krājumā, tāpēc tiek izdoti gan kolekciju katalogi, gan mākslas reprodukciju albumi, gan arī veidotas virtuālās ekspozīcijas internetvidē. Šādas muzeju aktivitātes ir interesantas un nepieciešamas ikvienam sabiedrības loceklim, kas ciena mākslas vērtības, vēlas papildināt savas zināšanas. Mūsdienu drukas tehnoloģijas ļauj skatīt izcilus gleznu reprodukciju albumus, kas drukāti uz labākās kvalitātes papīra un dod iespējami patiesāko priekšstatu par oriģinālu. Mājās ikviens interesents var aplūkot tūkstošiem kilometru tāla

pasaules prestižākā muzeja slavenāko autoru mākslas darbus arī virtuālā galerijā. Protams, tas nevar aizstāt iespaidu, ko mākslas baudītājs saņem muzeja izstāžu zālē, apskatot gleznas vai skulptūras oriģinālu. Izstāžu kuratori ir izdomas bagāti, lai ieinteresētu apmeklētāju fiziski doties uz muzeju un uzzināt izstādes vai ekspozīcijas koncepciju, izlasīt anotāciju un baudīt radīto atmosfēru (Dundure & Apele, 2016).

Muzejs kā demokrātiska institūcija mūsdienu situācijā vēlas būt kopienas starpnieks un vienotājs, padarot pieejamas savos krājumos esošās kultūrvēsturiskās vērtības cilvēkiem ar īpašām vajadzībām, tādā veidā paplašinot savu apmeklētāju loku.

Pētījuma mērķis: Izpētīt taktīlās uztveres nozīmi mākslas darbu pieejamības nodrošināšanā cilvēkiem ar redzes traucējumiem un analizēt izstrādātā kataloga “Klusā daba” ar taktīlu attēlu pielikumu izmantošanas rezultātus.

Pētījuma rezultāti tika iegūti, izmantojot teorētisko pētījumu metodes: zinātniskās un publicistiskās literatūras studēšana, analīze un izvērtēšana, kas atklāj attiecīgās problēmas būtību, kā arī personīgās pieredzes refleksija.

Raksta pirmajā daļā, autore izvērtējušas taktīlās uztveres nozīmi mākslas darbu pieejamības nodrošināšanā cilvēkiem ar redzes traucējumiem, kas sniedza pētījumam zinātnisko pamatojumu un apstiprināja izvirzītās problēmas aktualitāti un otrajā daļā aprakstīja mākslas darbu kataloga “Klusā daba” dizaina izstrādi, kas sevī ietvēra analīzi par taktīlās grafikas pielietojumu gleznu reprodukciju izgatavošanā un analizēja pielietotās tehnoloģijas mākslas kataloga izveidē.

### **Taktīlās uztveres nozīme mākslas darbu pieejamības nodrošināšanā cilvēkiem ar redzes traucējumiem**

#### ***The Importance of Tactile Perception in Ensuring Accessibility of Artistic Works to People with Vision Impairment***

Informācijas pieejamības nodrošināšana jebkuram sabiedrības loceklim, it īpaši sensorās uztveres funkciju ierobežotā izmantošanā, ir svarīgs uzdevums, kas jāveic arī muzeju jomā strādājošiem. Visvairāk informācijas trūkumu izjūt cilvēki ar neredzību, tie ir 85-90% no visiem sajūtu orgānu darbības traucējumiem kopumā (Landra & Tūbele, 2011). Informācijas un tehnoloģiju straujas attīstības apstākļos ir visi priekšnoteikumi, lai šo informatīvo tukšumu aizpildītu un piedāvātu visām kopienām mūsdienu sabiedrībā harmoniskas izglītošanās iespējas un labāku dzīves kvalitāti.

Ienākot jaunā gadu simtenī, muzeju centieni iesaistīt līdz šim novārtā atstātās sociālās grupas izstāžu un pasākumu norisē ieņem aizvien stabilāku vietu šo kultūras iestāžu nākotnes vīzijās un stratēģijās. Šādas iniciatīvas izskan gan no mākslinieku puses, gan sabiedriskajām organizācijām, gan pašiem muzejiem. Atverot mūsdienu muzeja mājas lapu, bieži vien var redzēt piedāvājumus

dažādām sociālām grupām, cilvēkiem ar īpašām vajadzībām. Cilvēkiem ar redzes problēmām tiek organizētas tā sauktās „taustes tūres”, kad izstāžu kurators vai cilvēks ar speciālām zināšanām iepazīstina grupas dalībniekus ar muzeja eksponātiem, kas ir speciāli atlasīti, sagatavoti un izkārtoti taktilai apskatei. Tāpat tiek piedāvāts iekļauties klausītāju grupā un audiāli iepazīt gleznu izstādes eksponātus, kā arī lietot paskaidrojošos materiālus, kas sagatavoti Braila rakstā vai ar palielinātiem burtiem. Šie ikdienas piedāvājumi neizslēdz arī muzeju īpašos projektus, kas vērsti uz padziļinātu mākslas darba būtības izskaidrošanu.

Neredzīgiem cilvēkiem bez īpašas asistences vai sagatavošanās ir liegta mākslas vērtību iepazīšana muzeju ekspozīcijās un izstāžu zālēs, jo savas specifikas dēļ māksla lielākoties ir vizuāla parādība vai lielums. No tā izriet jautājums: kā un vai vispār neredzīgs apmeklētājs var jēgpilni uztvert mākslu? Vizuālajā pasaulē kontakts ar mākslu notiek vizuāli, māksla ir radīta vizuāli un darba procesā papildīta ar saturu arī vizuāli (De Coster & Loots, 2004). Īpaši tas jāteic par glezniecību, kur tikai visi parametri un izteiksmes līdzekļi kopumā – formāts, kompozīcija, kolorīts, faktūra - veido pilnīgu mākslas darba uztveres ainu. Mākslas baudīšana vizuāli nes sev līdzī ne tikai fizisku parametru konstatāciju, bet estētiskos un filozofiskos aspektus, vērtējus un atzinumus. Tā vienmēr reflektē sabiedrības svārstības, morālās vērtības, tik pat labi, kā to pārskatīšanu. Māksla var būt kritiska, deformējoša, simboliska, un tai vienmēr ir saikne ar sabiedrības vizuālo tēlu. Neredzīga cilvēka konfrontēšana ar mākslu izraisa šaubas un virkni jautājumu, atbildes uz kuriem ir jāmeklē neredzīgu cilvēku iesaistīšanā un izglītošanā. Arī cilvēks ar redzes traucējumiem lieto vizuālus konceptus, kas var būt saglabājušies no laika, kad redze vēl nebija zaudēta, tie var būt daļēji uztverti ar redzes atlikumu, pat neredzīgs cilvēks saprot, ka redze ir ļoti svarīga pasaulē, kurā viņš dzīvo. Šī iemesla pēc, cilvēki ar redzes traucējumiem interesējas par mākslu kā būtisku dzīves aspektu, kā informācijas un pieredzes avotu (De Coster & Loots, 2004).

Apmeklētājiem ar vājredzību esošais muzeju piedāvājums ir daļēji vizuāli tverams, taču arī tādai uztverei ir nepieciešama sagatavotība gan no muzeja puses, gan paša cilvēka. Mākslas darbu reprodukciju aplūkošana izstāžu katalogos, var sniegt priekšstatu, piemēram, par liela izmēra gleznu, kas vājredzīgam cilvēkam nav fiziski tverama kopumā, taču samazinātā mērogā uztvere uzlabojas. Tālāk var sekot detaļu aplūkošana oriģinālā ar paskaidrojumiem un palīdzību no muzeja darbinieku vai pavadošās personas puses. Te jāpiemin vājredzības dažādās izpausmes, tāpēc šāds mākslas darba uztveres veids derēs tikai daļai cilvēku ar redzes problēmām.

Muzeju ekspozīcijās nereti tiek ievietoti priekšmeti vai objekti, kuriem jau pēc sākotnējās ieceres ir ļauts pieskarties. Tas, galvenokārt, attiecas uz tēlniecības darbiem mākslas izstādēs – apaļskulptūrām, bareljefiem, ciļņiem vai instalācijām - ar noteikumu, ka pieskārieni neietekmē priekšmeta materiālu un ka

tie ir droši un stabili novietoti telpā, nepakļaujot kļūmīgai situācijai to aplūkotājus. Nereti šādai taktīvai uztverei muzeju ekspozīcijās ir novietoti vēsturiski artefakti vai to atdarinājumi, lielu objektu modeļi vai maketi, kas ļauj arī pilnīgi neredzīgam cilvēkam iekļauties apmeklētāju vidū (Dundure & Apele, 2016).

„*BEYOND SEEING: art that brings together the blind and sighted*” (ĀRPUS REDZAMĀ: mākslas, kas saved kopā neredzīgo un redzīgo pasauli) - tā tika nosaukts sadarbības projekts un izstāde, ko 2013.-2014. gadā realizēja Admontas benediktīniešu klosteris, Austrijas Kultūras forums Maskavā un Mūsdienu mākslas centrs WINZAVOD. Projekts paredzēja to, ka pirmo reizi kopš 2002. gada, kad Admontas klostera Mūsdienu mākslas muzejā tika izveidota speciāla kolekcija „Ārpus redzamā”, tā tika parādīta ārpus Austrijas – Mūsdienu Mākslas centrā WINZAVOD Maskavā (Stift Admont, 2014).

Iesākot veidot šo kolekciju, tika pieaicināti 25 mākslinieki no dažādām valstīm, kas laika gaitā radīja darbus tieši izstādei ar nosaukumu *BEYOND SEEING*. Izstādes darbiem bija jābūt veidotiem tā, lai tos varētu uztvert gan neredzīgs, gan vājredzīgs, gan redzīgs cilvēks. Tikai dialogs starp redzīgajiem un neredzīgajiem izstādes apmeklētājiem pilnībā atklāja darbu būtību. Izstādes darbi bija vienoti galvenajā idejā par nevizuālu mākslas pieredzi. Tai pašā laikā katram darbam bija sava mākslinieciskā forma, kas izteica projekta mērķi (Stift Admont, 2014).



1.attēls, 2.attēls *Apmeklētāji Admontas klostera mākslas kolekcijas BEYOND SEEING izstādē*

Figure 1, Figure 2 *Visitors at the Exhibition of Admont Abbey Arts Collection BEYOND SEEING* (<http://www.stiftadmont.at/en/beyond-seeing/>)

Gleznojumi, instalācijas, multimediju darbi bija pilnīgi atšķirīgi un unikāli, nereti ar neparastu estētisko risinājumu. Gandrīz visi darbi bija taustāmi, klausāmi, pat apstāmi, kas tos padarīja, pieejamus tieši neredzīgiem cilvēkiem. Redzīgie apmeklētāji izstādē ienāca ar melnām acu maskām, kas viņiem vaigu vaigā lika sastapties ar pilnīgi jaunu, negaidītu mākslas pusi. Tādā veidā viņiem

tika dota iespēja iedomāties kā „izskatās” neredzīga cilvēka pasaule (skat. 1.att. un 2.att.).

Tas nav vienīgais šāda veida projekts pasaulē. Daudzos studentu un docētāju pētnieciskajos darbos dažādās pasaules mācību iestādēs atspoguļojas sabiedrības apziņā notiekošās izmaiņas par lielāku atbildību kopienās vienam pret otru, savstarpēju saprašanos un atvērtību citādam. Tādi projekti top, risinot arī vājredzīgu un neredzīgu cilvēku problēmas, viņu uztveres īpatnības un vajadzības.

Pētot informāciju un analizējot muzeju līdzšinējo piedāvājumu mākslas vērtību pieejamībā cilvēkiem ar redzes traucējumiem, jāsecina, ka ir daudz panākts tieši trīsdimensionālu artefaktu pielāgošanā, dublēšanā un pasniegšanā taktīlai aplūkošanai muzeju izstāžu zālēs. Mazāk ir piemēru par glezniecības darbu reproducēšanu, tulkošanu un pārvešanu vājredzīgu un neredzīgu cilvēku taustes uztverei. Taktīlās grafikas iespējas paver plašu darba lauku muzeju krājuma pasniegumā cilvēkiem ar redzes problēmām.

### **Taktīlās grafikas pielietojums gleznu reprodukciju izgatavošanā** *Tactile Graphics in the Creation of Painting Reproductions*

Pētījuma gaitā tika izgatavoti trīs gleznu taktīlo zīmējumu komplekti, savukārt rakstā analizēts viens. Visas trīs gleznas atrodas LKM krājuma Mākslas kolekcijā. Pārvešanai un reproducēšanai taktīlajā grafika tika izvēlēti šādi klusās dabas žanra mākslas darbi:

1. Arvīds Egle „Klusā daba” 1967.g., audekls, eļļa 90 x 116 cm, LgKM 6495
2. Helēna Svilāne-Kuzmina “Klusā daba ar citroniem” 1984.g., audekls, eļļa, 50 x 60 cm, LgKM 14185
3. Jānis Unda “Maize”, papīrs, akvarelis, 33 x 46 cm, LgKM 2579

Izvēli noteica gleznu atšķirības gan sižetiskajā papildījumā, gan mākslinieku rokrakstā, gan pielietotajos izteiksmes līdzekļos, gan gleznošanas tehnikā. Taktīlās grafikas attēli, kas tika izgatavoti pēc mākslas darbu reprodukcijām, ir tapuši ar grafiskās datorprogrammas CorelDRAW palīdzību.

Reālisma stila A. Egles klusā daba tika izvēlēta ne tikai attēlotās priekšmetiskās vides, bet arī horizontālā formāta dēļ, jo tas atbilda izvēlēta kataloga formāta virzienam (skat. 3.att.).



3.attēls Arvīds Egle „Klusā daba” 1967.g., audekls, eļļa 90 x 116 cm  
Figure 3 Arvīds Egle „Klusā daba” (“Still Life”), 1967, canvas, oil 90 x 116 cm  
(LgKM 6495)

Šajā gleznā ir daudz priekšmetu un tiem ir atšķirīgas formas. Pārnesot šo gleznu zīmējumā, problemātisks izrādījās priekšmetu samazinājums līdz A4 formāta lapai. Tomēr tika pieņemts lēmums, ka darbs tiks turpināts un priekšmetu formas ir jāvienkāršo, piemēram, puķu pušķis tika zīmēts daudz nosacītāks, atsakoties no detaļām. Sākumā tika uzvilktas priekšmetu un apkārtesošas telpas kontūrlīnijas. Sekojot pētītajām taktilo attēlu vadlīnijām, ko izstrādājuši tilfografikas speciālisti no *The Brille Authority of North America* (Ziemeļamerikas Braila apvienība), tika izvēlēts atšķirīgs līniju biezums kontūrlīnijām un tekstūru līnijām. Pirmie gatavie zīmējumi divos variantos tika tehniski testēti SIAC vājredzīgiem un neredzīgiem bērniem, izlaižot tos caur termosildītāju un vērojot vai faktūra veidojas pietiekoši saprotama. Zīmējums ar plānāku kontūru neizdevās, un tika pieņemts lēmums par biežāko līniju lietojumu. Faktūru aizpildījumā arī bija vērojamas kļūdas – no pārāk tievām līnijām neveidojās reljefs. Zīmējumi tika pārstrādāti un kļūdas labotas. Taktilo attēlu Vadlīnijas un standarts taktilām grafikām (*The Brille Authority of North America*, 2010) ietver sevi arī faktūru jeb tekstūru paraugus mikrokapsulu papīram.

Sekojot ieteiktajiem tekstūru veidiem un to sastāvdaļu lielumam un attālumiem starp moduļiem, tika izstrādātas jaunas oriģinālas laukumu aizpildīšanai domātas tekstūras. To zīmēšana norisinājās ar ģeometrisku figūru un līniju rīka palīdzību, katru sākot no viena objekta, piemēram, punkta, un pavairojot līdz tika iegūts vienlaidus tekstūras laukums. Šāds veids izrādījās vispiemērotākais, jo piesaistot un atsaistot vienu moduli no otra, var iegūt jebkuras konfigurācijas laukuma aizpildījumu. Ja izmantot vai pielāgot datorprogrammas piedāvātas tekstūras, tad tāds darbs prasa daudz vairāk darba,



un visbiežāk tādas tekstūras neatbilst vajadzīgajiem parametriem. Visas sagatavotās tekstūras var izmantot nākošajiem taktilajiem zīmējumiem, uzglabājot autoru „bibliotēkā”.

Tekstūru iekļājuma izvēle lielā mērā ir intuitīva, pēc lietotāja reakcijas vēlāk var noteikt, vai tā ir bijusi veiksmīga, vai ir jāmaina tekstūras veids. Blakusesošās tekstūras ir jāizvēlas ļoti rūpīgi, lai tās nebūtu ļoti līdzīgas, lai, piemēram, svītrojums vienam priekšmetam būtu vertikāls, bet blakus noteikti horizontāls. Punktojums nedrīkst būt pārāk smalks, drīkst lietot vairākus punktojuma veidus vienā zīmējumā, tikai to izmēriem un formai jābūt atšķirīgiem. Punkta pamatelementa forma var būt gan rombs, gan kvadrāts, gan arī neregulāras formas punkts. Ja lieto slīpu līniju iekļājumu, tad tām ir jābūt dažādu virzienu diagonālēm, kuras drīkst krustoties, veidojot restīti. Zīmējumā ir jāatstāj gluds, tīrs laukums bez tekstūras, kas arī darbojas kā aizpildījums. Vienlaidus reljefs laukums, ko dod iekrāsošana melnā krāsā, arī ir lietojams nelielu priekšmetu vai elementu aizpildījumā. Īpaši tas noder, lai izceltu kādu centrālo tēlu vai priekšplānā esošu objektu. Kopumā izvērtējot zīmējumu, kritiski jāaplūko visi attēlotie objekti un jāatsakās no nevajadzīgām detaļām, ja tās nepalīdz uztvert attēla būtību. Jāizvairās no detaļu sadrumstalotības, kas traucē taustes uztverē, novērš uzmanību, nogurdina. Taktilās grafikas veidotājs var arī pats piedalīties testēšanā, tā attīstot savu sensoro uztveri.

Eksperimentējot ar formātiem, tika izgatavoti arī A3 formāta zīmējumi. Lai gan praktisko nodarbību rezultātā šie zīmējumi tika testēti un iegūti vairāki pozitīvi rezultāti, tomēr tika nolemts izmantot A4 formāta papīru, jo tas atbilst ērtākajam ar abām rokām aptveramajam laukumam darbošanās laikā. A3 pozitīvie rādītāji skar mazāka izmēra priekšmetu attēlojumu, kurus palielinājumā ir iespējams skaidrāk sajust ar tausti. A3 formāta apgūšanā ir vērojams apgrūtinājums lielo attālumu dēļ starp attēlotajiem objektiem, tas dezorientē un liek vēlreiz un vēlreiz pārlūkot, lai saprastu objektu novietojumu. Lielākoties šī atziņa attiecas uz bērnu un jauniešu auditoriju.

Lai gatavais produkts izskatītos vizuāli pievilcīgs un būtu saturiski interesants un noderīgs, ir jāizvēlas atbilstoši izteiksmes līdzekļi, paņēmieni un tehnoloģijas.

### **Integrētā mākslas kataloga izveidē pielietotās tehnoloģijas** *Technologies Used in the Creation of the Integrated Arts Catalogue*

LKM krājuma Mākslas kolekcijas katalogs „Klusā daba” ar pielikumu vājredzīgiem un neredzīgiem cilvēkiem ir eksperimentāls divdaļīgs produkts, tāpēc pētījuma rezultātā tika nolemts izveidot šī kataloga maketu. Maketa izveidē tika izmantots 2 mm kartons, 150 gramu drukas papīrs, apdrukāta līmplēve un speciālais mikrokapsulu papīrs.

Tā kā teksta sadaļa mākslas katalogā ir paredzēta samērā neliela - kopējais katalogu raksturojošais ievads un gleznu etiķetes, tad uzsvars tika likts uz tā vizuālo - mākslas darbu reprodukciju daļu. Tika veikta darbu atlase un sistematizācija, etiķešu un ievadteksta sastādīšana. No atlasītajiem mākslas darbiem tika izveidota izlase, kas kopumā sastādīja 40 vienības. Atlases mērķis - sasniegt pēc iespējas viengabalainu un harmonisku kopējo iespaidu, izgaismojot Latgales mākslas vērtības, kas glabājas LKM Mākslas kolekcijā. Uzmanība tika pievērta kataloga lappušu spoguļa kompozīcijai, blakus esošo gleznu saskanīgai līdzāspastāvēšanai. Mākslas darbi tika fotografēti ar digitālo fotokameru un digitāli apstrādāti fotogrāfiju rediģēšanas programmā Adobe PhotoSHOP, ko veica LKM fotogrāfs Aleksandrs Bondarenko. Gleznas etiķete jeb nosaukums ar citiem raksturlielumiem tika izvietots gan zem attēla, gan blakus tam, gan divu reprodukciju teksts vienā blokā. Eksperimentālā kataloga lappuses tika digitāli nodrukātas krāsu drukā, un to iesiešana notika ar rokām. Iekšlapām tika izmantots 150 gramu pusmatēts baltais drukas papīrs. Balts papīrs ar Braila rakstu zīmēm uz tā, kas veido savdabīgu virsmas uzirdinājumu, ir tik lakonisks, bet reizē skaists, ka kļūva par iedvesmas avotu, lai atstātu iekšlapās neapdrukātu fonu un balto atstātu kā vāka pamattoni.

Analizējot grāmatu dizaina tendences, autores nolēma, ka veidos izdevuma apvākam izcirstas detaļas. Abām gatavā produkta sastāvdaļām tika izgatavots viens apvāks, kas ir salīmēts no kartona un uz tā vāka izveidoti apļveida izcirtumi, kas ir Braila rakstā izlasāms kataloga nosaukums. Apvāks ir ērti lietojams, jo abu sastāvdaļu izņemšanai ir paredzēta stīga auduma lente. Neredzīgs cilvēks, kas turēs rokas šo katalogu, varēs bez grūtībām saprast, kā tas ir izņemams un ieliekams atpakaļ. Šo apvāku realizācijas gadījumā būs nepieciešams izgatavot mazā tirāžā - līdz 200 eksemplāru, tieši tik, cik būs izgatavoti taktilo zīmējumu komplekta eksemplāri. Mākslas darbu vizuālais reprodukciju albums ir paredzēts lietošanai arī bez apvāka kā atsevišķs muzeja reprezentācijas izdevums.

Pielikums vājredzīgiem un neredzīgiem cilvēkiem, atšķirībā no kataloga maketa, ir lietošanai gatavs produkts nodarbību laikā muzejā. Taktilo attēlu izgatavošanai tika pielietotas tehnoloģijas, kuras pieejamas SIAC vājredzīgiem un neredzīgiem bērniem „Braila raksta un taktilās grafikas centrā”. CorelDRAW grafiskajā programmā sagatavoto zīmējumu komplekts tika izdrukāts uz īpašā mikrokapsulu papīra. Nākošā posma uzdevums bija šos grafikos zīmējumus padarīt reljefus. Tas tika panākts, virzot attēlus caur termosildītāju, kur siltuma ietekmē papīra virsma kļuva reljefa. Sagatavotais teksts mākslas darbu aprakstiem ar Braila tulkošanas programmu tika iztulkots un izdrukāts Braila rakstā uz 150 gramu balta drukas papīra. Aprakstošajam tekstam bija jābūt vienkāršam, lai tas būtu viegli uztverams un lai tulkojot un drukājot Braila rakstā, tā apjoms nepārsniegtu A4 formāta lapu. Atbilstošie teksti un zīmējumi tika secīgi sakārtoti un iesieti.

LKM krājuma Mākslas kolekcijas kataloga „Klusā daba” vāka dizainam tika izmatotas Braila rakstu zīmes un uzrakstīts nosaukums Braila rakstā. Autores to veica, vadoties pēc *Netherlands Library for Audio Books and Braille* (Nīderlandes audio un Braila raksta grāmatu bibliotēka) sniegtajiem ieteikumiem viņu izstrādātajā metodiskajā materiālā „Grafikas neredzīgiem cilvēkiem rediģēšana”. Braila rakstu zīmes tika izmantotas tāpēc, lai kataloga redzīgajos lietotājos veidotu sapratni un toleranci pret citādo. Tāpat vājredzīgu un neredzīgu cilvēku asistenti un tuvinieki skaidri sapratīs norādi uz produkta mērķauditoriju. Vāks tika izgatavots, izdrukājot tā dizaina attēlu uz līmplēves, kura, savukārt, tika uzlīmēta uz 2 mm bieza kartona.

Kataloga maketu varēs lietot kā prototipu drukātā izdevuma un apvāka izgatavošanas izmaksu aplēsēm. Produkta izveidē iespējams lietot otrreizējas pārstrādes produktus, piemēram, kartonu apvāka izveidei un kataloga vāka pamatnei. Izmaiņas tehniskajā izpildījumā ir iespējamās kataloga drukas realizācijas darbu ietvaros.

### **Secinājumi** **Conclusions**

Kopsummā mākslas valodas tulkošana vājredzīgiem cilvēkiem prasa dziļāku problēmas izpēti un starpdisciplināru pieeju, cilvēku ar redzes traucējumiem uztveres īpatnību izpratni un vajadzību respektēšanu. Muzejos glabāto mākslas vērtību pieejamības nodrošināšana vājredzīgiem un neredzīgiem cilvēkiem ir ceļš uz atvērtāku un iekļaujošu attieksmi no muzeju puses, atsaucību un komunikāciju no sabiedrības kopienām.

Noslēgumā daži būtiskākie secinājumi:

- sabiedrības attieksmes maiņa pret citādo paplašina cilvēku ar redzes traucējumiem iespējas uztvert un baudīt kultūras un mākslas izpausmes;
- grafiskais dizains ar tehnoloģisko risinājumu palīdzību paver plašu darba lauku izglītojošu produktu radīšanā cilvēkiem ar redzes traucējumiem;
- taktilo attēlu izmantošana muzejā ir sabiedrības sociālās grupas vienojoša un integrējoša pieeja mākslas darba tulkošanā un izpratnes veidošanā par mākslu;
- ar taktilās grafikas līdzekļiem radītais jaunais produkts ir atbilstošs muzeja piedāvājuma dažādošanai cilvēkiem ar redzes traucējumiem un lietojams muzeja vidē praktiskajās nodarbībās;
- pielāgotie mākslas darbu taktilie attēli palīdzēs muzejam kā izglītojošai institūcijai veiksmīgāk iekļaut savu apmeklētāju lokā indivīdus ar redzes problēmām.

Autores uzskata, ka vēl ir daudz neatbildētu jautājumu, lai pēc iespējas labāk izzinātu vienas sabiedrības grupas vajadzības, lai saprastu nevizuālas pasaules uztveres īpatnības un bagātinātu to ar pieejamiem un inovatīviem līdzekļiem.

### **Summary**

Ensuring the accessibility of information to any member of society, especially those with limited use of the sensory perception function, is an important task, which also needs to be addressed by those working in the field of museums. The people who feel the lack of information the most are the visually impaired; these are 85-90% of all sensory organ function impairments (Landra & Tūbele, 2011). The circumstances of rapid information and technology development have all the prerequisites for filling in this information void and offering all communities of modern society the opportunities for harmonious self-education and better quality of life.

The research results were obtained using theoretical research methods: study, analysis and assessment of scientific and journalistic literature, which reveals the essence of the problem, as well as the reflection of personal experience.

In the first chapter of the article, the authors assessed the importance of tactile perception in ensuring accessibility of artistic works to people with vision impairments, which provided the scientific grounds for the study and confirmed the importance of the problem; whereas in the second chapter, the authors described the creation of the design of the arts catalogue “Still Life”, which involved the analysis of the use of tactile graphics in the creation of painting reproductions, and analysed the technologies used in the creation of the arts catalogue.

Having studied the information and analysed the previous offer of museums regarding the accessibility of artistic values to people with visual impairments, we have to conclude that a lot has been achieved in the adaptation, duplication and presentation of three dimensional artefacts for tactile viewing in museum exhibition halls. There are fewer examples of reproduction, translation and transfer of paintings for the tactile perception of visually impaired people. The opportunities of tactile graphics open a wide field of work for the presentation of museum collections to people with vision problems.

In the course of the study, three sets of tactile drawings of paintings were created. All the three paintings are located in the Arts collection of Latgale Culture and History Museum.

For the final product to look visually attractive and to have interesting and useful content, suitable means of expression, approaches and technologies need to be chosen. In the creation of the model of the Latgale Culture and History Museum integrated arts collection catalogue “Still Life”, the approach that unifies and integrates the social groups of society has been used. The new product created using tactile graphics is suitable for varying the offer of Latgale Culture and History Museum for people with vision impairments. The integrated arts catalogue can be used for the practical activity prepared in the museum environment. The creation of the model is the basis for the implementation of the next aim – the creation of a printed publication of the arts reproduction catalogue. The integrated arts catalogue will help the museum as an

educating institution to integrate different communities of society into its circle of visitors.

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# ИНТЕЛЛЕКТУАЛЬНО-ГРАФИЧЕСКАЯ ВИЗУАЛИЗАЦИЯ ИНФОРМАЦИИ КАК ИНТЕГРАТИВНЫЙ МЕТОД ОБУЧЕНИЯ

## *Intellectual-graphic Visualization of Information as an Integrative Teaching Method*

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**Abstract.** *The article presents the theoretical reasoning and the practical value of such an integrative teaching method as intellectual-graphic visualization, which corresponds to the modern method of informatization of the society. The method is based on Metadidactics Theory, Visualization and Infographics Theory, and uses the fundamental cartographic approach to modeling spatially distributed information. Essentially, it is the reasoning for the second language use, i.e. the language of graphication of information, in the learning process.*

**Keywords:** *intellectual-graphic visualization, metadidactics, visualization of educational information, an integrative teaching method, the language of graphication.*

### **Введение**

#### ***Introduction***

Актуальность проблемы, которая рассматривается в статье, объясняется тем, что развитие общества должно быть корреляционно связано с методами и технологиями как обучения вообще, так и подготовкой специалистов, в частности. Постиндустриальное общество XX века сменяется в наше время обществом, характерными чертами которого являются информатизация и компьютеризация.

Информационная экспансия во все сферы жизни обуславливает ее отражение в образовании в первую очередь. Информация, в частности, учебная информация, понимается нами как «дидактическая проекция» научного материала, превращенного в учебный, предусмотренный программой. Научный материал, специально отобранный, адаптируется для познания как неизвестный, познание которого позволяет усвоить основы изучаемой дисциплины.

Цель статьи заключается в разработке интегративного метода интеллектуально-графической визуализации учебной информации, перевода ее в проблемную графическую форму, разработке и более разностороннем использовании полипредметного картографического метода обучения. По сути, рассматривается системная структура развития своеобразного языка представления учебной информации, а именно, языка графикации, подобно литеации, нумерации, например.

Исследование вопросов визуализация учебной информации при подготовке студентов в университетах необходимо и актуально, так как в ней скрыты большие возможности для повышения эффективности процесса обучения, развития творческих способностей обучающихся.

При написании статьи использован многолетний опыт работы в университете, опыт научно-исследовательской работы с аспирантами и студентами. В процессе педагогической деятельности развивались картографический и инфографический методы обучения, эффективность которых устанавливалась в процессе педагогического эксперимента, педагогического наблюдения, тестирования, анализа результатов обучения.

Базой исследования являлся Российский государственный педагогический университет имени А.И. Герцена и Ленинградский государственный университет имени А.С. Пушкина. Внедрение результатов исследования осуществлялось в ЛГУ имени А.С. Пушкина на факультете естествознания, географии и туризма при руководстве кандидатской диссертацией «Формирование готовности бакалавров к профессиональной творческой деятельности учителя» и при подготовке студентов бакалавриата по направлению «Педагогическое образование» (профиль География – Биология и Биология – География), Экология и природопользование, Туризм.

### **Теоретическая основа темы**

#### ***The theoretical background***

Один из современных механизмов развития личности обучающегося основан на «развивающей», личностно-деятельностной парадигме, предполагающей не только получение знаний, но и умение добывать их самостоятельно различными способами. В подобном случае знания присваиваются, становятся прочными, являются интеллектуальным фундаментом, на котором далее возможно самообразование и саморазвитие личности.

Изучая интеллектуально-графическую составляющую метода обучения студента в университете, мы позиционируем, что речь идет об интегративном подходе к обучению и воспитанию в целях формирования

человека с развитым умом, творческого, с аналитическим мышлением, разносторонне образованного, компетентного как в своей непосредственной деятельности, так и других областях науки и культуры.

Очевидно, что важной составляющей информационного континуума современного общества является информация. В первую очередь это связано с всесторонней компьютеризацией деятельности в обществе. Представление информации существует в различных видах и предьявляется пользователю различными способами. Основным при этом является процесс ее визуализации средствами графикации.

Современный процесс формирования новой визуальной культуры должен найти свое отражение и в педагогической деятельности. Информационная графика по существу содержит в себе универсальные возможности полиметодического подхода к формированию пространственного мышления обучающихся. Визуализация позволяет представлять информацию в виде изображения таковой на рисунках, фотографиях, графиках, диаграммах, схемах, таблицах, картах и различных экранах.

Графически можно показать любую информацию: обыденную, научно-техническую, научную. Очень важно также и то, что можно визуализировать данные, не обозреваемые непосредственно, а полученные из вычислений; например, можно показать плотность населения на территории, распространение эпидемии в регионе и т.п.

Главная возможность, представляемая визуализацией информации – это ее непосредственное зрительное восприятие в графическом виде потребителем. Ее отличает наглядность, «понятность» для восприятия людьми, даже не имеющими специальных знаний (например, карты атмосферного давления, карты погоды, транслируемые по телевизору).

Этому вызову сегодняшнего дня - развитию визуализации информации средствами графикации - определилось направление, называемое *инфографикой*. Под инфографикой понимается способ визуализации любых данных. Вначале это направление относилось к дизайну, к рекламе и сегодня развивается достаточно интенсивно, используется в самых различных случаях необходимости донести информацию до читателя (или, в данном случае, скорее, зрителя) наиболее полно и быстро (Что такое инфографика, б. д.)

Психолого-педагогическая особенность инфографики заключается в том, что зрительный образ воспринимается мозгом в целом, далее выстраивается некая иерархия различных аспектов получаемой информации, а уже потом мозг воспринимает ее по частям. И эта иерархия – собственная у каждого человека. Инфографика заметно облегчает мозгу процесс выстраивания этой иерархии, ускоряя восприятие информации.



Еще в 1971 переведена с английского и вышла в свет «первая ласточка» - оригинальное руководство по методам графического представления научно-технической информации. В книге рассмотрены все основные задачи, встречающиеся в практике графического выражения научно-технических идей, даны ценные рекомендации по ясному и лаконичному представлению информации графическими средствами. Автор книги – известный американский художник-график У. Боумен (1971). Обозначая книгу в современных терминах, можно сказать, что это одно из первых пособий по инфографике.

В конце XX века проф. И.С. Якиманская, рассматривает «пространственное мышление как динамическое единство субъективного и объективного, их тесного и неразрывного взаимообогащения в процессе деятельности. Поскольку в своих наиболее развитых формах пространственное мышление формируется в основном на графической основе, то его особенности исследуются в контексте общих характеристик образного мышления» (Якиманская, 1980, 4). Важным достоинством метода визуализации является то, что он способствует взаимодействию внешнего и внутреннего планов деятельности обучающегося.

Теория пространственного мышления положена в основу геопространственных представлений, которые являются необходимой компетентностью любого специалиста, но в первую очередь это профессиональное поле знания географов, экологов, природопользователей, специалистов в туристской отрасли.

Опираясь на теорию П.Я. Гальперина о поэтапном формировании умственных знаний, Салминой Н.Г. разработаны основы развития знаковых систем и их применение в обучении (Салмина, 1988). Знаковые системы известны давно и широко применяются в картографии, топографии при создании своеобразного языка условных знаков и способов изображения явлений.

По нашему мнению, если литература изучает зависимость между буквой и звуком, то необходимо принять, что графикация как способ визуализации, пока латентно представляет собой зависимость между графемой (знаком, символом) и понятием, смыслом, заложенным в ее вид. По сути, может идти речь о развитии своеобразного языка представления учебной информации, а именно, языка графикации. Кроме того, инновационный подход к подготовке бакалавров и магистров предполагает использование технологий визуализации информации. Это современное направление весьма популярно в различных областях знания и отраслях (социология, электронные ресурсы, медицина и других). Интерес к инфографике и визуализации не случаен. Они способствуют быстрому пониманию содержания информации за счет ее наглядности и графической

«свертываемости». Визуализация помогает осмыслить и понять, сжать и наглядно представить океан цифр, слов, идей. Визуализация – это еще и «социальный клей» по выражению Гавриловой Т.А. и др., средство, задающее общие рамки для коммуникации (Гаврилова, Алсуфьев, & Гринберг, 2017).

Очевидно, что визуализация учебной информации позволяет изучать любое моделируемое пространство и соответственно развивает пространственное мышление, обучающегося, активизируя оба полушария головного мозга, интегрирует художественные и логические составляющие познания, позволяет формировать абстрактное представление о прообразе, реально существующем в действительности.

Подобное расширенное понимание картографического метода обучения как визуализации средствами геоизображений пространственно распределенной информации позволяет говорить о его полипредметности, необходимой для освоения не только наук о Земле, но и иных предметов: истории, химии, иностранного языка, математики и многих других. Гносеологическая суть картографического метода определяется сущностью самой науки картографии, предметом которой является отражение и исследование пространственных взаимосвязей географических систем различного типа посредством их графического моделирования.

Истоки теории и практики феномена графического образа, теории геоизображений получили развитие в трудах Берлянта А.М. «Образ пространства: карта и информация» (1986), «Геоиконика» (1996) и многих других.

Теория картографического метода исследований легла в основу картографического метода профессиональной подготовки как учителей географии, так и других специалистов естественно - научного направления в целях формирования у них образного, пространственного мышления, умения визуализировать геопространство интеллектуально-графическими средствами.

Теоретические основания фундаментальной науки картографии и зародившемся в ее недрах картографическом методе исследования и обучения, совмещенные с современными представлениями относительно нового направления графической визуализации информации – инфографики, позволили расширить возможности формирования такого интегративного метода обучения, как метод интеллектуально –графической визуализации учебной информации.

## Организация исследования *Research organization*

Исследование освоения обучающимися интеллектуально – графической визуализации учебной информации, разностороннее применение картографического метода за счет сочетания его с возможностями инфографики, понимание основ языка графикации опирается на указанную выше теорию визуализации, понятие о геопространстве и геоизображении, графическое моделирование. Основная цель исследования - приобретение обучающимися профессиональной инфо-картографической компетентности, умения переводить вербальную форму информации в графическую, сочеталась с психолого-педагогической целевой составляющей – сопутствующим развитием умственной деятельности и соответственно пространственного творческого проблемного мышления обучающихся, повышение их интеллектуального уровня.

Исследовательский эксперимент осуществлялся на протяжении ряда лет с контингентом будущих специалистов по туризму и будущих учителей географии. Для студентов указанных направлений необходимо профессиональное знание территории, наличие представления о геопространстве, о его системной сложности. У них должно быть понимание таких важных понятий, как местоположение и соседство, геосистема и экосистема, потоки и связи, должно быть сформировано умение работать с картой, которая представляет собой «язык географии».

Феномен графического образа территории, ее графическая модель в виде карты корреспондировали с процессом освоения интеллектуально-графического метода визуализации учебной информации.

Освоение студентами метода осуществляется на протяжении всех четырех лет обучения на бакалавриате и условно подразделено нами на три этапа: *пропедевтический, деятельностный и творческий учебно-исследовательский*. Этапы неразрывно связаны между собой. Каждый этап состоит из аудиторной (лекции и практические занятия) и полевой подготовки и усложняется в процессе его развития, усиления при переходе одного в другой, следующий.

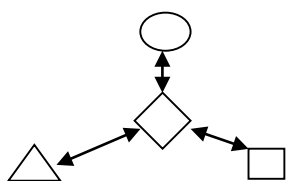
*Пропедевтический этап* (теоретико-практический дисциплинарный; основные связи – внутрипредметные) является определяющим для дальнейшего понимания метода и продолжается оба семестра первого курса. Главный его смысл заключается в том, что анализ любого графического образа показывает существование некоего «словаря форм», позволяющего этот абстрактный визуальный образ воспринимать как отображение прообраза, некоей изучаемой реальности. Вначале студенты

знакомятся с графемами как со средствами наглядности и постепенно наполняют их системным содержанием, выстраивая логические модели-образы, позволяющие анализировать учебную информацию, строить функционально-блоковые и другие модели на пространственном, творческом уровне. Содержание пропедевтического этапа заключается в том, что при овладении картографическими знаниями и специальными умениями в процессе изучения курса «Картография с основами топографии» или «Картографическое обеспечение туризма» студенты знакомятся с феноменом графического образа, способами его создания. Изучение топографических условных знаков и способов изображения явлений позволяет читать топографические и специальные карты, способствует дальнейшему пониманию языка графикации, представляемого в виде различных простых графем. При конструировании графического высказывания, графической иллюстрации необходимо иметь в виду, что графический образ, графическая форма складывается из пяти основных элементов: точки, линии, площади, цвета и текстуры. Образуемые ими сочетания, узлы, структурные и рубежные линии - это устойчивые инвариантные элементы феномена графического образа. На протяжении пропедевтического периода используются учебные карты, переход от единичных образов к обобщенным приемам, действия с различными геоизображениями. В качестве примера можно привести практические занятия по топографическому диктанту, по составлению туристского маршрута на основании словесного описания, созданию авторской таблицы условных знаков для туристских карт, чтение космических геоизображений и нанесение на них специальной нагрузки в целях информационного туристского обеспечения (авторские условные обозначения и легенда к ним.) Продолжается этап на протяжении 1, 2 семестров. Усвоены приемы географикации, графического высказывания.

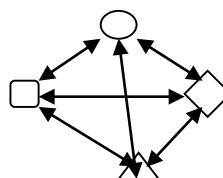
*Деятельностный этап* (теоретико-практический монодисциплинарный, переходящий в интегративный; основные связи между географическими дисциплинами и дисциплинами геотуристики предметной подготовки учебного плана, спецкурсами и спецсеминарами). Продолжается 3, 4, 5 семестры. Осуществляется учебно-практическая деятельность с применением метода интеллектуально - графической визуализации любой информации. Происходит развитие графических знаний и умений, картографической компетенции в процессе применения метода при изучении дисциплин учебного плана, выполнения творческих заданий, курсовой работы и по необходимости при прохождении отраслевых учебной и производственной практик. Кроме чтения и составления в условных знаках пространственно распределенной картографической информации формируется умение «перекодировки»

вербальной информации в графическую, т.е. умение «свернуть» и визуализировать словесное высказывание или понятие в графическую форму. К пятому семестру формируется умение составлять логические схемы и картосхемы, выполнять графические высказывания.

Яркий пример эффективности метода приводится в задании, в котором предлагается, опираясь на понятие «геосистема» и «экосистема», показать их графически и объяснить различия между ними. Из определения обоих терминов известно, что системы обладают сходством набора элементов (показываем их условно: абиотические в виде квадрата, окружности, треугольника, а биотические в виде ромба), их составляющих, но различаются направленностью внутрисистемных связей (показываем стрелками). Для модели экосистемы (Рис.1) характерно центральное положение «хозяина» - биотического элемента и направленность на него связей со стороны факторов среды. Тогда, как для модели геосистемы (Рис.2) существует признание равенства всех элементов системы и равнозначности всех связей в ней.



*Рис. 1. Модель экосистемы  
Figure 1 Ecosystem model*



*Рис. 2. Модель геосистемы  
Figure 2 Model of geosystem*

Аналогично визуализируя информацию, показывают субъект-объектные модели, соотношение понятий «природа» - (окружающая среда, природные ресурсы), и «общество» - (хозяйство и население) и далее географическая среда, географическая оболочка.

Другое задание предлагает студентам «прочитать» графему, на которой показана модель географического пространства для определенной территории, охарактеризовать ее, подготовить проект ГИС-модели по различным информационным слоям.

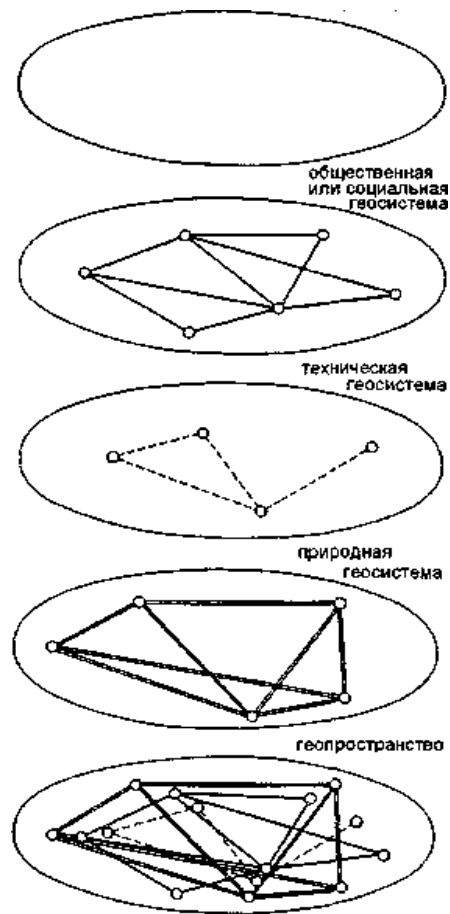


Рис. 3. Схема структуры географического пространства (Мересте & Ныммик, 1984)  
Figure 3 Schema of structure of geospace (Mereste & Nymnik, 1984)

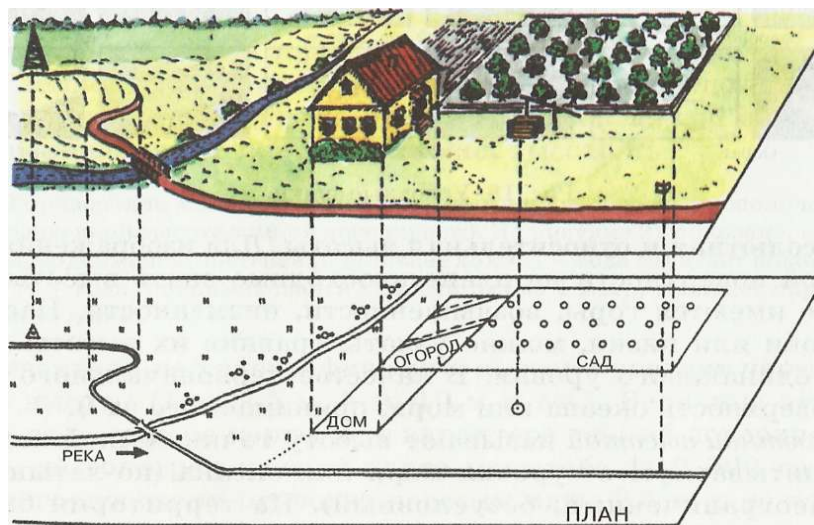


Рис. 4. Создание плана (Комиссарова & Гаджиева, 2017)  
Figure 4 Creation of the plan (Komissarova & Gadzhieva, 2017)

Второй этап предполагает сформированность инфо-картографической компетентности будущих бакалавров (интеграция способов инфографики и картографического метода) – то есть умение как составлять графемы и визуализировать пространственно распределенную информацию, так и наоборот - интерпретировать графические высказывания различного вида и усваивать учебную информацию.

Третий этап *творческий учебно-исследовательский* (теоретико-исследовательский интегративный. Основные связи межпредметные, при этом интегратором является графический образ.) Продолжается этап 6, 7, 8 семестры. Характеризуется под научным руководством преподавателя дальнейшим развитием опыта творческого применения как картографического метода, так и способов инфографики. В частности, на многих туристских картах помещаются такие элементы как *дополнительные данные*. К ним относятся *диаграммы, профили, графики, таблицы, схемы, карты-врезки, фотокарты, пояснительные тексты*.

В процессе учебно-научной деятельности на 3 и 4 курсах, умение обрабатывать различными способами визуализации полученную информацию формируется при выполнении творческих заданий, курсовой работы, дипломного эксперимента, написании выпускной квалификационной работы, научной статьи в университетский сборник. У студента складывается полная картина наличия практически всех необходимых способов информационно-картографического метода визуализации информации. Они владеют построением указанных видов инфографики, графической интерпретацией материала, его анализом и преобразованием информации в наиболее наглядную «свернутую» форму (логико-графических схем, таблиц, графиков, диаграмм, пространственных моделей).

### **Результаты исследования** *Results of the research*

Экспериментальные исследования показали, что умение оперировать знаково-символическими средствами представления информации необходимо формировать как овладение особым профессиональным языком в определенных условиях. Разработанная нами модель трехэтапного освоения интеллектуально – графической визуализации учебной информации предполагает в конечном итоге творческое развитие профессиональной компетентности будущих бакалавров, облегчает им усвоение нового материала, научает структурировать тексты учебников и сворачивать их в графические высказывания, графические конспекты. От этапа к этапу формируется умение применять метод в профессионально ориентированной учебной деятельности, в частности, при моделировании пространственно

распределенной информации, умение дополнительно применять способы инфографики – создавать графемы, карты, геоизображения, структурно-логические схемы, чертежи, графики, таблицы. Главное методологическое положение при этом - понимание того, что за графическим образом стоит мысленно представляемая объективная реальность и таким образом его восприятие, распознавание превращается в акт познания, развития пространственного, логического, творческого мышления.

### **Выводы** *Conclusions*

Обобщение многолетнего опыта преподавательской деятельности в университете на факультете естествознания, географии, социально-культурного сервиса и туризма позволило нам разработать инновационную систему интеллектуально-графического метода визуализации информации в основе которого лежит картографический метод исследования и обучения в сочетании с приемами инфографики.

В дополнение к изложенному важно обобщить исследование в том смысле, что владение визуализацией учебной информации активизирует оба полушария мозга обучающегося, развивая и логическое, и творческое мышление. Студент, сравнивая два «экземпляра» одного и того же предмета: воображаемого и реального, образа и его прообраза, геоизображения и физического геопространства, например, испытывает развитие творческой мысли, повышение возможностей самообразования средствами языка графикации, удовлетворение от полученных положительных результатов обучения.

Графикация в ее семиотическом значении представляет собой своеобразный методический феномен обучения, показывающий связь между изображением и содержанием учебной информации и предполагающий соответствующие психолого-педагогические последствия развития познавательной и интеллектуальной способности студента. Значение визуальных, в том числе графических образов особенно велико для людей с преобладающим наглядно-образным типом мышления. (Так А. Эйнштейн говорил о себе, что слова не играют значительной роли в его механизме мышления, основные элементы мысли для него знаки и образы).

### **Summary**

The article presents the idea of an intellectual-graphic visualization of educational information by means of graphication as an integrative metamethod during the training of specialists in Natural Sciences and in Tourism.



At its core, the method of visualization is integrative and methodologically its creation is theoretically related to the cartographic research and training method and to infographics. The graphocommunication concept is initially based on the study of the map language and, accordingly, maps themselves, founded on the laws of graphics (graphic semiotics) and visual perception of images, which allows to combine it with techniques of infographics.

The main purpose of space-graphic information transmission is activation and development of certain processes of thinking supported by images. The image is a means of transmission of «graphic thought» in the form of «graphic statement».

Ultimately, the method supposes development of students' graphic literacy by mastering capabilities of the educational information graphic language in its visualization, which inevitably leads to development of students' spatial-imaginative creative thinking.

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# A NEW DIGITAL ART GAME: THE ART OF THE FUTURE

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**Abstract.** *The task of this study is to create an innovative digital art game of contemporary aesthetics on the basis of research. Research implies the analysis of digital art games and the historical background of their aesthetics, as well as their classification following the stylistic trends. Digital games have a great potential to integrate people into fields that would otherwise not meet their interest. The new game would develop the creative skills of players and teach them the current trends in digital art. The game would project the inheritance of art from the age of modernism into the digital world by teaching the player to recognize it (for instance, pixel aesthetics is a successor to cubism and constructivism). The new game will let its user play around with the trends in digital art such as vaporwave, glitch and others, and to create new ones. Thus, it would deal with the problem of knowledge cache and cultural segregation that characterizes modern art: being an esoteric subject to a great extent, it is difficult to access a large segment of the public. The aim of this study is to raise the interest of a wide-ranging public for contemporary art and to point out the newest creative tendencies in art. The paper presents an overview of digital art games, introduces a novel term, vaporwave, that has not been registered in the art game discourse so far, and offers an updated definition of the art game. The Design Science Research method is used in order to cross-cut such remote fields as the general public and the arthouse world, codes of modern art and the taste of the general public.*

**Keywords:** *art of modernism, digital art game, glitch, hacking, pixel aesthetics, vaporwave, generative art.*

## Introduction

This paper is a part of cross-cutting research in the fields of digital art and ICT (information and communication technologies) product innovation. It examines the trends in modern art that were formed during the period of modernism and still constitute the basic trends of intellectual culture today. The research is aimed at finding a path to open up the cache of knowledge situated in the theory of modern art, and to incorporate the trends of modern art into the field of ICT. The focus of this research lies in experimental products such as gaming and eLearning (though eLearning is not outlined in this paper, see Gintere, Zagorskis, & Kapenieks, 2018). The goal is to transfer knowledge of modern art into the area of gaming, as well as to encourage the intersection of these

disciplines. Consequently, this research aims to create a new profile of products that would exemplify modern interdisciplinary and analytic thought.

The paper presents a classification of digital art games, the historical background of their aesthetics, and the art game concept. It summarizes the existing art game definition and updates it by adding the feature of coded messages to it. The theoretical basis of this research is rooted in the philosophical theories that explain the background of the art game discourse. The paper examines existing art games, their artists, and represents modern game theory. In the current game discourse, the games analysed in this paper do not always strictly belong to the art game field as it is still rather unformed: elsewhere, they have been called indie, ambient or activism.

This research introduces the novel term, vaporwave, in the art game discourse. Vaporwave is defined as the audio-visual Internet aesthetics associated with a satirical take on consumer capitalism, a nostalgic engagement with the popular entertainment and technology of previous decades. It incorporates early Internet imagery and late 1990s web design as well as symbols of leisure time. Vaporwave has only appeared in art terminology since the 2010s. It does not fit into the classification of art games according to their modernism heritage, however, it has been used in this study as one of the most current trends in digital art that is linked to the problems of modernism aesthetics.

The Design Science Research method is being used in this study in order to cross-cut such remote fields as the general public, the arthouse world, codes of modern art and the tastes of the general public. The Design Science Research method helps boost the efficiency and interest towards contemporary art games. It intends to integrate seemingly distant disciplines and seeks parallels in different areas in order to gain new knowledge and adapt fresh approaches. By finding common aspects in different areas, Design Science Research fuses areas and invites new trends into a research field (Pohl & Hadorn, 2007, 59). It creates new visions of handling problems in research such as the knowledge cache in the art of today. As Design Science Research is a method for the promotion of common good (Pohl & Hadorn, 2007, 21), it can make the modern art trends function in equal capacity for different social levels regardless of the art education of the player.

Arts' language with its intuition-based and creatively irrational approach can help to open new horizons in gaming. Modern art theory and gaming can be linked as related areas consequently moving contemporary art closer to the general public, and games can integrate the ideas of modern art into the lives of a wide-range of players.

The task is to create an innovative digital game of contemporary aesthetics. Its title is undecided yet; the project is in progress. The player of this new game will be able to create his/her own visual and acoustic environment using the

current trends of digital art inherited mostly from modernism: such as, glitch, pixel aesthetics, hacking, vaporwave, generative art. While activating the respective trends in the palette of effects, the player will meet their historical antecedents. The game will familiarize the player with the historical context of the current language of digital art as well as invite him/her to form individual artefacts. The game would raise the interest of a wide-ranging public in contemporary art and point out the newest creative tendencies in art. On a larger scale, this research intends to describe the language of art in the nearest future and thus to foresee the monetary value of the art of tomorrow.

### **Concept and Classification of the Art Games**

Work on the new art game will be carried out in a collaboration of two Latvian researchers, Dr.art. Ieva Gintere (Vidzeme University of Applied Sciences) and Mag.art. Kristaps Biters who is a game artist. The game is being created in the framework of a Post-doctoral research led by Ieva Gintere (see Acknowledgments).

In the contemporary New Media art world, interactivity plays a dominant role. Historically, it is linked to the term “death of the author” invented by Roland Barthes in the 1960s (Barthes, 1984, [1968]). Modern artwork functions in the realm of its user – reader, spectator, player. The author creates an environment, an artistic matrix and steps back. It is the user who takes over the control of the work, assigns individual meaning to it and treats the material according to one’s taste and experience. Many digital artworks carry the idea of the activity of the user.

As interactive media, digital games have a great potential to integrate people into fields that would otherwise not spark their interest. The new game would develop the creative skills of players and collect the results of play forming a database of artefacts that will lead to scientific conclusions about future art. At the same time, the game would project the inheritance of art from the age of modernism into the digital world by teaching the player to recognize it.

This research follows the German Bauhaus tradition in the sense of integrating modern art and aspects of everyday life. Modern art theory comprises an intellectual cache – a specific, highly intellectual capital of knowledge – that can be used for activating art games. In the new game project, the trends of modern art are a tool for supporting art gaming.

The art of modernism will be used in the new game for education purposes to make them live outside the realm of self-aimed art. Regardless of the intentions of Bauhaus artists, the movement Pattern & Design, constructivists and postmodernists such as Daniel Buren, contemporary art still is self-aimed to a large extent as it was cultivated in the period of modernism. It was a highly

specific niche art that rebelled against the consumption of art and stated that arts' only purpose is art itself: art for art. Being interactive, the art of today intends to be closer to the general public, however, it is often self-aimed and without any practical purpose.

The Latvian digital artist Gints Gabrāns (b. 1970) has created a net-art piece named SAN (2017) that serves as an example of this “pure art” in Latvia today. Using digital devices people can see a projection of the SAN digital sculptures on Latvia's landscapes and cities (Gabrāns, 2017). The piece demonstrates the situation of art inherited from modernism: the piece offers the aesthetic feeling, the sensual experience of virtual and augmented reality. Although it has an interesting technical dimension and shows a relatively new approach to art, the piece is not oriented towards new knowledge and skills of the user but is largely aesthetical. In addition to the aesthetic dimension, the new art game would integrate the mind of the player into conceptions of art, letting them think about their history, understand the offspring of modernism and fantasize over the future forms of art.

The term art game (also known as artgame, arthouse game or artist game) was introduced by Tiffany Holmes in 2003. She notes that it “challenges cultural stereotypes, offers meaningful social and historical critique, or tells a story in a novel manner” (Holmes, 2003, 46). Apart from originality, critical thinking and reflection (Díaz & Tungtjicharoen, 2015, 4), other features of an art game have been underlined in game theory such as small teams of artists, the non-commercial character of the game, a short format, and a poetic idea (Chen & Michael, 2005, 225; Parker, 2014, 141).

Historically, art game lies in a framework of art theory of modernism starting with cubism, dadaism and other avant-garde movements and continuing in a post-modern scope. The works are often coded by nature as they are conceptually non-transparent according to the classical definition of the code (Eco, 1988, [1971], 28). The contemporary artwork is usually intellectually loaded and requires the spectator to be immersed in its historical and conceptual context. It is most likely not understandable at first glance. It only reveals itself to its audience when sufficient information has been gathered and the audience learns to read it as a semiotic phenomenon. In other words, the artwork is coded (Paul, 2003, 51; Gintere, 2017, 435). This is an important feature of art games that needs to be added to the existing definition. Art game sometimes encompasses a semantic vertical of ideas, so it functions not only on the aesthetic level, but largely in the conceptual dimension. It has a theoretical context rich with cultural references. The aesthetics of art games is a capital of coded ideas that can be fully grasped after studying their heritage.

To resume the definition of the art game, it is a form of digital game that is characteristic of critical thought, reflection, small teams of artists, the non-

commercial character of the game, a specific, anti-mainstream visual style, a short format, a coded and poetic idea. Art game can be conceptual by nature, it encompasses aesthetic approaches such as vaporwave, pixel, hacking, glitch, and generative art. An important feature of art games that needs to be added to the existing definition is the coded message.

For instance, the game *The Artist is Present* (Barr, 2012) is coded or kind of speaks in a foreign language. At the first glance, it is semantically opaque: it is not constructed like a regular game. To understand its idea, one has to “read” the reference to the postmodern theory, to the relational aesthetics that treats art as a space of human relations (Bourriaud, 1998). The game is inspired by the performance artist Marina Abramovic and depicts her famous work of the same title (2010, MoMA) where she sits motionlessly at the exhibition hall and maintains eye contact with visitors sitting individually in a chair in front of her (Parker, 2014, 188). The game implies the philosophical question about the author’s presence in his/her art and his/her control over it.

The existing art games are classified in this study according to their cultural heritage, mostly from the art of modernism of the 20<sup>th</sup> century (see Fig. 1). Some of the games can surely also fall under two groups like the games by Jodi that meets the criteria of glitch aesthetics and hacking. There are games that do not quite fit into those groups, however they need to be mentioned here because of their original artistic expression, these are *Samorost* (Amanita Design, 2003), *Limbo* (Playdead, 2010), *Mountain* (David O’Reilly, 2014), and *Everything* (David O’Reilly, 2017). The study goes beyond the inheritance of modernism as it includes the fifth trend, vaporwave, one of the newest and most interesting tendencies in contemporary digital art that has remained under-examined in the context of game studies.

Art games could be classified according to the existing principles offered by several researchers, although those models are not created for art games in particular. For instance, there is the multi-dimensional model of classification where games are grouped by aspects of representation, teleology and others (Elverdam & Aarseth, 2007). Games can also be classified by function: avoid, shoot, match (Djaouti, Alvarez, Jessel, & Methel, 2008). Other groups of researchers introduce a game typology by their type of gameplay, purpose, thematic field, or audience (Djaouti, Alvarez, & Jessel, 2011). Nevertheless, those models do not take into account the historical context and aesthetic dimension. In this study, art games are classified following their stylistic qualities, and their historical heritage.

*Table 1 Classification of art games*

Type of aesthetics of the art games	Examples of the art games
Glitch	The Unfinished Swan, Untitled Game, Error City Tourist, Memory of a Broken Dimension
Pixel	Flywrench, Nidhogg, Passage, The Pyramid Gate, Every day the same dream, Fotonica
Hacking	The Intruder, Super Mario Clouds, [domestic], Nude Raider I & II Patches, RetroYou R/C, Cities in Flux, SOD, Atari Noise, QQQ
Vaporwave	Sunset, Bientôt l'été
Generative art	Bellwoods, Diablo

Glitch is one of the main features of the art games. It is a form of artistic expression that originally means “the digital tick caused by a lost or incorrect binary code” (Kelly, 2009, 6). The term has been used widely to signify various forms of disturbances for artistic purposes of the digital media like audio, video, software, images, and others. Glitch is historically rooted in the tradition of deformation. It has a theoretically loaded background that recalls at first the ancient thought of Plato who argued in his Republic (Book X, 598a) that artwork is always an imitation, a secondary product and it cannot reveal the truth concealed in the metaphysical substance (Plato, 1968, 280). The aesthetics of modernism has followed these philosophical settings by showing that art is always artificial: it cannot and should not depict the realistic order of the world. On the contrary, art has to do with artificial forms. Art should not copy the visible but refer to the abstract meaning of metaphysical reality and invite us to reflect upon metaphysics.

This understanding of the function of art led to the turn of aesthetics at the end of the 19<sup>th</sup> century. Vincent Van Gogh and Paul Cézanne among others started to paint a deformed reality. Cubism, dada, futurism and many other trends represent this tendency as well. Deformation is one of the basic means of expression in the art of modernism, and it keeps being topical in the art of the 21<sup>st</sup> century in terms of the aesthetics of failure, viral aesthetics, glitch and noise.

The new art game that is being created will incorporate glitch to a great extent as it is a crucial trend of digital art and the mission of this game is to transfer the knowledge of contemporary art. In the area of games there are several examples representing this tendency, starting from a slight deformation of the visual image and ending with glitches of software: The Unfinished Swan (Giant Sparrow, 2008), Untitled Game (Jodi, 1996), Error City Tourist (Strangethink, 2016). A player of Memory of a Broken Dimension (Hanson-White, 2015) finds himself in a distorted area in black and white, filled with shattered objects. Jodi is a famous collective of artists (Joan Heemskerk and Dirk Paesmans) working with

glitch most currently. Their *Untitled Game* is based on glitches in the software for aesthetic purposes (Paul, 2003, 201).

The next visible tendency of digital art is pixel aesthetics that uses a digital image with low resolution (pixel is the smallest union of colour that a screen can display). Emma Grahn in her article *Modern Pixel Art Games* mentions mosaic, beadwork and cross-stitch embroidery as antecedents to pixel art (Grahn, 2013, 6). Pixel aesthetics is an obvious successor to modernism, its precursors are cubism, constructivism and *De Stijl* where geometric shapes were a dominant means of expression. Simple geometric forms still are a classical value topical in digital games as well. Geometry embodies simple, universal beauty, and metaphysical order. See, for instance, the wonderful game *Monument Valley* (Ustwo Games, 2014).

One of the most visible artefacts of Russian constructivism in the 1920s was Tatlin's tower (1919-1920) though it was never built. Also, suprematism flourished in Russia at that time with the famous *Black Square on A White Surface* (1915) by Kazimir Malevich. A chrestomatic example of cubism is *Les Demoiselles d'Avignon* (1907) by Pablo Picasso where he used quadrangles and triangles instead of curved lines to draw bodies. The Dutch *De Stijl* movement also worked with pure geometric forms during the 1920s.

In the art games area, there are a lot of examples representing the tendency to use the pixel style. Namely, games by the artist Mark Essen or Messhoff – *Flywrench* (Messhoff, 2007), *Nidhogg* (Messhoff, 2014) – and *Passage* (Rohrer, 2007), *The Pyramid Gate* (Strangethink, 2014), *Every day the same dream* (Molleindustria, 2009), *Fotonica* (Santa Ragione, 2011), not mentioning the widespread use of pixel aesthetics in mainstream gaming like *Crossy Road* (2014), *Angry Birds* (2014) and *Flappy Bird* (2013). The prominent game artist Pippin Barr expresses himself very commonly in pixel aesthetics. The *Artist is Present* and many other of his works exemplify this trend. Games he creates show a simple design and ascetic environment. Although the new digital possibilities allow artists to create graphically smooth images, many of them still choose the old-school style of pixels nostalgically referring to the first videogames and the inheritance of modernism.

The so-called “hacking” is one the most visible New Media art trends. It is actively used in art games such as *The Intruder* (Bookchin, 1999), *Super Mario Clouds* (Arcangel, 2002), *[domestic]* (Flanagan, 2003), and many others. For instance, *Super Mario Clouds* is a game cartridge hack, a modified version of the famous videogame *Super Mario Brothers* (1985). The artist erased almost all of its graphics leaving a blue background with white clouds slowly moving on the screen.

Hacking is an anarchic trend with a tendency of crossing the red lines of the accepted behaviour. It enters the space of another work by breaking its original



identity, inventing new accents. The aims of hacking are nevertheless ethical: its goal is the liberation of the art world from conventions, a constructive criticism of values and lifestyle, searching for new horizons in the existing entourage of art.

The history of hacking goes back to Marcel Duchamp's and Robert Rauschenberg's classic works where they dare to intrude into pieces of other artists in order to create new ones. Duchamp used a post card with Leonardo's Mona Lisa painting and hooliganistically added a moustache and a beard to it (L.H.O.O.Q, 1919). Rauschenberg in turn used a drawing by his colleague Willem de Kooning, erased it and treated the traces of the drawing as his own artwork (Erased de Kooning Drawing, 1953). Those examples illustrate the tendency of contemporary art to rebel against conventional practices in culture and a wish to assign equal rights to every creative process. Robert Nideffer created a significant game referring to Duchamp's hacking precedent. His *Nude Raider I & II Patches* (1999) is a modification of the game *Tomb Raider* (Core Design, 1996) where Nideffer bestows the female protagonist of the game Lara Croft with a moustache and goatee (Pearce, 2006, 76).

Some of the game artists have used hacking to remake the mainstream action games and to turn them into art that reminds one of the paintings of modernism. For example, the author of *RetroYou R/C* (1999) Joan Leandre turned the car racing game into a visual experience close to abstract expressionism. Also, *Cities in Flux* (Sheely, 2010) glitches and distorts the original game's world in a stylistic of abstract art (it is a modification of *Grand Theft Auto: San Andreas*, 2004). Thus, art game today stands for changing the existing stereotypes in the area of games and intends to fill the gap between art and consumer culture. Other games of this direction are *Untitled Game* (Jodi, 1996), *SOD* (Jodi, 1999), *Atari Noise* (Constantini, 1999), and *QQQ* (Betts, 2002).

There is one more group of games that needs to be mentioned because of its' important role in the aesthetics of digital art. The group is called ambient games and they are connected in this research with vaporwave aesthetics. Ambient games are close to art games because of their original visual style and poetic idea like *Flower* (Thatgamecompany, 2009), *Journey* (Thatgamecompany, 2012), *The Endless Forest* (Tale of Tales, 2005), and others. These examples are not an obvious inheritance of modernism on a visual dimension, however they show an interesting turn of art after the fall of modernism. These games can be characterized by a pleasant atmosphere that is one of the most exciting problems of late 20<sup>th</sup> century art.

Modernism was not concerned with pleasure and relaxation. It was largely focused on the sublime aesthetics described in Immanuel Kant's *Critique of Judgment* (1790) and reinterpreted by Jean-François Lyotard in the context of modernism (Lyotard, 1988, 26). The art in modernism is not agreeable and calming, it is rather unpleasant. Lyotard says, its aesthetics are negative.

Following Kant, in order to experience sublime feelings, the visual object should not be enjoyable (Kant, 2006, 105). The sublimity fits with the downcast eyes: it is not our body with its capacity to see, but our mind that can fly in the sublime height. If the vision is being tempted by wonderful sights, the mind cannot focus on the metaphysical dimension. That is why visuality in modernism is not beautiful, but most likely weird and edgy.

In contrast to this, the 21<sup>st</sup> century digital arts' vaporwave style is oriented towards light pleasure and relaxation just like the above-mentioned games. Conceptually, they circulate about the same idea as vaporwave does: spending leisure time, enjoying the hours out of work. There are examples like *Sunset* (Tale of Tales, 2015), (Fig. 2) and *Bientôt l'été* (Tale of Tales, 2013) showing the typical attractive colours of vaporwave and its' calm, melancholic atmosphere. They also embody the Kantian aesthetics of beautiful (Koc, 2017, 67) reinterpreted in a curious way. Kant places the sublime higher than the beautiful by saying that our feelings for the beautiful are weak in comparison with the intense experience of the sublime, and one's mind is not engaged while contemplating the beautiful. Vaporwave uses these light emotions, it signifies something nice, pleasant and irrational.

Vaporwave emerged in the early 2010s in music. It appropriates smooth jazz, lounge and other "vaporish", light styles of so-called mood music. In the visual field, it uses fetishistic symbols of spare time of the era of capitalism like night life, lighted skyscrapers and exotic trips with rooms in chic hotels and beaches for hardworking people. It plays with the images of computers and phones to mark the presence of digital technologies. Also, it expresses self-irony admitting its own superficiality, and there is a sort of melancholy, a longing for real feelings and the past. With some antique statues and elements of the Greco-Roman building's vaporwave reminds viewers about classical aesthetics: the ancient understanding of aesthetics is a sensation that has been lost in the era of capitalism. Vaporwave embodies a longing for the old experience of deep emotions lost in favour of busy weekdays and prosperity. It plays with the very first models of digital technologies like Windows'95 to express longing for past times, accompanied by melancholic blue and violet neon lights.



Figure 2 *Sunset, screenshot* ([www.tale-of-tales.com](http://www.tale-of-tales.com))

There is one more aspect of art game that is in the focus of this article: the generative art. It is a direct successor of modernism art, and will form the stylistic palette of the new art game. Generative art (also called genart, g-art) is based on the principle of self-organization. It refers to artwork that is partly or fully created autonomously, out of the total control of the author. In digital art, generative artwork is drafted by the author but further implemented by a technology so that the author can even be unaware of the outcome in detail. Certainly, this principle was already well-known before the birth of digital technologies. In the basic structure, it reminds one of gardening where after planting a seed one cannot precisely determine how it will proceed (Toop, 2001, 242). Creation in generative art refers to the conceptual position of Dadaism during the era of modernism. Dadaists argued that the role of the author has to be diminished. The most interesting art, they stated, occurs when the author loses his authoritative role. He creates a structure and watches how the work lives its own life. In favour of innovation, Dadaists also glorified a mechanical creation when there is a ghost in the machine that creates an artwork instead of a human. Another precursor of generative art is the fluxus movement of the modernism era. The conceptual piece by John Cage 4'33" (1952) is a chrestomatic example of fluxus that shows the basic idea of generative art. Cage drafted the structure of the piece and left it open to interpretation for the audience so any sound that occurred in the concert hall was considered suitable to form the piece.

In the digital art game field, there are several wonderful works where one can see the biological principle of self-organized growth and that of randomness which characterizes generative art. Bellwoods (DesLaurier, 2018) is a vision of a meadow with small white birds and a flying kite that is occasionally colliding with the grass. The image changes constantly as if growing, colours are altered

periodically. Diablo (Weavesilk, 2013) surprises the player with an image of a demon that grows magically in bright neon colours and endless variations (Fig. 3). Alison Mealey has chosen to base her work Unrealart on the computer game Unreal Tournament (1999, Epic Games, Digital Extremes). Mealey lets virtual players play the game with generative strategy and uses the data from the games to produce abstract drawings (she uses the game's movements in the drawing process in an external program).



*Figure 3 Diablo, screenshot (www.weavesilk.com)*

To resume, this study underlines the aspect of historical heritage in the modern art game theory. The new game will incorporate the historical antecedents of art games and other media of art such as paintings and music. Likewise, it will keep the structure of art games classification model envisaged in this article in order to show the most visible aesthetic trends of the art games to the player. Consequently, the new game will be based on the results of this research and carry out the knowledge transfer from the field of research to the player.

### **Conclusions**

The new art game that is being supported by the European Regional Development Fund is innovatory because of its features that existing art games do not offer. At first, it is a research-based game with a historical context that would teach the player to recognize the current trends in art and the ancestors of aesthetics of art games. Secondly, the new game eventually implies a database that collects the artefacts – video materials, screenshots and other results of the activities of players. The collection of artefacts will be used for drawing scientific conclusions about the art tendencies in the near future.

The new art game will refine the skills of players and stimulate their creative forces. There are games like Art Game by Pippin Barr that places the player in the

role of contemporary artist, however Barr's Art Game puts an emphasis on the narrative, but our new game will emphasize self-expression and the transfer of knowledge. The new game is based on scientific research about the aesthetics of digital games: it shows the connection of modern art trends with gaming, it contains classification and analysis of existing art games and their theoretical discourse. The study goes beyond the inheritance of modernism as it encompasses the trend of vaporwave, one of the newest and most interesting tendencies in contemporary digital art.

### **Summary**

The paper presents a classification of digital art games, the historical background of their aesthetics, and the art game concept. The paper discusses the most prominent art games and represents modern game theory. It introduces the novel term, vaporwave, in the art game discourse. Vaporwave is defined as the audio-visual Internet aesthetics associated with a satirical take on consumer capitalism, a nostalgic engagement with the popular entertainment and technology of previous decades. Vaporwave has been used in this paper as one of the most current trends in digital art that is linked to the problems of modernism aesthetics.

In the contemporary game discourse, the definition of art game can be updated as follows. Art game is a form of digital game that is characteristic of critical thought, reflection, small teams of artists, the non-commercial character of the game, a specific, anti-mainstream visual style, a short format, a coded and poetic idea. Art game can be conceptual by nature, it encompasses aesthetic approaches such as vaporwave, pixel, hacking, glitch, and generative art. The study updates the definition of art game by adding a feature of a coded message and determines its aesthetic scope.

The new digital art game that is being created will incorporate the modern art trends topical in digital art today, and a current trend in art called vaporwave. The new art game will make the contemporary art trends function in equal capacity for different social levels regardless of the art education of the player. Thus, the trends of modern art are a tool for supporting art gaming while they are meanwhile being imported to a socially wide-ranging territory of players.

### **Acknowledgements**

This study has been supported by a grant from the European Regional Development Fund (ERDF) research "Leveraging ICT product innovations by enhancing codes of modern art" No. 1.1.1.2/VIAA/1/16/106 within the Activity 1.1.1.2 "Post-doctoral Research Aid" of the Specific Aid Objective 1.1.1 "To increase the research and innovative capacity of scientific institutions in Latvia

and the ability to attract external financing, investing in human resources and infrastructure” of the Operational Program “Growth and Employment”. Homepage of the research: <http://va.lv/en/research/research/leveraging-ict-product-innovations-enhancing-codes-modern-art>.

A related research supported by the Valmiera City Municipality “Analysis and supply of socio-technological opportunities provided by 5G technology for the development of smart cities and research projects” (no financial support for the respective research).



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## GUITAR TEACHING: STATE OF THE ART AND RESEARCH QUESTIONS

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**Abstract.** *This work reviews guitar methodologies and didactic materials from the first 16<sup>th</sup> century methods of guitar and vihuela to the software/hardware devices patented now-a-days. One of the richest sources for guitar education research are master classes registered since the last 50-100 years and available today to the researcher. A set of 12 master classes are analysed in this study. Fundamental decisions for the education and practice of the guitar are highlighted as the fingernails vs. yolks playing, “learning by music” vs. “learning by ear”, the use of music vs. tablature notation or the autodidactic way vs. the teacher-student interaction in class. Despite the successful new devices and advances in software and hardware, literature review reveals the importance of the teacher and the classical methods.*

**Keywords:** *guitar education, guitar teaching, guitar learning, guitar master classes, software/hardware devices for guitar learning, state of art.*

*Ha de hacer cuenta el que toca la Guitarra, que la mano derecha es el Maestro de capilla, y los dedos de la mano izquierda las voces regidas y gobernadas por él.*

*(The one who plays the guitar has to figure out that the right hand is the Chapel Master and the left hand fingers the voices directed by him).*

*Joan Carles y Amat*

### Introduction

Focusing on such a universal and developed instrument as the guitar leads to deal with many different instruments in one. Guitar is the instrument where more authors and peoples have found their ways for musical and cultural expression. Electric guitar and the genders associated to it (rock, jazz, heavy, blues,...) differs completely to classical guitar in techniques, performance and context, and this one to flamenco guitar.

They share though many teaching principles and methodologies. This research explores such principles and methodologies through the different didactics the history of guitar teaching has developed from the first vihuela and guitar methods during the 16<sup>th</sup> century to the latest technologies applied to make easier the process to learn how to play the instrument and make distance music education more effective.

For this aim, the methodology includes the text and discourse analysis on guitar treaties and methods, the analysis of recorded tet-a-tet master classes and of guitar lessons and advices directed to the internet public. From the bibliographical and audiovisual analysis some relevant research questions arise that will be enlisted and commented.

Now-a-days, patents and devices proliferate to join software and hardware in the learning processes, creating or transforming self-learning tools as cyborg-guitars, that light up on the neck of the guitar to show the player the location of the next note to play. Music sheets unfold in the screen playing the piece at our desired set speed. Sensors and artificial intelligence ally to watch and evaluate the movements of the hands.

Information and Communication Technologies (ICT) also allow us to access recorded master class and analyse the rich complexity of the face to face human interaction. Showing different teaching styles, guitar masters share some common fundamentals and recommendations.

The state of the art rises relevant questions and discussions about the advantages or disadvantages in the different methodologies and learning frameworks. To better evaluate them, it is important define or characterize the concepts of guitar education, interpretation and assessment themselves.

### **State of the art on guitar teaching technologies**

There is an emergent research line that grow up in number of scientific publications and patents dealing with new technologies applied to guitar learning. One of the most popular is *Fretlight*, an augmented reality guitar learning system backed up by international research (Keebler et al., 2014), patented and commercialized in partnership with the software *Guitar Pro*. Words from verified buyers are eloquent about the system:

*"I've been a musician for decades. Someone please tell me why a guitarist wouldn't want tabs playing solos, riffs, arpeggio's, scales, modes, and chords playing right on the neck of their guitar? This is an unbelievable tool..." (Jim & Allegany, <https://fretlight.com/>)*

Research and testing with this systems rises important questions about current theories of embodied music cognition, embodied music technology for learning. This system aims to allow the guitar learner in an instrumental self-extension, to be free from externalizations (sheet music, tablature, chord diagrams, books, audio files and instructors). Keebler et al. (2014) argue that the system “may help to mitigate initial barriers to learning an instrument by reducing the need for a transformational process between external representation (e.g., tablature) and the instrument itself” and also may produce a better long term retention for the learned information.

Body vs brain is a way to explain the cognizing/learning processes that shares the theories that back up Fretlight as well as the experience of great masters: “the pulsation is something that you cannot feel in your brain, pulsation is more in the body, the rhythm is more body than only the brain.” (Steidl, 2018)

Pioneering the assessment of such kind of systems, Kebler et al. (2014), test Fretlight and compare learning results with traditional methods, assessing after some lessons the learned results by some basic variables to test students’ performance: scale note quality, errors, inconsistency between notes and fluency as a time-dependent measure of inconsistency between notes and total scale time.

Other studies that have used include the former in note correctness, rhythmic precision, and attending to the complexity of music performance, add other performance indicators as confidence, expression, relaxation and posture, tone quality, synchronization between the hands (Apro & Siebenaler, 2016). These authors have done controlled comparative analysis between learning to play by reading or “by ear”. Although they compare progression on a concrete work of two groups of “music readers” and “ear players”, proving a higher progression in the latest, they also claim that both methods do not have to be opposed but complementary. For some pedagogues there should be an order in this complementarity, ‘sound before symbol’ has historically claimed educators as Johann Pestalozzi (1746-1827), Lowell Mason and more recently Shinichi Suzuki (1898-1998) comparing learning music to learning language or the “mother tongue,” through repeated modelling, listening, imitation, and repetition. (Apro & Siebenaler, 2016)

There are relevant analysis on teaching styles and methods in national contexts, as the study of Scarduelli and Fiorini (2015) that surveys from a relevant sample the influences in Brazilian guitar university professors. This study shows some authors and methods wide influence as the “Série didática para guitarra (1966)” by Abel Carlevaro (cited 16 times in the survey), “Escuela Razonada de la Guitarra” by Emilio Pujol (cited 6 times), “Studio per la Chitarra Op.1” by Mauro Giuliani (5 times) and Pumping Nylon by Scott Tennant (4 times). This survey demonstrates that, even though technologies are creating everyday new software-hardware combined solutions to support guitar teaching and learning, and “knowledge of the psychology of student development and learning has become more sophisticated in its ability to provide an intelligent and informed context for guitar teaching decision-making”, old classical methods are the most used at the present.

There are also authors standing by the teacher-student interaction, highlighting the teacher personality and his/her ability to motivate and “translate good judgement, experience and wisdom into the art of playing guitar” (Risteski, 2006)

Certainly, “learning a popular-musical instrument, like the guitar, is an experience often accompanied by very informal learning processes” (Keebler et al., 2014), but this processes are also taken in account, considered and taught. This happens for example in the flamenco guitar methods, like the one by Rafael Marín (1902) in which interactions with the singer and the dancer are also explained and recommended for the proper process of flamenco guitar learning. (Calahorro Arjona, 2017)

## Methodology

To deepen in the guitar teaching and learning state of the art, the research has analysed different relevant sources:

- scientific publications on the evolution of the guitar and the guitar education,
- guitar methods and treaties from the 16<sup>th</sup> to the 21<sup>st</sup> century,
- recorded master classes where the guitar master counsels a student based on a specific work (see table 1). This is quite a recent available resource for researching,
- master classes where the guitar master is alone talking and teaching to a distance audience (see Table 1),
- In-depth interviews to guitar players.

*Table 1 Analysed Guitar Master Classes*

Master	Context	Date and place	Retrieved from
Zoran Dukic	Moscu International Festival “Guitar Virtuosi” 2018	March 22, 2018 Bashmet Center Cameras: Konstantin Neklyudov, Dmitry Smirnov (Guitar Magazine)	<a href="https://www.youtube.com/watch?v=Cgc2JpqbGx0">https://www.youtube.com/watch?v=Cgc2JpqbGx0</a>
Zoran Dukic	Moscu International Festival “Guitar Virtuosi” 2018	March 22, 2018 Bashmet Center Cameras: Konstantin Neklyudov, Dmitry Smirnov (Guitar Magazine)	<a href="https://www.youtube.com/watch?v=11gY2XuBGK0">https://www.youtube.com/watch?v=11gY2XuBGK0</a>
Zoran Dukic	VI Festival Internacional de Guitarra Sinaloa 2016	March 09 2016 Bashmet Center Cameras: Konstantin Neklyudov, Dmitry Smirnov (Guitar Magazine)	<a href="https://www.youtube.com/watch?v=FOM2TJqZ3Ik">https://www.youtube.com/watch?v=FOM2TJqZ3Ik</a>
José Antonio Escobar	Moscu International Festival “Guitar Virtuosi” 2017	March 21st, 2017 Moscow © 2017, Guitar Magazine Camera: Konstantin Neklyudov, Dmitry Smirnoff	<a href="https://www.youtube.com/watch?v=nu5kN2WSX2k">https://www.youtube.com/watch?v=nu5kN2WSX2k</a>
Pablo Sainz Villegas	Marylhurst University near Portland OR	Sat, January 21, 2017.	<a href="https://www.youtube.com/watch?v=ctAMIJZfVVc">https://www.youtube.com/watch?v=ctAMIJZfVVc</a>
Julian Bream	Julian Bream’s House	First Broadcast: 11 Jan 1978	<a href="https://www.youtube.com/watch?v=iAXUZIruckt0">https://www.youtube.com/watch?v=iAXUZIruckt0</a>

	(BBC programme)		
Fabio Zanon	Moscu International Festival “Guitar Virtuosi” 2017	March 21st, 2017 Camera: Konstantin Neklyudov, Dmitry Smirnoff	<a href="https://www.youtube.com/watch?v=eIwvqDShVuk">https://www.youtube.com/watch?v=eIwvqDShVuk</a>
Fabio Zanon	Moscu International Festival “Guitar Virtuosi” 2017	March 21st, 2017 Camera: Konstantin Neklyudov, Dmitry Smirnoff	<a href="https://www.youtube.com/watch?v=eIwvqDShVuk&amp;t=1059s">https://www.youtube.com/watch?v=eIwvqDShVuk&amp;t=1059s</a>
Ana Vidovic	Zuidlaren Guitar Festival, 2009	Zuidlaren Guitar Festival	<a href="https://www.youtube.com/watch?v=QAf55G8OEDs">https://www.youtube.com/watch?v=QAf55G8OEDs</a>
Ana Vidovic	Brussels International Guitar Festival, 2013	Brussels, 19 may. 2013	<a href="https://www.youtube.com/watch?v=kBqL79d1swk">https://www.youtube.com/watch?v=kBqL79d1swk</a>
Pavel Steidl	Moscu International Festival “Guitar Virtuosi” 2018	March 22, 2018 Bashmet Center	<a href="https://www.youtube.com/watch?v=k1dcS9vqGMU">https://www.youtube.com/watch?v=k1dcS9vqGMU</a>
Pavel Steidl	Royal Conservatoire of Scotland.	Royal Conservatoire of Scotland.	<a href="https://www.youtube.com/watch?v=MTzq_qdYItg">https://www.youtube.com/watch?v=MTzq_qdYItg</a>

## Research results

Guitar education from the 16th century first methods to the present incorporation of new technologies and ICT has evolved greatly. Although in the first method of vihuela by Luis Millán (1570) numeric tablature was advanced, the first printed guitar methods had very general, short, imprecise explanations commenting a set of pieces gradually more difficult for the beginner.

In the first known method for (vihuela de mano), published in Spanish and Valenciá entitled *The Teacher*, for “it develops the same style and order that a teacher would follow with his beginner pupil: showing him in order from the beginning everything that he needs to understand this method”.

*The first book is for beginners and therefore it contains easy music corresponding to the hands that a beginner may have. And offering him easy music in the beginning he will be happy with what he is doing and everything will look easy for him. (Luys Milán, 1536)*

*El primer libro es para principiantes y assí tiene la música fácil y conforme a las manos que un principiante puede tener (...) Y dándole a los principios música fácil; contentarle ha delo que haze; y todo le parecera fácil.”*

Guitar masters in the 16<sup>th</sup> and 17<sup>th</sup> centuries tried to do their best translating their knowledge and pedagogical skills to the printed method, but besides the conventional music transcriptions (numeric by the time) they used their very own language and ideas to express the nuances and expression for each piece. Joan Carles y Amat (1596), for example, express that the “air” (the dynamic level) goes along the tone:

*About the air which the pieces must be plaid, there are no rules to stay, for the tone itself carries it: if it is proportionated, may [the air] be proportionated; if [the tone] is major or minor, may the air be major or minor, and so on. The one who plays the guitar has to*

*figure out that the right hand is the Chapel Master and the left hand fingers the voices directed by him.*

*“Del ayre con que se ha de tocar, no pueden darse reglas, pues el mismo tono lo lleva: si es de proporción, sea también de proporción; si es mayor ò menor, sea el ayre mayor ó menor, y asi en los demás. Ha de hacer cuenta el que toca la Guitarra, que la mano derecha es el Maestro de capilla, y los dedos de la mano izquierda las voces regidas y gobernadas por él; y la misma práctica y exercicio enseñarán á los principiantes á que pongan en execucion lo que se percibe con el sentido.” (p.34)*

Since then, guitar education methodologies and technologies have become more complex to make learning easier. ICT have facilitated distant learning, enlarging the impact of professors and masters. Software and hardware development have resulted in self-learning tools that are highly valued by beginners and by advanced players.

Some of this new learning technologies are based on embodiment cognition theories and processes, claiming a more effective short term learning and long term retention. More studies will be needed to confirm the role of memory and retention capacity in one method or other.

Some authors stay clearly that now-a-days “even though a huge amount of learning material exists, it is still hard to learn especially without a guitar teacher”. (Löchtefeld, Gehring, Jung, & Krüger, 2011).

Master classes analysis allow us to make a series of considerations relevant to guitar education:

- Guitar masters correct body and hand postures and movements, the music sheet and fingering and give technical and rhythmical advices. They are able to detect three or more errors/problems in a phrase.
- Guitar masters question digitation, contained in music sheets freely obtained in internet but does not know from who nor have listened to the piece from the guitar player who decided that digitation and advocates for music sheets without digitations.
- They highlight the musical and emotional character of the piece and refer to advices from other musicians from piano, opera, chant, (as Palestrina’s principle “If you repeat something more than three times you need to change the tempo”).
- Guitar masters deal with guitar as with whole orchestras, taking the most out of the instrument. Singing while playing the piece, deconstructing it, exploring different ways to deal with it.

### **Conclusions and/or recommendations**

There are great decisions in the guitar learning processes and history that have been often taken as substituting and excluding as fingernail vs. yolk or tablature vs. music transcription.

Francisco Tárrega (1852-1909) and Emilio Pujol (1886-1980), great Spanish guitar masters, played and backed up tipping the strings with the yolk but they have been a minority among guitar masters.

Indeed one of the important decisions to teach and learn guitar is to use or not musical notation. Tablature may be a much easier and quicker way to learn to play guitar but closes the door to the rich interconnections and translations in the whole spectrum of music.

For guitar learners, that look after real progress in the instrument –whether they play or not professionally and learn or not in professional schools- what it is not substitutory now-a-days is a personal teacher that can introduce the student in more subtle dimensions of guitar playing and music, that those allowed in distance learning and software/hardware devices.

But Information and Communication Technologies (ICT) can really give access (open access) to all the accumulated methodologies and materials since the 16th century, being especially interesting for guitar learning processes have access to new multimedia combinations that improve all aspects of teaching and learning processes.

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## ANALYSIS OF ARTISTICALY CREATIVE WORK OF STUDENTS IN LATVIAN HIGHER EDUCATION DANCE PROGRAMS

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Latvia

**Abstract.** *Often dance teachers do not realize that their professional activity is the creation of an artwork. Teachers are limited to a range of movements in some genres or the requirements of their work place, but above all dance teachers are representatives of art un they have a potential to create new, original artistic value and contribute to the art and cultural space in Latvia. Therefore it is essential to understand the development and level of artistically creative work in the study process. The aim of this article is to analyse the artistically creative work of students in different higher education dance programs. The aim is carried out in the analysis of literature and on its base promoted evaluation indicators and levels of artistically creative work for dance teachers as choreographers. A questionnaire is designed on a basis of these indicators and levels. The respondents are students in higher education dance programs in Latvian Academy of Music and Latvian Academy of Culture. The results promote strong and weak points in the artistically creative work of students as well as the necessary discussable questions in the study process.*

**Keywords:** *art of dance, artistically creative work, dance pedagogy.*

### Introduction

Often dance teachers do not realize that their professional activity is the creation of an artwork. It is hard to avoid making dance pieces in this profession, even if a teacher is limiting his work by teaching specific movement techniques. Of course some teachers are more limited than others concerning an established range of movements in some genres or the requirements of their work place. But above all dance teachers are representatives of art and they have a potential to create new, original artistic value and contribute to the art and cultural space in Latvia.

It is important to understand the development of artistically creative work of student and to comprehend what are the strong points and weaknesses in the study process. Also to understand what problems are taken for granted and need to be discussed with students in their time in the higher education institutions.

The aim of this article is to analyse the artistically creative work of students in different higher education dance programs. The aim is carried out in the



analysis of literature and on its base promoted evaluation indicators and levels of artistically creative work for dance teachers as choreographers. A questionnaire is designed on a basis of these indicators and levels. The respondents are students in higher education dance programs in Latvian Academy of Music and Latvian Academy of Culture.

### **Literature review**

Artistically creative work is a part of dance teacher's professional identity. Based on the research of A. Spona, M. Vidnere and J. Jermolajeva (2016), adding the component of "artistically creative work" and forming the components according to the necessities and daily work of a dance teacher a model of professional identity of a dance teacher is developed. The model contains (components):

- Professional philosophy of a dance teacher includes: professional values and views, traditions of the profession and goals of professional activity/work;
- Professional knowledge and skills (gained in higher education programs);
- Professional roles of a dance teacher can vary from teacher, educator to choreographer and even manager;
- Artistically creative work provides for creativity (new ideas, concepts, choreography), creative approach to dance classes, concert activities and preparation for them, and also a process of creating a work of art (a dance, performance, show);
- Professional attitude towards work – engaging in profession, professional honesty, patience, respect for yourself, students, parents, etc.;
- Professional image – experience, vision of professional and personal development.

In this article the emphasis is put on the artistically creative work of Latvian students in different programs of higher dance education. As the students mostly are studying and the majority of them don't have a job experience then components like "attitude towards work" or "professional philosophy" can be evaluated according to this situation. On the contrary, all of the students are studying choreography/ dance making and are capable of expressing their full point of view on their creative activities.

The awareness of the integrated link between the activity of a personality (in cognition, work, play, sport, etc.) and "entering" the world of values become especially significant if we are truly aware that art includes all the main types of

human activity. On the contrary, in art, in the creative process of art, organically includes - as if "disappears", all the main human activities, in order to create a completely new quality - artistic work (Anspaks, 2006).

By studying artistically creative work, as one of the most important perspectives in the explanation of this concept I. Briska (2011) puts forward the interaction of the artist's personality and art work. Given that art is created by man and is associated with a sensually perceptive form, a subjective component (artist's personality) and an objective component - the work of art itself - are found in artistically creative work. However, the opinions of researchers differ in the formulation of the artistically creative work itself. Some of the most well-known views on artistically creative work: the materialization of artist's creative imagination (Выготский, 1991), the presentation of a particular psychological content in physical or imagined material, intensified by imagination (Spranger, 1928), the allocating an objective form to a subjective structure, i.e., the artists sense, thought, mood (Арнхейм, 1974), objectification of a subjective artist's personality in art forms (Zeile, 1987; Караң, 1997), the incarnation of an idea in a sign system, thus alienating from the author and making it available to others (Борев, 1988), the development of the artist's world of feelings and thoughts under the influence of creative work (Bebre, 1982).

### **Methodology**

The aim is carried out in the analysis of literature and on its base created a model which promoted evaluation indicators and levels of artistically creative work for dance teachers as choreographers. A questionnaire is designed on a basis of these indicators and levels. The respondents are 64 students in higher education dance programs in Latvian Academy of Music ("Choreographer", "Dance and rhythmic teacher"), Latvian Academy of Culture ("Contemporary dance - choreography").

The results showed that there are practically no common points that promote or reduce development of artistically creative work. For example, it can't be said that first year students have lower activity or insight of artistically creative work than the student in the fourth year (see Fig.1). Also the represented dance genre was not the determinant point to make a suggestion about lack of creativity. Neither the work experience nor age of students.

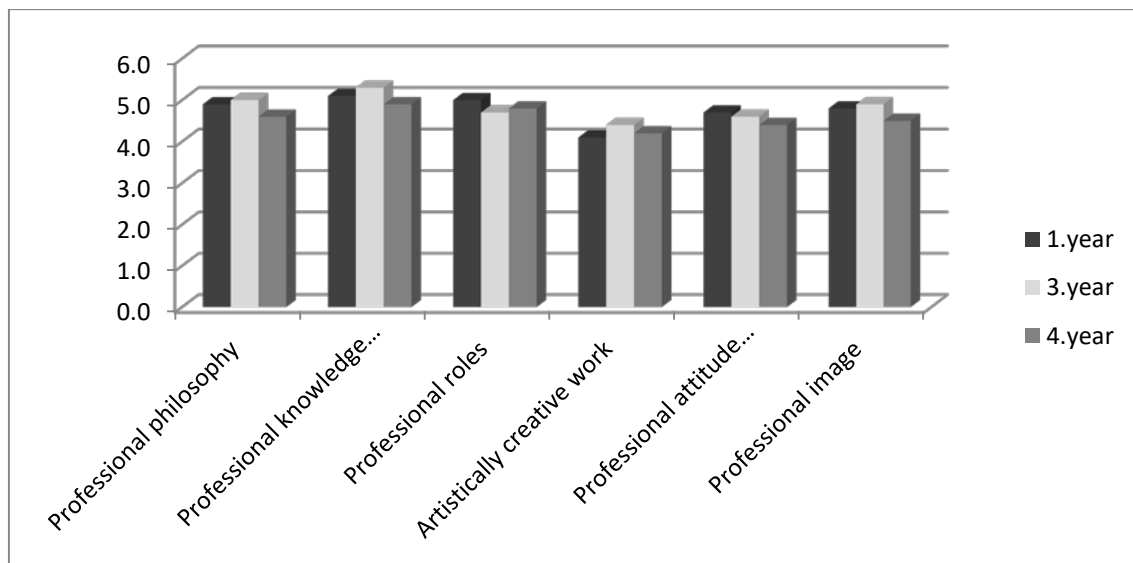


Figure 1 Professional identity components of students in "Dance and rhythmic teacher" program (average answer)

The questionnaire about artistically creative work contains different statements which can be marked as 1 or 2 – totally disagree, 3 or 4 – partly agree, 5 or 6 – totally agree. The student answers are represented jointly not highlighting any program or specific higher education institution. Based on the primary data analysis the author of this article also didn't accent the year in which the students are studying. The answers are shown according to the marked statements i.e., how many students answered 1 or 2 – low level, 3 or 4 – medium level, 5 or 6 – high level of artistically creative work.

The analysis of artistically creative work is done based on the developed indicators:

1. Revealing a story or theme in a dance;
2. Motivation for a dance creation;
3. Innovation.

The development of these indicators is marked by the division into levels with corresponding attitude of the dance teacher.

The most alarming results are concerning the statement in figure 2. It deals with plagiarism.

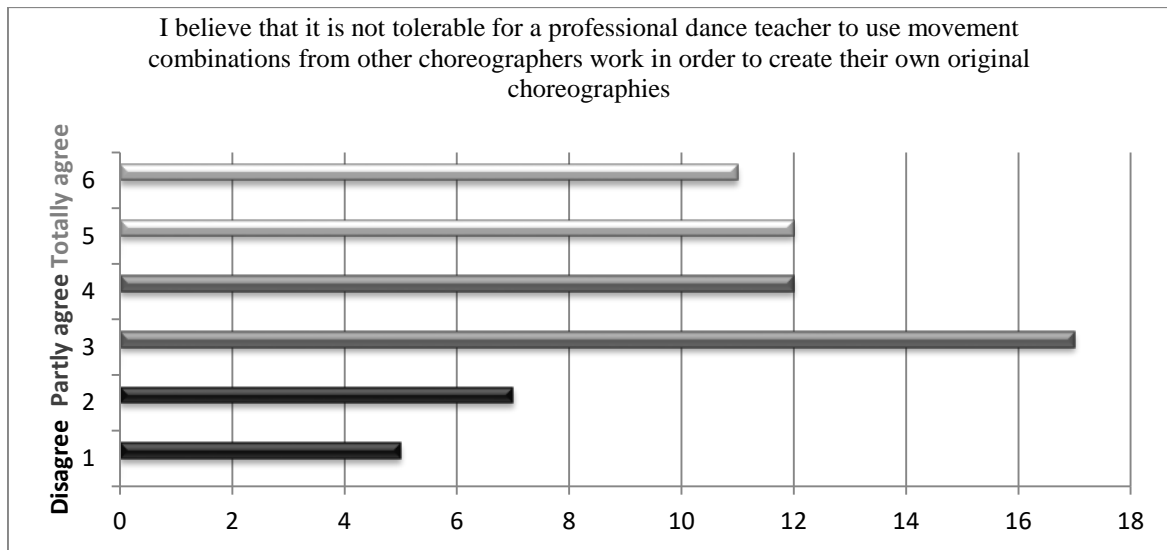


Figure 2 Usage of other choreographer movement combinations

In the wide range of information exchange and long history of dance it is difficult to create something that has never been seen before, nevertheless it is very important to understand such terms as - ethics, cultural behaviour and intellectual property. There are a certain range of already created movements in every genre/style of dance – a basic technique. Choreographers use these movements to develop their own combinations and add their own contribution to their presented genre. Also the chosen themes can be interpreted differently by various choreographers. But through it all the choreographer should take these “instruments” and use them to create his own vision. Again it is alarming that 42% of students partly agree and 19% of students think that it is normal to take something that other professional has created (a whole combination of movements) and use it without permission to make their own original dance pieces.

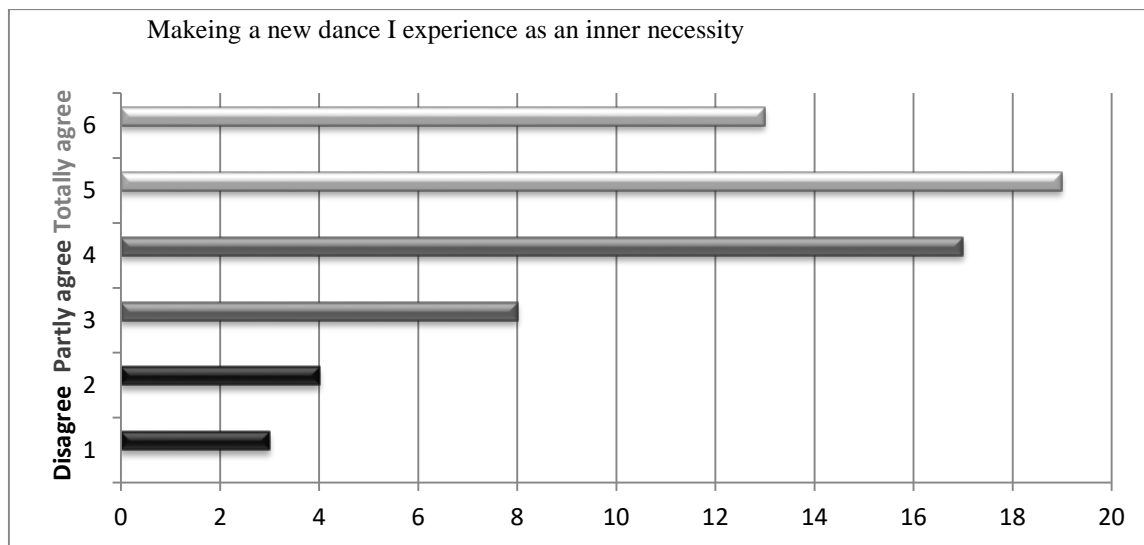


Figure 3 Inner necessity for dance making

As the figure 3 shows 50% of students fully agree to this statement, 39% agree partly and 11% of all students don't feel an inner necessity for making choreographies. That can change in the study process as the professional identity is a constantly changing non fixated process (Kerby, 1991).

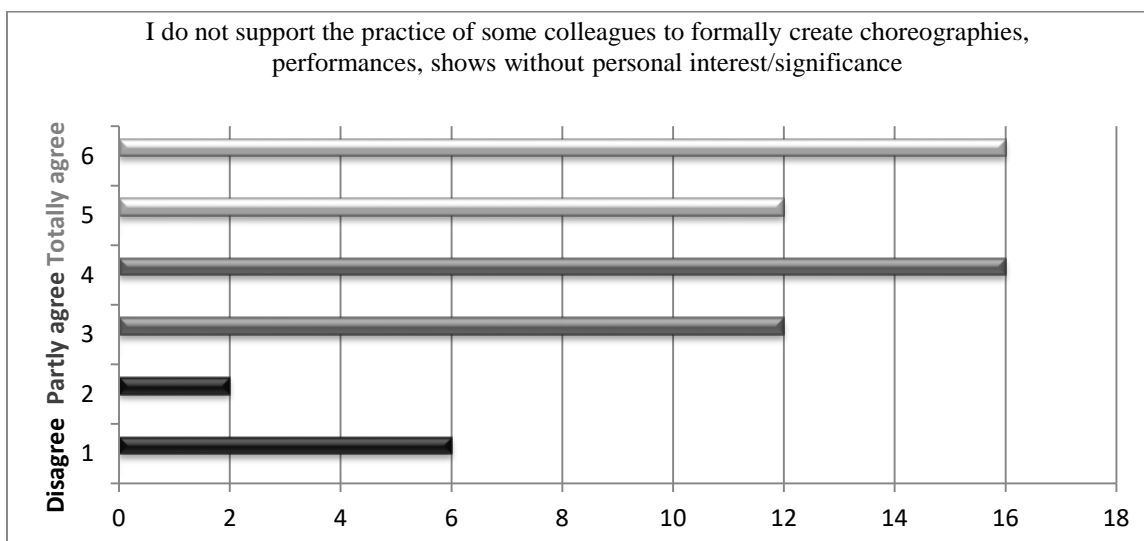


Figure 4 Creating choreographies, performances, shows without personal interest

The statement in figure 4 presents the attitude towards engagement in the artistically creative activities. The new choreographers and dance teachers need to find something important in the projects that they step in or in their own performances. If a dance performance or a show is created by a person who is partly interested or doesn't find anything important to him in his creation, then all

of it loses significance even to the viewers. A professional can make dances under any circumstances but that doesn't mean that the result has an artistic value or a deeper meaning. If dance teachers or choreographers will engage in too many meaningless projects, jobs, performances etc., then it might lead to nonfulfillment in work, burn-out or more serious problems.

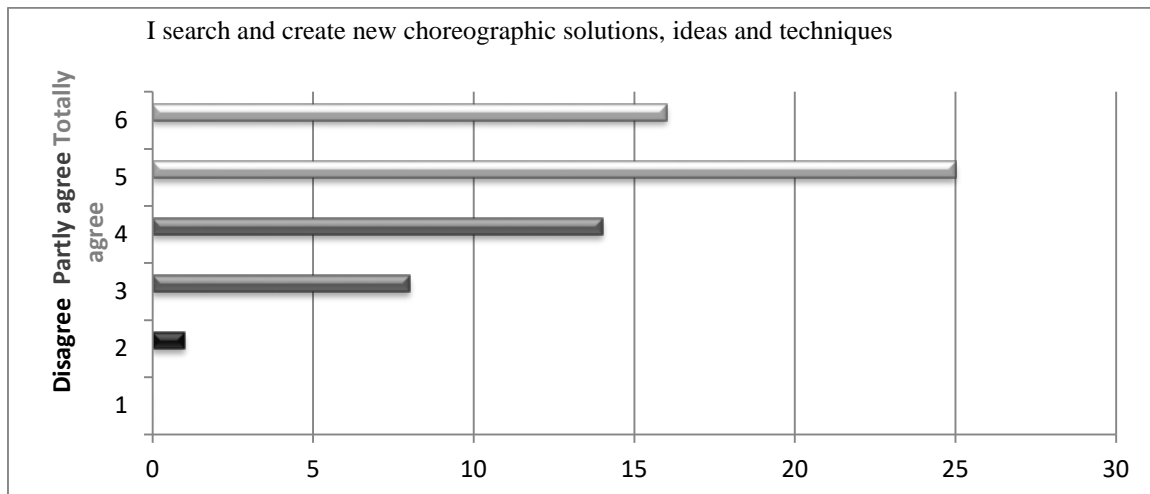


Figure 5 Creation of new choreographic solutions, ideas and techniques

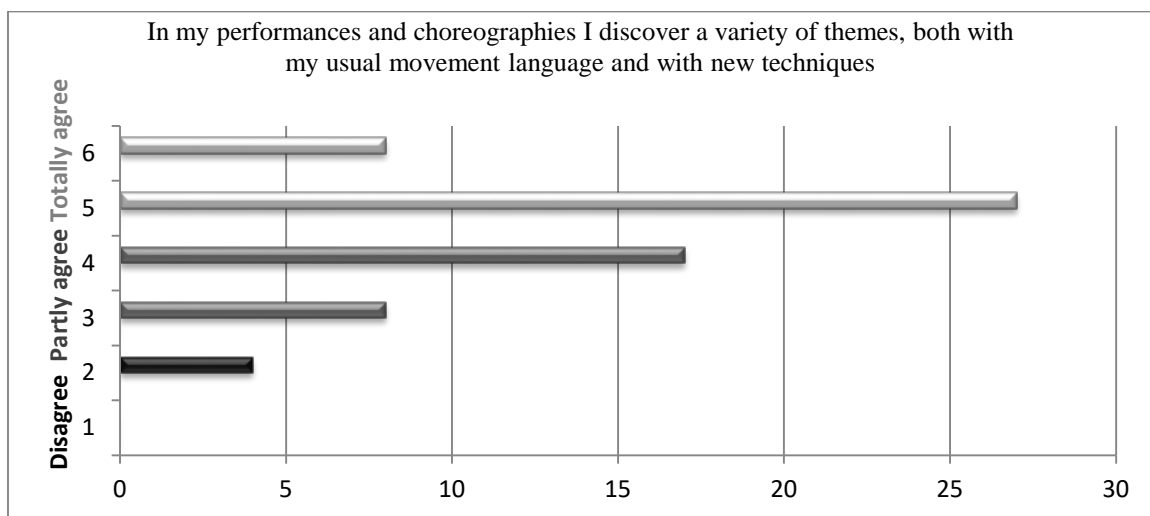


Figure 6 Theme revealing in performances through usual and new movement language

Figure 5 and figure 6 represents innovation in dance composition, movement and storytelling. The results show that 64% of students are searching and creating new choreographic solutions, ideas and techniques and 34% do it partially, also 56% reveal variety of themes in their performances with usual and new movement techniques.

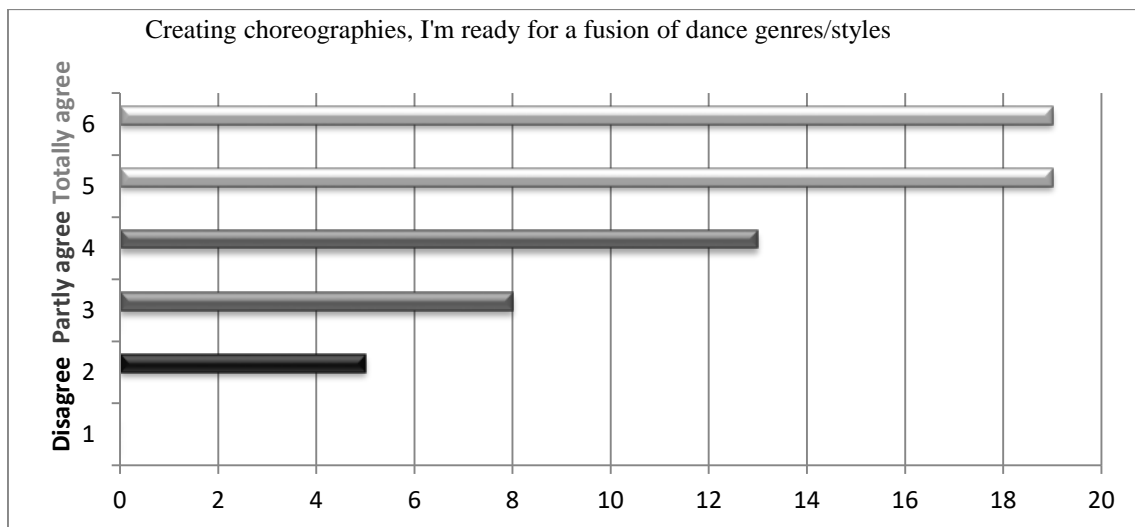


Figure 7 Dance genre and style fusion in choreographies

60% of students are ready for dance genre/style fusion in their artistic creations. It represents courage, creativeness and willingness to open borders and create something new. 33% of students partly agree to this statement and only 4 students are not willing to go over the borders of the selected genre/style. This enthusiasm need to be supported by the academies staff – creating their own projects or concerts, therefore increasing experience of emerging choreographers and teachers.

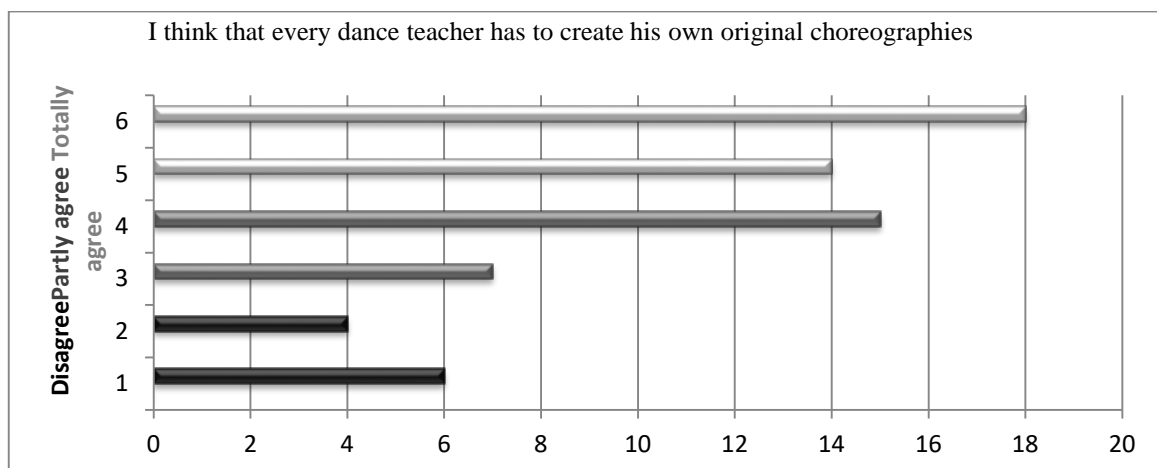
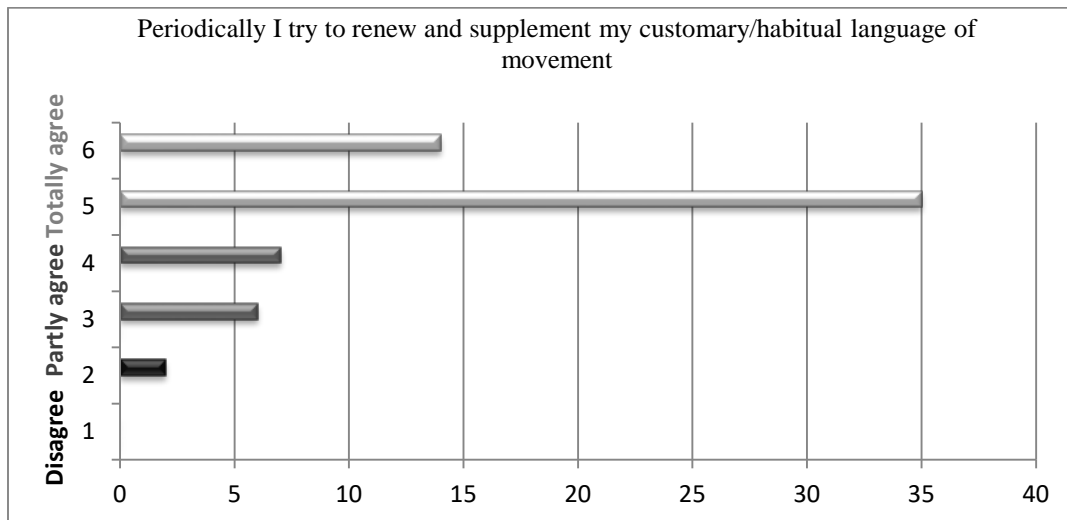


Figure 8 Dance teachers and creation of original choreographies

The statement in figure 8 can lead to discussions, but out of all the students only 10 people think that not every dance teachers should create his/her own original choreographies. Therefore 34% partly agree to this statement and 50% of students think that every dance teacher should make his/her own dance pieces.

Even if the teacher doesn't want to, or doesn't feel the need to create an art work, it is hard to avoid dance making and he must know everything there is to know about dance composition.



*Figure 9 Renewal of habitual language of movement*

A very confident majority of students (70%) try to update and supplement their customary/habitual language of movement. That is understandable hence the students are building their movement experience and learning new dance genre and styles. As the dance teachers are gaining experience and establishing their own style or “handwriting” it is getting hard to find new movements and go out of the usual “comfort zone”.

### **Conclusions and recommendations**

- There are practically no common points (age, study year, work experience, represented dance genre) that promote or reduce development of Artistically creative work;
- Development of artistically creative work is individual and should be analysed deeper with phenomenological approaches;
- 50% of students think that every dance teacher should make his/her own dance pieces;
- 60% of students are ready for dance genre/style fusion in their artistic creations. It represents courage, creativeness and willingness to open borders and create something new.



The author of this article recommends:

- That questions dealing with plagiarism should be discussed in the study process from philosophical and practical point of view;
- As a part of students don't feel an inner necessity for making dances – it is recommended that the process of creating choreographies in the study process can gain more spiritual/mental approach and not only technically informative one. The subject of dance composition need to provide both – technical and mental comprehension;
- The questions of health – mental and physical, are important in the study process. Questions of self-evaluation, not only in terms of teaching methods but also self-evaluation concerning work load, artistic fulfilment, engagement in different projects, concert activities and other aspects of profession. Students need to recognise when they are harming themselves (weakness, burn-out, depression) and how to balance all the professional roles;
- Lecturers need to inform students and recommend different ways or actions that can be useful in their professional work and how to deal with – lack of ideas, inspiration, lack of new movements.

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## A MULTIPAGE TACTILE BOOK ABOUT EMOTIONS – UPPER-SECONDARY STUDENTS’ CREATION ANALYSIS

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**Abstract.** *The article is an attempt at presenting the visual analysis associated with the didactic experience of the author. She decided to conduct demonstration lessons related to the art of learning emotions for two groups of upper-secondary students in Poland. The students’ teams were built of several people whom the task was to choose the specific emotion they were going to present in the book as well as to craft a tactile book using, for instance: coloured pieces of paper, glue sticks, stickers, textiles, felt-tip pens, magazines and so on. As a result of undertaken action, the author collected a dozen multipage tactile books about emotions created collaboratively by the lesson participants. The material was treated as cultural archetypes and then analysed with regard to sensational meanings given by their creators.*

**Keywords:** *art, didactics, emotions, tactile books, upper-secondary students.*

### **Introduction**

This paper explores the didactic opportunities of teaching about emotions through crafting. The direct inspiration to write it were enthusiastic reactions of students for such form of classes. The research material was gathered during demonstration lessons related to the art of learning emotions for two groups of upper-secondary students in Poland (in one of the towns in Mazuria region). Demo-lessons were organized as a part of promotion strategy of the University of Warmia and Mazury in Olsztyn. The students’ teams were built of several people whom the task was to choose the specific emotion they were going to present in the book as well as to craft a tactile book. Expressing emotions as the major topic was chosen because of their importance in nowadays youth’s lives and at the same time, the absence of teaching about emotions in the formal school curriculums. Before the final analysis, it is worth also to write about the significance of teaching about emotions in the light of current research and knowledge.

### **Why are social-emotional skills so important?**

As recent research indicate, early social-emotional skills are related to how socially, emotionally, academically and professionally skilled we are later in life

(Jones, Greenberg, & Crowley, 2015), so it becomes especially important when we think about equal opportunities. Social-emotional skills help children to persist in challenging tasks, to effectively seek help when they need it and to be thoughtful in their actions. But also the level of social-emotional skills in childhood may influence such aspects of adult life like completing a college degree, an increased likelihood of being employed, or even being less likely to have problems with the police.

Researchers argue that emotional intelligence is an important predictor of health, wellbeing, work-related outcomes and graduates employability. Admittedly, there are very few empirical studies which demonstrate that emotional functioning ability is something possible to teach and develop, but those which have been conducted so far now show that it is possible to improve levels of emotional intelligence and emotional self-efficacy through teaching interventions (Dacre Pool & Qualter, 2012). It has been proved that social-emotional skills can be taught and learning programs in schools can not only improve them but also increase positive attitudes toward school, positive social behaviour and academic performance. Such programmes can also decrease the likelihood of getting into trouble or experiencing emotional problems (Durlak et al., 2011).

We know so far now that there are individual differences in the ability to connect thoughts to emotions. People who can connect thoughts to feelings may better recognize “the emotional implications of their own thoughts, as well as understand the feelings of others from what they say” (Mayer & Geher, 1996). But specifically designed teaching interventions can enhance these abilities. It is possible to teach social-emotional skills at three levels: (1) knowledge of emotions and strategies to deal with emotional situations, (2) actual abilities in relation to emotional functioning and (3) personality traits in dealing with emotions (Dacre Pool & Qualter, 2012). The intervention described in the paper was based mainly in the first area – increasing knowledge about emotions and strategies of dealing with them.

As some researchers indicate, coping with emotions, such as anxiety and uncertainty, can be necessary for the process of career identity construction. These emotions are always related to metaphors and concepts available in the cultural community (Meijers, 2002). Even before, sociologists have located emotions in the interplay between social environment, mind and body (Hochschild, 1983; Turner, 2001). Through culture, we acquire habits of thinking and speaking leading to use of social, psychological and physical violence. But, as some authors claim, all human beings have the capacity for compassion and empathy (Rosenberg, 2003). We can learn more effective strategies to meet each other's needs than violence. One of the examples is an approach to nonviolent living developed by Marshall Rosenberg. Through workshops and books, he

successfully taught lots of people how to communicate in a non-violent way, which often resulted in interpersonal harmony and learning for future cooperation (Rosenberg, 2003).

Rosenberg's model can be used successfully even with very young children (3-5 years). With adult support and the help of visual books, the children are able to develop an emotional language, which they use to negotiate conflicts in a way that meets everyone's needs. During her research, Elaine Fullerton acknowledged that children enjoyed this style of communication and Rosenberg's model is more than just a tool. It can help to model and teach values in general (Fullerton, 2009).

Nowadays many people suffer from emotional overreactions or being gripped by fear or anxiety, so managing emotions should be a compulsory lesson taught at schools.

Emotions management becomes especially important in contemporary organizations aiming at the perfect adjustment to the organizational environment. At personal or subjective level being in charge of one's emotions means the self-control capacity, the emotional intelligence, the ability to administrate the positive and negative emotions, whereas an interpersonal or social level is focused on coping with the emotional changes between employees and leaders, as well as between employees and clients. Leaders become more aware of emotion-cognition interactions that determine the relative significance of emotion and cognition in planning, decision making and actions. In teaching emotions management it can be significant that the language associated with a given emotion feeling in particular situations becomes a tool in emotion management, self-regulation and other executive functions (Izard, 2009).

When teaching children and youth, we should remember that artworks can be a way of better understanding the culture acquisition process. Thanks to arts we can gain insight into how youth sees this important part of a social world constituted by emotions. Being inspired by these facts, we planned demo-lesson for the upper-secondary school students in accordance with the scenario presented below.

### **The course of a demo-lesson about emotions**

The teaching intervention was designed to engage adolescents into active forms of learning and to liberate their creativity. Crafting tactile books was one of several tasks aimed at increasing the knowledge about expressing emotions. We divided the class into five teams of six persons each. Teams got three QR codes to decode them with their smartphones and find out what are the names of emotions hidden. Those were: joy, sadness, contentment, rage, embarrassment, anger, anguish, suffering, disgust, fear, surprise, shock, apathy, dissatisfaction, disappointment. The task of the teams was to draw an emoticon depicting the

“decoded” emotion. The next task was a reversal. Each team got nine emoticons and their goal was to discuss and write down on a coloured sticky notes emotions or feelings represented by each emoji. After presenting their ideas, the students had to watch acting etudes of the New York Times performed by Matt Damon, Tilda Swinton and Robert Duvall. After each etude participants created a word cloud in the Mentimeter application using their smartphones, entering three associations that occurred after watching each video. Then all the answers were discussed. The last task for the teams was to create the tactile book in reference to the World Book and Copyright Day established on 23 April by UNESCO to promote reading and protection of intellectual property rights. Each team chose a specific group of emotions from Plutchik’s Wheel of Emotions and made a multipage tactile book using materials brought by the educators. Then books were presented and the ways of expressing emotions were discussed. All the projects were digitalised by Scanbot application. The results were so promising that we decided to use the books as visual research material. Obviously, soon the question of how to analyse such data aroused.

### **Frameworks of analysis – colours and shapes of emotions**

Natural basis for the analysis should be the theory of relationships between colours and emotions. Although popular opinions link colours and emotions (Mohr et al., 2018), such studies are rare. One of quite interesting research is a series of experiments conducted by David R. Simmons (2006). He created a two-dimensional model to explain the relationship between colour and mood. Those two affective dimensions have been: pleasant-unpleasant and arousing-calming. It turned out that the most pleasant colours were found to be saturated blues and purples and the most unpleasant were greenish and yellowish browns. Saturated reds and yellows were assessed as the most arousing (“mood-lifting”) and pale blues and purples were perceived as more calming. Moreover, Simmons claims that colour-emotion associations are stereotyped within a given culture, possibly due to media influences (Simmons, 2006).

The connections between colours and emotions have at least three sources: evolution, culture and personal experience. Evolutionary connections refer to colours of objects that were critical to survival (and thus evoked extreme emotions), for example, the blue of water or redness of some fruits and berries. These connections are probably universal for all humans. Cultural connections are specific associations of colours to people, places, objects or emotionally charged events, for example, the reds and greens of Christmas and the blacks and oranges of Halloween might trigger culture-specific emotions. And personal connections are created by idiosyncratic personal experiences (Cuykendall & Hoffman, 2009).

Affective connotations of colours are heterogeneous because they relate to different contexts (for example, red represents anger and love). According to an international online survey on semantic colour-emotion associations, colour choices can differ between moods on hue, lightness and chroma. Yellow hues were systematically associated with joy while yellow-green hues with relaxation. Lighter colours were matched to joy and relaxation (positive moods) than fear and sadness (negative moods). Most chromatic colours were matched to joy, then relaxation, fear and sadness (Mohr et al., 2018). Also, people tend to associate colours with their smells (Schifferstein & Tanudjaja 2004) and shapes.

Paul Ekman, one of the most famous emotions researchers, created the *Atlas of Emotions*, which represents what researchers have learned from the psychological study of emotion. The *Atlas* shows the range of states of each of the five main emotions (anger, fear, disgust, sadness and enjoyment). For each emotion, there is a shape, colour and animation that is specific for that emotion's states. Designed shapes for each set of emotional states can be seen in the figure below.



Figure 1 *Shapes and colours of emotions* (Ekman's *Atlas of Emotions*)

Anger is symbolized by redness and sharp triangle-like shapes. Fear is connected to purple and also sharp but more vibrating figures. Disgust is green and jittery. Sadness is represented by bluish colours and round shapes. Enjoyment is in all shades of orange and even more round and extensive forms. These charts were used to compare youth's representations and interpretations of emotions to what researchers have discovered in recent years.

## Methods

The analysis method used in the presented study is a content analysis which usually studies human communication including websites, newspapers, paintings, or books (Engward, 2013; Erlingsson & Brysiewicz, 2013). In this particular case, upper-secondary students' artworks were treated as a possible way of expressing emotions. Generally, analysis of human creation is one of the qualitative research methods which can be successfully used in educational studies. It aims to cognition, description and interpretation of the outcomes of students' or teachers'

creative activity (Kubinowski, 2010). Such research is usually conducted in two phases (Kwiatkowska, 1996):

- 1) gathering the material (a series of created artifacts) and contextual data information about the creator/artist (in this case – the group of students)
- 2) interpretation of the empirical material:
  - the formal description of the artifact,
  - discovering contents of the artifact within the interaction between a creator and an interpreter,
  - specification of symbolism occurring in the artifact,
  - conclusions of the analysis in the context of students' present and future functioning.

Doing visual analysis (Ledin & Machin, 2018) we should also pay attention to:

- typography (weight, height and width, expansion, curvature, proximity, regularity, slope and flourishes of fonts),
- line spacing and alignment,
- colour (dimensions and composition),
- borders (segregation, separation, integration, overlap, rhyme and contrast of objects).

In this particular study analysed students' creations are tactile books about emotions made during optional classes conducted by me and my colleague – Lidia Bielinis in April 2018 at upper-secondary school in Kętrzyn (classes were described in details previously). The books were made with the use of coloured pieces of paper, glue sticks, stickers, textiles, felt-tip pens, old magazines and so on. Due to this fact, the additional dimension of analysis are tactile impressions. The main research questions organising the analysis are:

- 1) Which emotions are being chosen by upper-secondary school students to represent them in artworks?
- 2) How upper-secondary school students, being asked about making tactile books, represent visually the emotions in their artworks?

Observations of students' discussions and reactions can also increase our understanding of how visual representations of emotions can improve teaching about them.

### **The formal description of the tactile books**

Emotions that have been chosen by upper-secondary school students were love, anger and suffering. We gathered eight books. Five of them were about love, two were about aggression and one about suffering. The formal description of the artifacts was concluded as in the table 1.

Table 1 The formal description of the artifacts (own analysis)

Features of the artwork	Artworks connected to love	Artworks connected to aggression	Artwork connected to suffering
<i>typography (weight, height and width, expansion, curvature, proximity, regularity, slope and flourishes of fonts)</i>	small, round letters, with numerous flourishes; in most cases – red font; letter M (the first letter of Polish word “miłość”=”love”) is bold	sharp, big letters, usually black font	sharp, big letters, usually black font; exclamation marks added
<i>line spacing and alignment</i>	narrow spacing, text centred	just single words	just single words
<i>colour (dimensions and composition)</i>	<b>background:</b> red or light yellow/orange or intensive green <b>other colours used:</b> blue, red, green, pink, yellow, purple, white, orange, silver, gold	<b>background:</b> light blue or red <b>other colours used:</b> red, dark blue, black, grey	<b>background:</b> red and light blue <b>other colours used:</b> black, navy blue, silver, brown, dark green, dark violet, yellow
<i>borders (segregation, separation, integration, overlap, rhyme and contrast of objects)</i>	contrasting colours next to each other, many different shapes of regular borders (mainly hearts, flowers and rabbits), thought-out composition	irregular, sharp shapes, chaotically spread around the pages; motives of angry, distorted or sad faces with empty eyes	irregular, sharp shapes, chaotically spread around the pages
<i>tactile impressions</i>	<b>glued:</b> foam soft elements, twisted ribbon, rough grid, soft pompoms, tiny crystals tape (cut into a heart shape or just small decorative pieces), carelessly crumpled tissue-paper	none	<b>glued:</b> thorn balloons, tiny crystals tape (cut into rectangle shape), thorn sharp plastic cups and plates, carefully formed tissue-paper

Artworks connected to love are more eye-friendly, colours are bright and optimistic, shapes are gentle and touching elements are soft. Students use rabbit figures to tell stories about love. Rabbits in their books meet with each other, think about love and look at each other with love (symbolized by the heart). One rabbit is crying because of losing its love.





Figure 2 *Rabbits in love* (students' work)

Beside heart symbols also the rainbow, the sun and clouds and lots of flowers are used. Love seems to be very pleasant.



Figure 3 and 4 *Hearts as a symbol of love* (students' works)

Artworks connected to aggression are the opposite. They seem to be unpleasant and even frightful. They present angry faces with distorted lips, furrowed eyebrows, empty eyes and even devil horns.



Figure 5 and 6 *(Un)touchable suffering and aggression* (students' works)

There are also drawings of abused people. These works do not contain touch elements, unlike the one artwork connected to suffering. It is full of touching-able items, but they are sharp, spiky and repulsive.

### **The symbolism of youth's tactile books**

The heart-shaped ideograph used by the youth is the best known, universal symbol of love. It represents the romantic love, affectionate emotion and caring. Since the 19th century, the symbol has become popular worldwide and has been used on Valentine's Day cards, candy boxes and other popular culture artifacts as a symbol of romantic love. Not surprisingly, the heart was used in many ways in students' tactile books.

In turn, the rabbit is a symbol of fertility, because it has a lot of offspring during the adult years. The rabbit totem can also represent more symbolic fertility of ideas. Moreover, a rabbit (or bunny) has fluffy and soft fur, so it is associated with pleasant feelings. It becomes often the character of children's books and cartoons. Generally, people find it cute. It is perfect to represent sweet and pure love.

The symbols of aggression and suffering are not so universal. That is why these emotions were represented in students' works rather by human reactions and facial expressions.

All symbols used by the students are a reflection of a culture in which young people live. Love emotions are experienced by many people, in most cultures of the world. The feeling itself is universal, but cultures influence how people feel,

think, and behave being in romantic love (Karandashev, 2015). In western culture, the concept of romantic love became very popular. Our mainstream media is filled with love symbols. Pop songs, music clips, movies are often about falling in and out of love as well as romantic relationships dilemmas. On the other hand, our media system promotes violent or aggressive behaviours. Such content is common on television, in movies, on the internet and in some of the most popular video games. No wonder that these emotions were chosen by the youth.

### **Conclusions and discussion**

The emotions chosen by students were extreme. The most popular was love, which seems quite natural and connected to the youth's developmental phase. In adolescence, love becomes a very important part of young people's lives. This is the time of first romantic relationships and also first painful experiences connected to rejection. At the contrary end of the scale are located tough emotions associated with aggression and suffering which are also youth's everyday experience. Symbolism in students' artworks is universal and taken mainly from the popular culture. Where symbols are well-known (like in the case of love), the artworks are less creative. In works where symbols of emotions were not so obvious, students generated more complex and innovative solutions. Visual representations of emotions developed in groups help young people to better understand them. It was revealed in summarizing discussions after completing the task. Such insight is necessary to effectively manage our own and others feelings. Projects of this type might potentially enhance the ability of critical reflection on people's behaviours.

The range of colours used in artworks seems quite interesting. According to David R. Simmons (2006), saturated reds and yellows assessed as the most arousing ("mood-lifting") colours were chosen and combined together by the students as love symbols. Red was also the colour of suffering and aggression, but it is worth noticing that in this case it was combined with pale blues perceived as calming. It is fully compatible with studies indicating that affective connotations of colours are heterogeneous because they relate to different contexts. That is why red may represent anger as well as love (see: Mohr et al., 2018). Selection of tactile books colours and shapes is also consistent with Ekman's (2016) *Atlas of Emotions*. Tough emotions, like anger, are often perceived by students as red and sharp. The hopelessness of violent relationships is seen as bluish, so it seems very sad. On the other hand, positive moods triggered by love can be located everywhere on a scale between yellow and red, which is close to Ekman's vision of enjoyment.

Using crafting techniques in teaching can actively engage students in the learning process. This kind of teaching can not only develop significant skills such

as reflection and critical thinking, as Lake et al. (2015) claim but also increase understanding of emotions crucial for successful professional and personal functioning in adult life. Working in groups is equally important because it teaches how to communicate and collaborate in order to develop the best possible collective visual representation. The most significant moment in one of the team's work was involvement their colleague from Korea who spoke neither Polish nor English. At first, his team invented the way of communication that allowed them to incorporate Korean colleague's view into their artwork. The phonetic record of the word "aggression" in Korean was included as the part of the tactile book. They were very sensitive about involving everybody in their work.

Creating the artwork provides an opportunity to spot the things that might not have been noticed before. Visual thinking about abstract concepts (like emotions) releases the unconscious knowledge resources. Reflecting on the process and experience can also help the student to apply the learning experience to the practice settings.

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## ОБРАЗ ЧЕЛОВЕКА С НАРУШЕННЫМ ЗРЕНИЕМ В ФИЛАТЕЛИИ КАК ОДНО ИЗ СРЕДСТВ ФОРМИРУЮЩИХ АДЕКВАТНОЕ ОТНОШЕНИЕ ОБЩЕСТВА К СЛЕПОТЕ И К НЕЗРЯЧИМ

### *The Image a Visually Impaired Person in Philately as a Means of Forming an Adequate Attitude Towards the Blindness and Blind*

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**Abstract.** *The topic of blindness and the image of a blind person in philately, although rarely analysed, has a great information potential. This research topic is part of our research "The Image of a Blind Man in the Cultural Heritage of Humanity." The purpose of the study is to systematize knowledge on the subject of image and blindness in philately, to consider the social aspects of this phenomenon. To collect information, the bulletin used the analysis of literature and the search for postage stamps depicting blind people in private collections of philatelists. The iconological method of interpretation of culture and art history was also used, which permitted to reveal the meaning of visions, symbols and their contexts. The monograph is based on the methodological assumptions of art historians Aby Walburg (1866 – 1929) and Erwin Panofsky (1892 – 1968), who claimed that historical and social aspects could be revealed through the works of art. E. Panofsky states that the works of art as human signs as well as other works can be considered documents, encoding the knowledge of the epoch, its culture and attitudes. The work of art is a symbol, indicating "something else" and allowing us to perceive the allegory; it is a document, telling us about certain cultural, religious, social and historic phenomena, depending on the context. The image of a blind person in stamps and commemorative envelopes are divided according to separate themes and analysed as social phenomena. The image of the blind and the topic of blindness in philately allow acquiring more knowledge about the blind, their potential, embossed writing, specificity of their orientation and mobility and at the same time forming positive attitudes towards visually impaired people. These findings activate further research on the image of a blind person in other areas of cultural heritage.*

**Keywords:** *blind man, attitude, philately.*

### **Введение**

### ***Introduction***

Филателия – собирание почтовых марок, печатей, штампов, конвертов с почтовыми марками, стала одним из самых популярных видов коллекционирования. Такой способ коллекционирования появился в пятом

десятилетия XIX века. Термин «филателия» ввел в 1864 году французский коллекционер Жорж Эрпен, репортер новостей. В 1926 году была основана международная федерация филателии (ФИП, 1983).

О теме слепоты в филателии писали немногие (Клюшников, 1969; Кулакаускене, 1976; Страздене, 1990; Валашин, 1992; Макаускас, 1996; Stuckey, 1997; Вайнорас, 2000; Gudonis, 2008). Чаще всего среди людей с ограниченными возможностями на почтовых марках и праздничных конвертах изображаются незрячие. В 1981 международный год людей с ограниченными возможностями в разных странах было издано 288 почтовых марок, среди которых 48 были посвящены незрячим. Впервые тема слепоты на почтовых марках появилась в 1916 году в Боснии и Герцеговине. На почтовой марке был изображен ослепший солдат, которого сопровождала девочка с печальным лицом. В целях справедливости необходимо отметить, что первым слепым на почтовой марке был изображен Георг V, король Ганновера (1851–1866). Слепота короля на ней незаметна, потому что этот свой недуг он считал государственной тайной (Страздене, 1990).

Каталог почтовых марок на тему слепоты и незрячих “Blindiada” составили американские авторы Кен Стаки и Гунила Стейнберг. Каталог был уточнен в 2005 году. Из огромного разнообразия темы «Слепота и незрячие в филателии» мы представляем читателям лишь несколько аспектов и примеров этой широкой темы.

Цель исследования – систематизация знаний на тему об образе и слепоты в филателии, рассмотреть социальные аспекты этого феномена.

Методология исследования. Почтовые марки и праздничные конверты являются частью наследия культуры, поэтому в исследовании был использован иконологический метод интерпретации истории культуры и искусства, позволяющий раскрыть значения образов, символов и их контекста. Опираемся на методологические толкования историков искусства Аби Варбурга (Aby Warburg, 1866–1929) и Ервина Панофского (Erwin Panofsky, 1892–1968), где благодаря наследию произведений искусства и другой культуры раскрываются

исторические и социальные аспекты. Е. Панофский указывает, что произведения искусства как знаки человека и другие произведения можно считать документами, в которых закодированы знания о прежней эпохе, культуре, взглядах (Holly, 1985; Gombrich & Saxl, 1986).

## **Известные люди с нарушениями зрения в филателии** *Famous people with visual disabilities in philately*

Известных людей с нарушениями зрения в мире достаточно много. Часть известных незрячих не родились слепыми, но ослепли позже – в детстве, в подростковом возрасте или в старости. Только в составленный нами «Тифлологический словарь» было включено 1146 имен известных незрячих (Gudonis et al., 2001). Одной из форм признания и уважения к известным людям является издание почтовых марок, как правило, с их изображениями. В мире много людей с нарушениями зрения, однако немногие из них заслужили уважение, хотя другие авторы думают иначе. Например, американский автор Кен А. Стаки отметил, что образы незрячих на почтовых марках являются нередким явлением, как может показаться многим. Несколько известных людей потеряли зрение или плохо видели, но их не предоставляют как незрячих (Stuckey, 1997).

**Гомер** (XII - VII в. до н. э.) греческий поэт, предполагается, потерял зрение будучи взрослым. В сознании цивилизованного мира в нем воплощен образ слепого гения–поэта, сотворившего сложную эпическую форму, которую позже поэты усовершенствовали (Stuckey, 1997). На почтовых марках, посвященных Гомеру изображается сам поэт или эпизоды из созданной им «Одиссеи».

На почтовых марках также изображались персонажи, которые сами отнимали у себя зрение (Эдип) или ослепленные персонажи мифов и Библии (Самсон).

**Эдип**, который, как гласит греческая легенда, выколол себе глаза после того, как узнал, что он по незнанию убил собственного отца и женился на своей матери. Теме Эдипа посвящены некоторые трагедии Софокла, Еврипида и Сенеки (Gudonis et al., 2001). С именем Эдипа связаны почтовые марки с сюжетами из разных спектаклей. В 1976 году на изданной на Кубе почтовой марке изображается сцена из балета «Король Эдип», который демонстрировался в Гаване на V международном фестивале балета. В 1987 году на изданной в Греции почтовой марке в роли короля Эдипа изображен греческий актер Эмиос Аеакис.

**Самсон** военачальник евреев, известный своими военными победами против филистинцев, был ослеплен после того, когда попал к ним в плен. Ослепление военнопленных было привычным явлением в мировой истории, так как оно превращало могучего героя в заслуживающий жалости и издевательства объект (Stuckey, 1997).

**Абдулла Рудаки** (около 860–941) персидский и таджикский поэт. Начиная с конца X века в литературе встречаются утверждения, что Рудаки был слеп от рождения. Мало известно о стихах, которые он



написал. Его девизом было *Мудрость лучше, чем зрение или глаза* (Stuckey, 1997).

**Абуль – Ала аль-Маарри** (973–1057), хотя и ослеп в возрасте трех лет, но это не помешало ему стать известным арабским поэтом и философом. Он написал более 30 научных работ и литературных произведений: трактаты по грамматике и лексикологии, стихотворения и т.д. Его философские трактаты, наполненные иронией, вдохновили Данте создать «Божественную комедию» (Gudonis et al., 2001).

**Ян Жижка** (около 1360–1424) военачальник гуситов XV в, потерял зрение в бою, но продолжал руководить армией (Stuckey, 1997). В 1410 году он продолжал руководить чешским войском в битве Жальгириса, а в 1421 – 1422 г. со своим войском отразил даже три похода крестоносцев (Gudonis et al., 2001).

**Сурдас** (1479–1583) индийский поэт XV-XVI вв. В 1952 году в Индии была выпущена почтовая марка известного индийского поэта Сурдаса, родившегося слепым в семье брахманов. С самого детства из-за его слепоты окружающие испытывали неприязнь к нему, поэтому в возрасте 6 лет он был вынужден покинуть дом своих родителей. Он приобрел религиозные и философские знания у известного мудреца Валлабхи. Окончив учебу он жил как индуистский священник. В течение своей долгой жизни он написал около 100 000 песен и поэм, из которых около 8 000 сохранились до наших дней.

**Галилео Галилей** (1564-1642) ослеп в пожилом возрасте. По случаю 400-летия со дня рождения этого известного итальянского астронома и математика в 1964 году благодарные соотечественники издали почтовую марку с его портретом (Kliušnikovas, 1969). Создатели этой почтовой марки использовали существующий портрет ученого, написанный сангиной, и добавили подпись Г. Галилея. Г. Галилей изображен на рисунке с уже слепым на правый глаз.

**Джон Мильтон** (1608–1674). Известный английский политический деятель и писатель Джон Мильтон был удостоен чести изданием почтовых марок с его портретами. Потеряв зрение от интенсивной работы, он отдался творчеству. Этот эпический поэт и создатель политических памфлетов, начал постепенно терять зрение в поздние годы юности и в среднем возрасте. Его эпическая поэма «Потерянный рай» была завершена, когда он окончательно ослеп (Stuckey, 1997).

**Турла О'Каролан** (1670–1738), ирландский музыкант и композитор, иногда его называют «последним великим ирландским певцом», ослеп будучи восемнадцатилетним юношей от оспы (Stuckey, 1997).

**Иоганн Себастьян Бах** (1685–1750), известный немецкий композитор, в последние годы своей жизни он постепенно ослеп и даже

врач в Лейпциге после двух операций на глазах помочь не смог. Большинство почтовых марок, предназначенных великому маэстро были выпущены на его родине, в Германии.

**Георг Фридрих Гендель** (1685-1759), как и Бах, страдал от потеряннного в пожилом возрасте зрения. Его оперировали три раза, но неудачно, поэтому в конце жизни он почти совсем ослеп. Произведение «Эфта» он закончил будучи почти совсем слепым (Stuckey, 1997).

**Леонард Эйлер** (1707–1783), швейцарский математик, ослеп на один глаз в возрасте 28 лет, на другой – в возрасте 59 лет. Он доказал миру, что и будучи незрячим можно быть математиком (Stuckey, 1997).

**Николай Лобачевский** (1792–1856), русский математик, ректор Казанского университета (1827–1846), создатель евклидовой геометрии (геометрия Лобачевского) потерял зрение в пожилом возрасте.

Король Англии **Георг III** (1738–1820) последние девять лет своей жизни управлял страной будучи слепым (Stuckey, 1997). Насколько известно, вначале слепота короля от всех скрывалась.

Среди других известных незрячих известен музыкант из Люксембурга **Матиас Шоу** (1747–1824) (Stuckey, 1997). На изданной в Люксембурге почтовой марке использована картина, в которой на желтом фоне изображен пожилой музыкант с треугольной шляпой на голове и со скрипкой в руках. На лице внушительно отражены незрячие глаза скрипача.

Латыши уважают память основоположника поэзии на латышском языке **Слепого Индрикиса** (1783–1828). Индрикис родился в Курше (Латвия) в волости Маздзерве в семье крепостного. В детстве он потерял зрение. Он начал писать стихи на примере народных песен. Узнав о его произведениях, пастор Г. Эльверфельд, который собирал латышский фольклор, познакомил молодого человека с основами поэтики. Самой распространенной темой его стихов была слепота. В 1806 году немецкие пасторы опубликовали сборник из четырнадцати стихов Индрикиса. Слепой Индрикис стал основоположником латышской поэзии на родном языке, так как до этого латышская поэзия и проза были написаны на немецком языке (Gudonis et al., 2001). Сохранился в 1935 году созданный Вилнисом Тутансом мемориальный камень с надписью зрячих и шрифтом Брайля. В Латвии, в ознаменование 225-й годовщины со смерти Индрикиса в 2008 году был издан мемориальный конверт, на котором изображен портрет Слепого Индрикиса на фоне пожелтевших страниц со стихами.

Самые большие заслуги перед незрячими мира относятся к французскому изобретателю, тифлопедагогу **Луи Брайлю** (1809–1852). Он начал слепнуть в 3-летнем возрасте и окончательно ослеп в 5 лет.

Л. Брайль в 1824 году разработал рельефно–точечный шрифт для незрячих и слабовидящих людей, который по сей день используется во всем мире. Он был награжден орденом Почетного легиона. Всемирный совет благосостояния слепых решил отметить 150-летие изобретения письма Брайля, объявив 1975 год международным годом Л. Брайля. По этому случаю в разных странах появилось много значков, открыток, конвертов и почтовых марок с изображением Луи Брайля.

**Френсис Паркман** (1823–1893) известный американский историк страдал из-за плохого зрения, которое преследовало его большую часть жизни, но сумел стать известным историком и писателем.

**Йосиф Пулитцер** (1847–1911) известный редактор, который внезапно ослеп в 1887 году. Его слепота не мешала ему и дальше трудиться еще двадцать лет (Stuckey, 1997).

Британский композитор **Фредерик Дельюс** (1863–1934) ослеп и был парализован, но продолжал создавать музыкальные произведения (Stuckey, 1997).

Учительница Элен Келлер **Энн Салливан Мэйси** (1866–1939) после заражения трахомой в 1880 г. поступила в Школу Перкинса для слепых. Как и Джеймс Джойс, она перенесла несколько операций на глазах, которые помогли восстановить большую часть зрения. Несколько лет перед смертью в 1936 г. она ослепла от катаракты (Stuckey, 1997).

**Мария Склодовская–Кюри** (1867–1934), польского происхождения французская физик и химик. С 1891 г. жила во Франции. Определила радиоактивность тория. Совместно с мужем Пьером Кюри (1898) открыла элементы *полоний* и *радий*, исследовала радиоактивное излучение. В 1903 г. вместе с П. Кюри и А. Беккерлем получила Нобелевскую премию по физике, а в 1911 г. она была удостоена Нобелевской премии по химии. Работа с радиоактивными веществами ощутимо сказалось на здоровье Марии Кюри, у нее резко ухудшилось зрение, появились проблемы со слухом. В период с 1923 по 1930 годы Марии было сделано четыре операции на глазах, которые восстановили ей зрение.

Внезапная потеря зрения может быть последствием несчастных случаев, как у шведского лауреата Нобелевской премии (1912) изобретателя автоматических морских маяков **Нильса Густава Далена** (1869–1937). Он ослеп проводя эксперимент в 1913 году. Дален продолжал совершенствовать свои маяки и после потери зрения (Stuckey, 1997).

**Элен Адамс Келлер** (1880–1969) прекрасно видела в младенчестве, пока после воспаления мозга ослепла и оглохла, когда ей было 19 месяцев (Stuckey, 1997). Больше всего праздничных конвертов с образами Элен Келлер и Энн Салливан и других, а также с текстами из истории жизни Элен было издано в США.

**Джеймс Джойс** (1881–1941) ирландский писатель, 30 лет – весь период расцвета творческих сил – он страдал от постепенного ослабления зрения. Его несколько раз оперировали из-за воспаления радужной оболочки, глаукомы и катаракты. Тогда ему приходилось терпеть сильную боль и долгие месяцы жить забинтованными глазами, не зная, будет ли он видеть, когда снимут бинты (Stuckey, 1997).

**Таха Гусейн** (1889–1973) египетский писатель и педагог, ослеп трехлетним из-за офтальмии (Stuckey, 1997). Учился в Сорбонском университете, защитил докторскую диссертацию. Некоторое время работал ректором в Каирском университете, в 1950 году стал министром культуры Египта. Земляки благодарны Таха ель Гуссейну за более 50 научных и литературных произведений, переведенных с английского, французского и греческого языков (Gudonis et al., 2001).

**Василий Ярошенко** (1890–1952), украинский писатель, просветитель, путешественник, эсперантист, переводчик, полиглот. Ослеп в раннем детстве. Его произведения издавались в Японии, Китае, России (Gudonis, 1986, 1990).

**Джеймс Тербер** (1894-1961), американский художник, карикатурист, журналист, драматург. В детстве в результате травмы нанесенной ему его братом потерял один глаз и в течение всей жизни постепенно слеп. На старости совершенно ослеп. Стал известным своим произведением «Тайная жизнь Уолттера Митти» и книгой «Терберовский карнавал» (Grauer, 1994).

**Хорхе Луис Борхес** (1899–1986), один из великих аргентинских писателей и основных фигур современной литературы, испытал постепенное ухудшение зрения и из-за отслоения сетчатки в 1956 г. ослеп (Stuckey, 1997).

К столетию со дня рождения основоположника Союза Слепых Литвы **Пранаса Дауниса** (1900–1962) был издан конверт, посвященный этому незрячему, с надписью для зрячих и письмом Брайля для незрячих.

**Беатриче Гринцевичюте** (1911–1988) певица Литвы, Зрение потеряла в детстве. По инициативе Альбинаса Вайчюнаса «Почта Литвы» в 2011 году издала конверт, предназначенный народной артистке Литвы, певице Беатриче Гринцевичюте в связи со 100-летием со дня ее рождения.

**Хоакин Родриго** (1901-1999) испанский композитор. В три года, переболев дифтерией, Родриго полностью ослеп. Он изучал музыку в Валенсии, позже – композицию в Париже, в 1934 году – теорию музыки в Университете Сорбонны и был удостоен премии Художественного общества за свою симфоническую поэму.

**Эдита Пиаф** (1915–1963) французская актриса и певица ослепла в возрасте трех лет. Такое состояние длилось четыре года, пока бабушка не

взяла ее с собою в паломнический поход к храму Терессы Лисицах. Певица объясняла возвращение зрения только благодаря вмешательству этой святой. Почтовые службы США и Франции выпустили марки певицы и американского джазового трубача Майлза Дэвиса. На площади Пиаф в Париже в 2003 году установлен памятник Эдит Пиаф, в 2015 г. в серии «Деятели мировой культуры» был выпущен конверт, посвященный Эдит Пиаф. (Stuckey, 1997).

**Рэй Чарльз** (1930–2004). В семь лет потерял зрение из-за глаукомы (Stuckey, 1997). В его честь почтовые марки были выпущены в США, Гвинее, Центральноафриканской Республике и Республике Бурунди.

Один из самых молодых слепых, изображенный на почтовых марках, **Стиви Уандер** (р. 1950), один из самых известных в мире современных музыкантов и композиторов рок-н-ролла. Он родился на месяц раньше срока и содержался в инкубаторе реанимационной палаты больницы. За это время он ослеп из-за ретролентальной фиброплазии (Stuckey, 1997). С. Уандер рано стал популярным. Первый альбом его записей вышел под названием «Двенадцатилетний гений». Одну из своих песен он посвятил слепому певцу Рэю Чарльзу. В 1964 г. маленький Стиви пел во вступительной программе концерта «Роллинг Стоунс». С. Уандер записал много авторских альбомов (Gudonis et al., 2001).

### **Обсуждение и выводы** *Discussion and conclusion*

Мы выделили другие темы, связанные со слепотой и незрячими, такие как письмо слепых, белая трость слепого, собака–поводырь незрячего. Из-за ограниченного объема статьи представили только некоторые почтовые марки и праздничные конверты, на которых изображены персоналии. Считаем, что почтовые марки и праздничные конверты, на которых изображены знаменитые незрячие, являются наиболее информативным материалом для общества, потому что он раскрывает потенциальные возможности слепых людей. Чаще всего на почтовых марках используются скульптуры (Гомер, Самсон, Абдулла Рудаки, Луи Брайль), барельефы (Гомер, Самсон), портреты, написанные художниками (Абдулла Рудаки, Абуль–Ала аль-Маарри, Ян Жижка, Сурдас, Галилео Галилей, Джон Мильтон, Турла О'Каролан, Иоганн Себастьян Бах, Георг Фридрих Гендель, Леонард Эйлер, Николай Лобачевский, Георг III, Матиас Шоу, Слепой Индрикис, Луи Брайль, Френсис Паркман, Мария Склодовская–Кюри, Нильс Густав Дален, Уильям Кристофер Ганди, Элен Адамс Келлер, Таха Гусейн, Василий Ярошенко, Хорхе Луис Борхес, Хоакин Родриго), сюжетные картины (Самсон со львом, Самсон и Далила, Элен Адамс

Келлер и Энн Салливан Мэйси, Элен Адамс Келлер с собакой, Джон Мильтон с дочерьми), репродукции, коллажи (Иоганн Себастьян Бах, Георг Фридрих Гендель, Леонард Эйлер, Слепой Индрикис, Луи Брайль, Йосиф Пулитцер, Мария Склодовская–Кюри, Нильс Густав Дален, Элен Адамс Келлер, Василий Ярошенко, Хорхе Луис Борхес) и даже дружественные шаржи (Нильс Густав Дален, Джеймс Джойс, Хорхе Луис Борхес, Джеймс Тербер), репродукции и фотографии (Фредерик Дельюс, Мария Склодовская–Кюри, Пранас Даунис, Эдита Пиаф, Рэй Чарльз). Независимо от форм искусства, которыми представлены образы незрячих, у всех их важное информационное значение. Большинство людей интересуются причинами нарушения зрения или слепоты. В этом смысле особенно информативной была статья Кена Стаки «Известные слепые на почтовых марках» в журнале «Актуальное время» (*Topical time*), в котором автор, кратко предоставив знания о незрячем, всегда старался указать причины слабого зрения или слепоты этих людей. (Stuckey, 1997). Неслучайно в этой статье часто цитируется данный автор. Таким образом, кроме другой информации, читатели знакомятся с некоторыми причинами слабого зрения и слепоты. В течение длительного времени обстоятельства жизни людей с нарушениями зрения ограничивают социальные контакты с обществом. Литовский писатель, публицист Антанас Йонинас, у которого был недуг зрения, в свое время заметил, что жизненный путь незрячего человека – это путь из резервата в резерват: специализированное учреждение дошкольного образования; специальную школу, предназначенную для слабовидящих и слепых детей; социальное заведение, предназначенное для взрослых с нарушениями зрения. В настоящее время при осуществлении идеи интегрированного обучения слабовидящие и слепые стали «более заметны». Эта тенденция подтверждается и данными наших опросов в 1990 и 2018 годах. В 1990 году в среде наших респондентов, постоянно общающихся с незрячими, было 3,6 процента, а в 2018 году – 17,3 процента. В 1990 году вообще не выдавших слепого человека было 14 процентов, а в 2018 г. – 5 процентов (Gudonis & Stelingienė, 2018). Поэтому важна любая форма информации СМИ, в том числе книги, почтовые марки и праздничные конверты, предоставляющая правдивые знания о людях с разными недугами. Если недостаток информации является отличной средой для возникновения мифов и стереотипов, то адекватная информация о потенциальных возможностях этих людей создает условия для формирования позитивного отношения к людям с разными недугами.

Почтовые марки и праздничные конверты, как часть наследия культуры, имеют большое информационное значение. Почтовые марки и праздничные конверты, на которых изображены незрячие, и другие

изображения, связанные с данным недугом, предоставляют обществу знания о потенциальных возможностях незрячих, о разнообразии доступных им профессий.

### **Summary**

The topic of blindness and the image of a blind person in philately, although rarely analysed, has a great information potential. The image of a blind person in stamps and commemorative envelopes are divided according to separate themes and analysed as social phenomena. The image of the blind and the topic of blindness in philately allow acquiring more knowledge about the blind, their potential, embossed writing, specificity of their orientation and mobility and at the same time forming positive attitudes towards visually impaired people. Postage stamps and holiday envelopes, as part of the cultural heritage, are of great informational value. Postage stamps and holiday envelopes, which depict the blind, and other images associated with this disease, provide the public with knowledge about the potential opportunities of the blind, about the diversity of professions available to them.

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## ХУДОЖЕСТВЕННЫЕ И ОБРАЗОВАТЕЛЬНЫЕ ЦЕННОСТИ СОЗДАНИЯ СЕМЕЙНОЙ МУЗЫКИ

### *Artistic and Educational Role of Family Music Making*

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**Abstract.** *Every family is influenced by modernity, transformation, various changes and the fast pace of life. Music can be the ideal basis for a modern family. The article will show scientific reflections on the educational and artistic role of creating family music. Goals and objectives, the specifics of music and building relationships in the environment of music will be emphasized.*

**Keywords:** *creating family music, family, learning through music.*

### **Вступление**

#### **Introduction**

На каждую семью влияют современность, трансформации, различные изменения и быстрый темп жизни. Феномен трансформации современности сопровождается, между прочим: чрезмерной профессиональной деятельностью родителей, ненадлежащим реагированием на эмоциональные потребности детей, отсутствием заботы о психических потребностях ребенка, чувством защищенности, отсутствием свободного времени или обаянием киберпространства (времени за компьютером). Поэтому важно поместить образовательную ценность в современную семью, и это через художественную деятельность. Семья создает основы для воспитания ребенка и определяет путь к воспитательному процессу. Это опора и мост с обществом.

Воспитание, как сознательная деятельность, стремящаяся к формированию человеческой личности, включает две сферы. Первая, инструментальная, связана с познаванием, способностью изменять окружающую нас реальность. Вторая, аксиологическая - это формирование отношения человека к миру и людям, системе ценностей, цели жизни, убеждениям. В процессе воспитания замечается сознательное действие семьи, школы, культурной и социальной среды. Надо также подчеркнуть индивидуальные усилия по формированию собственной личности и влияние средств массовой информации (телевидение, радио, СМИ и т. д.).



Основной целью статьи является признание феномена создания семейной музыки, его художественных, образовательных и социальных ценностей. В качестве метода исследования был выбран монографический метод, позволяющий проникнуть в суть феномена создания семейной музыки.

### **Музыка - идеальная основа для современной семьи** *Music - an ideal foundation for a modern family*

В важности семейного окружения для будущей музыкальности ребенка убеждают многие исследователи, в том числе А. Зенатти, М. Каклмар и Г. Баласко, В. Пейн, П. Дж. Мартин, Е.Л. Рубинов, Й.С. Шельтон, М. Бранд (Lewandowska, 1996). Следует помнить, что младенческий и дошкольный возраст - это время формирования эмоциональной и сенсорной чувствительности к звукам и музыке, музыкального восприятия, когнитивной чувствительности к акустической и музыкальной стимуляции. Это время развития позитивной мотивации ко всем контактам с музыкой а также спонтанной активности и музыкального выражения (пение, игра на инструменте, движение с музыкой, прослушивание и создание музыки и т.д.). Чем раньше мы начнём художественные мероприятия, покажем способы контактов с музыкой тем быстрее приведем ценные музыкальные значения для будущего (Kataryńczuk-Mania, 2009; Regner, 1995; Kumik, 2016). По словам Э. Соуриау, "если мы поможем ребенку развить музыку, которая в нем, мы сделаем его не только лучше и благороднее, но и счастливее" (Souriau, 1965).

### **Начало создания семейной музыки** *Beginnings of family music making*

В музыковедении термином "домашняя музыка" (нем. hausmusik) определяется любительскую, самостоятельную деятельность, представляемую в неформальной обстановке, вне концертных залов или других общественных мест. Её цель - создавать музыку не для публики, а прежде всего для себя, для и вместе с ближайшим окружением. В отличие от публичных музыкальных выступлений, принимающих форму концертов, сольных показов, презентаций, создание домашней музыки происходит без участия широкой аудитории, вне общественно доступных мест.

Где мы должны искать её происхождение? Уже это в средневековой традиции обычных народных песен, исполняемых во время или после окончания фермерских или полевых работ? Может быть в восемнадцатом

веке, когда мода на протекцию получила широкое распространение (от королевских через императорские двора, до аристократии), покровительствуя новым композициям музыкантов или групп для избранной аудитории?

Музыкальное образование, которое проводилось в домах XVIII-XIX вв не только аристократии, но и среднего класса, безусловно, оказало влияние на развитие семейной музыки. Характеристической чертой хорошего образования в те времена было умение петь и играть на инструменте (обычно на пианино).

С появлением записи на пленку общая традиция создания семейной музыки почти исчезла. В отрывочной форме она функционирует как пение во время дня рождения или Рождества. Конечно, есть семьи, в которых эта форма проводить время популярна и высоко ценится, но это не такое явление, как в XIX веке.

Репертуар, представляемый во время создания семейной музыки, подбирается с учетом количества и типов инструментов, которыми мы располагаем, уровня квалификации играющих членов семьи и их количества. При выборе песен обычно учитывается мнение всех членов ансамбля, хотя обычно есть какой-то лидер (дирижер), организующий весь процесс совместного творчества.

Поскольку музыкальные умения при создании семейной музыки не обязательно должны быть на высшем исполнительном уровне, основой репертуара таких выступлений являются не очень сложные или обширные произведения. Часто готовятся более простые издания музыкальных сочинений, разработанные специально для создания домашней музыки. Также публикуются специальные наборы нот с правильно подобранными инструментами, освоение которых не требует специального музыкального образования. Они включают, в зависимости от спроса, например, вокальные партии, гитарные аккорды и простое фортепианное сопровождение (Gardoń-Preinl, Mania, 2017).

### **Важность создания семейной музыки** *The importance of family music making*

Индивидуальное и групповое воспроизведение музыки взаимодействует сильнее, чем слушание живой музыки во время концерта или прослушивание ее с помощью современных аудио- и видеопроигрывателей. Играя на инструменте или участвуя в исполнении избранной песни, человек занимает активную позицию - создает музыку своим телом и с его помощью.

Сам исполнитель участвует в создании музыкальной структуры, выступает в роли автора, больше еще - создателя. И при всем этом не находится в ситуации, которая может вызвать негативные эмоции, стать причиной внутренней нервозности, что часто бывает во время публичных выступлений. Наоборот, создание домашней музыки - один из лучших способов избавиться от стресса, отрешенности от всех текущих проблем. Оно играет гораздо более значительную роль в духовном, нравственном и интеллектуальном развитии человека, укрепляя чувство ценности, чем выступления перед аудиторией или просто прослушивание музыки.

Создание музыки развивает личность, воспитывает внимание, память, концентрацию, способность воспринимать звуковые явления и распознавать их в музыкальном целом. Очень важным достоинством является тот факт, что оно позволяет найти для каждого, даже наименее способного члена группы, такой вид музыкальной деятельности, который находится в пределах ее возможностей, обеспечивая ощущение полноты и успеха (Przychodzińska-Kaciczak, 1987). Эмоциональные переживания, сопровождающие группу во время исполнения песен, часто превращаются в эстетические переживания.

Хорошо, когда человек может играть для себя или выступать в качестве исполнителя перед другими, в данном случае - перед членами семьи. Но еще лучше, когда близкие нам люди участвуют в процессе создания музыки. Мы знаем, что ничто не связывает людей так сильно, как совместные действия, совместное творчество. В таких ситуациях создание музыки может стать отличной возможностью собрать семью, поддержать старые контакты или установить новые. Когда люди играют вместе, развивается чувство ответственности, так как каждый ведет свою партию и отвечает за свою часть выступления. Благодаря музыке начинается понимать, что значит строить и поддерживать гармоничные отношения с другими. Дети становятся соучастниками того, что делают родители, родители, в свою очередь, того в чем участвуют дети. Все вместе начинают понимать и чувствовать, что значит быть ответственным за целое и конечный результат.

Здорово, если один из членов семьи имеет музыкальное образование. Однако это не основной или необходимый элемент. Самое главное в этом случае - желание быть вместе и наслаждаться музыкой.

**Музицирующие семьи - их функционирование, роль, участие в  
фестивалях, концертах**  
*Musical families - their functioning, role, participation in festivals, concerts*

Наблюдая за биографиями выдающихся музыкальных личностей, можно заметить роль поддержки, оказываемой членами семьи в процессе развития. Общение с музыкой означает не только игру, пение, но и общение детей с музыкой, прививание интереса к музыкальному искусству, сделание возможным удовлетворить их артистические потребности. Молодые люди, в основном интересующиеся популярной и молодежной музыкой, обращают внимание на мелодическую линию, отношения между музыкой и текстом, тембр, выразительные элементы и интерпретацию. Одно из предложений, которое укрепляет авторитет семьи - это создание домашней музыки. Мария Мантуржевская указывает на семь важных особенностей семейного окружения:

1. Социально-эмоциональная зрелость и взаимные межличностные отношения родителей.
2. Семья ориентирована на детей, их хорошее воспитание и тщательное образование.
3. Семья, поддерживающая музыкальное развитие ребенка, независимо от своих собственных музыкальных компетенции.
4. "Филогенетическое" кондиционирование таланта.
5. Компенсационные моменты в родительских отношениях.
6. Природные компетенции и образовательные таланты родителей, бабушек и дедушек или других значимых лиц, вовлеченных в процесс развития и воспитания будущих талантов.
7. Очень сильное убеждение среди членов семьи, что ребенок музыкально талантлив (Sierszeńska-Leraczyk, 2002).

В семьях музицирующих уважают этос работы, межличностные отношения основаны на взаимном уважении, понимании, часто взаимной, зрелой и стабильной любви, воздержанности и толерантности. Музыка является очень важным элементом, независимо от музыкальной компетенции родителей, бабушек и дедушек. Родителей интересуют занятия, они присутствуют на них, следят за работой ребенка и приглашают к систематическим упражнениям. Дома говорится о музыке и слушает ее. Музыка и музыкальное воспитание детей - важное измерение семейной жизни (Pikała, 2002).

Совместное исполнение художественного произведения благотворно влияет на психику людей, которые играют вместе и является важным интегрирующим элементом. Любительское музыкальное творчество семьи вызывает интерес ближайшего окружения. Музицирующая семья вносит

значительный вклад в культуру региона, распространяет музыкальную культуру.

Несмотря на то, что создание домашней музыки в настоящее время не в моде (забытые традиции, загруженность мероприятиями, новые способы проводить свободное время, отсутствие рекламы), поднимаются голоса заново эту форму вовлечения и объединения семей распространить.

Семьи, которые любят проводить свободное время, играя музыку, все чаще встречаются на различных фестивалях, встречах и концертах музыкальных семей. Их организаторы и самые музицирующие семьи имеют в виду несколько целей:

1. подчеркивание роли семьи в жизни человека,
2. попытка возродить, продвинуть и поддержать традицию создания семейной музыки,
3. создание социальных связей,
4. интеграция поколений,
5. презентация на более широком форуме музыкальных семей,
6. продвижение культуры данного региона.

Примерами таких встреч могут быть:

1. Серадзский Фестиваль Музицирующих Семей - Серадз. Он задуман как событие, объединяющее любительское музыкальное движение. Для участия в фестивале приглашается музыкантов-любителей, исполняющих так называемую серьезно музыку на акустических инструментах [...]. Возрастной раздел участников, а также уровень презентации - большой. От 5 до 50 лет, от любителей к профессионалам. Играли братья и сестры, а также родителей со своими детьми (Lubicie rodzinie pomuzykować? on-line <http://www.nasze.fm/news,21515>).
2. Фестиваль Семейных Камерных Оркестров - Добчице. Необходимость организации Фестиваля Семейных Камерных Оркестров возникла из-за того, что в регионе и Польше нет платформ, позволяющих семейным оркестрам выступать публично. Феномен создания семейной музыки, находящийся в состоянии регресса, должен поощряться и поддерживаться. Фактором, стимулирующим развитие этого явления, станет организация платформы, позволяющей таким ансамблям публично представлять свои достижения. Фестиваль носит интеграционный характер. Его целью есть поощрение групповой музыки в семейной обстановке, извлечение забытых навыков, радость совместной игры (Dni Muzykowania Zespołowego i Rodzinnego, on-line <http://www.dobczyce.pl/dni-muzykowania-zespolowego-i-rodzinnego.html>).

3. Встречи Музыцирующих Семей - Стажино. Целью мероприятия является популяризация прекрасных традиций создания семейной музыки как источника радости и интеграции в наших домах, а также создание возможностей для публичного представления создания семейной музыки (Komunikat z XXII Spotkania Rodzin Muzykujących – Starzyno 2016, on-line <http://oksitpuck.pl/komunikat-z-xxii-spotkania-rodzin-muzykujacych-strzelno-2016>).
4. Силезская Семейная Музыка - Семяновице-Слэнске. Это продвижение ценностей, которые семья несет с собой и наших силезских традиции семейного праздника (Rodzinne Muzykowanie, on-line <http://www.siemianowice.pl/aktualnosci/kultura/rodzinne-muzykowanie.2169>).
5. Пясечинский Обзор Музыцирующих Семей "Осеннее семейное музыкальное творчество" - Пясечно. Мы бы хотели, чтобы "Музыкальное семейное творчество" в Пясечно предоставило возможность вместе возродить традиции семейной музыки. Мы призываем семьи, которые уже являются музыкальными (и те, для которых наше приглашение станет стимулом для семейного пения и игры), принять участие в нашем обзоре [...]. Мы хотели бы встретиться, поделиться достижениями и, прежде всего, поиграть (Jesienne muzykowanie rodzinne, on-line [http://students.mimuw.edu.pl/~hg214597/gama/Gama/jesienne\\_muzykowanie.html](http://students.mimuw.edu.pl/~hg214597/gama/Gama/jesienne_muzykowanie.html)).
6. Кендзежин-Козельские Встречи Музыцирующих Семей - Кендзежин-Козле. Цели: возрождение традиции создания семейной музыки, продвижение и интеграция музыкальных семей, изучение культурного наследия нашего региона (Kędzierzyńsko-Kozielskie Spotkania Muzykujących Rodzin, on-line <http://www.psm-kozle.pl/kedzierzynsko-kozielskie-spotkania-muzykujacych-rodzin.html>).

Вопреки черным сценариям, согласно которым современные технологии уносят нашу жизнь и постепенно превращают людей в роботов, их также можно использовать для оживления семейной музыки. Люди больше не удовлетворены тем, что они могут смотреть или слушать что-то по телевизору или в Интернете. Они хотят познакомиться с живыми инструментами, живой музыкой и живыми людьми. Интернет, очевидно, не заменяет такую встречу, но может существенно облегчить ее. На многих веб-сайтах мы можем найти музыкальные материалы, информацию о том, где купить интересующий нас инструмент, отправить сообщения заинтересованным людям о месте или дате следующей музыкальной встречи. Разнообразие материалов, размещенных в Интернете, позволяет распространять новости о различных типах музыки, знакомиться с ее

другими типами, знакомиться не только с тем, что звучит рядом с нами, но и с тем, что звучит в отдаленных странах на других континентах.

### **Развитие музыкальной культуры, построение отношений в окружении музыки** *The specificity of the musics, building relationships in the surroundings of music*

Содержание, предлагаемое современными системами музыкального образования, позволяет детям и студентам сознательно использовать достижения отечественной и мировой музыкальной культуры, организовывать творческое участие в музыкальной жизни и развивать свои таланты и интересы.

Одним из ценных аспектов музыкального образования может быть нетрадиционное музыкальное образование, адресованное младшим, предложено Шиничи Сузуки (1898-1998). "Сузуки призывает родителей присутствовать, когда дети играют и, если у них есть предрасположенность, тренироваться вместе (с) ребенком между уроками" (Menuhin, 2000). Родитель, который исполняет ответственную роль домашнего учителя, благодаря похвале, совместной игре и работе поощряет и помогает выполнять упражнения. До того, как ребенок начинает учиться играть на инструменте, родители проходят минимум один месяц обучения, во время которого учатся, как стимулировать ребенка к игре, как развлекаться вместе с ним или дисциплинировать его. Быстро стало известно, что обучение музыке, начатое в раннем детстве, оказало благотворное влияние на общее интеллектуальное развитие, благодаря чему студенты в последующие годы обучения достигли лучших результатов во многих областях. Метод Сузуки - это непрерывное обучение ребенка, учителя и родителя. Ценность использования этого метода - создание любительской музыки. Совместное музицирование приводит к тому, что ребята быстрее устанавливают отношения, они способны делиться своим энтузиазмом с другими. Поэтому подчеркивается роль таких психолого-педагогических факторов этого метода, как:

- присутствие родителей на занятиях, их терпение и понимание,
- тесные отношения с родителями, укрепление отношений между ребенком и матерью, усиление родительского влияния,
- вызывание интереса и любви к музыке,
- игра по памяти,
- самоконтроль,
- необходимость делать музыку.

Во многих музыкальных академиях в Европе и по всему миру дети, которые растут в школах Сузуки, выделяются среди своих сверстников (например, Консерватория в Копенгагене, Академия Сибелиуса в Хельсинки, Музыкальная академия в Рейкьявике, Музыкальная школа Джулиарда в Нью-Йорке и многие другие). Сузуки считал, что раннее образование детей в сочетании с формированием положительных качеств характера и развитием музыкальных способностей окажет огромное влияние на воспитание желательного общественного облика и будет способствовать воспитанию людей с большими достоинствами (Suzuki, 2003).

### **Выводы** *Conclusions*

Контакт с музыкой учит оценивать. Это позволяет ребенку изучать музыку, выдавать эстетические мнения и перемещать все познавательные ценности от простейшего восприятия посредством структурирования к классификации к эстетическим и оценочным оценкам. Все эмоции, вызванные музыкой, способствуют образовательным воздействиям. Ребенок, воспитанный музыкой, учится уважать художественное творчество и культурные явления. Коллективные действия, такие как: совместное пение, игра в музыкальной группе способствуют созданию общественных взаимодействий, в которых ребенок демонстрирует ответственность и дисциплину. Благодаря музыкальной деятельности легче формировать у детей и молодежи мнения о важных ценностях в общественных контактах, окружающей среде, по отношению к родной стране, родной культуре и другим народам.

### *Summary*

Contact with music teaches to evaluate. This allows the child to learn music, to produce aesthetic opinions and to move all cognitive values from the simplest perception through structuring to classification to aesthetic and evaluative assessments. All emotions caused by music contribute to educational influences. A child brought up by music learns to respect artistic creativity and cultural phenomena. Collective actions, such as: joint singing, playing in a musical group contribute to the creation of social interactions in which the child demonstrates responsibility and discipline. Thanks to musical activity, it is easier to form opinions among children and young people about important values in public contacts, the environment, in relation to one's native country, native culture and other peoples.



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## КУБ НА ГОРЕ ЗАМКОВАЯ В КИЕВЕ КАК УНИКАЛЬНЫЙ ВНЕСИСТЕМНЫЙ ХУДОЖЕСТВЕННЫЙ ОБЪЕКТ

### *Cube on Zamkovaya Hora in Kyiv as a Unique Exogenous Object of Art*

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**Abstract.** *This article analyzes special aspects of the social existence of Station-1 objet d'art, a 108 cm brick cube, on Zamkovaya Hora hill in Kyiv. Created in 2001, this art object is an accumulating visiting center for different social strata, from representatives of informal youth associations to tourists and experts in local history. Transformations of the cube surface are viewed as a range of endless 'modular combinations' (Didi-Huberman). Watching people contact with an art object beyond art institutions proves the endlessness of manifestations of both vandalism (destruction) and creativity (poems and texts on the cube planes).*

**Keywords:** *art project "Fiction Gallery Expedition", communication, cube as art object, hill art, provocation.*

### **Введение**

#### ***Introduction***

Устанавливая на горе Замковая в центре Подольского района Киева бетонный куб в 2001 году, художники осуществили уникальный эксперимент, утверждая идею истинной свободы и независимости творчества. Арт-объект имел авторское название – «Станция-1». «Станцией-2» стал сайт «FGE» (Фиктивная Галерея Экспедиция) – виртуальная структура, не имеющая ни границ, ни стабильного места, ни физического адреса, что для начала «нулевых» было достаточно редким явлением. И только спустя 17 лет термин «Gallery Fiction» был использован для обозначения ситуации в современной художественной практике. «Искусство, учитывающее стремительно складывающуюся ситуацию, даже будучи произведенным физически, начинает ощутимо тяготеть к доминанте цифрового присутствия» (Серкова, 2018).

Авторы проекта не контактировали с арт-институциями как в связи с отсутствием на то время выставочных пространств, так и с целью избежать давления со стороны административных структур. Такая позиция

художников в начале «нулевых» имела определенные последствия. Анонимные объекты, возводимые на киевских холмах в виде материального проявления «FGE», не воспринимались социумом как произведения искусства, вследствие чего подвергались частичному разрушению или полному уничтожению, обрастая при этом различными слухами и мифами (Кладбище на Замковой горе). Автор идеи Игорь Коновалов обозначил возведение объектов авторским термином «искусство на холмах» (hill art), что соответствовало деятельности художников в уникальном киевском ландшафте. Однако на протяжении 17 лет постройки оставались незамеченными национальным искусствоведением.

Такая ситуация стала поводом для изучения особенностей коммуникации социума с произведениями искусства вне регламентируемых правил галерейно-выставочного пространства.

Куб, возведенный на горе Замковая, оказался наиболее интересным объектом для исследования, поскольку часто подвергался художественным трансформациям. Обширный архив составляют не только снимки куба, но и фотофиксация посещений арт-объекта. Съемка проводилась специальной оптикой на расстоянии около 500 метров с горы Щекавица. Однако и этот арт-объект абсолютно не попадал в поле зрения искусствоведов.

В результате возникла острая необходимость не только проинформировать научное сообщество о существовании этого уникального объекта, а детально изучить его полисемантическую структуру и выявить его сложное функционирование в условиях абсолютной свободы взаимодействия с человеком, что и стало основной **целью** данной статьи.

Основными источниками исследования стали интервью с художниками и сборник материалов (текстов и фотодокументов), посвященных деятельности «FGE» (Сквот на улице Олега Олевская). Отметим важность тезисов относительно символики куба французского философа Жоржа Диди-Юбермана, отдельные высказывания которого позволили глубже раскрыть поставленную цель (Диди-Юберман, 2001).

Таким образом, **актуальность** исследования лежит в изучении арт-объекта на горе Замковая как своеобразной точки столкновения искусства и социума. Процесс коммуникации продолжается и по сей день. Этот объект является единственным в своем роде, который появился в 2001 году благодаря смелой идее киевских художников и опередил свое время, объединив интернет-пространство и живую коммуникацию в природном ландшафте.

Методы исследования: описывая историю возникновения и трансформаций арт-объекта, внимание уделяется интерпретации семантики изменяющихся оболочек. Вместе с тем, структурируются и всевозможные

контакты человека с объектом, не маркированным в глазах зрителя как произведение искусства.

Объект исследования: куб на горе Замковая как арт-объект, не зависимый от административных органов и художественных институций.

Предмет исследования: особенности взаимодействия посетителей горы Замковая с арт-объектом и влияние его трансформаций на коммуникацию.

Гипотеза исследования. Констатируем существование сложных взаимоотношений между арт-объектом и реакцией зрителя, спровоцированной семантикой метаморфоз куба. Возведение куба в общедоступном киевском ландшафте и постоянные изменения его внешнего вида с 2001 года позволяют определить действия художников как интервенцию современного искусства в социум.

### ***Идея куба и его установка на горе Замковая в Киеве Idea of the cube and its installation on Zamkova Hora hill in Kyiv***

Летом 2001 года у художников сформировалась идея маркировать новым арт-объектом одну из самых известных возвышенностей Киева – гору Замковая, которая составляет уникальный ландшафт столичного Подола. Место размещения объекта, его форма, размеры и материал были выбраны не случайно.

Гора Замковая – не только уникальный природный ландшафт для любителей пеших прогулок и киевских панорам. Это историческое пространство, известное по хроникам с XIV века – именно там литовский князь Владимир Ольгердович в 1362 г. построил деревянный замок, который простоял до середины XVII века. Предположительно в начале XVI века у подножия горы был основан Свято-Вознесенский Флоровский женский монастырь. В XIX веке на горе было образовано кладбище, которое функционировало вплоть до 50-х годов XX века. В 1940 году на Замковой установлена радиостанция, которая использовалась для глушения сигналов иностранных радиовещательных станций. В начале 1990-х годов вышка была демонтирована.

В наши дни на горе сохранились остатки кладбища с разрушенными надгробьями. Место пришло в запустение и стало привлекать неформальную молодежь своей мрачной историей.

Можно сказать, что гора аккумулировала разнообразные слои культур, прошлых и нынешних, что и притягивало посетителей на этот уникальный участок киевского ландшафта.

По мнению автора проекта, кубическая форма оказалась наиболее подходящей для воплощения идеи «всплытия» Фиктивной Галереи. Тут

присутствует как трезвый расчет, так и определенные жизненные воспоминания. Куб является наиболее устойчивой формой. Это не только механическая устойчивость, но и сопротивление разрушению, определенная вандалостойкость.

Автору идеи вспоминалось и далекое детство, когда на стройке мальчишки выбирали гору строительных отходов повыше и, карабкаясь на нее, представляли себя генералами. Уже в истоках идеи возникают важные акценты, которые впоследствии составят стержень анализа этого арт-объекта, а именно – «игра» и «постамент».

Размышления над размерами куба привели к выбору числа 108. Не побоимся сослаться на Википедию, поскольку автор идеи в 2001 году начинал знакомство со значением числа 108 именно с этого ресурса (108 (число)). Наше научное исследование также не предполагает углубления в эзотерические материалы (Францишко, 2018). Однако число 108 действительно является определенной константой в науке и религии. Отметим некоторые. Например, науке: средняя скорость вращения Земли по эллиптической орбите вокруг Солнца чуть не дотягивает до 108 тыс. км/час (107, 15). По мере приближения к Солнцу ближе к перигелию достигает этой величины. Объем Земли  $\sim 108 \cdot 10^{10}$  км<sup>3</sup> ( $108,32073 \times 10^{10}$ ). 108 мин – время полета вокруг Земли по наиболее устойчивой орбите, именно столько длился полет первого космонавта Юрия Гагарина. Это также сакральное число в индуизме и буддизме.

Объект создавался очень быстро, в течение нескольких часов, не смотря на всю сложность доставки кирпича, воды и инструментов на довольно крутую гору (высота 80 м над уровнем Днепра). Строительство велось без согласования с городской администрацией, нарушая все существующие законы по возведению объектов в городской среде. Для нейтрализации визуальной тяжести стороны были выложены зеркальными плитками (Рис. 1). В результате кубическая масса буквально растворилась в отражениях неба, деревьев и кустарников.



*Рисунок 1. «Станция-1», кирпич, зеркальные плитки, 108x108x108 см, гора  
Замковая, г. Киев (фото автора)*

*Figure 1 «Station-1», brick, mirror tiles, 108x108x108 cm, Zamkovaya Hora hill, Kyiv  
(author's photo)*

### **Метаморфозы куба: интервенция современного искусства в социум *Metamorphoses of cube: intervention of the modern art in society***

Парадокс состоял в том, что этот объект, набиравший популярность среди жителей и гостей города, оказался за границей внимания масс-медиа от искусства. Тому было несколько причин, которые и послужили истоками провокаций и независимого существования куба в уникальном историческом ландшафте Киева.

Во-первых, для строительства арт-объекта было выбрано удачное место на краю горы, которое для посетителей служило местом уединения и отличной смотровой площадкой, открывающей панораму на Подол.

Во-вторых, куб строился и существовал в условиях абсолютной анонимности, без привлечения масс-медиа и спонсоров от искусства.

Наиболее важным для понимания идеи куба как независимого арт-объекта, явилась реакция социума. Посетители Замковой распоряжались кубом по своему усмотрению, без сурового надзора музейных стражей и секьюрити галерей. И первым контактом с объектом стал акт вандализма:

идеально зеркальный куб простоял два дня, а через неделю зеркала были сбиты полностью (Рис. 1). Это была одна из самых ярких провокаций «нулевых» в художественном пространстве Украины.

В такой способ социум спровоцировал художников сквота на Олеговской на трансформации куба. Авторы идеи, а также их единомышленники (Наталья Варварова, Анатолий Варваров, Алла Вознесенская, Эдуард Потапенков) расписывали куб, что привело к появлению легенд в киевском культурном пространстве (Кладбище на Замковой горе). Художники изменяли его внешний вид, нанося на плоскости различные знаки или превращая куб в легко узнаваемые предметы. На протяжении 2002 – 2017 годов куб становился разноцветной игровой костью с яркими точками на плоскостях, подарком – белой «коробкой», украшенной серебристым бантом. На его плоскостях в разное время появлялись красные сердца, знаки для проверки зрения, компьютерная кнопка Enter, звездное небо на синем фоне (Рис. 2).

Такие метаморфозы, особенно когда куб становился полностью красным или белым, провоцировали посетителей на включение в игру, своеобразный диалог. И посетители Замковой писали на кубе философски-лирические откровения, что в последующем фотографировалось авторами проекта. Приведем одну из них.

*«Боль – основная материя,*

*Основа этого мира...*

*Все остальное – ежесекундные миражи...*

*Луна – наша мать, видит и знает нас и то, что все*

*Мы лишь пицца осознания...*

*Если ты это знаешь и*

*Понимаешь, то ты – один из нас».*

Значительной частью документального наследия «Станции-1» стала фотофиксация посещений арт-объекта. Снимки групп посетителей, не подозревавших о существовании камеры на горе напротив, перемещались на «Станцию-2», в виртуальное поле сайта «FGE». Посетители чаще приходили к кубу в теплое время года. Однако даже зимой, когда подъем на Замковую довольно опасен, там также появлялись люди. Зафиксировано появление как многочисленных групп, так и одиноких посетителей. Возрастные категории самые разные – семьи с маленькими детьми дошкольного возраста, подростки, молодые люди (в большинстве), пожилые (изредка).

Фотофиксация свидетельствует, что большинство посетителей совершали прогулку ради панорамного пейзажа на киевский Подол, который открывался с Замковой горы. Забравшись на куб, можно было увидеть немного больше и, вместе с тем, почувствовать себя выше

остальных, поиграть в «памятник себе». Часто группы молодых людей превращали куб в стол и устраивали пикники, влюбленные пары целовались, одинокие – просто сидели и созерцали. Так начал свою жизнь в социуме столицы уникальный арт-объект – место паломничества, встреч и фотосессий жителей и гостей Киева.

В результате вышеописанных метаморфоз и взаимодействия с социумом арт-объект в 2002 году был переименован в «Точку опоры».

Выявлением идеи независимости арт-объекта на Замковой стала акция в июле 2017 г., когда танцовщица на кубе поднималась в прыжке, контрастируя со статичной формой. При этом художниками куб был преобразован в кубик Рубика (Рис. 2).

Осенью 2017 года в Киеве, в Центре Современного Искусства (ЦСИ) «Soviart» был представлен проект «Точка опоры», который презентовал историю создания и «жизни» одного из самых часто посещаемых и мифологизированных арт-объектов Киева от появления в 2001 году до сегодняшних дней. Впервые была снята завеса анонимности и названы имена художников сквота на Олеговской, авторов идеи – Игорь Коновалов и Владимир Заиченко. В экспозиции была представлена реконструкция зеркального куба а также уникальные фото посетителей Замковой, сделанные с горы Щекавица, и копии текстов 2003-2017 годов, оставленные на кубе неизвестными авторами.

### **Семантика игры: провокация, коммуникация, архивация** ***Game semantics: provocation, communication, archivation***

Диди-Юберман, погружаясь в смыслы минималистских фигур Тони Смита 60-70-х годов XX века, проводит следующие параллели: «...объект простой, как детский кубик, но черный, как фамильный склеп» (Диди-Юберман, 2001, 72). И в такой способ автор намечает один аспект, важный для нашего исследования – игра как процесс выявления сложной внутренней циркуляции смыслов. Ради справедливости стоит заметить, что связь с образом гроба, укорененного в истории цивилизации, «ящика для тела в 6 футов» (Die (1962), сталь, 183x183x183 см) не стала актуальной для монолитного бетонного куба, построенного в начале XXI века.

Однако игровое начало проявилось активно буквально с первых этапов возведения «Станции-1». Как это ни парадоксально звучит, художники играли с законом («поймай меня, догони»), устанавливая куб в центре столицы без согласования с администрацией. В то время как минималистские кубы Тони Смита (далеко не всегда четких кубических размеров) демонстрировались в галереях, что уже регламентировало определенное поведение зрителей. Один объект Тони Смит установил в



1961 году у себя за домом. Это был черный ящик из дерева размерами 57x84x84 см (Диди-Юберман, 2001, 79). Но и в этом случае контакт социума с объектом, размещенным на частной территории, был невозможен – Тони Смит и не ставил перед собой такой задачи.

Поэтому, выявляя уровни значения арт-объекта, построенного в начале XXI века, и анализируя результаты столкновений искусства и социума, стоит ориентироваться на смысловые связи в тех произведениях, где уже существует идея контакта с человеком. В известном произведении Пабло Пикассо «Девочка на шаре» (1905) куб появляется на переднем плане как важный смысловой элемент композиции. Исследователи предполагают связь с латинской поговоркой «*Sedes Fortunae rotunda, sedes Virtutis quadrata*» («Сиденье Фортуны круглое, сиденье Доблести квадратное»).

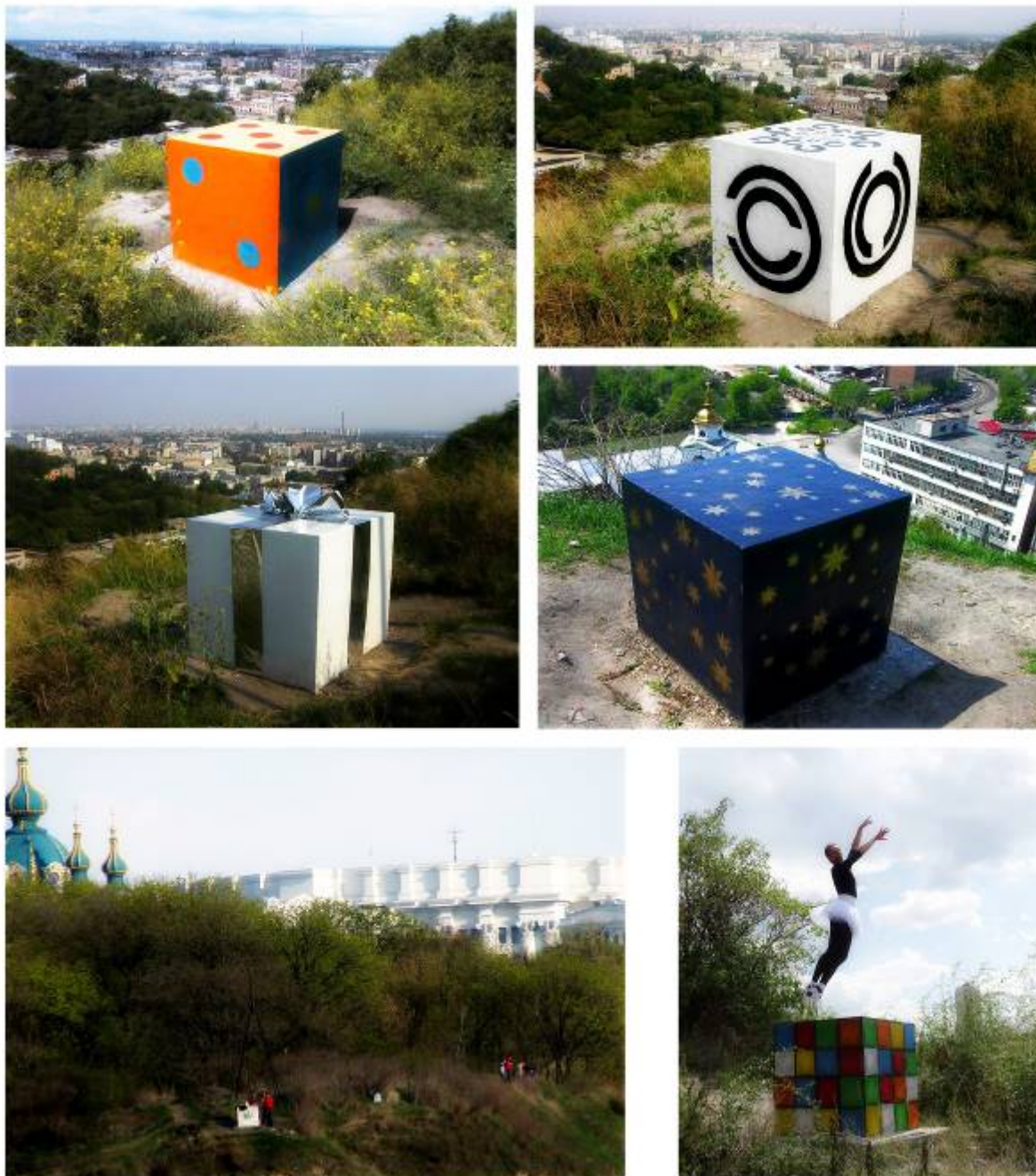
Статика куба нарушается несколько позднее, в теории супрематизма Казимира Малевича. Сначала квадрат, как геометрическая фигура, обретает динамику в белом пространстве, условно преодолевая плоскость холста. Затем в 1925 году появляются архитектонки, супрематические модели, среди которых определенное место занимают кубические формы. Деревянный куб на кирпичном фундаменте был установлен на могиле художника в Немчиновке (Утерянная могила Казимира Малевича). Важно отметить, что куб, как супрематический объект, выходит из пространства искусства, становится частью ландшафта и притягивает посетителей в силу особого, мемориального характера.

Минималистские кубы Тони Смита в 60-е годы позволили Диди-Юберману переосмыслить связь между формой и присутствием в закрытом пространстве галерей, где прямой контакт объекта со зрителем был априори невозможен и не ставился автором как задача.

Мы собрали и продемонстрируем наиболее важные прочтения смыслов куба по прошествии его 18-летнего существования на горе Замковая. Основой анализа является тезис Диди-Юбермана об игровой природе куба как кубика в руках ребенка. «Исключительная легкость в обращении с кубиком вовлекает его всевозможным играм, всевозможным парадоксам (Диди-Юберман, 2001, 69). Мы проанализируем эту мысль относительно существования куба в новых условиях – в свободной коммуникации в окружении природного ландшафта.

В результате анализа было выявлено два типа игры с кубом. Модификации внешнего вида объекта представили игру с оболочками: имитацию внутренней пустоты («подарок с бантом»), объема («игральная кость»), декорацию плоскостей в различные цвета и с использованием различных символов. Так в кубе формировалась функция провокатора.

Гора Замковая стала притягивать большее количество людей в надежде увидеть изменившийся куб.



*Рисунок 2. Метаморфозы куба на горе Замковая в Киеве (2002- 2017) (фото автора)  
Figure 2 Metamorphoses of cube on the Zamkovaya Hora hill, Kyiv (2002- 2017)  
(author's photo)*

Второй тип игры – игра с масштабом – уже был связан не с деятельностью художников, а с реакцией посетителей. Зрители рассматривали очередные изменения и испытывали «визуальное

беспокойство» (Диди-Юберман, 2001, 85). Тревожность вела к активации действия и куб вступал в контакт с посетителями, приобретая функции коммуникатора. При этом сам объект «режиссировал» поведение, подчиняя присутствующих своим условиям. Люди могли стоять возле куба (столик для пикника), сидеть на нем или лежать, использовать как постамент для фотосессий и хорошего обзора окрестностей. Наконец, использовать как чистую страницу для написания стихов, философских размышлений и вопросов. Такая игра масштабов – от грандиозного постамента до клочка бумаги или игральной кости «предельно обострила проблему наших собственных размеров рядом с ним» (Диди-Юберман, 2001, 86).

Более того, наслоения краски, символов и текстов преобразовали куб в палимпсест начала XXI века. В результате объект обрел свою третью функцию – стал архиватором.

### **Выводы** *Conclusions*

Исследование показало, что анонимно установленный в природном ландшафте, вне территории арт-институций, объект, не имеющий для широкой публики маркировки «произведение искусства», обладает функциями провокатора, коммуникатора и архиватора.

После появления зеркального куба, гора Замковая приобретает необычайную популярность среди жителей и гостей столицы. Однако через несколько дней зеркала были варварски сбиты, что в свою очередь, спровоцировало художников на новые преобразования поверхностей. Куб стал местом встреч, философских раздумий и катализатором самых разнообразных, порой абсолютно абсурдных провокационных мифологий, о которых писала киевская пресса. В результате куб обрел более широкий и глубокий семиотический регистр.

Таким образом, в коммуникации принимают участие три «игрока» - художник, зритель и арт-объект. При этом зритель в своих действиях невольно подчинялся «режиссуре» куба: движение материи спровоцировало движение духа и на плоскостях куба стали появляться стихи и тексты. Объект архивировал сообщения, которые сохранились благодаря фотофиксации.

Наблюдения доказывают уникальность данного опыта, полученного в результате демонстрации идеи абсолютной свободы искусства от кураторских практик, спонсоров, институций и законов. Куб на горе Замковая действительно стал «камнем независимости», объектом прямого

контакта и провокации, некоммерческим явлением, порвавшим все возможные условности существующей арт-системы.

### **Summary**

This article's target of research is a concrete cube installed by artists on Zamkova Hora hill in Kyiv in 2001. The objet d'art had an original name, Station-1. FGE (Fictitious Gallery Expedition), a virtual structure without neither borders, nor a stable place, or a physical address, which was quite a rare phenomenon for the early 2000, became Station-2. FGE project declared the freedom of creativity from conventions and demands of the existing art system.

The object was installed within several hours in spite of all the difficulties with the delivery of concrete, water and tools up to the hill of 80 m above the Dnipro river level. Construction was carried out without any agreement with the city administration, in violation of the law on the erection of objects in urban areas. Moreover, the authors financed the construction with their own funds. The cube was embellished with mirror tiles that were, however, knocked off in several days. Thus, the society provoked the artists to change the outside appearance of the cube.

During 2002 – 2017, the researched object transformed into dice, a gift box with a silver ribbon; at different times there were red hearts, eye charts, Enter key, a sky of stars against a blue background on its planes. There were poems, as well as lyrical and philosophical texts written on the cube. Photographing visits to the art object became an essential part of the documental heritage of Station-1. Images of groups of visitors, unaware of the camera on the opposite hill, were put on to Station-2, into the virtual field of FGE (Idea in time).

Study of the semantics of a changing art object has indicated two directions: analysis of the cube modifications and visitors' reaction to the object. Thus, the study entered the interdisciplinary plane, when it became possible, for the first time in 17 years of the research practice, to examine a 'quiet' intervention of modern art into the society, in real time.

Results of the research showed that the cube on Zamkova Hora hill possesses the functions of a provocateur, archiver, and communicator. The observations proved the unique character of this experiment, attained as a result of demonstrating the idea of the absolute freedom of art from curatorial practices, sponsors, institutions and laws.

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## THE DEVELOPMENT OF MUSICAL INTELLIGENCE IN JUNIOR SCHOOLCHILDREN DURING THE LESSONS OF THE ARTISTIC CYCLE

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**Abstract.** *The relevance of the research is due to the necessity of implementation of the person-oriented approach into the educational process with the aim to provide the development of musical intelligence in junior schoolchildren on the basis of determining their individual peculiarities, forming their cognitive and communicative skills. Due to this, basic approaches to understanding and interpretation of the notion “intelligence” have been analyzed; scientific researches concerning the issue of the development of musical intelligence of children have been processed. The aim and objectives of the article, which consist in processing the dynamics of the development of musical intelligence of children in the process of artistic activities, have been set. Pedagogical conditions of the development of musical intelligence of children during the process of artistic activity have been singled out, the dynamics of the development of musical intelligence during the lessons of artistic cycle has been discovered in junior preschoolers with the help of testing and musical and creativity activities, degrees of studied qualities development have been compared in children of control and experimental groups, results of summative and final tests have been compared. It has been established, that without observance of special psychological and pedagogical conditions and without purposeful mental impact the development of musical intelligence in junior schoolchildren will have no effect, because changes that occur during the training in accordance with the traditional approach are random in most cases and cannot guarantee the effectiveness of children`s development.*

**Keywords:** *development, intelligence, musical intelligence, junior schoolchildren, lessons of the artistic cycle.*

### Introduction

Changes that occur in the modern society determine demands to the person of future – this person is artistic and intellectually advanced. The society requires people with a high level of intelligence, who are able to find unconventional, creative and innovative decisions to solve different challenges.

The upbringing of such an individual, first of all, undertakes the establishment of compulsory education, where principles of person-oriented approach are realized. In Study programs of the primary education, particular attention is drawn to the personal and intellectual development of junior preschoolers. Herewith, the significant role in the educational system is devoted to the formation of universal educational actions, socially meaningful attitude to knowledge and development of cognitive and creative skills and learners' interest.

In the system of school education, primary classes are an important stage in the formation and development of intelligent and creative individuality, because it is in these years the fundament of the intellectual development of schoolchildren are laid. Art and especially music is of significant importance in the formation of musical intelligence of children because the understanding of the meaning of artistic work appears only on the basis of the cognition of its form.

Modern methodological approaches, aimed at the development of intelligence of children, are related to individual and differentiation approaches to primary school children on the lesson of the artistic cycle. Herewith, the significant researches' tasks are the development and the implementation of new and effective training technologies, the detection of principles and approaches of the development of musical intelligence of children, at which the child can develop and perceive the world in those kinds of activities that are close and understandable to her.

The aim of the article – to uncover the state and ways of the musical intelligence development of junior schoolchildren during the lessons of the artistic cycle.

The methodological background is the determination of the essence of the intelligence and its correlation with the person's development in the educational system, orientation on universal human values. In the article, the analysis of the pilot testing of the implementation of the differential approach to the development of musical intelligence of junior schoolchildren during the lessons of the artistic cycle is performed. For the realization of the target aim and solution of the objectives we used the following methods: theoretical (philosophical, psychological and philosophical, scientific-methodological literature analysis; generalization, comparison, systematization); empirical (pedagogical observation, questionnaire, pedagogical experiment). Trial facilities of the research were establishments of general secondary education in Vinnytsia city. The pupils of the 4<sup>th</sup> form took part in the experiment (162 pupils).

### **Theoretical background of the research**

Studying intelligence as a phenomenon has been the object of interest scientist and philosophers for many centuries (Anaxagoras, Plato, Aristotle, I. Kant, G. Hegel and others). The phenomenon “intelligence” was introduced into psychology at the end of XIX century by English anthropologist F. Galton. Works of foreign researchers of the XX century (D. Wechsler, J.P. Guilford, L. Thurstone and others) and famous national scientists (M. Akimova, A. Luria and others) are devoted to studying of the psychology of abilities, intelligence and creativity.

During the XX century, scientists determined intelligence as the ability to study (C. Spearman, S. Kolvin); the ability to operate with abstractions (L. Termen, D. Peterson); the ability to adapt to new conditions (W. Stern, L. Thurstone). In the 70s of the XX century in the USA was developed the theory of multiple intelligences. Works of R. Vinha, V. Brainin and others authors about the development of musical intelligence of children have the particular importance for our research.

The phenomenon “intelligence” in psychology became the subjects of disputes and critics. Psychologists tried to give the definition of the intelligence and came across a lot of difficulties. As far back as in the 20s of the XX century in the frame of worldwide discussion the appropriate way to measure the intelligence was testing, despite the fact that the determination of the phenomenon of the intelligence appeared to be very contradictive.

Scientist W. Stern implied the intelligence as the general ability to adapt to new living conditions. On the opinion of L. Polani, intelligence is one of the ways to gain knowledge. On the opinion of J. Piaget, acquiring knowledge (assimilation) is only one aspect of the process of applying knowledge in the furtherance of the practical task. In this instance, it is important to note, that the problem should be new or should have a component of novelty. According to J. Piaget, highly developed intelligence must manifest itself in the cross-functional flexibility, in the getting balance of the individual with the environment (Пиаже, 2003).

On the opinion of researcher M. Akimova, the core of the concept, which is under our consideration, is the mental alertness, because self-control assures the definite degree of activity (АКИМОВА, 2005). With this opinion agrees O. Holub, who considers activity and self-control and the fundamental factors of intelligent effectiveness and, moreover, includes to this list efficiency (Голуб, 2000).

Based on the above stated, we can consolidate, that the intelligence – is the ability, that determines the success of a person`s adaptation to new vital conditions. The process of intellectual development finds its reflection in the solution of the problem “in the internal plan of actions” in the case when



consciousness is above unconsciousness. J. Thomson considers the intelligence as an abstract notion, which regulates behavioral characteristics. A. Binet, T. Simon, who designed first intelligence test, considered that the intelligence is peculiar to those “who judges right, understands and thinks, who due to sound mind and leadership is able to adapt to different living conditions. L. Venher supported these views, determining the intelligence as the ability to act with wisdom, to think rationally and easily walk through life circumstances. (Венгер, 2003).

It is important to realize the fact that intelligence involves different cognitive processes, while extremely high levels of skills or abilities cannot be found in all areas of human activity. This fact emphasizes the necessity to encourage the development of skills in those areas where people can show special talent, and also provide them with assistance and support in other areas.

There is a form of intelligence associated with the verbal-auditory channel, this is musical intelligence – the ability of a person to recognize the meaning and significance of rhythmically organized periods and be able to produce them. These skills depend on the verbal and auditory abilities of the individual.

In our research, we rely on works of well-known national educators: A. Makarenko, O. Sukhomlynsky, who pointed out that on the basis of the individual formation of pupils, must be universal human values. To the age peculiarities of junior schoolchildren devoted works of D. Bohoiavlensyi, V. Krutetskyi, A. Leytes and others. Different aspects of the correlation of the intelligence and other cognition process have been uncovered in works of national scientists (B. Ananiev, P. Halperin, O. Nykyforova, A. Zaporozhets). The great contribution in the issue of research of the peculiarities of the educational process of junior schoolchildren has been done by V. Zahviazynskyi, O. Kuzmina and others.

The significant importance for our research has scientific works in musical pedagogy and psychology of O. Antroshchuk L. Barenboima N. Vetluchina T. Zemniak D. Kyrnarska and other authors, who studied the issue of the formation and the development of musical abilities in children. In researches of E. Abdullina L. Aleksieienko, N. Hrodzenska, V. Khrypchenko, L. Shkoliar and others, presented provisions, in which the accent is put on the complex approach to the study of the process of the musical development of children, on the differential accounting age and individual peculiarities of schoolchildren, on the formation of the artistic interest.

### **Empirical research**

Experimental work on the development of musical intelligence of children of junior school age consists of 3 stages: summative, formative and control

stage. The aim of the pedagogical experiment consists in confirmation of the effectiveness of the designed model and pedagogical conditions of the development of musical intelligence of children of junior school age during music classes, practical justification of expediency of applying adapted and designed in the process of the research methods of the development of musical intelligence.

During the summative stage of the experiment, a complex of research procedures has been developed, diagnostics of initial levels of the development of musical intelligence of junior schoolchildren has been done, the composition of control and experimental groups has been determined.

On this stage, educational work with children of junior school age, which is aimed at the development of musical intelligence of junior schoolchildren, has been studied.

With the aim to determine the effectiveness of the research, we applied the following methods: questionnaire on determining peculiarities of the development of musical intelligence of junior schoolchildren; observation over musical artistic activity of junior schoolchildren; music perception, its identification, transformation and reproduction or assessment of musical information receive on the lessons of the artistic cycle; comparative analysis of the research results.

Proceeding on R. Gardner`s theory of multiple nature of intelligence, we have done preceding work with the aim to detect the degree of formation of different types of intelligence of junior schoolchildren. Junior schoolchildren were offered to answer the questions of the questionnaire, which allowed detecting the inclination of a child to one or another type of activity.

R. Gardner`s questionnaire, which is based on the theory of multiple intelligence, consists of 28 statements. In the suggested questionnaire, a child has to mark numbers of statements which correspond to views of surveyed. Judging by reactions of surveyed, we can state the following: statements were understandable, time was spent a bit, within normal limits, all questions received full and clear answers, and there was no refusal on answering.

In the Fig.1 we can see, that all determined types of intelligence are presented, moreover, the most of all expressed visual-spatial intelligence, the least of all – linguistic. It is necessary to note musical intelligence: it is developed in children, but not on the high level (it is on the 6 levels in according to the level of importance).

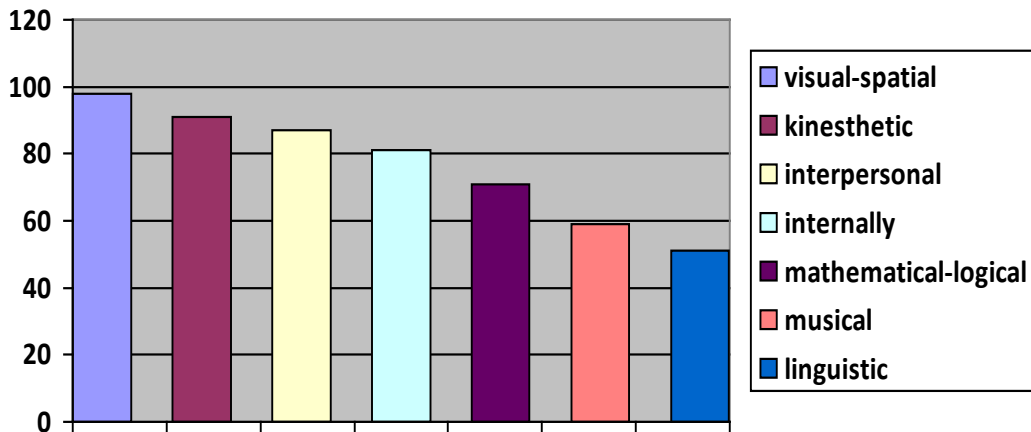


Figure 1 Types of intelligence (R. Gardner)

As a result of conducted diagnostic, junior schoolchildren were divided into an experimental group (EG) – 82 pupils and a control group (CG) – 80 pupils with the almost equal level of the musical intelligence development. The research was conducted in natural conditions of the educational process with the help of prepared techniques for studying each component of studied phenomenon.

On the stage of conducting the summative experiment, we singled out three levels of development of each component of musical intelligence of junior schoolchildren: low, medium, high (Table 1).

Though the experiment – assessment of the done tasks during music lessons, personal conversation about music, assessment of individual works, surveying junior schoolchildren – criteria and indicators have been singled out. Assessment of the done tasks by pupils has been done relying on mental and individual peculiarities of children and also in accordance with the difficulty of tasks.

Table 1 Levels and components of the development of musical intelligence

Component	Technique	Levels of the development of musical intelligence relying on the stated components		
		High level	Medium level	Low level
Cognitive	«Point the composer who wrote this music»	The interest of the child in music, the need for a permanent return to the favourite works in order to deep penetrate their content.	Insufficient interest of the child in music.	Virtually no interest of the child in unknown music.
	«Meeting with music»	Children ask to switch on the music of various forms and genres they have heard	Children quickly get tired and show	Children do not show much interest in music.

		in the classroom or outside it; the wealth of children's information	carelessness to music.	
Artistic-operating	«Composing music»	The degree of awareness of the plan, ingenuity, originality, individuality in the selection of means of an embodiment, the artistry of the embodiment of the plan, engaging in musical experience: based on knowledge and understanding of musical phenomena and events.	The degree of awareness intention, ingenuity, originality, individuality in the selection of means of an embodiment is less stable.	There are no musical knowledge and notions about musical phenomena
	Training-creative tasks	Correct execution of ten tasks directed on the development of certain skills, musical and creative abilities	Proper execution of six to eight tasks out of ten	Correct execution of five or fewer tasks out of ten
Reflexive	«Open yourself through music»	The openness of pupils, the desire to express themselves in music, the awareness of their feelings and emotions associated with music, a sense of involvement in music, its images, events.	It is not clearly expressed the openness of pupils, the unwillingness to express themselves in music, not always clear awareness of their feelings and emotions associated with music.	Lack of openness of pupils, lack of awareness of their feelings and emotions associated with music, misunderstanding of how to express themselves in music.
	«Choose your role»	Pupils independently characterize the meaning and development of the image, experimenting with the musical material. Original and expressive in their plans and forms of its embodiment. They manifest the pronounced need for various types of musical and creative activity.	Pupils are not sufficiently independent in characterizing the content and development of the musical image. They do not show a sufficiently pronounced need for various types of musical and creative activity.	The pupil needs the teacher's help in characterizing the content and development of the musical image. Does not reveal the need for various types of musical and creative activity

Diagnostic research has been carried out due to the detected components (cognitive, artistic-operating and reflective) and criteria, which allow determining the level of the development of musical intelligence of junior schoolchildren. With the aim to study of the level of formation of artistic-operating component we used the following indicators: practical skills and abilities in musical activity; possession of junior schoolchildren in ways of expressing artistic and aesthetic feelings; the ability to analyze the artistic and aesthetic situation, introduced by the teacher. Cognitive component analysis has been carried out based on the following indicators: stock music-theoretical and musical-historical knowledge; awareness of the stylistic affiliation of works of musical art, understanding of the specifics of musical art. The reflexive component study involved the usage of the following indicators: the ability to analyze their own aesthetic experiences associated with listening to music, draw conclusions about the internal state associated with the musical and creative activity (Table 2).

*Table 2 The content of musical intelligence components of junior schoolchildren*

Component	Criteria	Indicators	Techniques
Cognitive	The reserve of musical-theoretical and musical-historical knowledge; Understanding the style of music specifics.	Knowledge of the basic laws of musical art, musical forms, musical notes; skills and abilities to operate this knowledge in different types of musical activities.	«Meeting with music» «Point the composer who wrote this music»
Artistic-operating	Practical skills and abilities in musical activities.	Creative artistic interpretation of a musical composition; creation of a performing artistic image and its embodiment.	«Composing music» Tasks aimed at formation universal education actions.
Reflexive	Analysis of own aesthetic experiences associated with listening to music, self-analysis of the internal state associated with musical and creative activity of self-knowledge, self-examination	Aware of their ability to perceive music personally, to interpret their own impressions of heard music, to understand it, to endow its own personally meaningful meaning.	«Open yourself through music» «Choose your role»

Data on conducted diagnostic of levels of musical intelligence development of junior schoolchildren are reflected in the Table 3.

**Table 3 Levels of musical intelligence development of junior schoolchildren during summative stage of the experiment**

Component	Technique	Levels of musical intelligence development in accordance with the stated component					
		High level		Medium level		Low level	
		CG	EG	CG	EG	CG	EG
Cognitive	«Point the composer who wrote this music»	23,3 %	21,9 %	26,7 %	37,5 %	50 %	40,6%
	«Meeting with music»	23,3 %	31,2 %	30 %	34,4 %	46,7 %	34,4 %
Artistic-operating	«Composing music»	26,7 %	28.1 %	36,6 %	31,2 %	36,6 %	40,6%
	Training-creative tasks	23,3 %	28.1 %	36,6 %	31,2 %	40 %	40,6%
Reflexive	«Open yourself through music»	6,7%	15.6 %	6,7%	31,2 %	86,6 %	53.1 %
	«Choose your role»	6,7%	12,5 %	6,7%	37,5 %	86,6 %	50 %

Take in details techniques which we use on the summative stage of our research.

The technique “Point the composer, who wrote this music” (Кабалевский, 2001) has been used with the aim to determine the level of cognitive component development.

In musical development of junior schoolchildren the important things for us are: the openness of the child to unfamiliar music, the ability to find in it the main thing after the first listening; the presence of favourite high-artistic music, the frequency of appeals to the liked musical compositions, with a view to a deeper comprehension of their content. These positions allowed us to study both special techniques and systematic musical lessons, during which we celebrated the favourite musical works of children and the number of appeals to them.

During the music lesson, we asked pupils to indicate which musical composition they would like to listen to one more time at the end of the lesson. We were interested not only in children`s musical preferences but the dynamics of changes of schoolchildren`s attitude to the heard composition: do they reveal new perspectives in it. With this aim we repeatedly analyzed together with children compositions, drawing their attention to novelty in their answers.

According to the technique “Meeting with music” (Школяр, 2016) during the music lesson children were offered to plan the program of the last term lessons on their own decision and explain why do they prefer that or another kind of music. We put the following questions: “If you were the Teacher of music, which composition would you include on the last lesson in this term, what would you like to tell others with the help of music?”. The highest mark received pupils` stories, who, while planning, included compositions of different forms and genres, which had been heard on only during lessons but outside. The main thing in this technique is to increase the motivation of appealing to works

of art. The following musical information was taken into account: information about the composer, the author of the composition, acquaintance with the history of the creation of a musical composition, its vital content, variants of its own interpretation, the ability to sing, and to play melodies of compositions.

Artistic-operating component has been analyzed with the help of the technique “Composing music” (Школяр, 2016), which helped to reveal the degree of development of figurative representations, imagination, thinking in solving artistic and creative tasks, figurative listening, and vision. Application of the technique in practice is a creative process: the children were offered creative tasks, which contributed to the organization of independent musical activity of junior schoolchildren. The children chose the situations they liked (“Spring voices”, “Summer day”, “Rain sounds”, “Winter`s road”, “Fairy dream”), thought out original way of development of creative content of the future musical composition. For example, while choosing situation “Spring voices”, children imagined how arises life in the spring: snow is melting, sun warms the ground, the first flushes thrive. They expressed their own attitude to these events, proposed ways to implement their own designs in various types of musical and creative activities: playing children's musical instruments, singing, musical-plastic movements.

The verbal sketches of children became the basis on which gradually new characters, heroes appeared. We have watched what features of temperance were manifested in these characters, their relationships, how they are developing. By controlling the manifestations of children in their independent creative activity, we observed the process of an embodiment of the artistic conception of a musical work: as junior schoolchildren determine the means of musical expression, select children's musical instruments, and use vocal data, plastic. In the course of this work, one can observe the process of developing the thinking of junior schoolchildren in the creation of artistic images, the content of which they tell themselves or with the help of leading questions of the teacher.

The artistic manifestations of junior schoolchildren are not so easy to be controlled, because “technical mastery” of the reembodiment can be of the different levels, and that`s why this creativity can stay on the stage of the idea. That`s why we suggested the following criteria:

- the degree of awareness of the design of the work (independence of the plan, its logic, content);
- ingenuity, originality, individuality in the choice of means of reembodiment (argued non-standard, non-traditional);
- the creativity of the embodiment of the plan of a musical work in terms of concentration of the expression of the main idea;
- the manifestation of the child's accumulated musical experience (whether the characters perform well-known songs, whether the

learner relies on knowledge and ideas about musical phenomena and events (Яворский, 2004).

The emphasis in the analysis of children's musical creativity is on studying how the pupil plans his activity, starting with the motive of creativity and ending with the real embodiment of the plan of the musical work. The main criterion in this situation is the degree of combination of attributes of musical and creative activity - "I hear, think, feel, act."

Training-creative tasks are of the different degree of complexity. Their cognitive and interesting character allows them to develop in junior schoolchildren the ability to analyze, synthesize and draw conclusions, develop research skills, their intellectual abilities, and distribute the musical outlook of children.

The students were offered the following educational and creative tasks: look carefully at the note example, in which the notes are omitted, marked by degrees; inserting the necessary notes, sing a passage from the song "Hunter" by the composer N. Potolovskyi, first naming the notes, and then with the words. Some tasks together: 1) set the pitch risk in a note example; 2) define and put the length of the melody; 3) how long it is recorded; 4) sing a melody and name notes (Ветлугина, 2007).

When performing such tasks junior schoolchildren develop certain skills, including singing; the ability to perceive correctly, to feel the means of musical expression, not only emotionally, but consciously, without which it is impossible to master the musical art and the development of intelligence in the process of learning at the lessons of the artistic cycle in school.

The reflexive component was studied using the "Choose a Role" technique (Школяр, 2016). These are the main roles in the musical and creative activities of the composer, performer, and listener. The conversation at the music lesson involves finding out what role the pupil defined in the proposed situation; as he manifests itself in accordance with the role he chooses: independently inventing the development of the image, revealing its characteristic features, carefully selecting the forms of embodiment, experimenting with the musical material; how much the child is original and unusual in his plans and forms of its implementation; how vividly the junior schoolboy expresses the need to identify himself in solving the musical-artistic task set for him in various kinds of musical activity; Is he independent in the creative search.

After the music lessons, individual conversations were held, during which we clarified the attitude of junior schoolchildren to their own musical activity: "Did you like the role you performed? Why?", "What are your impressions of the lesson; Was interesting, fun, boring, indifferent? Why?", "How did you feel: good, fun, courageous when doing tasks?", "What role will you choose for yourself next time? Why?".



Technique "Open yourself through music" (Школяр, 2016). The purpose of this technique is to penetrate the depth of the personal attitude and perception of children by the musical work. Using the methodology in the learning process allows us to determine how junior schoolchildren "discover themselves" through music, are aware of their feelings and experiences, feel their own involvement in the content of the musical composition, its images, events. Junior schoolchildren are offered a part of the work, for example, a fragment from "Waltz of Flowers" P. Tchaikovsky, "Nocturne" F. Chopin, "Preludes" D. Kabalevsky, and three tasks are given.

Task 1. Students take the position of "interlocutor of music". The melody tells them something "tells", and then they retell about their feelings, thoughts.

Task 2. Children reveal the musical content of the work in the plastic movement.

Task 3. Children are asked to embody "themselves" in the drawings. It is necessary to emphasize the fact that a junior schoolboy draws his feelings while listening to music. This condition applies to all three tasks of the techniques because pupils' assessment the pupil of his spiritual world is important. Music acts as a source, a catalyst for self-esteem, self-analysis of the musical and creative activity of the child.

The content of work on the development of musical intelligence of junior schoolchildren during the artistic lesson provided:

- determining the level of development of the musical intelligence of junior schoolchildren by the consequences of diagnosis, specifying the directions of musical activity that corresponds to the tasks set;
- the use of principles and methods that promote the development of musical intelligence of junior schoolchildren.

At the formative stage of the experiment, the model and pedagogical conditions aimed at solving the problems of the development of musical intelligence of junior schoolchildren at artistic lessons were developed and introduced into the educational process, which consisted of:

- creative interaction between the teacher and pupils;
- taking into account age and individual abilities, skills of children;
- creating a stable motivation for pupils to realize themselves in musical activities;
- the direction of the content of work on the development of musical intelligence in children to strengthen the individual-differentiated and personal nature of training (Brovchak, Starovoi, & Likhitska, 2018).

The pedagogical model of the development of intelligence of junior pupils is the basis for the implementation of the educational process in an educational establishment. In our research, the model of the educational process is an open pedagogical system with a plurality of external and internal factors, which, in

turn, are conditions for the development of intelligence. Since the simulation process consists in separating the essential in the studied object, we chose the main factors that influence the development of intelligence of junior pupils.

The pedagogical model of the development of musical intelligence of junior pupils at music lessons contains the goal of this direction of the development of the child's personality, its task, principles, methods, components, its criteria, indicators of development, determination of levels, development and implementation of pedagogical conditions, that is, reveals the content structure of the problem under our research.

*The development of the main directions of the organization of the educational process*, which contributes to the development of musical intelligence of children of junior school age, is the first stage in the implementation of the model. At this stage, it is important to identify the main components of this process and the causal relationships between them.

*The construction and justification of the model* in the context of the problem of the development of the musical intelligence of junior pupils at music lessons is the second stage of development. In the process of determining the pedagogical conditions of the development of musical intelligence of junior pupils we took into consideration firstly, – the activity and content of the process of musical development of the individual, and secondly – stimulation, creation of a certain situation, and, thirdly, – assistance to junior pupils in the educational process.

*The third stage is the development of pedagogical conditions* that promote the development of musical intelligence of junior pupils. This stage specifies and structures the goals and objectives of the process of development. Focusing on qualitative and integrative criteria of musical development of pupils in the process of learning at music lessons, the main goal is the development of artistic and creative personality. The methodical requirement for the development of pedagogical conditions is the correct idea of the special provisions, the organization of which is carried out by us the process of the development of musical intelligence of junior pupils.

Of great importance in the development of musical intelligence in junior schoolchildren is the creation of the artistic and creative atmosphere of the music. Positive microclimate at music lessons plays an important role in the process of teaching children. The creative atmosphere at the music lesson was provided by us thanks to: a specially selected musical repertoire, the technical equipment of the cabinet of music and its aesthetic design, the active use of technical means of teaching (objective indicators) and pedagogical skills, emotional and psychological adjustment for creative collaboration with pupils (subjective indicator).

During the organization and implementation of the formative stage of the

experiment, we were guided by the following principles for the implementation of the tasks of methodological work: relying on familiar material, taking into account previous musical experience; activating musical activity through dialogue forms of work; control over the process of musical development; specially selected musical repertoire; organizing different kinds of musical activities within one lesson.

Based on the results obtained during the diagnostic examination, conclusions were made on the effectiveness of such methods for the development of musical intelligence: reflections on music (D. Kabalevsky), a method for developing skills and abilities for listening to music (N. Hrodzenska), Cinquain (A. Krepsi), the method of intonation and style comprehension of music and modeling of artistic and creative process (O. Krytska L. Shkoliar), the method of auditory examination (Ye. Nazaikinskyi). The purpose of using methods for developing musical intelligence was to create a psychological atmosphere of creativity for junior pupils, which beneficially affected their emotional state, feelings and thoughts, development of cognitive potential.

The recommendations for the selection of tasks were as follows: musical repertoire, exercises and tasks should be accessible for the perception of those who study; aimed at developing certain skills and abilities; should be emotional, contributing to the development of mental processes in the child at the artistic lesson.

During the research, the educational tasks of the pupils` personality development were solved: the formation of a positive attitude to their abilities and opportunities; increase self-confidence and independence; development of general and musical abilities; formation of skills of thinking activity.

During the control testing, a re-diagnosis of the development of music intelligence was conducted on the basis of the created model, pedagogical conditions, new principles and methods.

For the sake of clarity, we illustrate the changes in the tables of the components of the musical intelligence of children in the control and experimental groups at the summative and post-formation stages (Fig. 2, 3, 4).

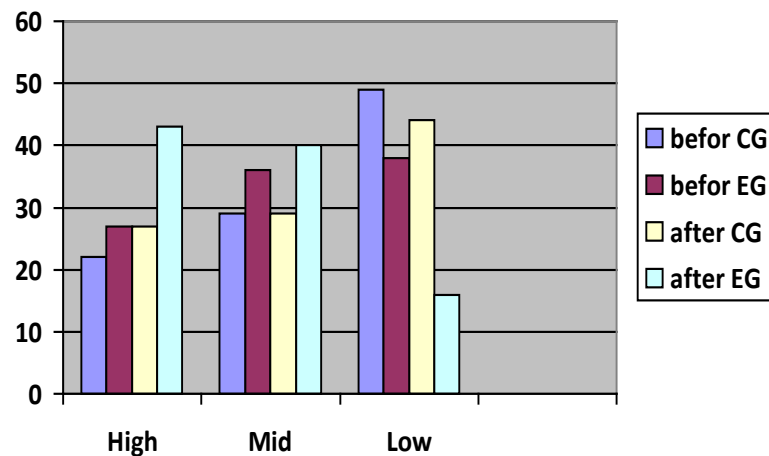


Figure 2 Comparative assessment of the development of the cognitive component of musical intelligence of junior schoolchildren of the control and experimental groups

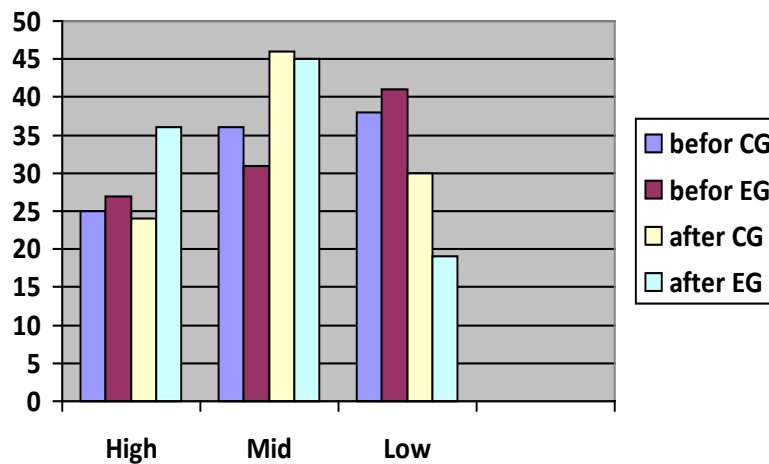


Figure 3 Comparative assessment of the development of the artistic-operating component of musical intelligence of junior schoolchildren of the control and experimental groups

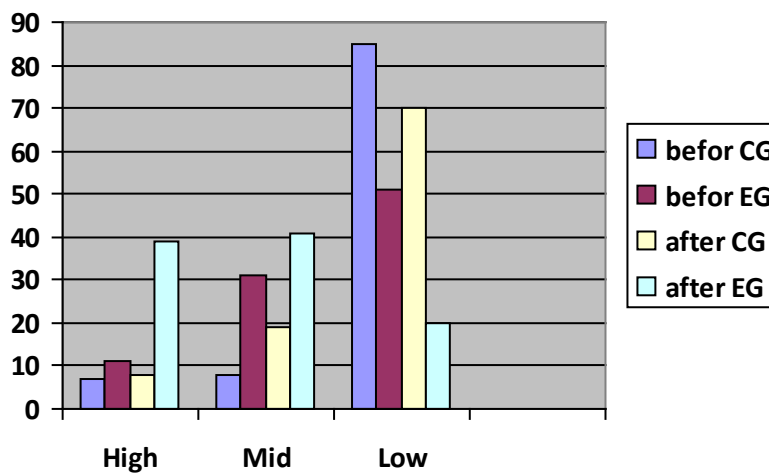


Figure 4 Comparative assessment of the development of the reflexive component of musical intelligence of junior schoolchildren of the control and experimental groups

The results of the formatting stage of the experiment indicate that the level of development of musical intelligence of junior schoolchildren in the experimental group significantly increased, while in the control did not increase significantly.

Our work contributed to the development of musical intelligence of children of junior school age in the educational process at the music lesson. Many of children have the well-formed cognitive component: in children from CG - from 23.3% to 26.6%; in EG - from 26.6% to 44%.

The development of the artistic-operating component was demonstrated during the creative artistic interpretation of the musical work, the creation of the artistic image and its embodiment in the process of imaginary experimentation with means of musical expression (in the CG level decreased from 25% to 24.4%, in EG significantly increased: from 28, 1% to 35.3%).

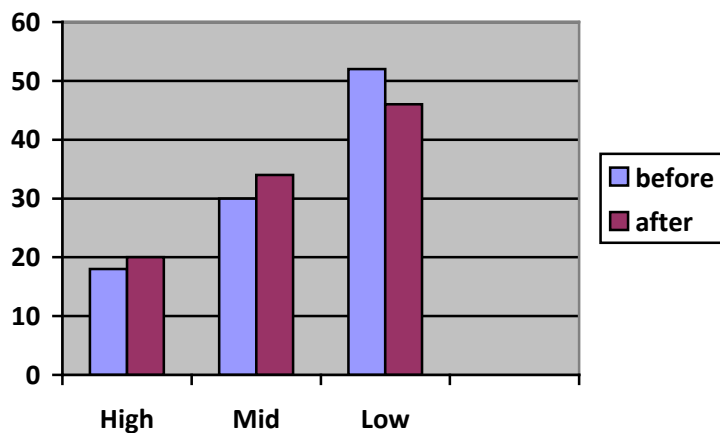
The effectiveness of the formation of the reflexive component is the awareness of junior pupils of their ability to personal perception of the musical work, the interpretation of their own impressions of the heard music, that is to reflexive-critical analysis of their musical and creative activity in the process of studying at the lessons of the artistic cycle in the school (in CG - from 6, 7% to 9.3%, in EG - from 14.1% to 38.3%) (Table 4).

*Table 4 Levels of musical intelligence components development at the control stage of the experiment*

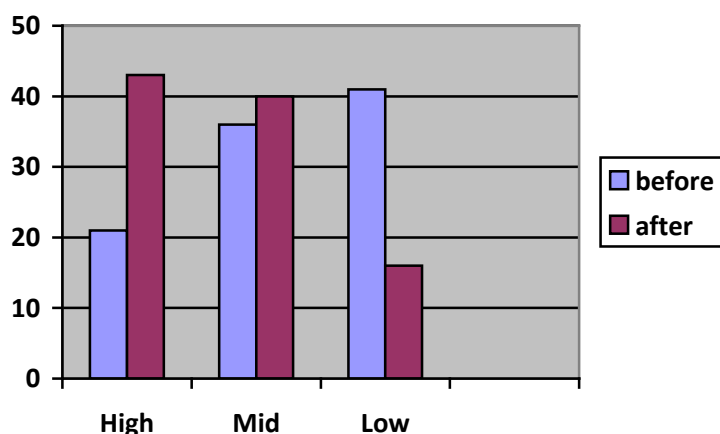
Component	Technique	High level		Medium level		Low level	
		CG	EG	CG	EG	CG	EG
Cognitive	«Point the composer who wrote this music»	26,7 %	34,4 %	26,7 %	46,8 %	46,6 %	18,8%
	«Meeting with music»	26,7 %	53,1 %	33,3 %	34,4 %	40 %	12,5 %
Artistic-operating	«Compose music»	30 %	31,3 %	50 %	43,7 %	20 %	25%
	Training-creative tasks	16,7 %	37,5 %	43,3 %	43,7 %	40 %	18,8%
Reflexive	«Open yourself through music»	10%	46,8 %	23,3%	34,4 %	66,7 %	18,8 %
	«Choose your role»	10%	28,2 %	16,7%	46,8 %	73,3 %	25 %

The control stage of the experiment included an evaluation of the results of the formatting stage of the experiment and a comparative analysis of the results of the research: a) a comparative analysis of the questioning of junior schoolchildren showed that the prevailing majority of junior schoolchildren showed an interest in musical and creative activities; b) a conscious and active position of the teacher of music, working on creating pedagogical conditions for

the development of musical intelligence of junior schoolchildren in the process of teaching music, ensures the personal development of children in the desirable direction (Fig. 5, 6).



*Figure 5 Dynamics of the development of musical intelligence in junior schoolchildren of the control group*



*Figure 6 Dynamics of the development of musical intelligence in junior schoolchildren of the experimental group*

Comparing the results of the pedagogical experiment at different stages, one can see that in the experimental group the dynamics of the development of musical intelligence (the number of children with a high level) has improved significantly.

The conducted pedagogical experiment convincingly confirmed the expediency of the substantiated and implemented in the educational process model and pedagogical conditions for the implementation of a differentiated approach to the development of musical intelligence of junior schoolchildren at the lessons of the artistic cycle.

## Conclusion

Creation in the experimental conditions of the musical and creative atmosphere at the music lessons allows you to conduct a diagnosis, an individual and differentiated approach to each pupil, to develop special programs on musical education of junior schoolchildren. The analysis of the results of the experimental research confirmed the relevance of the idea of developing a model and creating the necessary pedagogical conditions for the development of musical intelligence of junior schoolchildren. The realization of these opportunities manifests itself in the development of the general ability of junior schoolchildren to study, in improving the value-oriented process of learning music information on the basis of auditory experience, understanding and application of abstract concepts, in exacerbating the critical rethinking of existing knowledge, as well as in improving the efficiency of the solution of artistic and creative tasks. This process is due to the joint activities of the teacher of music and junior schoolchildren, aimed at building the abilities of children to non-standard thinking and creative manifestations in various types of musical activity.

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# ДИЗАЙН ИНТЕРЬЕРОВ ТАШКЕНТСКОГО МЕТРО, ОСОБЕННОСТИ ЕГО АРХИТЕКТУРЫ И СТРОИТЕЛЬСТВА

## *Interior Design of Tashkent Metro, Features of its Architecture and Construction*

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**Abstract.** *The article considers the establishment of the Tashkent metro, its creation, the history of development and design of metro stations, original design solutions of the metro construction technology. The design and artistic solution of the metro stations and its themes are presented mainly on the examples of Tashkent metro stations; information about architects, artists, creators of the architectural and artistic image of the Uzbekistan metro is also presented in the article. The study will allow to get acquainted with the experience of designing and construction of the metro in Uzbekistan and in other countries, and to use it rationally in the construction of the new metro stations.*

**Keywords:** *Metro, Uzbekistan, Tashkent, innovative technologies, metro stations, artistic decor, structures, interior decoration.*

### **Введение**

#### ***Introduction***

**Актуальность:** Ташкентский метрополитен является гордостью и художественной достопримечательностью столицы Узбекистана, представляющий как научный, так и исторический интерес для общественности. Также, перспектива развития подземного и наземного метро в Ташкенте, включая его уникальные социально–культурные функции среды, является актуальным для Узбекистана. В этой связи, вопрос сохранения и развития в совокупности с популяризацией Ташкентского метрополитена, как в стране, так и за её пределами, стоит остро на сегодняшний день. К данному метро и его станциям должен быть применен подход бережного отношения, эффективного сохранения и поддержки текущего состояния, как и ко всем памятникам архитектуры Узбекистана, а



также продуманный и соответствующий подход в строительстве новых станций.

**Цели изучения:** Рассмотреть историю создания и развития метроостроения в Узбекистане, его особенности архитектуры и строительства, приводя сравнительные примеры некоторых метрополитенов мира. Изучить и исследовать дизайн архитектурно–художественного оформления интерьеров станций метро Ташкента, рассмотреть оригинальные проектные решения в технологии метроостроения Узбекистана.

**Методы:** в статье использовался аналитический, сравнительный и описательный методы, а также практический опыт. В частности, изучен (-а) следующее: (1) литература о мировом метроостроении и строительстве метро в Узбекистане; (2) практический опыт работы зарубежных специалистов, а также дизайнеров, художников, монументалистов Узбекистана; (3) объект исследования: метрополитен зарубежных стран и ташкентское метро; (4) предмет исследования: дизайн интерьеров метро, их технологии и конструкции,

**Изученность проблемы:** вопросы создания мирового метрополитена и метро Узбекистана изучены и исследованы в контексте трудов учёных и исследователей, таких как: Абрамчук В.П., Власов С.Н., Мостков В.М. (2005). *Подземные сооружения*; Главатских В.А., Молчанов В.С. (2006). *Строительство метрополитенов*; Кадырова Т.Ф. (1987). *Архитектура Советского Узбекистана*; Калинин В.П. (1988). *Метрополитены*; Михайлов Б.П. (1963). *Архитектура Советского Союза*; Махмудова М.Т. (2018). *Самое красивое метро*.

**Научная и практическая значимость статьи:** Опыт, накопленный за многие годы в проектировании и строительстве метрополитена в Узбекистане и в других странах, необходимо изучить, модернизировать, усовершенствовать ранее использованные технологии и внедрить новые материалы, конструкции, оборудование при строительстве новых станций метро в Ташкенте с перспективой строительства метрополитена в других городах Узбекистана.

### **История создания, развития и дизайн станций метро Ташкента** *The history of creation, development and designing of Tashkent metro stations*

Метрополитен – это глобальное явление, которое занимает особую страницу в истории градостроительства, архитектуры, искусства. Вместе с тем, в каждом городе – Москве, Санкт-Петербурге, Лондоне, Нью-Йорке, Париже, Токио и во многих и многих других городах мира, где исторически сложилась и интенсивно развивается сеть подземных линий и станций, метрополитен имеет свои особенности и место в черте города.

Сейчас невозможно представить современные города без метро. Уникальная и сложнейшая система метрополитена, которую создал человек, является не только подземным транспортом для массового использования, а также памятником истории и культуры, при строительстве, формировании и развитии его лежат инновационные идеи и технологии. Подземные сооружения, несмотря на их различие в назначении, объёмно-планировочных и конструктивных решениях, имеют много общего (Власов, 2005).

Столица Узбекистана – Ташкент – один из крупнейших индустриальных и культурных центров Центральной Азии и СНГ, город мира и дружбы с многомиллионным населением, в котором расположено одно из красивейших метро в СНГ и в мире, первая линия которого была открыта 6 ноября 1977 г., это почти через 100 лет после появления первого метрополитена в мире, построенного в Лондоне в тоннелях мелкого заложения в 1860–1863 гг. (Лысиков, 2003).

На территории СНГ метро впервые появилось в России, в Москве в 1935 г. Его первые тринадцать станций составили часть грандиозного подземного архитектурного ансамбля (Михайлов, 1963). Затем, в 1960 г. открылся Киевский метрополитен в Украине, в 1966 году был введён в эксплуатацию первый участок метрополитена в Тбилиси (Грузия), а в 1967 г. пробный поезд прошёл по первому участку Бакинского метрополитена в Азербайджане.

В начале 60-х годов XX века в Ташкенте возникла острая проблема общественного транспорта, так как население города перевалило за миллион человек. Границы Ташкента непрерывно расширялись, а в ходе его реконструкции после разрушительного землетрясения 26 апреля 1966 г. появилось множество новых микрорайонов и в «часы пик» становилось особенно ясно, что для решения транспортной проблемы нужно искать новые пути, такие как строительство метрополитена. Однако, появление метро в Ташкенте многим казалось невозможным в связи со специфическими условиями города, в частности его высокой сейсмичности, лессовых просадочных грунтов и жаркого климата. Но, несмотря на это, Ташкентский метрополитен был построен, и он органично вписался в современный облик столицы Узбекистана и стал одной из достопримечательностей страны. Это был первый метрополитен, появившийся на территории Центральной Азии. Второй метрополитен был построен уже через много лет и только в XXI веке в Алматы (Казахстан).

По воспоминаниям многих известных архитекторов Узбекистана, при обсуждениях первых вариантов метрополитена в республике, присутствовали представители из Москвы, которые после обсуждения проектов, вначале не согласились с их решением и считали, что надо

отличать подземные транспортные сооружения от мраморных дворцов, и что следует проектировать упрощенные и утилитарные в плане декорирования станции. И тогда архитекторы Узбекистана привели в пример первые станции московского метрополитена. Так, являясь памятниками архитектуры советского периода и учебным полигоном для многих аналогичных предприятий городского транспорта за рубежом, станции Московского метро отличались высокими художественными и композиционными решениями, гармонично сочетая инженерные мысли и художественное совершенство (Калиничев, 1988).

Например, несомненный интерес представляет станция «Маяковская», архитектором которой является А. Душкин (Калиничев, 1988), открытая ещё в 1938 г. и получившая за этот проект Гран-при на Всемирной выставке в Нью-Йорке в 1939 г. Несмотря на то, что архитектура «Маяковской» относится к «сталинской неоклассике», наличие некоторых авангардных деталей придаёт ей оттенок стиля «ар деко», такие как колонны и арки станции, покрытые рифлёной нержавеющей сталью.

После долгого обсуждения всех «за» и «против», а также принимая во внимание опыт строительства метро в других городах мира, глава правительства Узбекистана Ш. Рашидов в конце обсуждения обратился к С.Р. Адылову, только что назначенному ответственному работнику по строительству метрополитена в Ташкенте. Он в свою очередь представил новые проекты станций Ташкентского метро и предложил использовать богатые природные материалы при их оформлении. В итоге, данные проекты, разработанные вместе с группой специалистов, были одобрены правительством.

Ташкентский метрополитен отличается особенностями своей архитектуры и строительства, его станции – неповторимы. На станциях была использована широкая палитра природных камней – мрамора и гранита. Использовалась традиционная национальная отделка: роспись, резьба по ганчу и особенно художественная керамика, которая известна по архитектурным памятникам Самарканда, Бухары, Хивы (Махмудова & Махмудова, 2017).

Но не только своими красотами привлекателен этот метрополитен, в практике проектирования и строительства Ташкентского метро были применены оригинальные проектные решения в технологии метростроения. Так, например, на станции Х. Алимджана одновременно с сооружением монолитного свода выполнены архитектурно–художественные арки из бетонных блоков со стеклосмальтой и готовой лицевой поверхностью. Или на станции «Айбек» впервые были разработаны и внедрены новые сейсмостойкие железобетонные секции из крупноразмерных объёмных элементов (Калиничев, 1988).

Архитектурный и художественный образ станций создавался в процессе напряженной творческой работы. Оформление наземных и подземных вестибюлей станций были дополнены ансамблями улиц и площадей города, которые составили единую идейно–художественную композицию (Махмудова, 2018). Так, например, станция «Дружба народов» и площадь вместе с дворцом «Дружба народов» составляют единый комплекс. Открытая в 1977 г., станция «Дружба народов» (арх.: М. Галеева, В. Муратов, У. Рахимов), представляет собой сооружение колонного типа с подземным и наземным вестибюлем. Позже, уже в 1980 г. был построен главный концертный зал Узбекистана – Дворец «Дружбы народов» (арх.: Е. Розанов). Следует отметить, что многие названия станций за годы Независимости были переименованы, некоторые не один раз, также как и эта станция.

Таких быстрых темпов, какими строились Чиланзарская и Узбекстанская линии, не знала история сооружения метрополитенов. Тысячи людей вдохновенно трудились над сооружением метро в Ташкенте. Для сравнения, самым длинным долгостроем на постсоветском пространстве является метро XXI века в Алматы, строительство которого продолжалось 23 г. и успешно завершилось в декабре 2011 г.

Первая линия Чиланзарского метро, соединила самый густонаселенный район Ташкента – Чиланзар, с центром города. В конце 1984 г. была сдана в эксплуатацию первая очередь второй линии (Узбекстанская линия), а в 2001 г. – третья Юнусабадская линия метро. Последняя линия метро была самая сложная в плане проектирования и строительства, потому что прокладка тоннелей велась под каналами и озером Бозсу, с большим числом инженерных коммуникаций. Такие работы проводились и в других странах, так, например, станция «Опера» в Париже объединяет тоннели, построенные под рекой Сеной и под домами, а также тоннели-мосты, сооруженные через подземные карьеры (Лысиков, 2003).

И всё таки, несмотря на то, что сейчас по всему миру строятся новые линии метрополитена с оригинальными архитектурными проектными решениями, по ряду конструктивных, планировочных и технологических решений, а также экономическим и другим параметрам, метрополитен в Ташкенте превосходил аналогичные сооружения, построенные в те годы в других городах. Так, в связи с тем, что Ташкент находится в сейсмической зоне, метрополитен Ташкента строился с соблюдением требований сейсмологов. И здесь впервые тогда были возведены конструкции, устойчивые к сейсмической активности (Калиничев, 1988). При строительстве метрополитенов в районах высокой сейсмичности за рубежом решение вопросов сейсмостойкости шло в основном по пути увеличения массивности сооружений, выполняемых из монолитного

железобетона. Но эта тенденция не соответствовала тогда подходу к строительству метро в Узбекистане, снижала степень индустриальности сооружений, вела к увеличению трудозатрат. Поэтому совместными усилиями метростроителей и проектировщиков был создан новый тип сейсмостойкой конструкции станции открытого способа работ, сооружаемой индустриальными методами из крупноразмерных элементов, прочно соединяемых между собой армированными и омоноличенными стыками (Семенов, 1983). Специалисты утверждают, что все сооружения метро Ташкента способны выдержать подземные толчки силой до 9 баллов по шкале Рихтера, т.к. инженеры создали усиленные колонны, перекрытия, тоннельную обделку, сооружения, всё это значительно уменьшало силу колебаний.

Также, впервые в мировой практике в Ташкентском метрополитене были построены две сейсмометрические станции для наблюдения за работой подземных сооружений при землетрясениях, и за два года строительства здесь произошло 24 землетрясения, интенсивностью до 6 баллов (Семенов, 1983).

Метрополитен в Ташкенте целиком мелкого заложения, едва ли не единственная станция глубокого заложения – это станция «Юнус Раджаби» на Юнусабадской линии (24 м); для сравнения: в Москве самая глубокая станция находится на глубине 63 м., а в Алматы – 57 м., а в Санкт-Петербурга – станция «Адмиралтейская», глубиной 102 м., которая является самой глубокой в России и одна из самых глубоких в мире (Первушина, 2009).

Наземных станций в метрополитене Ташкента в те годы ещё не было, за исключением трёх коротких наземных участка с метромостоми через ташкентские водные каналы. На Чиланзарской линии – между станциями «Новза» и «Миллий бог», затем – между станциями «Хамид Алимджан» и «Пушкинская». И третий метромост находится на Юнусабадской линии между станциями «Бадамзар» и «Шахристан». Но уже сегодня на Сергелийской линии метрополитена воздвигается надземное метро по совершенно новому методу – эстакадному, который впервые применяется в Центральной Азии.

В оформлении станций метро участвовали лучшие архитекторы, живописцы и монументалисты страны. Так, создание «подземных дворцов» в столице проходило под руководством специалистов и архитекторов Ташметропроекта, таких как Ф. Музаффарова, А. Адылова, Я. Мансуров, А. Табибов, В.Махмудов, С.Казимов, О.Айдинова, Р.Файзуллаев.

Создатели метрополитена, используя богатые традиции мирового метростроения и опыт народного зодчества, широко применяя произведения монументального искусства, сделали каждую станцию

неповторимым художественным произведением, повествующим о ярких событиях в жизни республики (Кадырова, 1987).

Название станции метро и его тематика влияли на решение дизайна и его художественный образ. Большое влияние на архитектурно–художественный облик станций оказывает и место его расположения, связанное с какими-либо историческим событием, личностью, или расположением крупных индустриальных комплексов. Подлинный синтез архитектуры, монументального искусства, дизайна и эстетики способствовал достижению высокого уровня художественности в оформлении ряда станций таких, как: «Алишер Навои», «Космонавтлар», «Мустакиллик майдони», «Хамид Алимджан» и многие другие. Дизайн оформления станций является синтезом искусной качественной работы, смелых творческих решений инженеров и профессиональных мастеров архитектуры, талантливых художников и монументалистов.

Одной из самых выразительных и интересных является станция «Мустакиллик майдони» (арх.: Л. Попов, Л. Адамов, А. Адылова), в которой сочетаются все элементы архитектурного и художественного решения, создающих эмоционально–выразительный облик перрона. Многочисленные хрустальные люстры, живописными гирляндами, расположенные в трёх пролётах перрона придают ему торжественность и парадность. А щедро залитый поток света ассоциируется с образом солнечного Узбекистана. Синтез произведений, созданных художниками, и оригинальной архитектуры станции настолько органичен, что является показательным примером архитектурно-художественного решения метро.

Другим нравится решённая в традиционном архитектурно-художественном образе станция «Алишер Навои» (арх.: Я. Мансуров, В. Махмудов), в которой арочно–купольное решение свода, украшенное керамикой, ассоциируется с монументальными памятниками средневекового зодчества Узбекистана. Интерьер станции украшен орнаментальным геометрическим декором «гирях» и растительным – «ислими», выполненным художниками Р. Мухамаджоновым и А. Рахимовым. В интерьере использованы керамические рельефы на темы произведений Алишера Навои. Монументально–декоративные композиции ассоциируются с поэтическими произведениями великого узбекского поэта, а сама же станция стала своеобразным памятником основоположнику узбекской литературы. Образы Алишера Навои созданы известным художником–монументалистом – Чингизом Ахмаровым. Эти станции отличаются удивительной красотой, неповторимостью образов, а также национальным колоритом, красотой архитектурных композиций.



*Рисунок 1. Станция метро «Алишера Навои». Архитекторы – В. Махмудов, Я. Мансуров. 1984 г. Интерьер*  
*Figure 1 Metro station "Alisher Navoi". Architects – V. Makhtudov, Y. Mansurov. 1984. Interior*

Темы истории, личностей и традиции, которые были взяты за основу при строительстве Ташкентского метро, также использовались во многих метрополитенах. Это прослеживается и в Московском метрополитене или, например, в Казахстане: архитектурно–художественное решение интерьеров станций основывается на традиционных приемах декоративно–прикладного искусства казахского народа – «Жибек Жолы», название которого связано с Великим шёлковым путем, проходившим через Южный Казахстан. Однако есть и такие станции в Алматы, которые повествуют об истории XX в., как, например, станция «Байконур» выполнена в современном стиле хай-тек и связана с одноименным космодромом в Казахстане.

Оформление еще одной станции Ташкентского метрополитена – «Пушкинская» – как бы переносит в ту эпоху, в которой жил и творил А.С. Пушкин, великий русский поэт (арх.: Л. Адамов, А. Адылова, Р. Файзуллаев, А. Табибов). Станция отличается строгостью и особым изяществом, что достигнуто кессонированным потолком, чётким рядом колонн. Сборно–декоративный подвесной потолок этой станции был выполнен из цементно–песчаных блоков (Калиничев 1988). Стены вестибюлей и колонны платформенного зала украшены бра в форме свечей в металлической оправе. При спуске на платформу укреплены бронзовые геральдические панно, в одном из них изображение поэта (Рустамов, Садовников, & Абиджанова, 1986).

В Узбекистанском метрополитене тогда также впервые в практике проектирования и строительства Ташкентского метро были применены необычные и интересные проектные решения в технологии метростроения. Так, например, здесь было использовано адиабатическое охлаждение и увлажнение воздуха в системе основной вентиляции. (Калиничев, 1988). При учете жаркой климатической зоны, были внедрены высокопроизводительные самоочищающиеся фильтры ВСФ-300, что позволила в летнее время очищать воздух, подаваемый на станции и в тоннель от пыли, увлажнять и понижать его температуру с 40 до 25 градусов по Цельсию, то есть были созданы комфортабельные условия для пассажиров в самые жаркие дни.

Также была установлена эвакуационная система пассажиров. В случае землетрясения все составы как можно быстрее достигают пункта назначения, после чего все пассажиры покидают составы, затем и саму станцию. Все действия сопровождаются работниками станций во избежание паники.

В организации движения Ташкентского метрополитена, применена система автоматического регулирования скорости (АРС), рассчитанная на пропуск 40 пар пяти вагонных составов в час пик.

При рассмотрении архитектурного облика и функциональности метро некоторых стран сделан вывод, что по сравнению с Ташкентским метрополитеном, некоторые метро в таких городах, как Торонто, Токио, Нью-Йорк во многом проигрывает. Так, например, в Токио во многих станциях низкие потолки, однообразные кафельные стены, но есть и положительные качества: комфортабельностью отличаются не только станции, но и сами вагоны метро. Зимой все сидения подогреваются, летом – вагоны обязательно кондиционируются. А в Нью-Йорке некоторые местные станции знамениты своей грязью, а также множеством крыс, в некоторых вагонах нет света, стены оклеены рекламными проспектами, разрисованы, иногда двери неисправны и окна разбиты, чего не встретишь в Ташкентском метро. Но есть и плюс – метро в Нью-Йорке работает круглосуточно. А в Торонто (Канада) архитектурный облик станций – прост и лаконичен, отделочные материалы долговечны, но дешёвы и прекрасно зарекомендовали себя в эксплуатации (Калиничев, 1988).

### **Перспектива развития метро в Ташкенте** *The development perspective of metro in Tashkent*

В ближайшие четыре года будет достроен оставшийся участок Юнусабадской линии метрополитена, а также строительство новой наземной ветки в Сергелийском районе. Следует отметить, что в настоящее



время при строительстве Юнусабадской линии метрополитена используются новейшие техники, доставленные из Германии, Италии, Китая и Сербии, которые позволяют бурить проходы для туннелей каждый месяц более чем на 300 метров. Кроме того, такая техника способна осуществить монтаж тубингов подземных дорог. Конечно, учитывается опыт возведения действующих линий Ташкентского метрополитена, а также используются новые современные строительные методы и технологии.

Строительство наземной ветки метро было обусловлено развитием крупной строительной индустрии в Сергелийском районе и значительной его удаленности от центра города. В связи с этим, возникла крайняя необходимость в строительстве отдельной линии метро от станции «Алмазар» до массива «Спутник» («Йулдош») в Сергелийском районе Ташкента. Протяженность новой линии составит более 8 км, на ней будут действовать шесть станций. Линия будет находиться на расстоянии 6 м от земли. Следует отметить, что данная линия станет частью единой системы, и поезд будет просто подниматься на поверхность, то есть на эту линию, и пассажирам не придется пересаживаться в другой состав. Сдача первой очереди наземного метро Ташкента запланировано к празднику «Навруз» в марте 2019 г.

### **Рекомендации и пожелания при строительстве метро в Узбекистане** *Recommendations and suggestions for the construction of the metro in Uzbekistan*

1. Рекомендуется решать эстетические задачи одновременно с вопросами удобства, так как эстетическое осмысление материальной основы интерьеров станций метро должно быть связано с их функциональной целесообразностью и техническим совершенством.
2. Необходимо изучить опыт, накопленный за многие годы в проектировании и строительстве метрополитена в Узбекистане и в других странах, и рационально использовать его при строительстве новых станций.
3. Благодаря богатому художественному оформлению, Ташкентский метрополитен является предметом гордости и достопримечательностью столицы Узбекистана. В этой связи, при строительстве и проектировании новых станций метро, следует применять к ним не только художественный подход, а также использовать современные мировые инновационные технологии.
4. Рекомендуется использовать новые эффективные материалы, более совершенные конструкции и методы возведения подземных и

наземных станций метро, высокие технологии строительства на базе новейшего автоматизированного оборудования, оснащённого компьютерами, что позволит повысить производительность труда, сократит сроки строительства и стоимость линий метрополитена.

5. Метро XXI в. – это не только средство передвижения в больших городах, но и воплощения интересных дизайнерских идей и архитектурных проектов. В этой связи, в выборе тематического облика и с целью создания неповторимого художественного решения станции рекомендуется обращаться к историческим образам и традициям, а также современной истории страны.

### **Summary**

The metropolitan is a cultural heritage site. From the very beginning of the construction of the metro in Uzbekistan, his stations were considered not only as necessary constructions of the underground road, but also as works of architecture, embodying a certain ideological and artistic concept and reflecting the best examples of folk art. The Tashkent metro differs significantly from the undergrounds of many countries in Europe and America with their emphatically utilitarian simplified appearance. The best architects, painters and sculptors of Uzbekistan, a whole constellation of world names, participated in the design of metro stations.

Today, the “underground palaces” of Tashkent have become an integral part of the architectural ensemble of the capital of Uzbekistan, which in the future will continue amazing and delighting residents and guests of the country. But the Tashkent metro is not only attractive due to its beauty. Thus, for the first time in the practice of designing and construction of the domestic metro here the original design solutions were applied in the metro technology.

Tashkent metro is a unique monument of modern architecture of Uzbekistan. Many guests of the capital, both specialists in the field of metro construction, and ordinary people who visited the Tashkent metro, are amazed by its unique and beautifully decorated stations, which combine eastern and western architecture. This beauty and majesty will continue delighting the whole world in the future.

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# ATSTAROJOŠIE ELEMENTI APĢĒRBĀ LIETOTĀJU DROŠĪBAI, TO RISINĀJUMI APĢĒRBU DIZAINĀ

## *Reflecting Elements in Clothing for User Security, Solutions in Clothing Design*

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**Abstract.** *Aim of the article is to justify the topicality of contemporary decorative functional solutions in clothing design, emphasizing the necessity of using reflective material elements in clothing during the dark time of the day and assessing the reasons for the lack of existing offer for different user groups. The use of laser technologies, as a modern, diversified design resource and environmentally friendly textile processing method. Research methods: theoretical - analysis of literature sources, statistical data, and analogues; empirical - questionnaires and data processing. Study sample: 288 respondents, period – 2017/2018 study year. The research is of practical importance, as it assesses previous studies, statistical data and analyses the habits of pedestrian reflectors use / non-use in Latvia. The availability of laser equipment at the Rezekne Academy of Technologies provides experimental work with different thickness, different fibre fabrics with a carbon dioxide laser system. The treatment of synthetic fibre reflective fabric is performed by laser cutting, determining the best cutting parameters for a particular type of fabric. As a result, the design of the outfit collection is developed, ensuring a decorative and functional tie in the clothing with reflective elements.*

**Keywords:** *clothing design, laser technology, reflective elements, survey.*

### **Ievads**

#### **Introduction**

Mūsdienu apģērbs izpilda vairākas funkcijas, tas ir daudzveidīgs pēc nozīmes. T. Hongu, G.O. Phillips, M. Takigami (Hongu, Phillips, & Takigami, 2005) pamato, ka apģērba attīstība cieši saistīta ar zinātņi un tehnoloģijām – dažādu zinātnes nozaru attīstības un sintēzes rezultātā radušies jauni materiāli un pielietojumu veidu variācijas. Gaismu atstarojošs materiāls modes dizainā tiek izmantots gan dekoratīvi, gan funkcionāli, bieži vien izstrādājumos sākotnēji to izmantoja apdarei. Vēlāk to sāka iestrādāt jakās, skriešanas un riteņbraucēju apģērbā, kā arī profesionālajā darba apģērbā (Learn about reflective, 2018). Efektīvi atstarojošo elementu risinājumi virsapģērbā un aksesuāros ir vērojami

funkcionālajā apģērbā (mediķu, glābēju, policistu u.c. uniformās), bērnu un sportiskā stila jauniešu apģērbos.

Nozīmīgs ir atstarojošo elementu lietojuma funkcionālais aspekts. Latvijā ir spēkā noteikumi, kas nosaka atstarotāju lietošanu, un to mērķis ir nodrošināt neaizsargātāko satiksmes dalībnieku (gājēju, riteņbraucēju) pamanāmību (Ministru kabineta noteikumi, 2015). Tomēr, neskatoties uz sociālajām kampaņām, atstarotāju/apģērbu ar atstarojošiem elementiem piedāvājumu, esošā situācija neapmierina visas lietotāju grupas.

Mūsdienu tendences tekstilrūpniecības attīstībā pasaulē parāda nepārtrauktu jaunāko tehnoloģiju izmantošanu izejmateriālu un produktu izgatavošanas tehnoloģiskajā procesā. Dizaineri, veidojot jaunākās modes kolekcijas, apvieno mūsdienīgus materiālus un tehnoloģijas. Daudzveidīgas dizaina iespējas apģērbā dažādām drānām, ietaupot laiku un iegūstot oriģinālu rezultātu, ražošanas procesa uzlabojumus, nodrošina tekstilmateriālu lāzerapstrāde. Esošās priekšrocības ir noteikušas tehnoloģijas straujo popularitāti modes industrijā pasaulē.

Pētījuma mērķis: pamatot kvalitatīvu un prasībām atbilstošu gaismu atstarojošo elementu lietošanas nepieciešamību apģērbā diennakts tumšajā laikā, izvērtējot esošā piedāvājuma dizaina neatbilstības iemeslus dažādām lietotāju grupām un lāzertehnoloģiju izmantošanu atstarojošās drānas apstrādē apģērbu dizainā.

Pētījuma metodes: teorētiskās – literatūras, avotu un statistikas datu analīze, analoģu izpēte; empīriskās – datu ieguves metode – anketēšana un datu apstrāde.

## Literatūras apskats

### *Literature review*

Pētījumā autores veica pieejamās teorētiskās informācijas apkopojumu un izvērtējumu par mūsdienīgu atstarojošo materiālu un elementu piedāvājumu un iespējām tērpu modes dizainā.

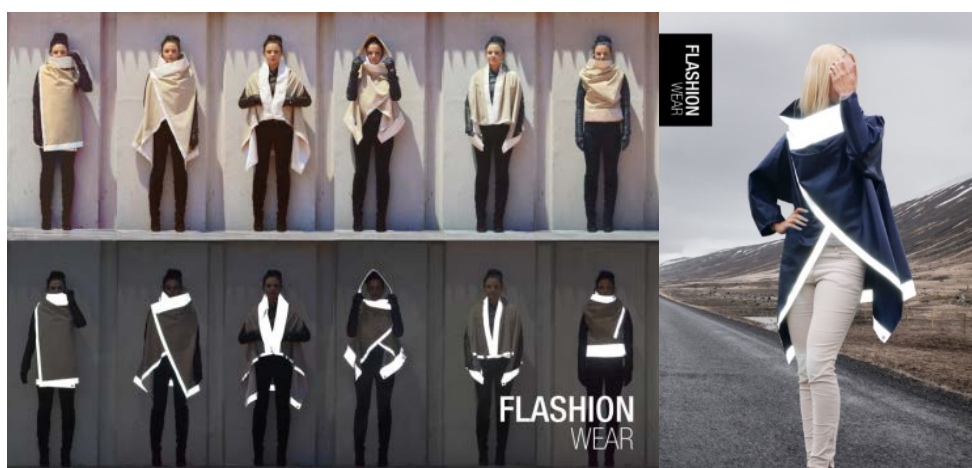
Vēstures dati liecina, ka atstarojošs sudrabkrāsas materiāls tika radīts 20.gs. 30.gados. Tas sastāv no liela skaita sīkām stikla lodītēm, kas apakšā pārklātas ar alumīniju. Modes dizaina izstrādājumos sākotnēji to izmantoja šņorēm sporta apavos un mugursomu aukliņām. Drīz vien to iestrādāja jakās, skriešanas un riteņbraucēju apģērbā, kā arī profesionālajā darba apģērbā (Learn about reflective, 2018). B. Englišs (English, 2013) pamato, ka provokatīvā postmodernisma (no 1960.gada) mode iekļāva jauno tehnoloģiju materiālus un metodes, tai skaitā arī atstarojošos, lai „apģērbtu ķermeni”.

Mūsdienās gaismu atstarojoši materiāli un elementi atrodami gan funkcionālajos, gan modes apģērbos, veicot aizsardzības un/vai dekoratīvo funkciju. Apģērbā tiem, galvenokārt, ir funkcionāla nozīme, jo diennakts tumšajā

laikā tie padara redzamu to valkātāju. G. Bartkowiak, K. Kuhl (Bartkowiak & Kuhl, 2013) pamato, ka saskaņā ar standartu EN471 atstarojošs apģērbs (augstas redzamības apģērbs) ir brīdinājuma apģērbs, kas paredzēts, lai nodrošinātu pamanāmību visā diennakts laikā. Atbilstošs un efektīvs risinājums pamatā ir funkcionālajā apģērbā (mediķu, glābēju, policistu u.c. uniformās). Bērnu, sporta un jauniešu stila apģērbos ir izmantoti iestrādātie atstarojošie elementi. Atstarojošie materiāli visbiežāk ir sudrabkrāsas, neona zaļos un oranžos toņos, virsapģērbā un aksesuāros, pieprasījums pēc tiem dažādās nozarēs pieaug.

Pasaules klases kompānijas gaismu atstarojošo materiālu ražošanā ir 3M un ORAFOL (ASV) (3M™ Scotchlite™ Reflective Material, 2018) ar divām gaismu atstarojošām tehnoloģijām – prizmatiskā vai stikla lodīšu principa. Ražotāji piedāvā ne tikai standarta poliestera sudrabkrāsas atstarojošas drānas ar ierasto gludo tekstūru, bet arī „elpojošas”, ar reljefu faktūru, jebkuras krāsas un dažādu dizainu drānas, kas dienas laikā izskatās, kā parasti materiāli, bet tumsā veic gaismu atstarojošu funkciju.

Šie materiāli tiek izmantoti arī apģērbā. Viens no inovatīvākajiem Latvijas dizaineru piedāvātajiem risinājumiem ir Agneses Pundiņas zīmola *FLASHIONwear* transformējamās atstarojošās vestes (1.attēls), lietusmēteļi un apmetņi, kas ir ērta alternatīva ierastajām atstarojošajām vestēm. Funkcionālo apģērbu zīmols, rūpējoties par gājēju drošības sajūtas uzlabošanu diennakts tumšajā laikā, iestrādājis atstarojošos elementus mūsdienīgā apģērbā. Izstrādājumiem ir dažādas nēsāšanas variācijas un interpretācijas, lai apģērbu varētu pielāgot dažādiem laika apstākļiem (Lielākā modes un tekstila izstāde Baltijas valstīs, 2018).



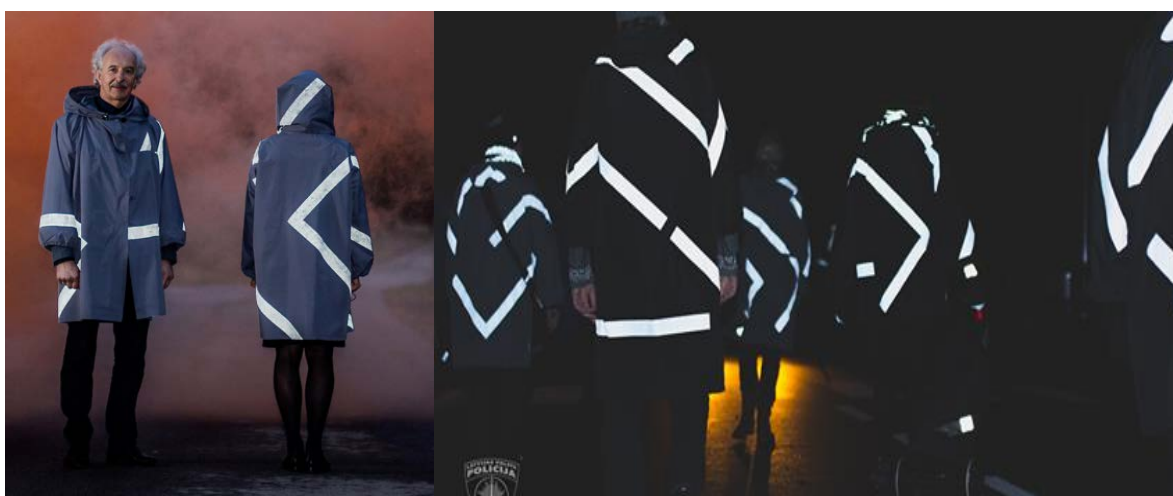
1.attēls. *FLASHIONwear* transformējamā veste. Atstarojošs mētelis

Figure 1 *FLASHIONwear* transformable vest. Reflective coat

(<http://www.flashionwear.lv/> <http://www.flashionwear.lv/produkti/veste/>)

Valsts policijas projekta “Atstarotājvīrs” ietvaros, sadarbībā ar Latvijas Mākslas akadēmiju (LMA) radītā atstarojošo virsapģērbu un aksesuāru kolekcija SPIID (2.attēls), ar mērķi - sabiedrībā aktualizēt atstarotāju lietošanas paradumu nozīmību (Valsts policija, 2017). Tik nepieciešamie ierastie atstarotāji nepievilcīgā dizaina un neērtuma dēļ nespēj iekarot cilvēku atsaucību (Atstarotāji nepievilcīgā dizaina un..., 2016).

Apģērbu kolekcija, kuras autore Sabīne Vīksne, ir par lietotāja līdzatbildību uz ceļa un par atbildību ražošanas procesā – netērēt laiku, materiālus, cilvēkresursus, pielietot unificētu atstarojošo apdruku, neizšķiest audumu, izmantot "bez atlikuma" jeb "zero waste" ražošana principus (Ne tikai droši, bet..., 2017).



2.attēls. «SPIID» atstarojošo apģērbu modes skate

Figure 2 Reflective Clothing Fashion Show

(<http://www.fold.lv/2017/10/spiid-atstarojoso-apgerbu-modes-skate/>)

Latvijā praksē ieviestajā sadarbības pieredzē ar apģērbu dizaineriem, Valsts Policijas projekta “Dzīvība ir modē” ietvaros, ir radīti īpaši apģērbi jauniešiem ar atstarojošiem elementiem (3.attēls), lai tumšajā laikā ikviens būtu pamanāms un drošs par savu dzīvību. Jaunieši nelabprāt izvēlas lielveikalos nopērkamās atstarojošās vestes (Latviešu dizaineri rada apģērbu..., 2017).



3.attēls. Kolekcija projektā *Dzīvība ir modē, 2016*

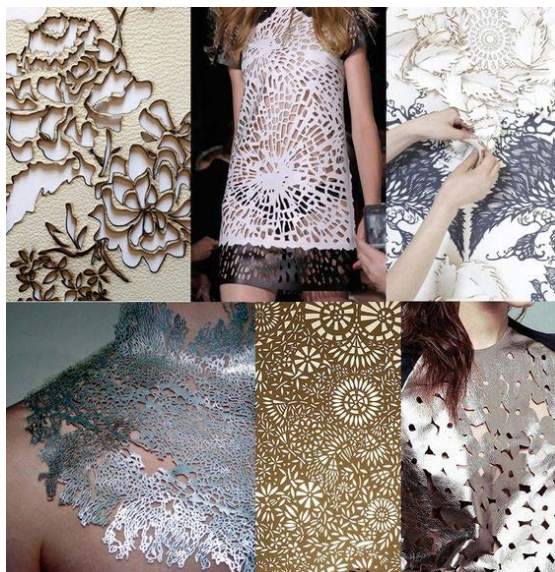
Figure 3 *Reflective Clothing Collection Life is in fashion*

(<http://www.lsm.lv/raksts/kultura/dizains-un-arhitektura/foto-latviesu-dizaineri-rada-apgerbu-kolekciju-ar-atstarotajiem.a172119/>)

Līdzās jaunākajiem materiāliem dizaineru kolekcijās, nozīmīgas ir arī izmantojamās tehnoloģijas. Veiktie pētījumi (Periyasamy, Rwahwire, & Zhao, 2017) par videi draudzīgām metodēm un tehnoloģijām modes dizainā, pamato tekstildrānu lāzerapstrādes priekšrocības. Kate Goldsworthy (*Laser Cut Fabrics...*, 2013) akcentē lāzertehnoloģiju pielietojumu tekstilmateriālu apstrādē, kā ilgtspējīgāku apstrādes metodi, salīdzinot ar tradicionālajām. Tiek norādīts fakts, ka apģērba rūpniecība ir otrā lielākā piesārņojošā pasaulē, radot 10% no pasaules siltumnīcefekta gāzu emisijām (*Laser Engraving Fashion...*, n. d). Lāzerapstrādi Latvijas modes dizainā izmanto ļoti maz. Tā atrodama specifiskos projektos, piemēram, Latvijas Olimpiskās delegācijas apģērba kolekcijā "Phjončhana 2018", sportistu apģērba izturības palielināšanai apstrādes procesā tika pielietota lāzergriešana (Mālmeisters, 2017).

Kā atzīmē J. Bromberg (Bromberg, 1991), kopš 1970. gada lāzerus izmanto tekstilam. Abreviatūru vārdnīca (Vance, 2011) vārdu saīsinājumu salikteni (abreviatūra, akronīms) "lāzers" (angl. „*laser*”) atšifrē kā „*Light Amplification by Stimulated Emission of Radiation*” (gaismas pastiprināšanās ar stimulētu radiācijas starojuma emisiju), kas izskaidro lāzera darbības principu (*How Lasers Work*, n. d). Lāzerstars sagriež materiālu konkrētās formās un rakstos (4.attēls), tiek iegūta līdzena, precīza griezuma līnija, kas pārspēj tradicionālos griešanas veidus, jo ir minimāls materiālu zudums. Procesa sagatavošanā tiek izmantotas datorprogrammas attēlu veidošanai un apstrādei, tālāk darbu turpina lāzers (*The use of laser in garment manufacturing: an overview*, 2016).





4.attēls. Tekstila un ādas lāzergriešana

Figure 4 Laser cutting of textiles and leather

(<http://thecuttingclass.com/post/60758709747/laser-cut-layering-at-threeasfour>)

Šī tehnoloģija ir ļoti precīzs, stabils, bezkontakta process. Audums, āda vislabāk tiek apstrādāti ar dimantu CO<sub>2</sub> lāzeru (Lasers for materials processing, 2016). Honkongas zinātnieki savā pētījumā, augstas precizitātes un ātruma dēļ, pierāda lāzerapstrādi, kā labāku par tradicionālajām metodēm, izvirzītajos kritērijos (Yuan, Jiang, Newton, & Au, 2013). A. Marle, E. Beier (Mahrle & Beyer, 2009) min lāzergriešanu kā lētāku salīdzinājumā ar tradicionālajām griešanas metodēm. R. Nayak, R. Padhye (Nayak & Padhye, 2016) atzīst, ka pēdējā laikā lāzera izmantošana apģērbu ražošanas nozarē pieaug, galvenie iemesli ir saistīti ar samazinātām izmaksām, elastīgumu un pretviltosanas iespēju. L. Beikere (Baker, 2016) atzīst citu dizaina un amatniecības tradicionālo tehnoloģiju pilnveidi, izmantot arī lāzerus.

I. Vilumsone-Nemes (Vilumsone-Nemes, 2018) pamato, ka mainot procesa parametrus: ātrumu, lāzera jaudu un fokusa punkta lielumu, var iegūt dažādus apdares efektus. Modes namu kolekcijas demonstrē lāzerapstrādes iespējas: no viegla caurspīdīguma *Sportmax* skatēs, līdz sarežģītam idejiskam zīmējumam *Burberry Prorsum* piedāvājumā (Modes tendences Prêt-à-porter, 2018). Analizējot dizaineru veikumu, autore secina, ka visbiežāk, radot īpašu dizainu, tiek pielietota tieši lāzergriešana. Lāzertehnoloģiju pieejamība Rēzeknes Tehnoloģiju akadēmijā (RTA) autorēm nodrošina to izmantošanu materiālu apstrādes iespēju izpētē, atstarojošas drānas lāzergriešanai ārgērbu kolekcijas dizaina izstrādes procesā.

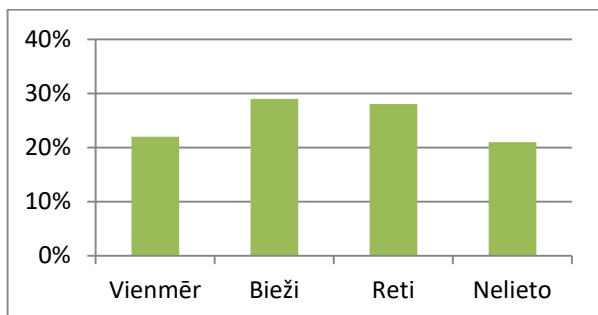
## **Pētījuma rezultāti** *The results of the research*

Veicot situācijas analīzi par atstarojošiem elementiem apģērbā lietotāju drošībai, par atstarotāju lietošanas/nelietošanas iemesliem, autores turpina esošos pētījumus (Bukova-Žideļūna, Villeruša, & Pudule, 2018). Tika sastādīta anketa, izmantojot *Google* veidlapu un izplatīta sociālajos tīklos un e-pastā. Pētījuma bāze: 288 respondenti. Kā derīgas tika atzītas 278 anketas. Pētījuma veikšanas periods – 2017./2018. studiju gads. Aptaujā piedalījās 79% sieviešu un 21% vīriešu, 25% respondentu vecums ir 20-30 gadi.

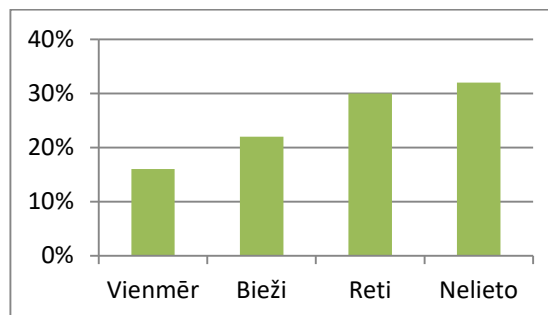
Autoru veiktā tirgus piedāvājuma analīze parādīja, ka mērķauditorija piedāvājumā esošajam apģērbam ar atstarojošiem elementiem, galvenokārt, jaunieši; apģērbā dominē sportiskais stils; ir nepietiekams piedāvājums patērētājiem brieduma gados klasiskajā stilā. Metodes un veidi, ko izmanto atstarojošo elementu iestrādāšanai: šūtas atstarojošas lentes, atstarojošu drānu laukumi, gludi atstarojoši elementi, atstarojošie elementi, kas drukāti ar sublimācijas paņēmienu, trikotāža ar atstarojošiem pavedieniem.

Aptaujas rezultāti:

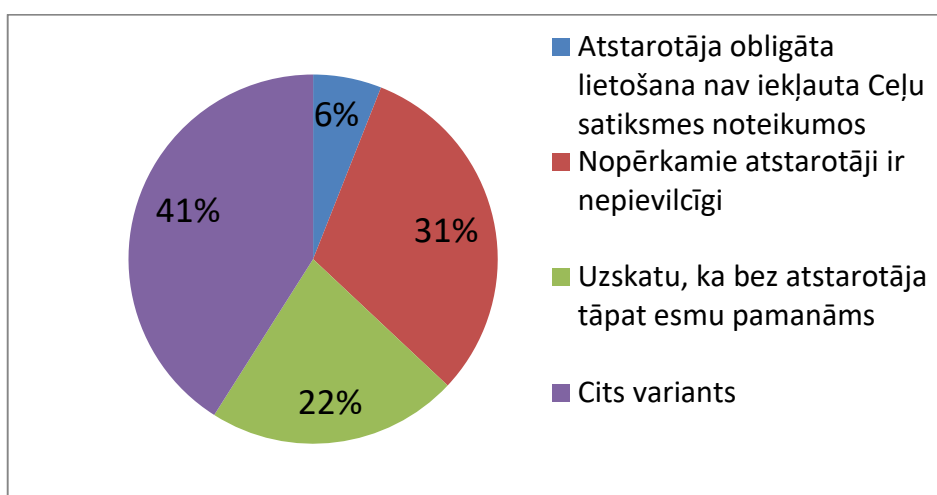
- gājēju lietotie atstarotāju veidi (%): apģērbam vai somai piespraužams - 65%; aproce - 28%; iestrādāts ikdienas apģērbā (virsjakā) vai aksesuārā (soma, cepure u.c.) - 22%; veste - 10%; iestrādāts darba apģērbā - 10%; cits variants (lukturis, telefona gaisma) – 2%;
- atstarotāja veida efektivitātes novērtējums (%): iestrādāts apģērbā vai aksesuārā – 49%; veste – 47%; apģērbam vai somai pievienojams, piespraužams atstarotājs – 18%; aproce – 3%;
- 31% aptaujāto atzīst, ka piedāvājumā esošais ir sportiska stila apģērbs, nav pieejami apģērbi ar klasiskā stila iezīmēm un atstarojošiem elementiem;
- atstarotāju izmantošana ārpus apdzīvotām vietām un apdzīvotās vietās diennakts tumšajā laikā (%) (5., 6.attēls);
- 36% respondentu atzīst, ka atstarotāju neizmantošanas iemesls ir pašu nevērīga attieksme un citi (7.attēls);



5.attēls. Atstarotāju izmantošana uz neapgaismotiem ceļiem ārpus apdzīvotām vietām tumšajā diennakts laikā, %  
Figure 5 Use of reflectors outside settlements



6.attēls. Atstarotāju izmantošana uz neapgaismotiem ceļiem apdzīvotās vietās tumšajā diennakts laikā, %  
Figure 6 Use of reflectors in populated areas



7.attēls. Atstarojošo elementu nelietošanas iemesli  
Figure 7 Reasons for not using Reflective Elements

Respondenti par efektīvāko atzīst, galvenokārt, apģērbu/aksesuāru (saskaņā ar noteikumiem) ar iestrādātu atstarojošu elementu un atstarojošo vesti, kuru ikdienā, esošā dizaina dēļ, tomēr neizmanto.

### Secinājumi Conclusions

- Dizaineri izmanto atstarojošā materiāla īpašības virsapģērbu apdarē, bet nereti, vairāk dekoratīva efekta, nevis funkcionalitātes dēļ, kas tomēr ir prioritāra, jo padara apģērbu valkātāju redzamu.
- Veiktā aptauja raksturo esošo situāciju atstarotāju/atstarojošo elementu izmantošanā apģērbā un pamato apģērbu ar efektīviem atstarojošiem

elementiem nepietiekošo piedāvājumu visām lietotāju grupām, ir aktuāls pieprasījums pēc apģērbiem ar klasiska stila iezīmēm un atstarojošiem elementiem.

- Aptaujas rezultāti par gājēju lietotiem atstarotājiem parāda, ka esošā piedāvājuma efektivitāte ir apmierinoša tikai 20% gadījumū.
- Latvijā dizainere Sabīne Vīksne (zīmols *FLASHIONwear*) piedāvā mūsdienīgus apģērbus drošības uzlabošanai, lai apģērbu lietotāji būtu vairāk pamanāmi un respektējami ceļu satiksmē.
- Dizaina koncepcija raksturo ilgtspējīgu, videi draudzīgu dizainu, kas aicina izvērtēt ražošanas tehnoloģijas, apstrādes metodes, kuras ietekmē visas pasaules resursus, vidi, klimatu un iedzīvotāju veselību. Lāzerapstrāde tiek raksturota kā videi draudzīga, kā arī perspektīva esošo priekšrocību dēļ.

### Summary

H. Davies (Davies, 2008) notes that Modern fashion motivates continuous change and the emergence of new ideas, this process is accelerated and complemented by young designers, who are rapidly propelling the current fashion industry era. T. Hongu, G.O., Phillips, M. Takigami (Hongu, Philips, & Takigami, 2005) notes that the development of clothing is closely related to science and technology - new materials and variations of application is resulting from the development and synthesis of various scientific disciplines.

The designers of the latest fashion collections combine modern materials and technology. Laser processing of textiles provides versatile design options for garment decoration for different fabrics, saving time and obtaining original results, and - manufacturing process improvements. It is these benefits that have led to the rapid popularity of laser cutting in the fashion industry.

Aim of the research is to justify the necessity of qualitative and compliant use of reflective elements in clothing during the dark time, evaluating the reasons for the lack of existing supply design for different user groups and the use of laser technologies in the design of clothing reflective elements.

Research methods: theoretical - literature, source and statistical data analysis, analogue research; empirical - data mining method - questionnaire and data processing.

Nowadays, light-reflecting materials and elements can be found in both functional and fashionable clothing, with protective and/or decorative features. World-class companies in the field of reflective materials include 3M and ORAFOL (USA) (3M™ Scotchlite™ Reflective Material, 2018) with two reflective technologies.

Functional clothing brands, taking care of improving the pedestrian safety in the dark hours of the day, incorporate reflective elements into modern clothing. The products have different wear variations and interpretations so that clothing can be adapted to different weather conditions (Biggest Fashion and Textile Exhibition in the Baltic States, 2018).

The availability of laser equipment at the Rēzekne Academy of Technologies provides experimental activities and research of laser processing capabilities of reflective material, choosing laser cutting in the design of reflective materials for clothing collection.

R. Nayak, R. Padhye Recently (Nayak & Padhye, 2016) notes that, the use of laser in the apparel industry has been increasing, the main reasons for widespread use being reduced costs, flexibility and security. Research (Periyasamy, Rwahwire, & Zhao, 2017) on environmentally friendly techniques and technologies in fashion design justifies laser treatment of textiles with many advantages over traditional fabric processing technologies.

The analysis of the market offer shows that the target audience for existing clothing with reflective elements, mainly young people. The clothing is dominated by sport style that is an inadequate offer to consumers in the mature years dressing in classical style.

The authors' survey describes the current situation in the use of reflectors or reflective elements in clothing and justifies the inadequate supply of clothing with effective reflective elements, and the need for the design of current demand among users, including those with classic style features.

Survey results:

- 65% of respondents use a reflector or use a bag with a reflector;
- 36% of respondents admit that the reason for not using reflectors is: it is forgotten at home, not transferred from one garment to another, etc.;
- 31% of respondents admit that they would like reflective elements in clothing with classical style features.
- Effectiveness assesment of reflector type: embedded in clothing or accessory - 49%; vest - 47%; attached to clothing or bag - 18%; bracelet - 3%. Respondents consider clothing / accessories (according to the rules) to be the most effective, with an integrated reflective element and a vest, but they are not used on a daily basis.

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# LIEPĀJAS SOCIĀLI EKONOMISKO PROCESU IETEKME UZ RAINA PARKA FUNKCIONĀLO UN VIZUĀLO RISINĀJUMU LĪDZ OTRAJAM PASAULES KARAM

## *Impact of Socio-Economic Processes on the Development of Rainis Park in Liepaja until World War II*

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**Abstract.** *In the 19th century, a special attention was devoted to arrangement of Libava urban environment. Public gardens were created. At the beginning of mass culture, a new urban landscape conception got into focus of artistic attention. In the Republic of Latvia, physically and mentally competent living environment for a person developed. Green urban structures were improved. Public activities in Rainis Park were expanded. The object of the research – Rainis Park's functional and visual changes in Liepaja. Research problem – Rainis Park's architectural spatial and functional changes caused by sociopolitical processes have not been sufficiently studied. Research novelty – Rainis Park's spatial and functional structure is analyzed in the context of city development. The goal of the research – to determine the most typical changes in Rainis Park's historical plan and visual image. Main methods applied – this study is based on analysis of archive documents, projects and cartographic materials of urban planning, as well as study of published literature and inspection of buildings in nature.*

**Keywords:** *greenery system, architect Jānis Krastiņš, Liepāja, public park's functional and visual changes, Rainis Park.*

### **Ievads**

#### ***Introduction***

Krievijas impērijā 19.gs. pirmajā pusē īpašu uzmanību pilsētās pievērsa funkcionālo jautājumu risināšanai, pilsētvides sakārtošanai un apstādījumiem. Iedzīvotāju atpūtai radīja publiskus dārzus, bet vēlāk par labiekārtojuma neatņemamu sastāvdaļu kļuva sabiedriskie parki, bulvāri un skvēri. Libava 19.gadsimtā strauji attīstījās, un pārmaiņas sociālajā dzīves veidā mainīja cilvēku attieksmi pret dabu – pilsētā ainavu papildināja iedzīvotāju iekopti stādījumi, un par inteliģences pulcēšanās vietu kļuva Paviljona dārzs, bet 19.gs. otrajā pusē un 20.gs. sākumā par strādnieku atpūtas vietu kļuva Pilsētas parks.



Latvijas Republikā agrārās reformas īstenošana pavēra iespējas pilsētu plānveidīgai attīstībai. Liepājā rekonstruēja un pilnveidoja apstādījumus: Raiņa parkā izvērsa sabiedriskas aktivitātes, bet Jūrmalas parku pilnveidoja atbilstoši kūrorta apmeklētāju interesēm. Vietas atpūtai abos parkos radīja funkcionāli atšķirīgas, lai jūras piekrastē cilvēkam būtu fiziski un garīgi pilnvērtīga un daudzveidīga dzīves telpa, kas saudzīgi un iejūtīgi papildina gleznaino un trauslo dabas ainavu – iedvesmas avotu. Cilvēka fizisko, socioloģisko un psiholoģisko prasību nodrošināšanai saglabāja reljefu, ūdenstilpnes, koku stādījumus.

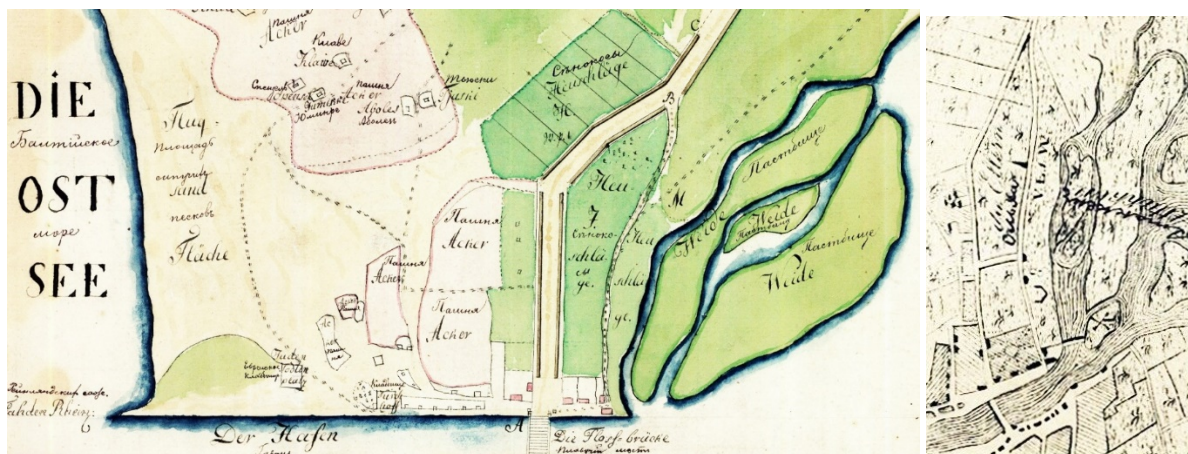
Pētījuma objekts – Liepājas Raiņa parka funkcionālais risinājums un vizuālais tēls. Pētījuma problēma – gadsimtu gaitā sociāli politisko procesu veicinātās Raiņa parka funkcionālās un arhitektoniski telpiskās izmaiņas nav pietiekami pētītas un izvērtētas. Arhitekts, prof. Jānis Krastiņš, kurš Liepājā ir tikai viesojies, bet nav dzīvojis, lai pētītu pilsētā iekoptos apstādījumus, lasītājiem piedāvā vispārīgu, nekonkrētu un tendenciozu informāciju par Pilsētas parka veidošanas pirmsākumiem. Pētījuma novitāte – Raiņa parka funkcionālā un telpiskā uzbūve analizēta Liepājas attīstības procesu kontekstā. Pētījuma mērķis – noteikt sociāli ekonomisko procesu ietekmē notikušās raksturīgākās Raiņa parka vēsturiskā plānojuma un vizuālā tēla izmaiņas. Galvenās metodes – pētījumam izmantoti arhīvu dokumenti, kartogrāfiskie un publicētie materiāli, pilsētībūvnieciskie projekti, fotofiksācijas, kas iegūtas, veicot apsekošanu.

### **Paviljona dārza un Pilsētas parka izveide Libavā** *Creation of Pavilion Garden and City Park in Libava*

Libava 19.gs. sākumā strauji attīstījās, un no Mītavas (tagad Jelgava) uz Grobiņu regulāri brauca pasta karietes, kas ieradās Libavā pa ārkārtīgi sliktu ceļu (skatāms 1757.gada Libavas plānā, kas glabājas Krievijas Valsts kara vēstures arhīvā (KVKVA, *Российский Государственный военно-исторический архив*); 349. fonds, 19. apraksts, 335. lieta), kuru neviens nelaboja. Pirms tilta pāri ostas kanālam ceļš veda garām birzīj mitrā pļavā. Liepājas ezera piekrastē pa iebraukto Grobiņas–Libavas ceļu, kura rietumpusē bija alkšņu mežiņš (skatāms KVKVA, 349. fonds, 19. apraksts, 336. lieta) 1803.gada Liepājas nocietinājumu projektā *Plan de la Ville de Libau*, 349. fonds, 19. apraksts, 336. lieta), 1808.gada 13. oktobrī Libavā ieradās Krievijas imperators (1801–1825) Aleksandrs I. Libavas 1826.gada kartē (1. att.) šai vietai uz ziemeļiem no ostas kanāla dots vācisks nosaukums “*Heuschleige*” (siena pļava). Annas baznīcas mācītājs Eduards Heinrihs Kristians Rotermunds (*Eduard Heinrich Christian Rottermund*; 1804–1882) savā hronikā atzīmēja, no kurām vietām pilsētā draudze 1837.gadā guvusi ienākumus: seši rubļi bijuši no “Alkšņu-Priedniekciema”. Libavas 1838.gada kartē (2. att.) ar vācu vārdu “*Ellern*” (tulkojumā – alkšņi) rādīts alkšņu

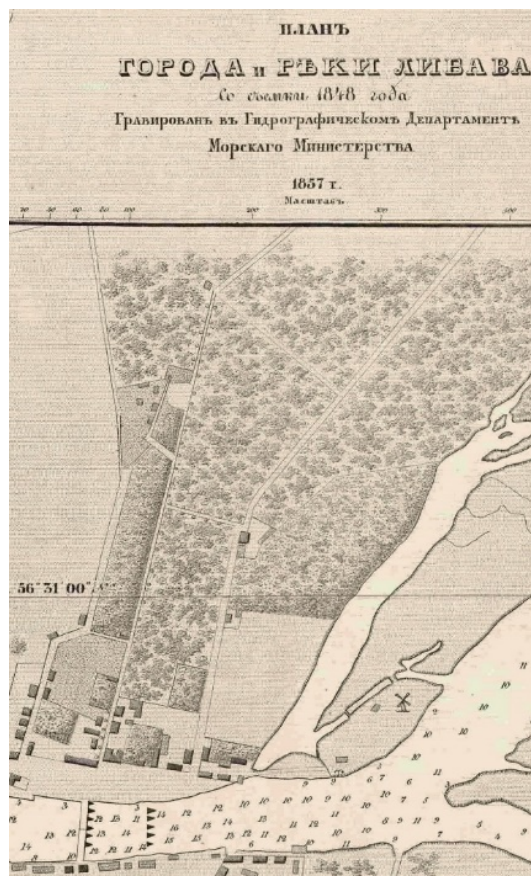
mežiņš (Driķe 2018), kura rietumpusē 1840.gadā nolēma izbūvēt Grobiņas–Libavas lielceļu, un 1841.gadā tā abās pusēs, kur auga nevērtīgi koki un krūmi, sāka sakopt teritoriju.

Ieceri īstenoja ar imperatora (1825–1855) Nikolaja I atbalstu, un 1841.gada 23. septembrī atklāja jaunā Grobiņas–Libavas lielceļa pirmās piecas verstis (Wegner 1898). Vēlāk Libavas kartēs iezīmēja Aleksandra (vācu: *Alexander*, tagad Brīvības) ielas trasi (3. att.) ar raksturīgu līkumiņu. Ceļa abās pusēs 1842.gada pavasarī iestādīja kokus (4. att.), bet Aleksandra ielas malā iepretī līkumiņam vasarā uzbūvēja paviljonu koncertiem (5. att.) un ierīkoja publisku dārzu (6. att.). Apstādījumi aizņēma plašu teritoriju starp Paviljona (vācu: *Pavillon*, tagad 1905.gada), Vakzāles (vācu: *Bahnhof*, tagad Rīgas) un Dzelzceļa (vācu: *Eisenbahn*, tagad Dzelzceļnieku) ielu, un līdz 1843.gadam radīja pilsētnieku iemīļotu vietu, kur 1843.gada pavasarī rīkoja pirmos priekšnesumus – uzstājās atlēti Šūmans un Henhs (Driķe, 2018).

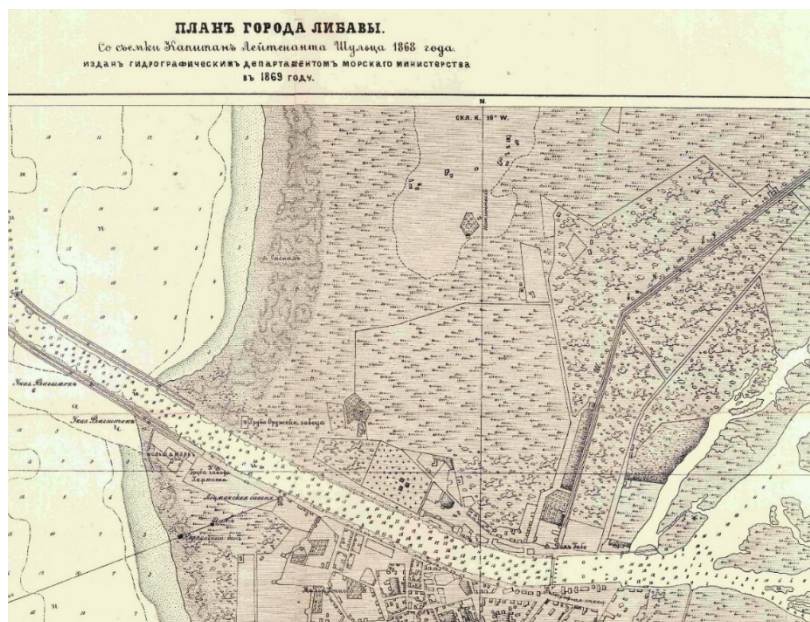


1.attēls. Mērnieks Heinrich Johann Cramer. Plāns Libavas apkārtnēi no Baltijas jūras līdz Liepājas ezeram un pilsētas robežai Grobiņas kroga tuvumā. 1826.gada 9. jūlijs (LVVA-1)  
 Figure 1 Surveyor Heinrich Johann Cramer. Plan of Libava surroundings from the Baltic Sea to Liepaja Lake and the city border near Grobina pub. July 9, 1826

2.attēls. Tanner F., Klokor O. E. Libavas situācijas plāns. 1838 (LVVA-2)  
 Figure 2 Tanner F., Klokor O. E. Situation plan of Libava. 1838



3.attēls. *Libavas 1848. gada uzmērījuma plāna fragments. 1857 (LVVA-3)*  
Figure 3 *Fragment of Libava 1848 survey plan. 1857*



4.attēls. *Libavas 1868. gada uzmērījuma plāna fragments. 1869 (LVVA-4)*  
Figure 4 *Fragment of Libava 1868 survey plan. 1869*

Purvaino pļavu ar nelielo Alkšņu mežiņu pretī paviljonam nolēma nosusināt: Parka komisijas uzdevumā liekā ūdens novadīšanai 1843.gadā izraka kanālu un izveidoja grāvju sistēmu, sāka stādīt Pilsētas jeb Paviljona parku, kur ierīkoja gājēju celiņus un tiltiņus, uzcēla sarga būdiņu un bufeti. Senākajā Libavas parkā auga bērzi, liepas, kastaņas, priedes, bet visvairāk – melnalkšņi (Dāvidsone, 1974, 185). Apkaimes pļavas izmantoja siena vākšanai. Grāmatu izdevējs Rūdolfis Pūce (*Rudolph Puhze*) par parka iekopšanu pārpurvotajā Alkšņu mežīnā 1894.gada laikrakstā “*Libausche Zeitung*” stāstīja, ka koku un krūmu stādīšana veikusies gluži ātri, jo iedzīvotāji bija atsaucīgi un jaunajam parkam atvēlēja augus un piemērotu augsni. Vēlāk ierīkoja bumbotavu ķeģļu spēlei un uzcēla “šveiciešu stila” paviljonu ar restorānu (7.att.), kas bija intelīgences un turīgāko aprindu pārstāvju satikšanās vieta. No parku vēstures ir zināms, ka restorāni (8.att.) Libavā bija atsevišķu personu īpašums (Dāvidsone, 1974, 193).



5.attēls. Paviljons Aleksandra ielas malā (LM-1)  
Figure 5 The pavilion at the edge of Alexander Street



6.attēls. Skats uz paviljonu no dārza puses (LM-2)  
Figure 6 View of the pavilion from the garden side

Parka paviljons darbojās visu gadu, un tajā notika koncerti, deju vakari, karnevāli, vingrotāju un svarcēlāju cīkstēšanās. Pretī parka galvenajai takai, kas veda no paviljona otrpus ielai, bija laukums – vieta orķestrim.



7.attēls. “Šveiciešu stila” paviljons atpūtai Pilsētas parkā (LM-3)

Figure 7 The pavilion of “swiss style” for the rest in City Park



8.attēls. Pilsētas parka paviljons ar restorānu (LM-4)

Figure 8 The pavilion with a restaurant in City Park

Grāmatā “Liepāja. Jūgendstila arhitektūra” profesors Dr. habil. arch. Jānis Krastiņš 2015.gadā par Pilsētas parku rakstīja: “Teritoriju uz austrumiem no Jaunliepājas, iepretim Liepājas ezera ziemeļu galam, aizņēma preču stacija, bet starp to un apbūvētajiem kvartāliem izveidoja Pilsētas parku (vāciski *Stadtspark*; tagad Raiņa parks), kas plešas starp Preču (tagad Zemnieku) un Aleksandra (tagad Brīvības) ielu. Nav precīzu ziņu, kad sāka šī parka veidošana. Daudzviet pavīd apgalvojumi, ka tas noticis 1849.gadā, kas “pilsētas galva Kārlis Ulihs (*Ulich*) aicināja liepājniekus ziedot koku dēstus parka izveidei” un tas “veidots kā ainavu parks pēc Rīgas galvenā dārznieka Georga Kufalta (*Kuphaldt*) projekta”. Dokumentāru pierādījumu tam nav un arī nevar būt, jo ainavu arhitekts Georgs Kufalts 1849.gadā vēl nemaz nebija dzimis, bet nekāda parka agrāk purvainajā ārpuspilsētas vietā nebija vēl 19.gadsimta septiņdesmito gadu sākumā: Jaunliepājas plānojuma metos pāri teritorijai, kurā vēlāk tapa šis parks, zīmētas vien dažas ielas” (Krastiņš, 2015, 20). Šī teksta autors atsaucēs norādījis, ka informāciju ieguvis no šādiem avotiem: Parki, skvēri un laukumi [tiešsaiste], Liepāja Anno 1625 (Liepājas pilsētas domes oficiālais portāls) [skatīts 28.02.2012], kā arī [http://www.liepaja.lv/page/2823&mode\\*print](http://www.liepaja.lv/page/2823&mode*print); Liepāja: Raiņa parks [tiešsaiste]. *Zudusī Latvija senos zīmējumos, atklātnēs un fotogrāfijās no 19.gs. beigām līdz mūsdienām* (Latvijas Nacionālās digitālās bibliotēkas Letonica projekts) [skatīts 28.02.2012]. <http://www.zudusilatvija.lv/objects/object/2613/>; Ozola, S. Liepājas zaļā rota – šodien un agrāk. *Kurzemes Vārds*, 2007, 29. augustā (Krastiņš, 2015, 20, 21). Publikācijas “Liepājas zaļā rota – šodien un agrāk” autore rakstīja: “Vienotas zaļo stādījumu sistēmas izveidē 19. gadsimta beigās un 20. gadsimta sākumā lielu darbu ieguldīja Liepājas pilsētas galvenais arhitekts Pauls Makss

Berči un izcilais parku mākslas speciālists, dendrologs, Rīgas dārzu un parku direktors Georgs Fridrihs Ferdinants Kufalts.” Par Raiņa parku rakstā bija teikts: “Jaunliepājas – vēlāk Raiņa vārdā nosauktais – senākais parks Liepājā bija iesaistīts Jaunliepājas plānojuma struktūrā, vienlaikus veicot aizsargfunkciju starp dzīvojamo apbūvi un plašajiem dzelzceļa līniju sazarojumiem.” Profesora interpretācijas par laikrakstā “Kurzemes Vārds” publicēto informāciju vien norāda uz šī cilvēka attieksmi pret citu pētnieku darbiem.

**Pilsētas parks Libavas jaunās apbūves plānojumā uz ziemeļiem no ostas**  
***City Park in the planning of the Libava new building north of the port***

Libavai nozīmīgs bija 1871.gads, kad no Dinaburgas (tagad Daugavpils) ieradās Pauls Makss Berči (*Paul Max Bertschy*, 1840–1911) un kļuva par Libavas pilsētas arhitektu. Šajā gadā atklāja dzelzceļa līniju no Libavas līdz Kaišadoriem un uzbūvēja Libavas dzelzceļa pasažieru stacijas ēku. Lai veicinātu tirdzniecības sakarus ar Krieviju, Lietuvu un Poliju, sliežu ceļu caur Mažeikiem, Mītavu un Rīgu 1873.gadā pievienoja Pēterburgas–Dinaburgas–Varšavas dzelzceļa līnijai. Libavā ieradās tirgotāji, bet rūpnieki un amatnieki dibināja ražotnes.

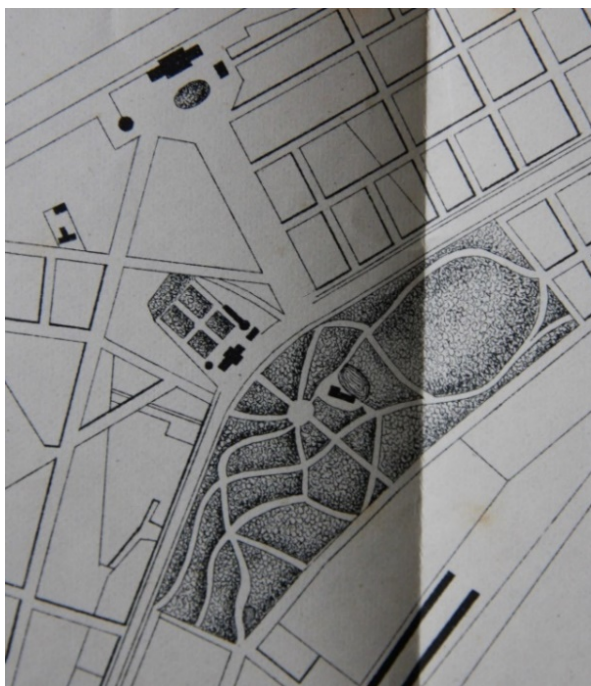


**9.attēls. Pauls Makss Berči (?). Skices fragments Pilsētas parka plānojumam un dzīvojamai apbūvei uz ziemeļiem no Tirdzniecības ostas kanāla. 1870. gadi (?) (LM-5)**

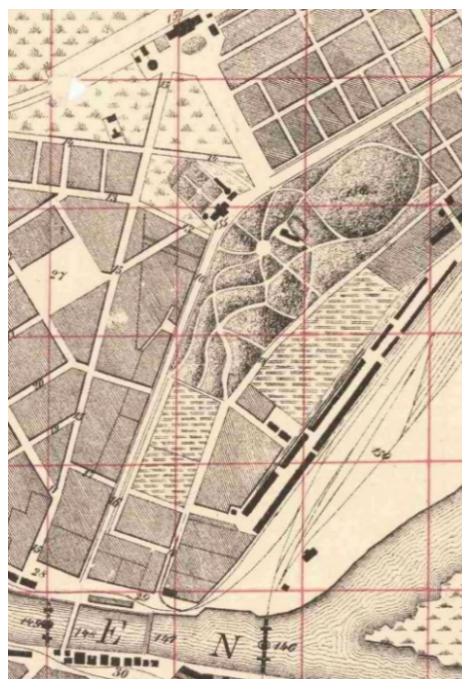
**Figure 9 Paul Max Bertschy (?). Sketch fragment for City Park planning and residential building north of the Trade Port Canal. 1870s First Half (?)**

Paviljona dārzs un Pilsētas parks vairākus gadu desmitus bija iedzīvotāju populārākās svētku, muzicēšanas un jautrības vietas pilsētā. Parka nomnieki rūpējās par Pilsētas parka apsaimniekošanu (Driķe, 2018), bet pēc kūrmājas un vasarnīcu kvartāla izveides 1875.gadā Pilsētas parks vairs nebija tik iemīļots.

Libavas ostai 1875.gadā izstrādāja padziļināšanas projektu, kurā paredzēja izbūvēt Ziemas ostu un viļņlaužus, pagarināt molus, izvēršot to galus paplašinātai ieejai kanālā. Dzelzceļu no Libavas 1876.gadā pagarināja līdz Romniem Poltavas guberņā. Sliežu ceļš veicināja plānveidīgu rūpnīcu un strādnieku dzīvojamo ēku apbūves attīstību dzelzceļa pasažieru stacijas tuvumā un uz ziemeļiem no ostas, kur sāka veidot jaunu pilsētas daļu. Liepājas muzeja Berči fondā ir divas apbūves plānojuma skices bez datējuma (iespējams 1870.gadu I puse) un autora paraksta, kuras, visticamāk, izstrādāja P.M. Berči. Skicēs ir rādīti projektējamo ielu virzieni, atpūtas zonu izvietojums un sliežu ceļa loks, kas no Tirdzniecības ostas kanāla līdz dzelzceļa pasažieru stacijai aptver fabriku un dzīvojamās apbūves teritoriju. Viens dzelzceļa atzars 19.gs. nogalē veda rietumu virzienā uz dzelzceļa pasažieru staciju, Ziemas ostu un kanāla ziemeļrietumu piekrasti, bet otru atzaru un preču staciju izbūvēja Liepājas ezera rietumu piekrastē. Vienā no skicēm risināts Pilsētas parka un tā apkārtnes plānojums (9. att.) (Ozola, 2018, 487).



**10.attēls. Pilsētas parka un Paviljona dārza plānojums ap 1875.gadu. 1902 (Schoen)**  
*Figure 10 Planning of City Park and Pavilion Garden around 1875. 1902*



**11.attēls. Pilsētas parka, Paviljona dārza un apkārtnes plānojums. 1880 (LVVA-5)**  
*Figure 11 Planning of City Park, Pavilion Garden and surroundings. 1880*

Vienlaicīgi ar pilsētas apbūves izveidi uz ziemeļiem no Tirdzniecības ostas kanāla arī nosusināja Pilsētas parka teritoriju, kur izraka dīķi un no iegūtajām zemēm parka centrālajā daļā iepretī paviljonam uzbēra kalniņu, no kura pavērās skats uz apstādījumiem. Attīstīja parka plānojumu (10., 11. att.), kuru centrālajā daļā veidoja simetrisku, labiekārtoja dīķa apkārtni (12. att.) un ierīkoja galvenos gājēju ceļņus (13. att.), to virzienus saskaņojot ar ielu izvietojumu dzīvojamajos kvartālos. Parka ziemeļdaļā izveidoja lielu pastaigu loku.



*12.attēls. Freidlin S. Dīķis un gulbji  
Pilsētas parkā (BCB-1)*  
*Figure 12 Freidlin S. Pond and swans in  
City Park*



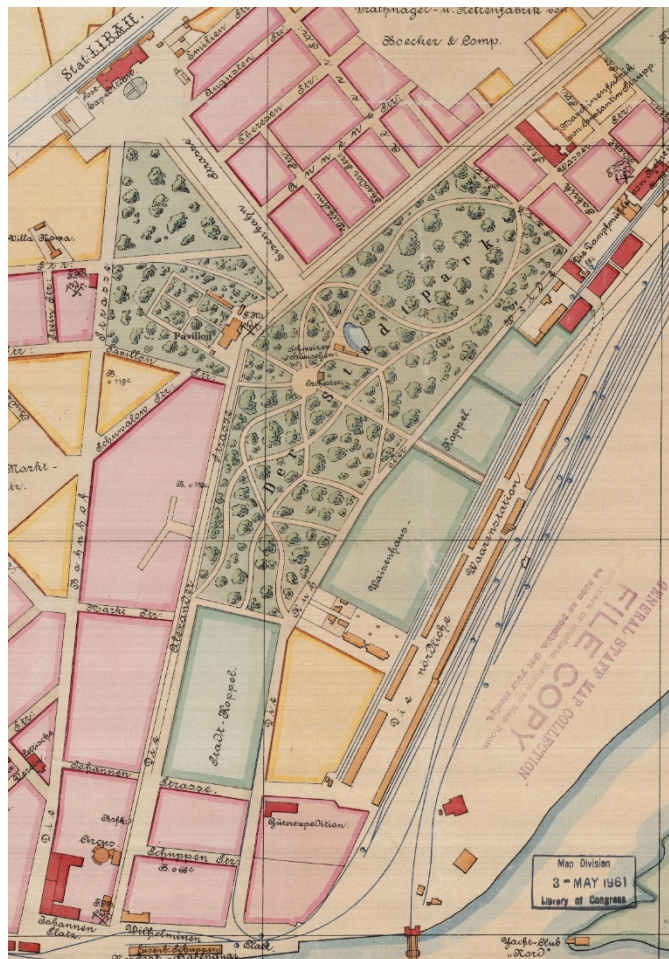
*13.attēls. Pastaigu taka Pilsētas parkā. Līdz  
1900 (BCB-2)*  
*Figure 13 Walking trail in City Park. Until  
1900*



*14.attēls. Pilsētas parka celtnes (SO-1)*  
*Figure 14 Buildings of City Park*



Pilsētas parka apstādījumi 1875.gadā norobežoja atpūtas zonu no dzīvojamās apbūves, bet 1886.gada maijā uzbūvēja paviljonu (14., 15., 16., 17. att.), lai 19. jūnijā sagaidītu lielkņazu Vladimiru Aleksandroviču (1847–1909) un viņa kundzi Mariju Pavlovnu (1854–1920) un cienātu viņus ar pusdienām. Parka celiņu virzienus saskaņoja ar ielu izvietojumu apbūves kvartālos (15. att.).



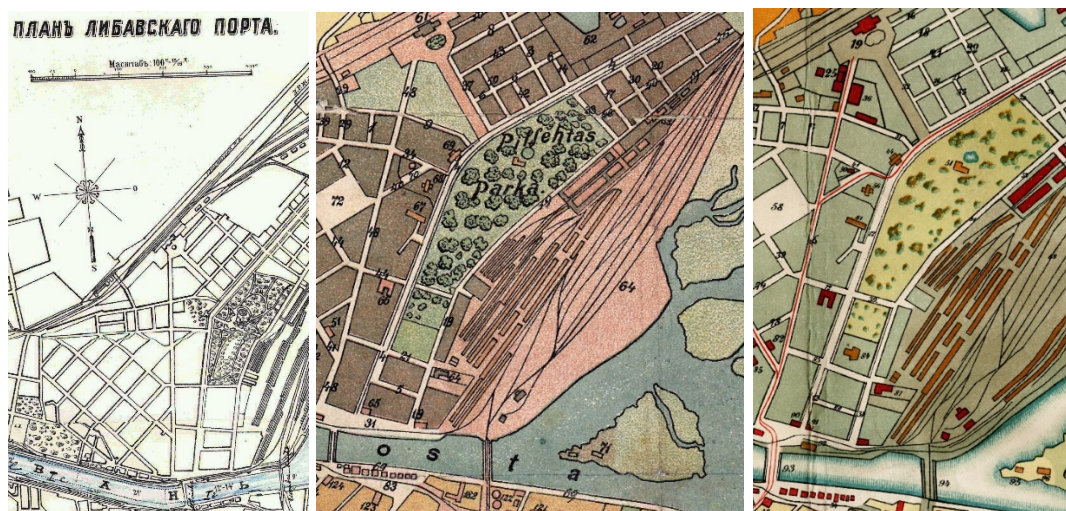
15.attēls. *Pilsētas parka, Paviljona dārza un apbūves kvartālu plānojums. 1887 (LNB-1)*  
*Figure 15 Planning of the City Park, Pavilion Garden and building blocks. 1887*



16.attēls. Paviljona dārzs un Pilsētas parka plānojums ar kanālu. 1890 (SO-2)  
Figure 16 Pavilion Garden and Planning of City Park with a canal. 1890



17.attēls. Pilsētas parka plānojums ar kanālu. 1891 (LVVA-6)  
Figure 17 Layout of City Park with a canal. 1891



18.attēls. Apbūves kvartāls Paviljona dārza vietā (LVVA-7)  
Figure 18 The building quarter instead of Pavilion Garden

19.attēls. Apbūves kvartāls Paviljona dārza vietā un Pilsētas parka paplašināšana. 1897.g. 8. aprīlis (LNB-2)

Figure 19 A building quarter instead of Pavilion Garden and expansion of City Park. April 8, 1897

20.attēls. Privāts mērnieks Schupp. Pilsētas parka paplašināšana. 1900.g. 1. novembris (LNB-3)

Figure 20 Private land surveyor Schupp. Enlargement of City Park. November 1, 1900

Libavas jūras un sauszemes cietokšņa projekta autors, ģenerālmajors, augstas klases kara inženieris Ivans Alfrēds Mak-Donalds (*Иван-Альфред Георгиевич Макдональд*, 1850–1906) 1890.gada 19. janvārī sāka vadīt būvdarbus Libavas ostas modernizēšanai, bet 1893.gada novembrī ziņoja, ka ir pabeigta priekšostas būvniecība. No ostas kanāla ziemeļrietumu piekrastes uz dzelzceļa pasažieru staciju veda galvenā maģistrāle, no kuras atzara – Suvorova (tagad Raiņa) ielas noslēguma sākās ceļš uz Karostas pilsētiņu, kuru uzbūvēja no 1893. līdz 1906.gadam. Pie Libavas–Grobiņas lielceļa atzara, kas veda uz “Vērnīku” un “Gobzemju” mājām Vērnīkupītes austrumkrastā, atpūtas vietā pirms tilta uzcēla Troņmantnieka paviljonu (Ozola, 2018, 489).



21.attēls. *Pilsētas parka plānojums. Ap 1903 (LNB-4)*

*Figure 21 Planning of City Park. Around 1903*

22.attēls. *Pilsētas parka plānojums un Paviljona kvartāls ar sporta laukumu. 1903 (LNB-5)*

*Figure 22 Planning of City Park and Pavilion quarter with playground. 1903*

23.attēls. *Pilsētas parka plānojums un Paviljona kvartāls ar sporta laukumu. Ap 1916 (LNB-6)*

*Figure 23 Planning of City Park and Pavilion quarter with playground. Around 1916*



24.attēls. *Pilsētas parka apstādījumi un Aleksandra ielas aleja. Līdz 1912 (BCB-3)*  
*Figure 24 City Park greenery and Alexander Street alley. Until 1912*

Kūrortpilsētā Libavā 19.gs. nogalē sabiedriskajiem apstādījumiem – parkiem, alejām pilsētas ielās un bulvāriem pievērsa īpašu uzmanību, un Libavas pilsētas dome par konsultantu uzaicināja Georgu Fridrihu Ferdinandu Kufaltu (*Georg Friedrich Ferdinand Kuphaldt*, 1853–1938), pēc kura ieteikumiem, iespējams, Pilsētas parkā pilnveidoja gājēju taciņu tīklu un apstādījumus, tos paplašinot dienvidu virzienā (18., 19., 20. att.). Pāri kanālam veda vairāki tiltiņi (16., 17. att.). Paviljonu ar dārzu iekļāva apbūves kvartālā (18., 19., 21. att.), kur izveidoja laukumu fiziskām aktivitātēm (22., 23. att.). Aleksandra ielas nozīmi pilsētvidē akcentēja aleja (24. att.).

### **Raiņa parka pārmaiņas Latvijas Republikas laikā** *Changes of Rainis Park during the Republic of Latvia*

Jaunliepājas iedzīvotāju galvenā atpūtas vieta pēc Pirmā pasaules kara un Latvijas Republikas proklamēšanas bija Pilsētas parks ar pastaigu celiņiem (25., 26., 27. att.), kas jau bija izveidoti pirms kara.



25.attēls. *Raiņa parka celiņu izkārtojums. 1925 (LVVA-8)*  
*Figure 25 Arrangement of footpaths in Rainis Park*



26.attēls. *Raiņa parka celiņu tīkls un apkārtnē. 1935 (Liepājas pilsētas Valde)*  
*Figure 26 Footpaths network in Rainis Park and surroundings*



27.attēls. *Raiņa parka ēnainās vecu koku alejas (BCB-4)*  
*Figure 27 Rainis Park's shady old tree alleys*



*28.attēls. Fotogrāfs (1905–1922), harmoniju un ērģeļu būvētājs Juris Bokums (1877–1956). Trīsžuburu koks Raiņa parkā. 1920-ie gadi (BCB-5)*  
*Figure 28 Photographer (1905–1922), harmony and organ builder Juris Bokums (1877–1956). Three branch tree in Rainis Park. 1920s*



*29.attēls. Raiņa parka apstādījumi un sarga māja (SO-3)*  
*Figure 29 Greenery of Rainis Park and guard's house*



30.attēls. *Raiņa parka dīķis ar saliņu un tiltiņš. Ap 1933 (SO-4)*  
*Figure 30 Pond with an island and a bridge in Rainis park. Around 1933*



31.attēls. *Raiņa parka kanāls. 1936 (BCB-6)*  
*Figure 31 The channel of Rainis Park*

Liepāju 1925.gada novembrī, kad apmeklēja Jānis Rainis, parku nosauca dzejnieka vārdā. Dižiem kokiem (28. att.) bagātajā un sakoptajā Raiņa parkā bija uzcelta arī sarga māja (29. att.). Pilsētas apstādījumus trīsdesmit gadus sargāja Fricis Augusts (1874–1942). Parka ainavu bagātināja ūdeņi – dīķis ar saliņu, uz kuru veda tiltiņš (30. att.), un kanāls (31. att.).

### **Secinājumi** **Conclusions**

Libavā 19. gadsimtā veidoja Pilsētas parku iedzīvotājiem izklaidēm un uzbūvēja funkcijai atbilstošas celtnes. Kad Pauls Makss Berči kļuva par pilsētas arhitektu, Pilsētas parks ieguva pārdomātu plānojumu ar pastaigu celiņiem un atpūtai piemērotu apbūvi un norobežoja dzīvojamo teritoriju no ražošanas un transporta zonas. Latvijas Republikas laikā par parku īpaši rūpējās: tas ieguva latviešu dzejnieka Raiņa vārdu, un līdz Otrajam pasaules karam sargs nodrošināja kārtību, bet apstādījumus aprūpēja dārznieks.

Profesors Jānis Krastiņš ziņas par Raiņa parku ir ieguvis interneta tiešsaistē, bet presē publicēto rakstu autoru viedokļus interpretējis, taču nav analizējis kartogrāfiskos materiālus un iepazīs savu kolēģu – arhitektu (Irēna Dāvidsone, Ilze Māra Janelis u. c.) publicētos rakstus un pētījumus par Raiņa parku. Pilsētas parkā nekad netika projektētas ielas, bet gan tika ierīkoti plaši gājēju celiņi. Par Pilsētas parka veidošanas sākumu precīzas ziņas ir iegūstamas 19. gadsimtā izdotajos kartogrāfiskajos materiālos un laikrakstos.

Pilsētas parka centrālo daļu 19.gs. vidū raksturoja simetrisks plānojums, bet kartogrāfiskajos materiālos, kas izdoti 20. gadsimta sākumā, ir redzamas izmaiņas Pilsētas parka plānojumā un izvērsti likumoti gājēju taciņu tīkls. Celiņu

izvietojumu pieskaņoja parka kanālam, kuru jau 19.gs. nogalē izkopa, iekļaujot apstādījumu ainavā.

### Summary

On November 27, 1795, the Russian Empress Catherina II (1729–1796) signed the order on establishment of districts in Courland: the Courland Governorate (28.11.1796–03.03.1918) was formed. Large-scale activities on the Baltic Sea coast affected urban development. Libau obtained a strategic significance in the Russian Empire. However, extremely bad runways did not promote trade. In 1841, the highway Libau–Grobin was opened. It improved the traffic significantly. Northwards from the Trade Canal, a favourite meeting place for members of intelligence was formed: a pavilion (1842) with a restaurant and concert hall was built and Pavilion Garden was created. A swampy place overgrown by bushes was turned into City Park with walkways.

In the 19<sup>th</sup> century, transport and building of industrial companies changed the urban environment. Artistically aesthetic considerations in cities became important. In 1871, Paul Max Bertschy (1840–1911) from Prussia arrived in Libau in order to perform city architect's duties, a railway line from Libau to Kaišiadorys (near Vilna) was opened and a passenger railway station was built. The railway service promoted the boom of Libau, and the urban environment developed. Boulevards and streets surrounded by rows of trees, or alleés provided link with urban green elements. Gardens were cultivated in compliance with natural science principles. At the end of the 19<sup>th</sup> century, an important place was awarded to the presence of green plantations in urban planning. Public parks with a convenient footpath system become a respectable phenomenon, but discussions went on about their functions. In City Park of Libau a special attention was paid to natural elements – relief, waters and artificially created plantations. City Park after World War I achieved the name of Latvian poet Jānis Rainis.

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# LIEPĀJAS CENTRA ARHITEKTONISKI TELPISKĀS VIDES PĀRMAIŅAS EKONOMISKO APSTĀKĻU UN POLITISKĀS IDEOLOĢIJAS IETEKMĒ

## *Architectural Changes in Liepaja's Center Due to Economic Conditions and Political Ideology*

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**Abstract.** *In Liepaja, until 1703 economic developed on the Trade Port channel's southern embankment. The main traffic flow changed his direction: from the port to the New Market leads Great (Latvian: Lielā) Street, at which end a wooden bridge was built over the channel. In the 19<sup>th</sup> century, the Administrative Center formed at the New Market Square's vicinity. Streets connected squares and green structures in a united system. The Rose Square was set up instead the New Market. During World War II, the building at embankments and Great Street was destroyed. Using the Master Plan, approved in 1950, architect Vladimir Kruglov created the Detailed Plan for developed of Liepaja Center and Great Street. A reinforced-concrete bridge was built across the channel. Until the 100th Anniversary of the Proclamation of Independence of Latvia, the bridge was expanded, but Great Street was reconstructed. The object of the research – the city center of Liepaja and Great Street. Research problem – architectural changes of the city center of Liepaja and Great Street has studied not sufficiently. Research novelty – architectural analysis of the city center of Liepaja and Great Street. The goal of the research – to determine the typical changes in planning of the city center and Great Street in the context of Liepaja urban development. Main methods applied – analysis of archive documents, projects and cartographic materials of urban planning, as well as study of published literature and inspection of buildings in nature.*

**Keywords:** *Detailed Plan, Great Street of Liepaja, Master Plan, planning of the city center, Rose Square.*

### **Ievads**

#### **Introduction**

Baltijas jūras piekrastē apdzīvotu vietu izveidi noteica ūdeņu radītās salas un Līvas upe, kuras tecējums sākotnēji sakritis ar Pērkones upi. Nomaļus no kuršu zvejnieku ciemiem atradās lībiešu Līvas (lībiešu valodas vārds „liiv” apzīmē smiltis) jeb „Smilšu” ciems uz sēkļa. Ap 13. gadsimtu kuģniecībai, tirdzniecībai un preču pārkraušanai izveidoja Līvas ostu (*Lyva portus*) (Lancmanis, 2011, 14–15), bet leišu karapulki 1418. gadā nopostīja Līvas ciemu

(Bākule, 2001, 137). Turpmāk kuģu satiksmei izmantoja Līvas grīvu, un tās apkaimē veidojās apbūve (1. att. I) (Schoen), taču upe aizsērēja un 1538. gadā kļuva kuģniecībai nederīga.

No Kēnigsbergas (tagad Kaļiņingrada) pa liedagu un Līvas piekrasti 16.gs. vidū sauszemes ceļš veda uz miestu ar vācu nosaukumu *Libau* un tālāk – uz Rīgu. Ceļa paplašinājumā pirms miesta izveidoja Siena tirgu (vācu: *Heumarkt*), bet satiksmes plūsma dalījās divos virzienos – uz Veco tirgu (vācu: *Alter Markt*) mūsdienu Malkas, Zāļu, Eduarda Veidenbauma (agrāk Fromma), Siena, Rožu, Latviešu, Peldu (agrāk Garā) un Zivju ielu sateces vietā (1. att. II) un uz tirdzniecības centru Avotu (agrāk Ungera) ielas noslēgumā starp Peldu un Ludviķa (agrāk Skārņu) ielām. Zivju ielas galā pa kreisi tirgoja zivis, bet netālu bija vistu tirgus.

Kurzemes un Zemgales hercogistes (*Ducatus Curlandiae et Semigalliae*) laikā amatnieki un tirgotāji namus būvēja ap Sv. Annas koka baznīcu (ap 1587) pie kuras bija kapsēta, bet netālu atradās skola un vācu draudzes mācītāja senākā māja. Izveidoja sabiedrisku centru, un miests *Libau* 1625. gada 18. martā ieguva pilsētas tiesības. Apbūvi attīstīja arī teritorijā starp Pērkones upi un Līvas ieteku Vecupi. Dīķa ielas apkaimē iedzīvotāju nodarbošanās un dzīvesveids sekmēja saimnieciska centra izveidi pie ostas (1. att. III). Senā ceļa trasējumu no Siena tirgus tieši uz tirdzniecības centru ir saglabājusī Krišjāņa Valdemāra (agrāk Sāls) iela. Ceļu uz Rātlaukumu pie sāls noliktavām Katoļu, Ungera, Skārņu, Kungu un Tirgoņu ielu sateces vietā, kur kopš 1625. gada atradās rātsnams, iezīmē Kuršu (agrāk Pētera), Katoļu un Friča Brīvzemnieka (agrāk Juliannas) ielas (Bākule, 2001, 140). Vecā tirgus apkārtnē būvēja klētis, krogus, staļļus, iebraucamās vietas pajūgiem. *Libau* pilsētā 1634. gadā izveidoja Mazo (amatnieku) ģildi, bet 1646. gadā – Lielo (tirgotāju) ģildi. Ziemeļu kara (1655–1660) ugunsgrēki nopostīja koka apbūvi. Pilsētā ap 1682. gadu attīstījās privātā kuģniecība, bet tirdzniecības sakari ar vācu zemēm, Holandi, Poliju, Zviedriju ienesa būvniecībā jaunas vēsmas: ap 1690. gadu uzcēla noliktavu (tagad Zivju ielas 4/6 pagalmā) (Lancmanis, 1983, 35), bet Lielajā ielā 1693. gadā sāka būvēt pirmo mūra dzīvojamo namu. 1697. gada 1. oktobrī sāka rakt ostas kanālu, kas ietekmēja pilsētas plānojumu. Lielās, Zivju, Tirgoņu, Graudu un Andreja Pumpura (agrāk Pasta) ielu sateces vietā 17. gs. beigās ierīkoja Jauno tirgu (vācu: *Neue Markt*) (1. att. IV).

Pētījuma objekts: Liepājas pilsētas vēsturiskā centra arhitektoniski telpiskā vide. Pētījuma problēma: Liepājas vēsturiskā centra arhitektoniskās izmaiņas ir pētītas nepietiekami. Pētījuma novitāte: Liepājas vēsturiskā centra plānojuma un apbūves analīze līdz mūsdienām. Pētījuma mērķis: noteikt pilsētas vēsturiskā centra apbūves un plānojuma raksturīgās izmaiņas Liepājas pilsētvides attīstības kontekstā. Pētījuma galvenās metodes: analīzei izmantoti arhīvu dokumenti,

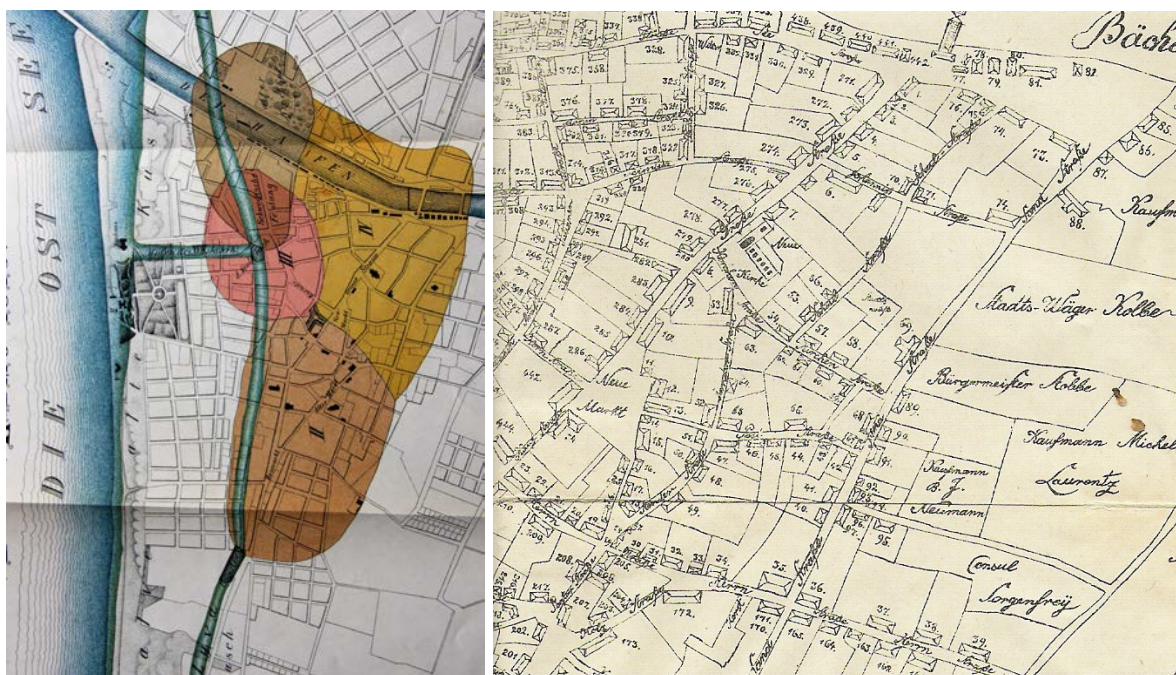
projekti un kartogrāfiskie materiāli, kā arī publikācijas un fotofiksācijas, apsekojot apbūvi.

### **Ostas pilsētas Libau attīstība līdz 18. gadsimta beigām** *The development of the port city of Libau until the end of the 18<sup>th</sup> century*

Kurzemes un Zemgales hercogistes pilsētā *Libau* no 1697. līdz 1703.gadam izbūvēja tirdzniecības ostas kanālu, ko turpmāk pilnveidoja, un galvenā satiksmes plūsma pilsētas ziemeļdaļā ieguva jaunu virzienu – no ostas uz Jauno tirgu. Tirgotāju mūra nami ar tajos izbūvētiem pagrabiem veidoja Stendera ielas apbūvi, bet tuvējā Pasta ielā, kur atradās zirgu pasta stacija, radīja sakaru centru. Stendera un Pasta ielu stūri 1703. gadā akcentēja ar greznu ēku. Siena un Vecā tirgus apkaimē attīstīja sabiedrisko centru. Pilsētas apbūve 1705. gadā aizņēma teritoriju no Siena tirgus laukuma dienvidgala līdz Lielās ielas noslēgumam ostas dienvidu krastmalā, kur bija labības noliktavas un attīstīja saimniecisko centru, bet tilts veda pāri kanālam un sardzei bija uzcelta ēka (1713). Nozīmīgu satiksmes ceļu sateces vietās ap laukumiem sāka veidot tirdzniecības, sabiedriskām un saimnieciskām norisēm atbilstošus centrus ar konkrētai telpiskai videi raksturīgu mājokļu apbūvi. Attīstījās tirgotājiem piemēroti dzīvojamo ēku tipi ar plašu bēniņu telpu un pagrabiem. Laukuma funkcijai atbilstošas apbūves kompozīcijas pamatā bija mēroga un telpisko formu attiecības. Saimnieciskā rosība ostmalā un ielu krustojumu laukumos un paplašinājumos ietekmēja 18. gadsimta pilsētas apbūves un plānojuma attīstību, taču Lielais Ziemeļu karš (1700–1721) aizkavēja pilsētas jaunā centra izveidi. Ostmalu un Jauno tirgu saistīja Lielā iela (2. att.), kuru 1735.gadā sāka bruģēt. Jūrā 1737. gadā pabeidza ierīkot divas pāļu rindas moliem, un turpmāk osta, kuras apkaimē radīja kuģniecības un satiksmes centru, varēja uzņemt lielus kuģus un paplašināt tirdzniecības sakarus ar ārzemēm.

Lielajā ielā tirgotāja Vītes nodegušās mājas vietā 1742. gada 19. jūlijā svinīgi ielika pamatakmeni Sv. Trīsvienības baznīcai, kuras celtniecību pabeidza 1758. gadā, kas satiksmei pāri kanālam jau bijis ierīkots paceļams tilts, pirms kura uzbūvēja „Jaunos vārtus” ar sardzes māju (1772). Daudzi tirgotāji dzīvojamos namus un noliktavas būvēja ostas tuvumā. Vienu no piecām ēkām, kas 18. gadsimtā ietvēra Rātslaukumu, piemēroja rātes vajadzībām, bet ap 1758.gadu rātei izvēlējās (Lancmanis, 1983, 125, 127) vienstāva ēku Kungu un Zivju ielu stūrī (Libauscher, 1912, 18), kur veidoja pārvaldes centru. Veco rātsnamu pārvērtā par svaru māju, bet ap 1770. gadu uzbūvēja ēku Lielajā ielā 2. Baznīcas labajā pusē tirgotājs no Mēmeles (tagad Klaipēda) Johans Georgs Zameits uzcēla dzīvojamo ēku, kura 1775. gadā ieguva jaunu īpašnieku. Kaspars Dītrihs Meijers (*Caspar Dietrich Meyer* (I)) baznīcas kreisajā pusē Lielajā ielā 21 (Lancmanis, 1983, 138), domājams, pārbūvējot vecāku celtni, uzcēla mūra

dzīvojamo namu (1750), kuru 1774. gadā nopirka hercogs Pēteris, bet 1794.gadā – lieltirgotājs Stenders. Rātslaukuma rietumpusē un Skārņu ielā no 1780. līdz 1860. gadam atradās gaļas skārņi, un laukumu pārdēvēja par Skārņu laukumu. Jaunā tirgus laukuma ziemeļrietumu un austrumu pusē uzcēla pirmās ēkas. Sociāli ekonomisko apstākļu ietekmē 18.gs. nogalē ap Jauno tirgu sāka veidot daudzfunkcionālu centru, kuru ar rātsnamu un Veco tirgu saistīja Zivju iela. Tirgoņu iela bija satiksmes ceļa īsākais atzars no Peldu un Kuršu ielu krustojuma uz Skārņu laukumu un Jauno tirgu. Smilšainās ielas nobruģēja.



*1.attēls. Dažāda laikmeta apbūves izvietojums Libau pilsētas plānā: senākā apbūve (I), 16. gadsimta apbūve (II), 17. gadsimta apbūve (III), pilsētas centra apbūves teritorija 18. – 19. gadsimtā (Schoen)*

*Figure 1 The plan of Libau with building location in different ages: the oldest building (I), the 16<sup>th</sup> century building (II), the 17<sup>th</sup> century building (III), the building of city center in the 18<sup>th</sup> – 19<sup>th</sup> centuries*

*2.attēls. Mērnīeks Fridrich August Barnekau. Libau apbūves plāna fragments ar Jaunā tirgus laukumu un Lielo ielu. 1797 (Plan der Stadt Libau gemeßen im Jahr 1797)*

*Figure 2 Surveyor Fridrich August Barnekau. Part of Libau Town Plan with building along New Market Square and Great (Latvian: Lielā) Street. 1797*

**Kurzemes guberņas pilsētas Libavas arhitektoniski telpiskās vides izmaiņas****19. gadsimta pirmajā pusē*****Changes in the architecturally spatial environment of the city of Libava in the first half of the 19th century***

Kurzemes un Zemgales hercogiste 1795. gada 15. maijā kļuva par Kurzemes guberņu Krievijas impērijā, kur buržuāziskās aristokrātijas kultūras un ideoloģijas ietekmē arhitektūrā par valdošo stilu līdz 1830. gadiem kļuva klasicisms, kura mākslinieciski estētiskajā sistēmā izmantoja antīko orderu elementus, bet kompozīcijā – simetriju, frontalitāti, cēlu vienkāršību, izteiktu hierarhiju celtnes akcentētajam centram pakārtotajās sastāvdaļās, bet Libava – par administratīvo centru un nozīmīgu ostu, ražošanas un tirdzniecības pilsētu, kur plānveidīgi sāka īstenot plašus pilsētībūvnieciskus pārveidojumus. Par Kurzemes guberņas arhitektu (1795–1804) iecēla dāni Severīnu Jensenu (*Severin Sören (Sörren) Jensen*, arī *Gensen*, 1723–pēc 1809), un viņš arhitektūrā un pilsētībūvniecībā ienesa agrīnā klasicisma vēsmas: sabiedriskās telpas veidošanai izvirzīja jaunus mākslinieciski estētiskos apsvērumus – pilsētas apbūvi, ielas un laukumus centās saistīt vienotā kompozīcijā. Libavas pilsētvidē 19. gs. pirmajā pusē iesaistīja jaunus sabiedrisko ēku tipus, attīstīja ielu un laukumu sistēmu, radot arhitektoniski telpiskās kompozīcijas centrus un aprises teritorijas zonējumam.

Valstī stratēģiski nozīmīgajā ostas pilsētā Libavā apbūve attīstījās uz dienvidiem no ostas kanāla, pilsētas teritoriju jūras pusē iezīmēja Toma iela, bet ezermalā – Smilšu iela, un 1800. gadā bija 415 ēkas un noliktavas, taču ostas ziemeļu krastmalā bija tikai 16 dzīvojamās ēkas, un ļoti sliktie pievedceļi neveicināja tirdzniecību (Libauscher, 1912, 25). Inženiera Vitteš pārraudzībā 1802. gadā veica Libavas ostas labiekārtošanu. Pilsētas izaugsmei un dažādu vajadzību nodrošināšanai bija nepieciešamas atbilstošas ēkas, tādēļ daudzus agrāk celtos namus 19. gs. sākumā pārveidoja. Būvēja arī jaunas, netradicionālas ēkas, kas pilsētvidi padarīja arhitektoniski daudzveidīgāku. Pašvaldība 1798.gadā atpirka 1750. gadā celto dzīvojamo māju Lielajā ielā 21, un pēc pārbūves 1800. gadā ierīkoja rātsnamu, kurā bija telpas pilsētas valdei un sekretariātam, kā arī finanšu, saimniecības, tehnikas, izglītības un dzimtsarakstu nodaļām, pilsētas krājķesei, lombardam un bāreņu tiesai. Jaunā tirgus tuvumā veidoja administratīvo centru. Rūpējoties par atpūtniekiem, Kungu un Malkas ielu stūrī pie Vecā tirgus uzbūvēja vācu teātri (1804). Ielu krustojuma paplašinājums kļuva par priekšlaukumu. Latīņu skolu 1806. gadā apvienoja ar aprīņa skolu un izveidoja trīs klašu mācību iestādi. Skolu likums Krievijā noteica, ka draudzes skolas un elementārskolas paredzētas zemnieku un amatnieku bērniem, bet aprīņa skolas – tirgotāju, zemāko virsnieku un muižnieku bērniem. Ģimnāzijās mācījās muižnieku bērni. Bijušā rātsnamā

1808.gadā dibināja pilsētas meiteņu skolu ar atsevišķām nodaļām turīgu un mazturīgu vecāku bērniem. Veidoja kultūras centru, kuru Garā (tagad Peldu) iela saistīja ar peldvietu jūras piekrastē.

Libavā ienāca Napoleona karaspēka Makdonalda franču-prūšu korpusa daļas, un pāri kanālam 1812. gada 26. jūlijā uzstādīja plostu tiltu. 1817. gada 25. augustā apstiprināja Kurzemē varu ieguvušo un Krievijas impērijas augstākajās varas struktūrās ietekmīgo vācu izcelsmes muižnieku projektu par dzimtbūšanas atcelšanu, bet 1818. gada 30. augustā Mītavas (tagad Jelgava) pilī imperatora Aleksandra I klātbūtnē pasludināja dzimtbūšanu Kurzemē par atceltu. Kurzemes pilsētās ieradās daudzi zemnieki.

Tirdzniecības ostas kanāla dienvidrietumu krastā uzbūvēja loču torni (1821), bet vētra 1821. gada rudenī salauza plostu tiltu un to daļēji ieskaloja jūrā. Tiltu atjaunoja, un pilsētā uzlaboja satiksmi, kas sekmēja nelielu ražotņu būvniecību. Daniels Fridrihs Zagers (*Daniel Friedrich Säger*, 1774–1826) netālu no rātsnama Pasta ielā 8 dibināja Libavā pirmo drukātavu (1823), bet pēc tirgotāja Fridriha Hagedorna (*Friedrich Hagedorn*, 1764–1848) iniciatīvas Libavā dibināja krājeksi (1825) – pirmo kredītiestādi Krievijas impērijā. Jaunā tirgus tuvumā veidoja finanšu centru. Pēc birģermeistara Fridriha Gotharda Šmāla (*Schmahl*) ierosinājuma Kungu ielā atvēra pilsētas slimnīcu (1830) un veidoja ārstniecības centru. „Jaunos vārtus” nojauca (1830) un pāri kanālam uzcēla pastāvīgu koka tiltu, bet kanālā izbūvēja piecus ledus lauzējus (1838). Libavā 1839. gadā bija 22 ielas, 63 šķērsielas, 2 bruģēti laukumi un dzīvoja 9578 iedzīvotāji. 1841. gadā atklāja Libavas–Grobiņas šoseju, kas ievērojami uzlaboja satiksmi, bet 1846. gadā dibināja Augstāko meiteņu skolu. Pēc pārbūves 1848. gada 15. septembrī iesvētīja un atklāja augstākās apriņķa skolas ēku Baznīcas ielā 7 (Gintners, 2004, 16–19), kur attīstīja izglītības centru.

Libavas arhitektoniski telpiskās kompozīcijas funkcionālo centru galvenie elementi bija laukumi, no kuriem noteicošais bija Jaunā tirgus laukums, bet palielinājās arī pārējo laukumu nozīme. Ielas saistīja laukumus un pilsētvides telpiskās struktūras un radīja Libavā vienotu ielu un laukumu sistēmu. Valsī 19.gs. pirmajā pusē īstenoja mākslinieciski estētiskās prasības, un ēku tipoloģiskā daudzveidība nodrošināja centru funkcijai atbilstošu apbūvi un veicināja teritoriju izmantošanu.

### **Libavas centra funkcionālās izmaiņas līdz Pirmajam pasaules karam** *Functional changes of Libava Center to the First World War*

Eiropā 19. gs. vidū strauji attīstījās dzelzceļu satiksme, tirdzniecība un rūpniecība. Rūpniecība un transports 19. gs. otrajā pusē kļuva par nozīmīgu pilsētveidojošo faktoru, kas radikāli mainīja apdzīvoto vietu plānojuma un apbūves raksturu, telpisko organizāciju, apbūves raksturu un izkārtojumu.



Pilsētās plānveidīgi īstenoja plašus pilsētībūvniecības pārveidojumus, īpašu uzmanību pievēršot vides funkcionālo un estētisko jautājumu risināšanai. Palielinājās sabiedrisko celtnu tipoloģiskā daudzveidība. Kvartālu perimetra apbūvē ielas telpu veidoja līdzīgu interjeram, stingri ievērojot ēku augstuma un ielas platuma attiecības. Krievijas impērijā dzelzceļa līniju būvniecību 19. gs. otrajā pusē saistīja ar jaunu pilsētu izveidi. Funkcionāli atšķirīgas un patstāvīgas pilsētas daļas attīstīja kā autonomas struktūras ar dažādu apbūvi.



*3.attēls. Fotogrāfs Freidlin S. Jaunā tirgus laukums un pilsētas dienvidpuses apbūve. 1895 (Freidlin)*

*Figure 3 Photographer Freidlin S. New Market Square and the South Side building of the city of Libava*

Libavas laukumi kļuva daudzfunkcionāli, un tos rekonstruēja, bet ielu paplašinājumus saimnieciskām vajadzībām vairs neizmantoja. Jaunā tirgus laukumu (3. att.) pārbruģēja (1860), un gaļas skārņus (1862) uzbūvēja Zivju ielā 2. Skārņu laukumā, kuru tirdzniecībai vairs neizmantoja, 1860. gadā ierīkoja vietu sardzes uzturēšanai un pārdēvēja par Virssardzes laukumu. Mazstāvu ēkas (4. att.) pakāpeniski nomainīja namu kompleksi (5. att.), un 19. gs. nogalē ugunsdzēsējiem jau bija uzbūvētas ēkas un tornis. Laukumu ietvēra cieša apbūve.



4.attēls. Ķelnes rūpnīcā “Herbrandt”  
būvēts elektriskais tramvajs Lielajā ielā.  
Ap 1900. (LM-1)  
Figure 4 Herbrandts Koeln electric tram  
car at Great Street. Around 1900



5.attēls. Lielā iela un Jaunā tirgus laukums  
pēc 1899. (EH-1)  
Figure 5 Great Street and New Market  
Square. After 1899. Around 1900



6.attēls. Fotogrāfs Joseph Neuburger. Lielā iela un Tirdzniecības ostas kanāla  
dienvidrietumu krastmala. Ap 1890–1899 (Neuburger)  
Figure 6 Photographer Joseph Neuburger. Great Street and the Trade Port Canal's  
southwest shore. Around 1890–1899

Eiropā militāri politiskais klimats pēc Balkānu kara (1877–1878) un Berlīnes kongresa (1878. g. 13. jūnijs–13. jūlijs), kurā apsprieda Balkānu valstu reorganizācijas jautājumus, un Krievijas impērijas attīstības specifika radīja nepieciešamību Baltijā izveidot neaizsalstošu un modernu ostu. Libavā 1878.gadā sāka ostas rekonstrukciju un pāri ostas kanālam uzbūvēja dzelzs tiltu (1881). No Smilšu līdz Lielajai ielai ostas kanāla dienvidaustrumu krastmalā (6.att.) par saimnieciskās dzīves centru kļuva Zāģeru laukums. 1880. gadā to nosauca par Biržas laukumu, izbūvēja dzelzceļa pievadu, uzcēla Libavas biržas

komitejas ēku (1885–1887). Sākās vispārējā ekonomiskā krīze (1881–1882), kurai no sekoja depresija (1883–1886). Ostas pārbūvi pabeidza 1888. gadā. Imperators Aleksandrs III (*Александр III*, 1845–1894) 1890. gada 15. janvārī parakstīja pavēli par Libavas kara ostas un jūras cietokšņa celtniecību. Tirdzniecības ostu modernizēja un paplašināja (1891–1897).

Pilsētvidē samazinājās dabas platības, un zaļumus papildināja mākslīgi radīti stādījumi. Saikni starp funkcionāli nozīmīgām teritorijām nodrošināja satiksmes maģistrāles, kuras akcentēja Holandes liepu un zirgkastaņu alejas. Puķkopji 19. gadsimtā guva nozīmīgus sasniegumus rožu audzēšanā, un dārzu un parku stādījumus papildināja rožu dārzi jeb rozāriji. Georgs Fridrihs Ferdinands Kufalts (*Georg Friedrich Ferdinand Kuphaldt*, 1853–1938) 1889.gadā Vērmanes dārzā pie saules pulksteņa izveidoja pirmo rozāriju Rīgā. Izteiksmes līdzekļu daudzveidība dārzu un parku idejas īstenošanā atspoguļoja tā laika māksliniecisko domāšanu.

Pilsētās galvenos funkcionālos uzdevumus veica centri, atspoguļojot apbūves plānojuma kompozīcijas ideju, kas bija jāattīsta, jāpadziļina un jākonkretizē, lai publiskajā telpā panāktu tektonisku un gleznieciski plastisku līdzsvaru. Kijevā 1892. gada 13. jūnijā atklāja Krievijas impērijā pirmo ielu elektriskā dzelzceļa līniju. Pilsētās pieauga transporta kustības intensitāte, un laukumi kļuva par satiksmes mezgliem, kurus veidoja mākslinieciski izteismīgi, ievērojot transporta prasības. Vairāku ielu telpām piederošos maģistrāļu krustojumus 1890. gados pārvērtā par pilsētvides struktūras elementiem ar laukumam līdzīgu nozīmi. Arhitektoniski telpiskajā kompozīcijā nozīmīgākās vietas akcentēja trīs dimensijās uztverami stūra namu apjomi ar izteismīgiem torņiem, radot atskaites sistēmu. Klasicisma stila arhitektūras mākslinieciskā valoda ar tās reglamentētajiem kanoniem vairs nespēja elastīgi reaģēt uz laikmeta diktētajām pārmaiņām, un arhitekti katram konkrētajam gadījumam no vēsturiskā mantojuma arhitektonisko formu krājuma izvēlējās piemērotākos mākslinieciskās izteiksmes līdzekļus. Neskatoties uz formu daudzveidību, eklektisms veidojās stilistiski viengabalains. Kompozīcijas sistēma it kā mazināja dažādu stilu formu atšķirības, padarot celtnes savstarpēji harmoniskas (Krastiņš, 1988, 7, 9, 14).

Libavas pilsētas dome 1894. gadā izveidoja komisiju, lai izstrādātu noteikumus ielu dzelzceļa ierīkošanai, bet 1896. gada 14. decembrī ar firmu „*Continental Gesellschaft für elektrische Unternehmungen in Nürnberg*” noslēdza līgumu par ielu elektriskā dzelzceļa līnijas izbūvi. Kopš 1899. gada septembra elektriskais tramvajs nodrošināja satiksmi starp Karostu, dzīvojamajiem un rūpniecības rajoniem, kas atradās uz ziemeļiem no ostas kanāla, un pilsētas centru. Satiksmes maršrutā iekļāva Lielo un Graudu (vācu: *Korn*) ielu, un arī Jaunā tirgus laukumu, kura centrā uzstādīja elektriskā apgaismojuma laternu. Jaunā tirgus laukums kļuva par nozīmīgu transporta mezglu (7. att.), bet

apkaimes laukumi – par kompozīcijas elementiem arhitektoniski telpiskajā centru sistēmā. Jaunais tirgus ap 1903. gadu kļuva neērts un traucēja satiksmi. 1907. gadā beidza būvēt Karostu, bet 1908. gada 1. novembrī likvidēja jūras cietoksni. Pētertirgū (vācu: *Peter-Markt*) ierīkoja stacionāras vietas tirdzniecībai, atklāja arhitekta Luija Melvila (*Louis Ludwig Wilhelm Melville*; 1837–1915) projektēto tirgus paviljonu (1910) un teritorijā starp trīs baznīcām izveidoja Libavā lielāko tirgu. Libavas valde 1910. gada 20. septembrī pieņēma lēmumu par Jaunā tirgus slēgšanu un uzskatīja, ka izstrādājot pilsētai vienotu plānojumu un saistot ielas, laukumus un zaļumus vienotā kompleksā, varētu sasniegt augstu labiekārtojuma līmeni. Stādījumi akcentēja transporta maģistrāles, un satiksmes mezgli ieguva jaunu vizuālo tēlu.



*7.attēls. Freidlin. Lielās un Graudu ielas krustojums pie Jaunā tirgus. 1899–1911. (BCB-1)*

*Figure 7 Freidlin. The intersection of Great and Korn Street at New Market. 1899–1911*



*8.attēls. Freidlin. Rožu laukums, Lielās un Graudu ielas krustojums. 1914–1917. (BCB-2)*

*Figure 8 Freidlin. Rose Square and the intersection of Great and Korn Street. 1914–1917*

Krievijas pilsētu vidi bagātināja rožu un ziedu stādījumi. Libavā zaļumu sistēmu 1911. gadā papildināja Jaunā tirgus vietā radītais trīsstūrveida laukums ar divām centriskām pastaigu takām – nelielu celiņu starp pilsētas dārznieka Katerfelda (*Katterfeld*) iestādītiem 500 rožu stādiem apaļajā dobē ap laternu pretī Graudu ielai un lielu pastaigu taku, kuras malā izvietoja 12 koka soliņus atpūtai. Kociņu lapotnes tikai veidojās, un ainavu papildināja ziedu paklāji zālājā. Rožu laukuma plānojumu ar pilsētvidi saistīja gājēju takas Pasta, Tirgoņu un Graudu ielu virzienā. Graudu un Lielās ielas satiksmes maģistrāļu krustojumu rotāja izteiksmīgs akcents – pilsētas arhitekta Paula Maksa Berči (*Paul Max Bertschy*, 1840–1911) projektētais Landau nams ar stūra torni (ap 1914). Libava ieguva skaistu pilsētas simbolu – Rožu laukumu (8. att.).

### **Liepājas centra latviskais veidols Latvijas Republikas laikā** *Latvian shape of Liepaja Center during the Republic of Latvia*

Neatkarīgās Latvijas Republikas laikā Liepājas pilsētas valdes tehniskajā nodaļā uzsāka jauna ģenerālā plāna (ap 1927) izstrādi. Pilnveidoja centra apbūvi un plānojumu (9. att.) – uzcēla Latviešu biedrības namu (1934–1935, arhitekts Jānis Blauss (1880–?) ar palīgiem Zebaueru un Celmiņu), Armijas ekonomisko veikalu (1934–1935, arhitekts Aleksandrs Rācenis (1899–1984)), lombarda un krājkases ēku (1936–1937, Valdis Zebauers (1903–?)). Viesnīca „Pēterpils” kļuva par pašvaldības īpašumu (1936) – to pārdēvēja par „Pilsētas viesnīcu” un pārbūvēja (1938).



9.attēls. *Lielā iela Liepājā. 1939 (LM-2)*  
*Figure 9 Great Street in Liepaja. 1939*



10.attēls. *Rožu laukums Liepājā.*  
*Pēc 1934 (LM-3)*  
*Figure 10 Rose Square in Liepaja.*  
*After 1934*

Apstādījumos līdz Otrajam pasaules karam iecienīti bija pazemi un cirtti dzīvžogi. Rožu laukumā (10. att.) apvienoja ainaviskā un ģeometriskā dārza formas, ierīkoja zālienus un ziedošu ziemciešu puķu grupējumus.

### **Liepājas centra atjaunošana sociālisma ideoloģijas ietekmē** *Restoration of Liepaja Center under the influence of socialist ideology*

Latvijas Republikā 1940. gada 17. jūnijā ienāca padomju karaspēks un 21.jūlijā tika atjaunota padomju vara. Latviju 5. augustā iekļāva Padomju Sociālistisko Republiku Savienībā (turpmāk tekstā PSRS) un uzsāka īpašumu un namu nacionalizāciju. Otrā pasaules kara pirmajās stundās 1941. gada 22. jūnijā pret Liepāju vērtais vācu armijas uzbrukums pārtrauca iedzīvotāju mierīgo dzīvi. Vācu aviācijas uzlidojumos un tiešajā karadarbībā no 25. līdz 27. jūnijam Liepājā sagrava Biržas (no 1955. gada – 17. jūnija, tagad Kārļa Zāles) laukuma ēkas, iznīcināja ostas kanāla dienvidaustrumu krastmalas apbūvi, bet 1942. gada

bombardēšanā nopostīja ēkas pilsētas centrā ap Graudu, Lielo (no 1955. gada Ļeņina) un Tirgoņu ielu, saglabājot Rožu (no 1945.g. 25. septembra līdz 1988.gadam Uzvaras) laukumu (**11. att.**). Pēc kaujas operācijas 1944. gada 9. – 10. oktobrī vācu armiju grupas „Ziemeļi” karaspēks nonāca ielenkumā jeb „Kurzemes katlā”. Trīsdesmit kilometrus uz dienvidiem no Liepājas izveidojās frontes līnija. Padomju aviācijas uzlidojumā 14. un 21. – 22. decembrī Liepājā sagrava „Pilsētas viesnīcu”, muzeja ēku Alejas (no 1948. gada Komjaunatnes, tagad Jāņa Čakstes) laukumā, namus Peldu (no 1948. gada Komjaunatnes) ielā un Kūrmājas (no 1945. gada Padomju) prospektā (Ozola, 2015).



*11.attēls. Skats no Sv. Trīsvienības baznīcas uz kara postījumiem Rožu laukumā un Lielajā ielā. 1942 (Jāņa Sudmaļa (1887–1984) foto)*

*Figure 11 View from Holy Trinity Church on war damage at Rose Square and Great Street.*

Latvijas pilsētās pirmajos gados pēc kara atjaunoja un rekonstruēja rūpnīcas, komunālo saimniecību un transportu. Rīgā pie LPSR MP nodibināja Arhitektūras lietu pārvaldes Republikāniskās arhitektūras-plānošanas darbnīcas (1945), kur nopostīto pilsētu apbūves atjaunošanai izstrādāja sociālisma ideoloģijai atbilstošus ģenerālos plānus vai shēmas. Pilsētu centru plānojumu un apbūvi pārveidoja: radīja plašas ielas un regulārus, simetriska plānojuma laukumus Ļeņina pieminekļa novietošanai. Latvijas Padomju Sociālistiskajā Republikā (turpmāk tekstā LPSR) pilsētībūvniecību regulēja visai Padomju Savienībai unificētie pilsētu plānošanas un apbūves normatīvi, kas paredzēja izmantot būvniecībā Vissavienības tipveida projektus. Kvartālu perimetra apbūvē cēla daudzstāvu dzīvojamās ēkas (1945–1955).

Liepājā karadarbības laikā autotransports un komunālā saimniecība tikpat kā nepastāvēja, bet tramvaju saimniecības inventāru aizveda uz Vāciju. Pilsētā

sāka novākt drupas. Liepājā parku, bulvāru un skvēru labiekārtojums nebija apmierinošs, tādēļ labiekārtošanai sastādīja darbu plānu, saskaņā ar kuru līdz 1945. gada 25. oktobrim bija jāierīko elektrisko apgaismojumu Lielajā, Tirgoņu, Kuršu, Peldu, Uliha (no 1945. gada Uzvaras), Graudu un Klaipēdas ielās un Līvas laukumā. Kopš 1946. gada 19. janvārī no Uzvaras laukuma (**12. att.**), kur ap bijušo Rožu laukumu (13.att.) ierīkoja sliedes, satiksmi līdz Karostai un dzelzceļa pasažieru stacijai nodrošināja autobuss un tramvajs (Ozola, 2015).



*12.attēls. Uzvaras laukums Liepājā pirms Padomju Nama uzcelšanas. Ap 1950 (EH-2)*

*Figure 12 Victory Square in Liepaja before erecting of the Soviet House. Around 1950*



*13.attēls. Rožu laukuma apstādījumi un tramvaja vagoni ar piekabi pēc modernizācijas pirmajos gados pēc Otrā pasaules kara. (GS-1)*

*Figure 13 Greenery of Rose Square and tram car with a trailer after modernization during the first years after World War II*

Arhitekts Vitālijs Ivanovs (1909–1964) izstrādāja priekšlikumu skices Liepājas plānojuma attīstībai. Uzklusot projekta autora ziņojumu un izskatot skices, Liepājas pilsētas DDPI 1946. gada 16. augustā nolēma lūgt LPSR MP apstiprināt skices Liepājas plānojuma attīstībai un piešķirt līdzekļus ģenerālā un detālā plānojuma izstrādei. 1947. gada 21. februārī Rubaņenko adresēja Liepājas pilsētas galvenā arhitekta pārvaldei dokumentu Nr. 82-3 un norādīja, ka līdz 1.maijam jāizstrādā „Liepājas celtniecības kompleksā shēma 1946.–1950. gadam”, bet Arhitektūras lietu Komitejas pie PSRS MP priekšsēdētājs G. Simonovs 14. jūnija pavēlē Nr. 302 pagarināja beigu termiņu līdz 1947. gada 15. jūlijam (Ozola, 2015).

Divos pirmajos gados pēc kara iedzīvotāju skaits Liepājā pieauga līdz 110 000, bet dzīvojamā fonda atjaunošana atpalika no rūpniecības un transporta attīstības. Vajadzēja atjaunot Lielās ielas apbūvi. Arhitektūras lietu pārvaldes pie LPSR MP Arhitektūras Padomes 1947. gada 29. novembra sēdē Arhitektūras lietu pārvaldes pie LPSR MP priekšnieks Ēvalds Ādolfs Kišē (1899–1974), Arhitektūras Padomes loceklis, arhitekts-eksperts, docents Osvālds Tīlmanis (1900–1980), Projektu un aprēķinu ekspertīzes biroja priekšnieks Minuhins,

Pilsētu plānošanas nodaļas vadītājs Kramarevs, Galvenās Arhitektūras Celtniecības komitejas galvenās inspekcijas priekšnieks Aizsilnieks, Pilsētu plānošanas nodaļas vecākais arhitekts Alfons Ūdris (1924–1999), Liepājas pilsētas galvenais arhitekts Roberts Vītolnieks (1907–?), Jelgavas pilsētas galvenais arhitekts Vladimirs Laks (1910–?), Liepājas attīstības projekta autors Vitālijs Ivanovs, Republikāniskās Arhitektūras-plānošanas darbnīcas arhitekts-eksperts S. Razživins un sekretārs Pļavinskis izskatīja Liepājas un Jelgavas pilsētu turpmākās attīstības iespējas. Protokolā Nr. 54 bija teikts, ka arhitekta Vītolnieka izstrādātā „Liepājas kompleksās celtniecības shēma 1946. – 1950.gadam” tiek apstiprināta ar nosacījumu, ka tiks veikti precizējumi.

Pamatojoties uz LPSR MP rezolūciju, Liepājas pilsētas DDPI pieņēma lēmumu, ar kuru pasludināja Liepājas pilsētas teritoriju par slēgtu. Sākot ar 1948.gada 1. janvāri civilpersonām atļāva ierasties Liepājā, uzrādot Jūras-Kara komandanta izdotu caurlaidi. Uzvaras laukuma daļai starp Stendera, Baznīcas, Lielo un Pumpura ielu 1948. gadā apstiprināja rekonstrukcijas projektu, bet 1950.gada 21. aprīlī Liepājas pilsētas DDPI apstiprināja plānošanas uzdevumu tilta būvniecībai pāri Tirdzniecības ostas kanālam: līdz 1. oktobrim bija jāpagatavo divi arhitektoniskā noformējuma priekšlikuma varianti – izpildījumam no dzelzsbetona un metāla. Projektējamā tilta ass novietojumu noteica pilsētas arhitekts, bet tilta platumu – asfaltēta brauktuve ar vienā līmenī izvietotām divām tramvaja līniju un automašīnu kustības joslām un gājēju ietvēm brauktuves katrā pusē. Liepāju ar 64 200 iedzīvotājiem 1950. gada augustā pasludināja par slēgtu pilsētu. Pedagoģiskās skolas vietā 1. septembrī darbību sāka divgadīga augstākā mācību iestāde – Liepājas Skolotāju institūts, bet pēc sliežu ceļa izveides ap bijušo Rožu laukumu tramvajs 15. novembrī sāka kustību no Uzvaras laukuma (Gintners, 2004, 53). PSRS Ministru Padome priekšsēdētāja Josifa Staļina vadībā 1951. gada 18. augustā pieņēma lēmumu par Liepājas Tirdzniecības ostas akvatorijas, tai pieguļošo teritoriju, visu piestātņu, krasta būvju un iekārtu atdošanu 4. jūras karaflotei līdz 1952. gada 1. janvārim. Tirdzniecības ostā izbeidza saimniecisko darbību un pielāgoja militārām vajadzībām. Lielās ielas abās pusēs uzstādīja dekoratīvas vāzes, bet Lielās, Jūras un Radio ielas apkaimē 1952. gadā ierīkotajā skvērā uzstādīja soliņus un novietoja skulptūru „Meitene tautastērpā”. Saskaņā ar Latvijas PSR Ministru Padomes 1952. gada 14. maija lēmumu Nr. 689 paredzēja labiekārtot Uzvaras laukuma teritoriju, kur uzstādīja Goda plāksni, ierīkoja soliņus un novietoja divas dekoratīvas ziedu vāzes. Labiekārtoja arī Armijas ekonomiskā veikala vietu. LPSR MP un Liepājas pilsētas DDPI 1952. gada maijā pieņēma lēmumu uzcelt Padomju (apgabala) Namu, lai Uzvaras laukumā veidotu Liepājas administratīvo centru. Piesaistes un labiekārtojuma projektā paredzēja laukumā pirms celtnes uzstādīt V.I. Ļeņina bronzas skulptūru (14. att.). Saskaņā ar LPSR MP Arhitektūras lietu pārvaldē 1952. gada 18. martā apstiprināto arhitektūras



plānošanas uzdevumu Nr. 031, LPSR Republikāniskā projektu institūta arhitekts Vladimirs Kruglovs (1902–?), izmantojot 1947. gada uzņēmumu „sarkano līniju plānam”, Liepājas pilsētas centrālajai daļai izstrādāja detālpilnojumumu (1953) (15. att.). Projektēšanai izmantoja bijušajās Arhitektūras-plānošanas darbnīcās izgatavoto ģenerālā plānojuma shēmu, kas 1950. gadā ar rezolūciju Nr. 1389 bija apstiprināta LPSR MP. Lielo un Tirgoņu ielu 1955. gada 21. aprīlī pārdēvēja par Ļeņina ielu (Gintners, 2004, 55). Pāri Tirdzniecības kanālam 1956. gadā izveidoja koka tiltu uz pāļiem, bet metāla tiltu demontēja. 1957. gadā PSRS Transporta ministrijas celtniecības organizācija „Moststroj” (Мостстрой) sāka būvēt dzelzsbetona tiltu.



14.attēls. Arhitekts Vladimirs Kruglovs (1902–?). Priekšlikums Uzvaras laukuma izveidei Liepājā. 1953 (LPB-1)

Figure 14 Architect Vladimir Kruglov (1902–?). Proposal for Victory Square in Liepaja. 1953

15.attēls. Vladimirs Kruglovs. Liepājas Lielās ielas apbūves pirmprojekts ar esošām, saglabājamām ēkām un projektētajām ēkām. Rasējums № 17. 1952 (LPB-1)

Figure 15 Vladimir Kruglov. Source building project with existing, preserved houses and designed houses of Lielā (Great) Street in Liepaja. Drawing № 17. 1952

Liepājas centra apbūvi uzsāka veidot Liepājas Vispārējais Teritoriālais Celtniecības trests (turpmāk tekstā LVTCT), uzbūvējot Uzvaras laukuma malā arhitekta Andreja Aivara (1909–1975) projektēto sabiedrisko ēku (Ļeņina ielā 14), kurā vēlāk izvietoja Liepājas pedagoģisko institūtu (16. att.). Liepājas galvenā arhitekta Vītoliņa vadītā komisija 1957. gada 16. decembrī pieņēma namu ekspluatācijā, bet līdz 1959. gada 1. maijam iecerēja labiekārtot laukumu starp Pedagoģisko institūtu un Lauksaimniecības mašīnu rūpnīcas dzīvojamo namu Ļeņina ielā 12 (17. att.) (Gintners, 2004, 56). Ar Liepājas garnizonu, kas

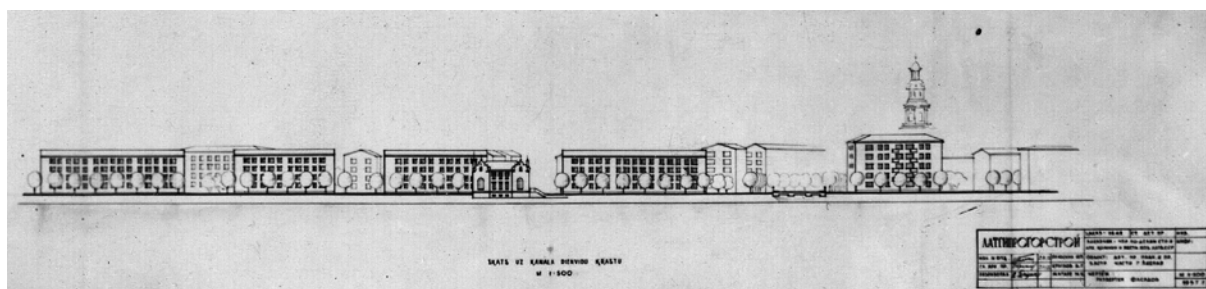
*Ozola, 2019. Liepājas centra arhitektoniski telpiskās vides pārmaiņas ekonomisko apstākļu un politiskās ideoloģijas ietekmē*

bez līguma noslēgšanas bija sācis Flotes oficieru namam izmantot agrāko Latviešu biedrības namu Uzvaras laukumā 5/7, no 1959. gada 1. oktobra uz pieciem gadiem noslēdza ilgtermiņa īres līgumu, taču īres maksu neiekasēja, ņemot vērā ģirnieka ieguldītos līdzekļus (Ozola, 2015).

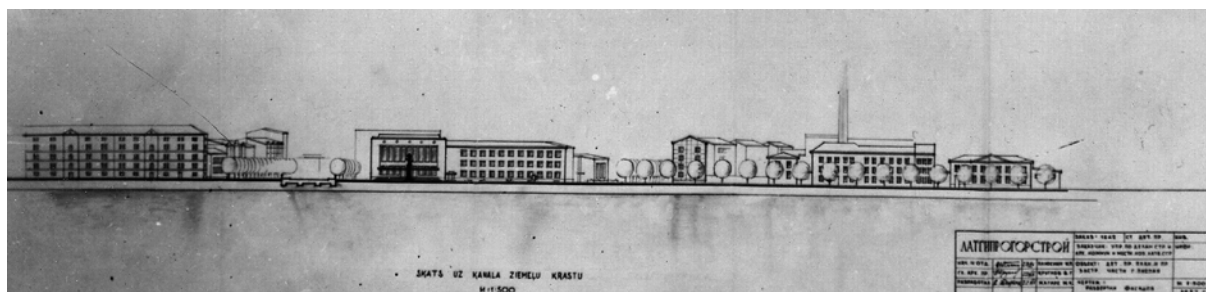


*16.attēls. Arhitekts Andrejs Aivars (1909–1975). Padomju Nams (vēlāk Liepājas Pedagoģiskā institūta ēka) Ļeņina ielā 14. 1961 (GS-2)*  
*Figure 16 Architect Andrejs Aivars (1909–1975). The Soviet House (later the building of Liepāja Pedagogical Institute) at 14 Lenin Street. 1961*

*17.attēls. Skats no Rožu laukuma uz dzīvojamā ēku Ļeņina ielā 12. Ap 1955–1960 (GS-3)*  
*Figure 17 View from Rose Square to the residential building on 12 Lenin Street*



*18.attēls. Maiga Žagare. Liepājas Tirdzniecības ostas kanāla dienvidkrasta ēku fasāžu notinums. 1957 (LPB-2)*  
*Figure 18 Maiga Žagare. View on the Trade Port Canal's southern shore in Liepāja. 1957*



*19.attēls. Maiga Žagare. Liepājas Tirdzniecības ostas kanāla ziemeļkrasta ēku fasāžu notinums. 1957 (LPB-2)*  
*Figure 19 Maiga Žagare. View on the Trade Port Canal's northern shore in Liepāja. 1957*



20.attēls. Tirdzniecības nams “Kurzeme” un 1961. gadā uz Liepāju atvestais modeļa T59E tramvaja vagona bez piekabes. 1968 (Ilmāra Ādamsona foto)

Figure 20 The trading house “Kurzeme” and the T59E model tram car without a trailer brought to Liepāja in 1961. 1968



21.attēls. Viesnīca “Līva”. 1970-ie gadi (LPB-3)

Figure 21. Hotel Liva. 1970s

Liepājai izstrādāja projektu pirmās kārtas celtniecībai 1959.–1965. gadam (1959, arh. Pāvels Seļeckis (1913–1971) un Irēna Rubauska (dz. 1930)). Pāri Tirdzniecības ostas kanālam, kur Jaunajā Ostmalā izveidoja Parādes laukumu, (18. att.), uzbūvēja tramvaja tiltu (1960) Lielās ielas noslēgumā (19. att.), bet koka pāļu tiltu 1963. gadā nojauca. Parādes laukumā 1960. gadā notika Liepājas aizstāvju pieminekļa (1960, arh. Jānis Līcītis, tēln. Egons Zvirbulis (1907–1986)) atklāšanas svinības. Liepājas centra apbūvi 1961. gadā papildināja universālveikals „Kurzeme” Ļeņina ielā 1/5 (1959, arhitekti Josifs Goldenbergs (1907–1984) un L. Ģintere, inženieris Krastkalns) (20. att.) (Ozola, 2015).

Valsts Pilsētu celtniecības projektēšanas institūta “Latgiprogostroj” (Латгипрогострой) arhitekta Irēna Rubauska 1965. gadā izstrādāja Liepājas centra detālplānojumu, paredzot dzīvojamo kvartālu rekonstrukciju un pilsētas centra robežu paplašināšanu. 1966. gada 15. janvārī atklāja kara laikā nopostītā pilsētas valdes nama vietā uzbūvēto viesnīcu „Līva” (21. att.). Liepājas ģenerālajā plānā (1966) paredzēja divu dzīvojamo ēku kompleksu un tirdzniecības, administratīvā, kultūras un sporta centra izveidi. Funkcionālās zonas saistīja zaļumu sistēma un gājēju celiņi. Kārļa Marksa (Graudu) un Ļeņina ielā starp universālveikalu „Kurzeme” un kolhozu tirgu iecerēja būvēt augstceltni, tirdzniecības centru paplašināt Zivju ielas virzienā, bet starp Ļeņina, Komunālo (Baznīcas) un 17. jūnija (Bāriņu) ielu izveidot kultūras centru ar sporta namu, peldbaseinu, pilsētas bibliotēku. Kultūras nama galvenā fasāde būtu vērsta pret Uzvaras laukumu un skvēru blakus viesnīcai „Līva”. Teritorijā starp Radio un Jūras ielu iecerēja būvēt arhitekta Arvīda Blauberģa (dz. 1906) projektēto platformāta kinoteātri „Liepāja” un gar Jūras ielu izveidot aleju. Lai

arhitektoniski apvienotu kanāla abus krastus, pilsētas centra apbūves turpinājumam ziemeļu virzienā pāri ostas kanālam iecerēja radīt administratīvo centru ar Padomju nama daudzstāvu kompleksu un laukumu mītiņiem.

Uzvaras laukuma skvēram starp Zivju un Stendera ielu arhitekts Kārlis Plūksne (1906–1973) izstrādāja rekonstrukcijas projektu (1969). Tolaik labiekārtojumam izmantoja jaunu ieseguma materiālu – betona plāksnes. Liepājas centra plānojuma attīstības koncepcijā (1970) paredzēja Uzvaras laukumā uzstādīt tēlnieka Alberta Terpilovska (1922–2002) darināto V.I. Leņina pieminekli (1970). Uzvaras laukumā iekļāva arī Rožu laukumu, kuram daiļdārznieks Kārlis Barons (1912–1996) izstrādāja dendroloģisko projektu, lai nomainītu padomju laikā ierīkotos stādījumus (Dāvidsone, 1974, 195). Atjaunoja sākotnējo stādījumu un plānojuma kompozīciju – skābaržu ietvertu lielo pastaigu apli ar apaļo rožu dobi centrā un gājēju plūsmām atbilstošiem celiņiem.

Liepājas centrā izveidoja pilsētvidi, kuras estētiku un labiekārtojumu noteica viesarhitekti: rekonstruēja laukumus, paplašināja ielas, tās pārvēršot par maģistrālēm. Uzsāka sabiedrisko ēkas un dzīvojamo namu būvniecību. Liepāja ieguva sociālisma ideoloģijai atbilstošu vizuālo tēlu.

### **Liepājas centra vizuālais tēls atjaunotajā Latvijas Republikā** *Visual image of Liepaja Center in the restored Republic of Latvia*

Liepāju 20. gs. sākumā pazina kā kūrorta pilsētu ar ainavu arhitektūras meistardarbiem. Pilsētas izaugsmi skatīja virzībā uz nozīmīgu mērķu sasniegšanu – kūrorta, rūpniecības, dzīvojamās apbūves un ostu attīstību, zaļo stādījumu pilnveidošanu un pilsētas identitātes radīšanu. Mūsdienās šauro nākotnes skatījumu uz Liepājas attīstību un rīcības samazināto mērogu nosaka privātās iniciatīvas – par prioritāti kļuvusi ikdienas problēmu risināšana. Viesnīcas “Līva” rekonstrukcijai 1999. gadā rīkoja projektu konkursu, kurā par labāko no četriem piedāvājumiem atzina arhitektes Agitas Lieģes risinājumu. AKA projektēšanas birojs arhitekta Andra Kokina vadībā izstrādāja projektu Rožu laukuma rekonstrukcijas projektu (1999), saistot to ar Zivju ielas rekonstrukcijas koncepciju (2001–2006). Finansiālu un komerciālu apsvērumu ietekmē par rekonstruētā Rožu laukuma arhitektoniskās kompozīcijas akcentu kļuva nevis rožu stādījumi, bet betonēta rožu dobe Liepājas sadraudzības pilsētu simbolikas izvietojumam. Atbilstoši iecerētā tirdzniecības centra novietnei tika izmainīti gājēju celiņu virzieni. 20. gs. sākuma ainavu arhitektūras meistardarbu pārvērta par vietēja mēroga risinājumu – sabiedrisko ēku priekšlaukumu.

Liepājas pilsētvides un Rožu laukuma attīstības koncepcija līdz Pirmajam pasaules karam ietvēra Eiropas pilsētībūvniecības prakses un ainavu arhitektūras jaunākos sasniegumus un labāko pieredzi, kuru Latvijas Republikas laikā

papildināja nacionālas vērtības. Sociālisma ideoloģijas ietekmē pēc Otrā pasaules kara Liepājas centra arhitektoniski telpiskās attīstības modeli radikāli izmainīja, saudzējot Rožu laukuma sākotnējo ieceri. Atjaunotās Latvijas Republikas laikā tika radīts Liepājas centra teritorijas sadrumstalotībai un fragmentācijai atbilstošs pilsētībūvniecisks risinājums – Rožu laukums pārvērsts par sabiedrisko ēku priekšlaukumu un ieguvis jaunu identitāti.



22.attēls. *Lielā iela pēc rekonstrukcijas. 2018. gada 23. decembris (Silvijas Ozolas foto)*

*Figure 22 Great Street after reconstruction. December 23, 2018*

Liepājā pilsētībūvnieciski un ainaviski nozīmīgo meistardarbu Rožu laukumu pielāgoja teritoriālai sadrumstalotībai un fragmentācijai un pārvērta par sabiedrisko ēku priekšlaukumu, kam piešķīra jaunu identitāti. Pēc vērienīgas rekonstrukcijas tiltu pār kanālu 2018. g. nogalē paplašināja. Radikāli pārveidotā Lielā iela (22. att.) ieguva jaunu veidolu, bet, vai labāku?

### **Secinājumi** *Conclusions*

Ekonomisko apstākļu ietekmē ap Lielo ielu un Jaunā tirgus laukumu 18.gadsimtā izveidojās daudzfunkcionāls pilsētas centrs, kura 19. gs. nogalē un 20. gs. sākumā mazstāvu apbūvi pakāpeniski aizstāja īres nami ar veikalu telpām pirmajā stāvā. Līvavas centram un satiksmes mezglam radīja kvalitatīvu arhitektonisko telpu, iesaistot arī apstādījumus. Latvijas Republikas laikā ap Rožu laukumu un Lielajā ielā uzbūvēja celtnes tirdzniecības un kultūras funkcijai. Radīja latvisku vidi, izmainot Rožu laukumu apstādījumu raksturu.

Padomju Latvijā pēc Otrā pasaules kara viesarhitektu vadībā radīja sociālisma ideoloģijai atbilstošu pilsētvidi: politisku apstākļu ietekmē pārveidoja

laukumus, paplašināja ielas, tās pārvēršot par maģistrālēm. Liepājā sociālisma estētikai atbilstošu pilsētvidi īstenoja daļēji: vēsturisko apbūvi aizstāja monumentālas sabiedriskas un dzīvojamās ēkas, izveidoja Uzvaras laukumu, saglabājot pilsētas simbolu – Rožu laukumu, kuram mainīja vizuālo tēlu.

Pēc Latvijas Republikas atjaunošanas Liepājas attīstību nosaka privātas iniciatīvas, kas veicina funkcionālu sadrumstalotību: pilsētvide ir zaudējusi stilistiski vienoto raksturu, jo pilsētas centra attīstību nenosaka kvalitatīva izstrādāta arhitektoniskā un mākslinieciskā koncepcija. Rožu laukuma pārveidi noteica komerciālas intereses. Izmantojot Eiropas Savienības finansējumu, ir īstenoti vērīenīgi projekti – tilta paplašināšana un Lielās ielas rekonstrukcija, taču zaudēta kādreiz Liepājas centram raksturīgā pievilcība.

### Summary

On the coast of the Baltic Sea, where the Līva River ran, a town Libau was formed. After foundation of the Duchy of Courland and Semigallia, St. Anna's wooden church (around 1587) at the Old Market Place was built. Near the oldest pastorat of the German parish and a school located. A publish center was established. At the mouth of the Līva, there was a port, and an economic center created by domestic inhabitants. Salt (now *Krišjānis Valdemārs*) Street retained the track from Hay Market to Town Hall Square at the crossroads of five streets. On 18 March 1625, Libau acquired town rights. Around 1682 private shipping developed: the Port Channel (1697–1703) was built. On the north side of the town, the traffic flow got the opposite direction. The Great (Latvian: *Lielā*) Street, where the foundation stone of Holy Trinity Church (built in 1758) was inseted on 19 July 1742, led from the shipping and traffic center on the port's southern shore to the New Market at the crossroads of Fish (Latvian: *Zivju*), Merchant (Latvian: *Tirgoņu*), Grain (Latvian: *Graudu*), Post (now *Andrejs Pumpurs*) Streets. A horse post station on Post Street was the communication center. Around 1758, the town council chose a one-storey building at the corner of Lords' (Latvian: *Kungu*) and Fish Street where the administrative center was formed. In the late 18<sup>th</sup> century, the first buildings built at New Market Square's northwest and east sides created the multifunctional center.

On 15 May 1795, Libava became the administrative center and an important port of Imperial Russia. In trading town planned urban transformations began. Architect of Courland Province (1795–1804) Severin Jensen set new artistic aesthetic requirements for the urban environment: buildings, streets and squares was linked in united planning composition. Functional centers of Libava during the first half of the 19<sup>th</sup> century were integrated into the system of streets and squares created the shape of territorial zoning. A residential building on 21 Great Street was rebuilt and a Town Hall (1800) was opened there. A German theater (1804) was built at the Old Market which, but in a former Town Hall a school for girls was established (1808). Long (now *Peldu*) Street linked the cultural center by a swimming on the seashore. On 26 July 1812, Napoleon soldiers installed a bridge over the canal, but in autumn of 1821, the storm broke it.

Restored bridge promoted traffic and building of industrial facilities. Hospital on Lord Street was opened (1830). Traffic was improved by a permanent wooden bridge and the Libava-Grobin highway (1841). On 15 September 1848, at Church Street 7 a district school was opened. Financial, administrative, medical and educational centers in vicinity of the New Market determined the architecturally spatial composition of Libava. Squares of Libava by the mid- the 19<sup>th</sup> century became multifunctional and they were reconstructed. Extensions of streets were no longer economically used. New Market Square was repaved (1860), and small houses were replaced by building complexes. In 1878, the Port Channel was rebuilt, an iron bridge was erected (1881). The square on Great Street's east side became the center of economic life. The Trade Port was modernized (1891–1897).

In cities natural structures decreased, but the transport movement increased. Traffic highways were highlighted by alleys, which also linked functionally important areas. The squares became traffic junctions, and they were artfully expressive. In September 1899, electric tram traffic started. The route also included the Great Street and New Market Square, which became an important transport hub. On 20 September 1910, the Libava Board decided to close the New Market, which obstructed traffic. It was considered that developing a unified planning for the city and linking fields, streets and greens could increase the level of improvement. In 1911, the square system of the city was supplemented by Rose Square created instead of the New Market.

During the Republic of Latvia the construction and planning of Liepaja Center improved by the House of Latvian Society (1934–1935, architect Jānis Blauss (1880-?) with assistants of Zebauers and Celmiņš), Army Economic Store (1934–1935, architect Aleksandrs Rācenis (1899–1935)) and the House of lombard and savings bank (1936–1937, Valdis Zebauers (1903-?)). At Great Street, "City Hotel" was rebuilt (1938). Rose Square was covered by shriveled hedges. Landscape were complemented by lawns and flower beds.

Soviet troops on 17 June 1940 entered the Republic of Latvia, and soviet power on 21 July was restored. Latvia on 5 August was incorporated into the Union of Soviet Socialist Republics, and the nationalization of property started. In World War II, German aviation flights during 25–27 June destroyed the building on Liepaja Trade Port's southern embankment, but in 1942, the bombing destroyed the building of Grain, Great (Lenin from 1955) and Merchant Street, preserving Rose Square (from 25 September 1945 to 1988 – Victory Square). The "City Hotel" was destroyed by the Soviet aviation on 14 and 21–22 December of 1944.

Ruins began to be harvested in Liepaja. According to Liepaja Planning Sketches created by architect Vitaly Ivanov (1909–1964) "The Complex Scheme of Liepaja Construction 1946–1950" was made. By August 1950, Liepaja became a closed city. On 15 November, the tram started his moving from Victory Square. The Trade Port until 1 January 1952 was handed over to the 4<sup>th</sup> Sea Gunboat. Economic activity in the Trade Port was completed, and the port was adapted for military purposes. Architect Vladimir Kruglov (1902-?) developed a Detailed Plan of Liepaja Center (1953). Urban environment aesthetics corresponded to ideology of socialism determined by guest architects. Great and Merchant Street on 21 April 1955 was renamed Lenin

Street. The commission headed by Liepāja Chief Architect Roberts Vītolnieks (1907-?) on 16 December took on employment a Soviet House building (arch. Andrejs Aivars (1909-1975)) erected at the edge of Victory Square (Lenin Street 14), where the Liepāja Pedagogical Institute later was disposed. Lenin sculpture was planning to install at the Soviet House's front-square. In 1960, a bridge for tram traffic over the Trade Port Canal was completed. A project for the first round of construction developed in 1959–1965 by architects Pāvels Seļeckis (1913–1971) and Irēna Rubauska (born 1930)). The monument dedicated protectors of Liepāja (1960, arch. Jānis Līcītis, sculptor Egons Zvirbulis (1907–1986)) was opened on Parade-ground on the Trade Port Canal's north embankment. The construction of Liepāja Center in 1961 was supplemented by the supermarket "Kurzeme" (1959, architect Goldenbergs and Ģintere, engineer Krastkalns) at 1/5 Lenin Street. In the Detailed Plan of Liepāja Center (1965), architect Irēna Rubauska (born 1930) intended to reconstruct the residential quarter and expand boundaries of the city center. Two residential complexes, a commercial, administrative, cultural and sports center were included in the Master Plan of Liepāja (1966). The main facade of the Culture House faced Victory Square. It was planned to continue the city center building north of the Trade Port Channel and create an administrative center by the multi-storey complex of the Soviet House. A cinema "Liepāja" (arch. Arvīds Blauberģs; 1906–?) on a plot between Radio and See Street was built to be architecturally united two shores of the canal. According to the design (1969) of architect Kārlis Plūksne (1906–1973), a bronze monument of V.I. Lenin (1970) made by sculptor Alberts Terpilovskis (1922–2002) was installed on Victory Square. Kārlis Barons (1912–1996) developed a dendrological project of Rose Square to replace plantations of Soviet time.

In the renewal Republic of Latvia, the development of Liepāja is determined by private initiatives. Under the guidance of architect Andris Kokins, a project for the reconstruction of Rose Square (1999) was developed. Due to financial reasons, the accent was not roses but the concreted planting bed on which broad edges emblems of twin towns of Liepāja were placed. Directions of pedestrian paths were changed according to the planned shopping center, linked to the concept of reconstruction of Fish Street (2001–2006). Important masterpieces of landscape were adapted to the territorial fragmentation and Rose Square turned into a front-square of public buildings gave a new identity. After an extensive reconstruction, the bridge over the canal was extended at the end of 2018. The radically transformed Great Street got a new shape. But, was it better?

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# LIEPĀJAS DZĪVOJAMĀ RAJONA “ZAĻĀ BIRZE” ATTĪSTĪBA ATJAUNOTAJĀ LATVIJAS REPUBLIKĀ

## *Development of Liepaja residential area "Green Grove" during the independent Republic of Latvia*

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**Abstract.** *In Latvia, after restoration of independence on May 4, 1990, the economy was restructured. In Liepaja, without analyzing city's historical planning and not finding successful solutions for inhabitants, many factories closed down. Not getting to know with the Detailed Plan of the residential area "Green Grove", professionally developed by architect Irena Rubauska, and lobbying individual interests, specialists of "Group 93" Ltd. produced a new territorial plan for Liepaja. In 2007, Latvian in prison reform was started. The first prison was decided to build in the residential area "Green Grove". The object of research – Liepaja residential district "Green Grove". Research problem – functional and structural changes of "Green Grove" are implemented without performing the analysis of earlier urban development concepts and do not ensure harmonious development of inhabitants' living environment. The goal of research – analyze the influence of Liepaja Economic Zone and city development strategies on quality of inhabitants' living conditions in residential areas of "Green Grove". Main methods applied – this study is based on analysis of archive documents, projects, cartographic materials of urban planning, study of published literature and inspection of buildings in nature.*

**Keywords:** *Detailed Plan, Liepaja Economic Zone, Master Plan, residential area "Green Grove"*

### **Ievads**

#### ***Introduction***

Latvijā pēc 1990. gada 4. maijā atjaunotās neatkarības strauji saruka ražošanas attīstības tempi. Ekonomiku pārstrukturēja un daudzus uzņēmumus slēdza, bet citi samazināja ražošanas apjomu vai tika pārveidoti. Liepājā, lobējot atsevišķu uzņēmēju un firmu intereses, radikāli pārvērta pilsēttelpu, kur sākās pretrunīgi vērtējams attīstības periods. Īpašumtiesību maiņa radīja funkcionālu sadrumstalotību, un, neanalizējot pilsētas vēsturisko plānojumu un nemeklējot liepājniekiem veiksmīgus risinājumus, neilgā laikā iznīcināja daudzas ražotnes: viens no lielākajiem uzņēmumiem, kuru likvidēja, bija “Liepājas Cukurfabrika”. Lielas platības pilsētā aizņēma „Liepājas Metalurģis” un „Lauma Lingerie” (LPB-1, 2008, 45).

Laikā, kad plānošanas sistēmas tiesisko pamatu – teritorijas plānojumu sastāvu, saturu, izstrādāšanu, apstiprināšanu un tiesisko statusu regulēja Ministru Kabineta 1994.g. 6.septembra noteikumi Nr. 194 „Teritoriālplānošanas noteikumi” (LPB-1, 2008, 16), tika izvērtēts Liepājas 1988. gada ģenerālplāns un Liepājas pilsētai 1996. gadā apstiprināja jaunu attīstības plānu, kur pamatoja Liepājas pilsētas kultūras mantojuma, vēsturiskā centra, raksturīgā ielu plānojuma un aleju aizsardzības nodrošināšanu, respektējot pilsētbūvniecības tradīcijas, bet 1997.g. 30. janvārī ar lēmumu Nr. 86 pieņēma “Liepājas apbūves noteikumus” (LPB-1, 2008, 20). Liepājas 1996. gada plānu raksturoja plašas, funkcionāli neizmantotas teritorijas, arī pilsētas nomalē pie 14. novembra bulvāra un no Slimnīcas ielas uz rietumiem (LPB-1, 2008, 48). Valsts prezidents Guntis Ulmanis 1997.g. 4. martā apstiprināja 17. februārī pieņemto “Liepājas speciālās ekonomiskās zonas likumu”. Liepājā no 1997.g. 1. marta izveidoja speciālo ekonomisko zonu turpmākiem divdesmit gadiem. Termiņu pagarināja līdz 2035.g. 31. decembrim, lai attīstītu tirdzniecību, rūpniecību, kuģniecību, gaisa satiksmi, starptautisku preču apmaiņu caur Latviju un veicinātu Liepājas reģiona izaugsmi, taču ar nosacījumu, ka Liepājas SEZ pārvaldes speciālo budžetu izlieto infrastruktūras attīstīšanai tikai SEZ teritorijā, kuras robeža sākas Baltijas jūras krastā pie Cietokšņa kanāla, kas robežu iezīmē līdz Alsungas ielai, kas savukārt robežu nosaka līdz dzelzceļa joslai, pa kuru tā sasniedz 14. novembra bulvāri, turpinās līdz Liepājas pilsētas robežai un sasniedz Liepājas ezera dambi. Ikvienas pilsētas sekmīgai attīstībai teritorijas lielāko daļu – apmēram 60–70% jāparedz dzīvojamai zonai, kur izvietotas dzīvojamās ēkas, administratīvi sabiedriskās, apkalpes un citas iestādes, parki, skvēri, ielas un laukumi (Buka & Volrāts, 1987, 148), taču “Liepājas speciālās ekonomiskās zonas likumā” teikts, ka Liepājas SEZ teritorijā iekļauta osta (1182 ha), industriālie uzņēmumi (543 ha), lidosta (251 ha), bijušā militārā bāze Karostā (1763 ha), kas kopā aizņem 3739 ha jeb 65% pilsētas teritorijas (LPB-1, 2008, 91), atstājot iedzīvotājiem tikai 35% teritorijas.

Pētījuma objekts – Liepājas dzīvojamais rajons “Zaļā Birze”. Pētījuma problēma – neveicot dzīvojamā rajona “Zaļā Birze” agrāk izstrādāto pilsētbūvniecisko koncepciju analīzi, dzīvojamā teritorijā īstenotās funkcionālās un strukturālās izmaiņas nenodrošina iedzīvotāju dzīvesvides harmonisku attīstību. Pētījuma mērķis – analizēt Liepājas pilsētas un Liepājas Ekonomiskās zonas attīstības stratēģiju ietekmi uz dzīvojamā rajona “Zaļā Birze” iedzīvotāju dzīvesvides kvalitāti. Galvenās metodes – pētījumam izmantoti kartogrāfiskie materiāli, arhīvu dokumenti, projekti, studēta literatūra, objekti apsekoti dabā.

## Dzīvojamā rajona “Zaļā Birze” pārmaiņas Liepājas speciālās ekonomiskās zonas attīstības ietekmē

### *Changes in residential area “Green Grove” due to development of Liepaja Special Economic Zone*

Liepājā (1. att.) dzīvojamais rajons “Zaļā Birze”, kur padomju laikā saskaņā ar detālplānojumu īstenoja pirmā un otrā mikrorajona būvniecību (2. att.), palika aiz Liepājas SEZ teritorijas robežas (3. att.), kuru iezīmē Grīzupes iela no Kapsēdes ielas līdz Liepājas pilsētas robežai, pa kuru sasniedz krustojumu ar Liepājas–Ventspils dzelzceļu, kas nosaka robežu līdz dzelzceļa atzaram uz rūpniecības zonu "Kapsēde". Dzelzceļa atzars iezīmē robežu uz līdz krustojumam ar Kapsēdes ielu, pa kuru robeža sasniedz krustojumu ar Grīzupes ielu. Pilsētas galvenā arhitekta (1997–2004) Uģa Kaugura un Liepājas SEZ teritoriju plānotājas, arhitektes Ivetas Ansones vadībā IU „Arhitekta Edgara Bērziņa birojs” pēc Kanādas firmas “Dillon Consulting Limited” pasūtījuma un attīstības koncepcijas 2001. gadā radīja Karostas dzīvojamā rajona (Bērziņš, Burkovskis, & Grīnbergs, 2001) un Karostas industriālā parka (Bērziņš & Burkovskis 2001) detālplānojumus. Liepājai 2002. gadā izstrādāja transporta perspektīvo shēmu.



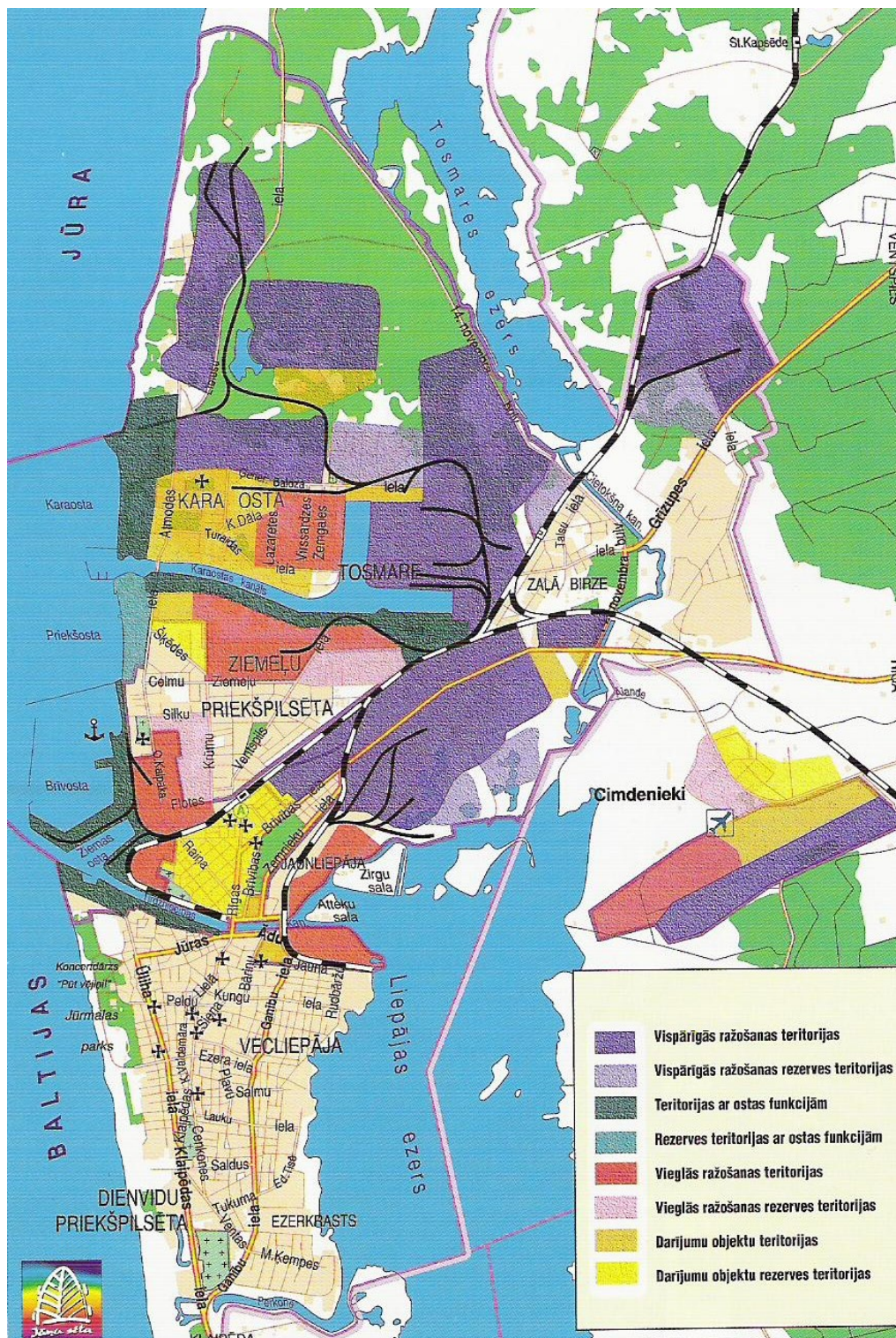
**1.attēls. Liepājas tūrisma kartes fragments ar “Zaļās Birzes” un “Jaunās Pasaules” dzīvojamās apbūves teritorijām. 1990-ie gadi (JS-1)**

**Figure 1 Fragment of Liepaja tourism map with residential building territories of “Green Grove” and “New World”. 1990s**

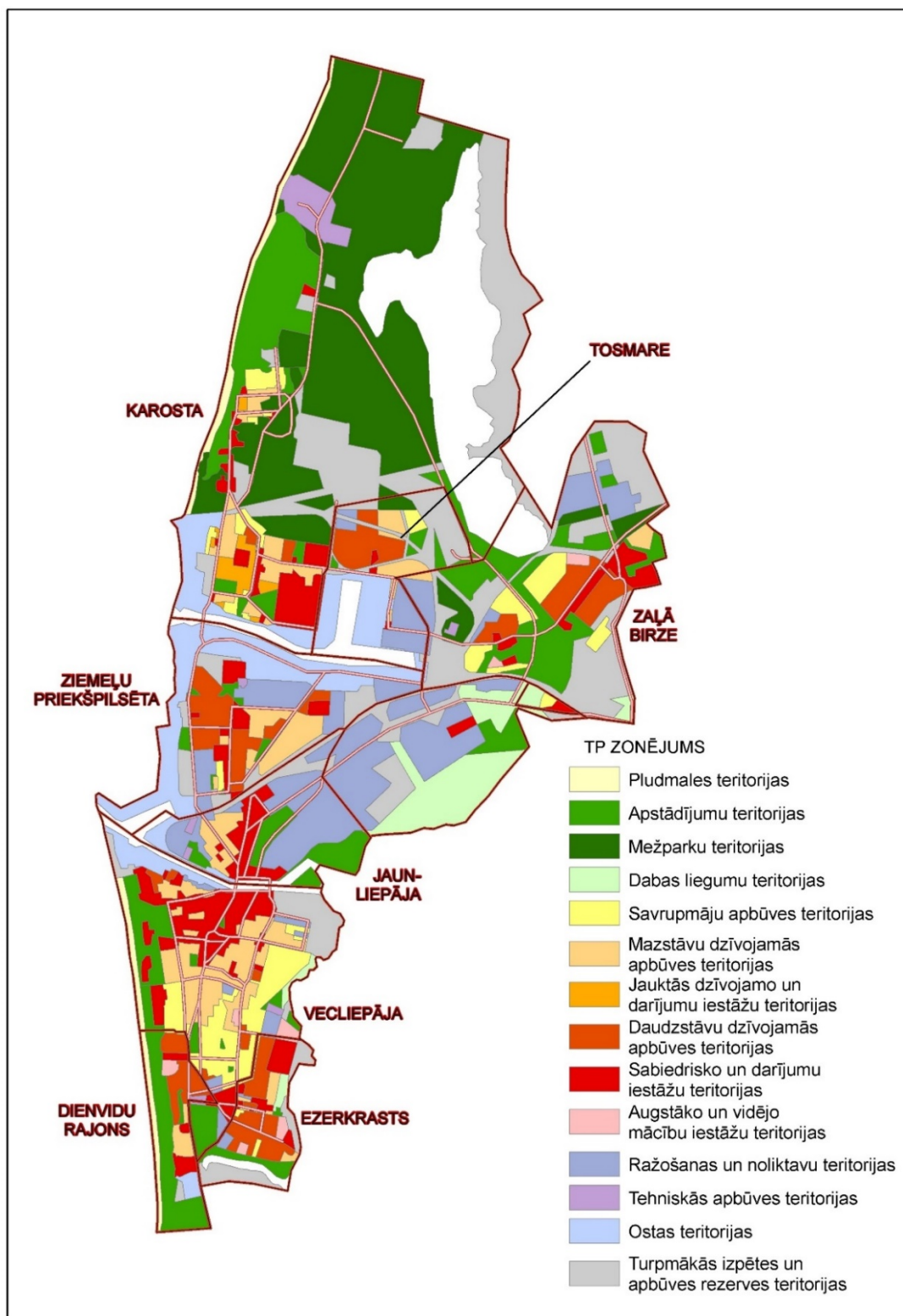


**2.attēls. Liepājas satelītplāna fragments ar “Zaļās Birzes” un “Jaunās Pasaules” dzīvojamās apbūves teritorijām. 1998 (Latvijas satelītkarte)**

**Figure 2 Fragment of Liepaja satellite plan with residential building territories of “Green Grove” and “New World”**



3.attēls. Liepājas Speciālās ekonomiskās zonas plāna fragments ar “Zaļās Birzes” un “Jaunās Pasaules” dzīvojamās apbūves teritorijām. 1999 (JS-2)  
 Figure 3 Fragment of Liepaja Special Economic Zone’s plan with residential building territories of “Green Grove” and “New World”



4.attēls. SIA Grupa 93. Liepājas pilsētas attīstības plāna (1996) izvērtējuma funkcionālā shēma ar “Zaļās Birzes” un “Jaunās Pasaules” teritorijām pēc grozījumu veikšanas. 2008. gada 10. decembris (LPB-1, 2008, 40)

Figure 4 “Grupa 93” Ltd. Liepāja’s functional zoning plan with residential building territories of “Green Grove” and “New World”. December 10, 2008

Uzsāktā zemes reforma, militāro teritoriju atgūšana, tirgus ekonomikas veidošanās un procesi sabiedrībā tik strauji mainīja noteikumus, ka bija grūti radīt izsvērtu plānu ilgākam laikam (12 gadiem). Prognoze par iedzīvotāju skaita pieaugumu Liepājā, 2010. gadā sasniedzot 134 000, neatbilda īstenībai. Nebija konkrēts mērķis bijušo militāro un ražošanas teritoriju izmantošanai. Konstatēja, ka teritorijas plānojums, kas papildināts ar 42 grozījumiem, turpmāk nav izmantojams. Finansējuma piesaistei Liepājas pilsētas dome 2008. gadā pieņēma "Liepājas pilsētas attīstības stratēģiju 2008. – 2014. gadam" (LPAS) – Liepājas plānošanai nozīmīgu dokumentu, kas ietvēra pilsētas attīstības vīziju, prioritātes, un ar ekonomiku, sabiedrības labklājību un pilsētvidi saistītus uzdevumus un mērķus. Uzskatīja, ka LPAS ir veiksmīgi un profesionāli izstrādāts dokuments, lai uzlabotu, attīstītu un pilnveidotu dažādas nozares, taču konkrētas prioritātes neizvirzīja. Kopējais mērķis nebija fokusēts vienai izcilībai, bet būt „virs vidējā līmeņa” daudzās jomās (LPB-1, 2008, 4, 20). Uzdevumi tieši norādīja uz teritorijām un objektiem – pilsētai nozīmīgām vērtībām, ar kurām saistīja nākotnes ieceres un īstenojamus plānus. Pilsētai, atrodoties jaunos un neordināras attīstības meklējumos, LPAS nesniedza precīzas atbildes: tās bija jāizskaidro teritorijas plānojumā, kur uzņēmējdarbību – ražošanu, loģistiku un darījumus saistīja ar plašām neapbūvētām teritorijām ceļu tuvumā. Skraji apbūvētā nomale un mazdārziņi Grīzupes ielas apkārtnē pie pilsētas slimnīcas un PUMAC industriālā parka radīja priekšstatu, ka ostas perspektīvā pievedceļa apkārtnē izjauktā hidroloģiskā režīma dēļ būvniecībai ir slikti apstākļi. Nomaļo teritoriju attīstību neveicina daudz pievilcīgākas vietas, kas atrodas tuvu pilsētas centram. Liepājas pilsētas attīstības plāna (1996) risinājumus izvērtēja laikā, kad Latvijā izstrādāja "Telpiskās plānošanas sistēmas attīstības koncepciju", kuru pieņēma 2009.g. 14. jūlijā, tādēļ tos salīdzināja ar LPAS mērķiem un uzdevumiem (LPB-1, 2008, 15), lai veidotu saikni starp politiku un ikdienu. "Teritorijas plānošanas likums" (2002) nosaka, ka jāņem vērā pašvaldības politikas plānošanas dokumenti – attīstības stratēģija, programmas un plāni, tādēļ SIA „Grupa 93” un eksperti, pamatojoties uz līgumu ar Liepājas pilsētas Būvvaldi un sadarbojoties ar pilsētas pašvaldības speciālistiem un uzņēmumiem, 2008. gadā izvērtēja 1996.gadā apstiprinātajā "Liepājas pilsētas attīstības plānā" (LPB-1, 2008, 5) esošo un paredzēto dzīvojamo apbūvi, tirgus pieprasījumu pēc mājokļiem un attīstības teritorijām, sociālās infrastruktūras teritorijas, ražošanas (sprādziena bīstamo, rūpniecisko avāriju riska, skaņas līmeņa diskomforta zonas u. c.) objektu ietekmi uz blakus teritorijām, kultūrvēsturiskā mantojuma saglabāšanu, transporta risinājumus un vides aizsardzību, Liepājas SEZ attīstības plāna un Liepājas ostas zemes izmantošanas plānu sasaisti ar spēkā esošo teritorijas plānojumu un LPAS. Analizēja, vai spēkā esošais attīstības plāns veicina LPAS izvirzīto mērķu sasniegšanu, noteica vadlīnijas, izstrādāja "Liepājas pilsētas attīstības plāna (1996.g.) izvērtējumu" un funkcionālo shēmu (4. att.), sniedza rekomendācijas

jauna Liepājas pilsētas pašvaldības teritorijas plānojuma izstrādei un konstatēja, ka "Liepājas pilsētas attīstības plāna (1996.g.)" sastāvs un saturs neatbilst pašreizējā teritorijas plānojuma izstrādāšanas prasībām (LPB-1, 2008, 16). Attīstības stratēģijas teritoriālo jeb telpisko ideju pauda pilsētas struktūrplāns – LPAS pielikums (LPB-1, 2008, 36), kas ietvēra ar pilsētas ilgtspējību un identitāti saistītus elementus, parādīja pilsētas telpisko struktūru, vērtības, attīstības faktoros un ieskicēja jaunā plānojuma aprises un priekšlikumus (LPB-1, 2008, 5).

Dzīvojamā rajonā "Zaļā Birze" 1969. gadā sāka iedalīt zemesgabalus daudzdzīvokļu māju celtniecībai, un pirmajā mikrorajonā izbūvēja dažas ķieģeļu ēkas, bet turpmāk izvērta blokmāju celtniecību, kuru pārtrauca pēc Latvijas Republikas atjaunošanas. Liepājā bija 1447 dzīvojamās mājas, un tika uzsākta privatizācija, kas mainīja dzīvojamā fonda īpašuma struktūru. Dzīvojamā rajonā "Zaļā Birze" ir 5% no pilsētas dzīvojamā fonda (LPB-1, 2008, 58). Uzsākot jaunā Liepājas teritoriālā plānojuma izstrādi, SIA "Grupa 93" speciālisti, neiepazīstoties ar arhitektes Irēnas Rubauskas un viņas kolēģu vērienīgajiem pilsētībūvniecības projektiem un profesionāli izstrādāto dzīvojamā rajona "Zaļā Birze" detālplānojumu, padomju laika dzīvojamo rajonu raksturoja kā necilā vietā savrupmāju apbūvē iebūvētas daudzstāvu dzīvojamās ēkas, radot neskaidru plānojuma struktūru, kur mijas savrupmāju, daudzstāvu un ražošanas ēkas un sastopami disonējoši apbūves tipi. Pavirši plānots, pavirši būvēts, taču aktīvs dzīvojamais rajons, kur jāsakārto dzīvesvide, jāizvērtē dzelzceļš pilsētvidē, ko pasliktina Tosmarē plānotais pievedceļš (LPB-1, 2008, 33). Pilsētībūvnieciski neveiksmīgo apbūves struktūru aiz savrupmājām veido ielas frontē izvietotās daudzstāvu dzīvojamās ēkas (LPB-1, 2008, 41). Daudzdzīvokļu namu apbūve savrupmāju tuvumā raksturota kā haotiska, ar grūti saprotamu plānojumu un bez piebraucamajiem ceļiem, publiskas ārtelpas un sabiedriskiem apstādījumiem. Aspazijas birzes nekoptajā teritorijā trūkst pastaigu takas un atpūtas vietas. Namu pagalmos saglabājies padomju laika labiekārtojums ar bērnu rotaļu laukumiem neatbilst mūsdienu drošības un kvalitātes standartiem (LPB-2, 2012, 52–53).

Pēdējo piecpadsmit gadu strukturālās izmaiņas atspoguļojas arī Liepājas teritorijas izmantošanā un apbūvē: radikāli mainījusies ekonomiskā vide, sarukuši padomju laikā forsētās industriālās attīstības tempi, likvidēti vairāki lieli uzņēmumi. Liepājā vairs nav militāra osta, un ir mainījusies padomju laikā slēgto militāro teritoriju izmantošana. Jaunu privātmāju apbūves teritoriju nav daudz: lielākas platības ir pilsētas ziemeļdaļā un Tosmares ezera dienvidkrastā – Kārklū ielas galā un uz austrumiem, kā arī pie Grīzupes ielas. Sabiedrisko un darījumu iestāžu teritorijās pie Grīzupes ielas plānotā pakalpojumu centra attīstības potenciāls pilsētas kontekstā ir ierobežots (LPB-1, 2008, 45).

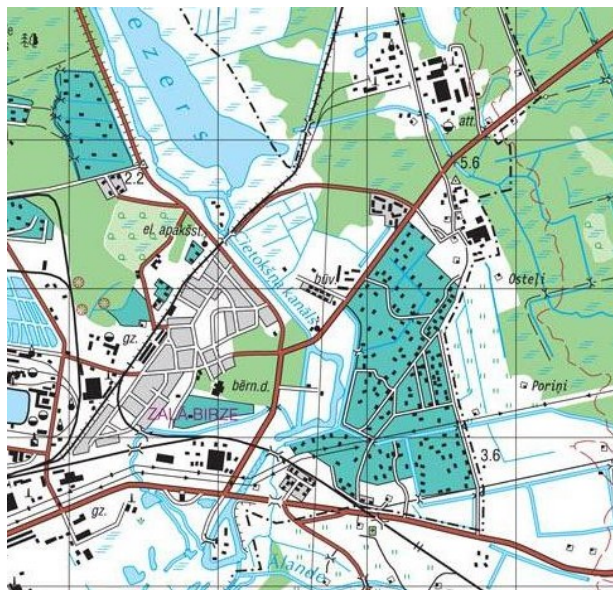


## **Dzīvojamā rajona "Zaļā Birze" teritorijas attīstības vīzija 21. gadsimtā** *The vision of the residential area "Green Grove" development in the 21<sup>st</sup> century*

Arhitektes Irēnas Rubauskas iecere, kas ietverta "Zaļās Birzes" dzīvojamā rajona detālplānojumā, nav īstenota, un arhitektoniski telpisko kompozīciju vairs nerisina (Ozola, 2018, 510–513). Liepājas pilsētas Būvvalde noslēdza līgumu ar SIA „Grupa 93”, un, pamatojoties uz Liepājas domes 2009.g. 14. maija lēmumu Nr. 195 „Par pašvaldības teritorijas plānojuma izstrādes uzsākšanu” un Liepājas pilsētas domes 2009.g. 11. jūnijā (lēmums Nr. 236) apstiprināto Darba uzdevumu, kā arī ņemot vērā LR normatīvos aktus, Nacionāla līmeņa, Kurzemes plānošanas reģiona un Liepājas pilsētas plānošanas dokumentus, institūciju nosacījumus plānojuma izstrādei, SIA „Grupa 93” speciālisti Sarmīte Lesiņa, Lolita Čače, Ronalds Krūmiņš, Viesturs Laiviņš, Marita Nikmane, Lāsma Lediņa, Anita Beikule, Jurijs Kondratenko, Neils Balgalis, piedaloties piesaistīto ekspertu komandai (Jānis Lejnieks, Elmārs Daniševskis, Lelde Eņģele, Lionel Fanshawe (*Terra Firma Consultancy*), Sandra Ikauniece), kas strādāja ciešā sadarbībā ar Liepājas pilsētas Būvvaldes speciālistiem Arvīdu Vitālu, Ivetu Ansoni, Daci Volksoni, Līgu Ločmeli, Līgu Beilu, Guntu Šnipki, Ilzi Bernāti, Induli Kalnu, Daci Arāju, Attīstības pārvaldes pārstāvjiem Ingūnu Tomsoni, Vilni Vitkovski un pašvaldības Darba grupu izpilddirektora Edgara Rāta vadībā, no 2010.g. maija līdz 2011.g. nogalei sagatavoja galīgajā redakcijā Liepājas pašvaldības nozīmīgāko plānošanas instrumentu pilsētas teritorijas izmantošanai un turpmākai attīstībai "Liepājas pilsētas teritorijas plānojumu" (LPB-3, 2012) un "Teritorijas izmantošanas un apbūves noteikumus" (LPB-4, 2012). Arhitekti Sergejs Ņikiforovs, Uģis Kaugurs, Gundars Vīksna, Andris Kokins, Edgars Bērziņš, Egons Bērziņš, Uldis Pīlēns, Ausma Skujiņa un Silvis Grīnbergs izteica viedokļus, kas rosināja meklēt skaidri formulētus risinājumus. Plānojuma informatīvajā daļā iekļāva tematiskās kartes, kartoshēmas un divās daļās strukturētu paskaidrojuma rakstu: „Pašreizējās situācijas raksturojums” (LPB-2) ietver informāciju par esošo situāciju un attīstības priekšnoteikumus, bet „Plānojuma risinājumi” (LPB-3) ietver plānojuma izstrādes pamatnostādnes, mērķus un uzdevumus, ideoloģiju, risinājumu skaidrojumu. Saistošajā daļā ietilpst „Teritorijas izmantošanas un apbūves noteikumi” un kartes „Teritorijas plānotā (atļautā) izmantošana”, „Galvenās aizsargjoslas un citi aprobežojumi”, „Aizsargājamās apbūves teritorijas” un „Maksimālais apbūves augstums aizsargājamās apbūves teritorijās”, bet sējumā „Pārskats par teritorijas plānojuma izstrādi” iekļauta informācija par plānojuma izstrādes un sabiedriskās apspriešanu procesu. Uzskata, ka Liepājas pilsētas ekonomiskās attīstības galvenais dzinējspēks ir daudzveidīga tautsaimniecības nozaru attīstība, kuras pamatā ir ražošana un ostas darbība. Prioritāras jomas ir tranzīts, loģistika, tūrisms.

Teritorijas plānojuma galvenie uzdevumi došot iespējas attīstībai, bet nosaka ierobežojumus un prasības pilsētībūvniecisko struktūru aizsardzībai. Pilsētas ilgtspējības pamats esot tās iedzīvotāji, tāpēc vislielākā uzmanība tiksot vērsta uz kvalitatīvas dzīvesvides nodrošināšanu, ērtas, pievilcīgas, veselīgas un vitālas pilsētas attīstību. Latvijas ilgtspējīgas attīstības stratēģijā līdz 2030. gadam Liepāja definēta kā nacionālas un starptautiskas nozīmes attīstības centrs, kas nozīmīgs gaisa satiksmes un ostu attīstības jomā, konkurētspējīgs partneris Baltijas reģiona pilsētu tīklā un Latvijas attīstības centru funkcionālajā tīklā. Attiecībā uz Liepāju kā būtiskākos izaicinājumus atzīmē iespējas ārējās sasniedzamības konkurētspējas uzlabošanai, ieguldot investīcijas ostas infrastruktūrā un loģistikas pakalpojumu attīstībā, iespējas piesaistīt tūristus, izmantojot Lietuvas tuvumu (LPB-3, 2012, 5).

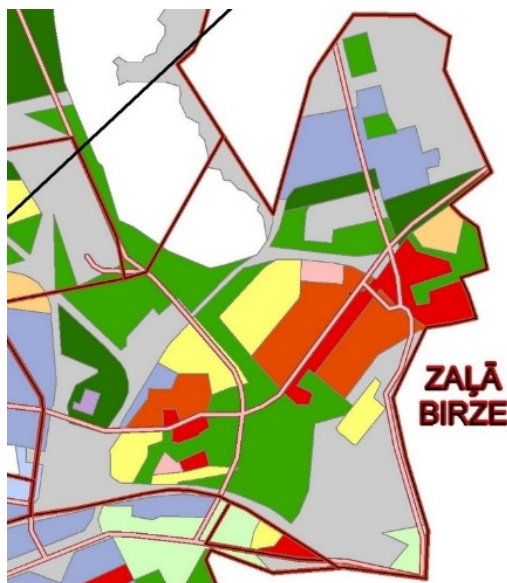
Jaunajam teritorijas plānojumam neizmantoja 2008. gada topogrāfisko uzmērījumu (5. att.), bet ņēma vērā teritorijas plānojuma grozījumus (6. att.), detālplānojumus, plānojuma izstrādei iesniegtos priekšlikumus, esošo dzīvojamo apbūvi, mājokļu pieprasījuma un piedāvājuma analīzi, iedzīvotāju skaita izmaiņu tendences un prognozes, Liepājas attīstības stratēģijā ietvertos mērķus un "Liepājas pilsētas attīstības plāna (1996) izvērtējuma" funkcionālo shēmu (7. att.). Noteica savrupmāju apbūves teritoriju (DzS) viengimenes dzīvojamām ēkām vai dvīņu jeb divām bloķētām viengimenes dzīvojamām mājām un mazstāvu dzīvojamās apbūves teritoriju (DzM) daudzdzīvokļu un rindu ēkām ar īres vai privātiem dzīvokļiem. Daudzstāvu dzīvojamās apbūves teritoriju (DzD) paredzēja daudzstāvu daudzdzīvokļu mājām ar īres vai privātiem dzīvokļiem (LPB-5, 2011, 60). Personu apvienība E. R. A. dzīvojamās apbūves teritoriju "Liepājas Speciālās ekonomiskās zonas attīstības plānā 2018.–2035. gadam" skaidro ļoti prasti: tā esot teritorija, kur dominē daudzstāvu un mazstāvu daudzdzīvokļu māju apbūve, un savrupmāju apbūve, lai nodrošinātu mājokļu funkciju ar atbilstošu infrastruktūru (Liepājas Speciālās, 2017, 91).



5.attēls. Liepājas topogrāfiskās kartes fragments ar dzīvojamā rajona “Zaļās Birzes” un “Jaunās Pasaules” teritorijām. 2008 (Latvijas Republikas)  
Figure 5 Fragment of Liepāja topographic map with territories of residential areas “Green Grove” and “New World”

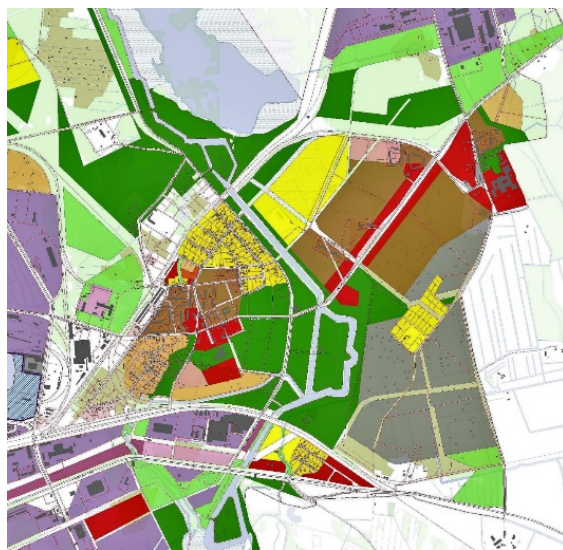


6.attēls. Niedole Ija. Liepājas teritoriālā plānojuma grozījumu projekta fragments ar dzīvojamā rajona “Zaļā Birze” un “Jaunā Pasaule” teritorijām. 2008. gada decembris (LPB-7)  
Figure 6 Niedole Ija. Fragment of Liepāja topographic map with territories of residential areas “Green Grove” and “New World” after amendments have been made. 2008



*7.attēls. SIA Grupa 93. Fragments no Liepājas pilsētas attīstības plāna (1996) izvērtējuma funkcionālās shēmas pēc grozījumu veikšanas dzīvojamā rajona “Zaļā Birze” un “Jaunā Pasaule” teritorijās. 2008. gada 10. decembris (LPB-1, 2008, 40)*

*Figure 7 “Grupa 93” Ltd. Fragment of Liepaja topographic map with territories of residential areas “Green Grove” and “New World”. December 10, 2008*

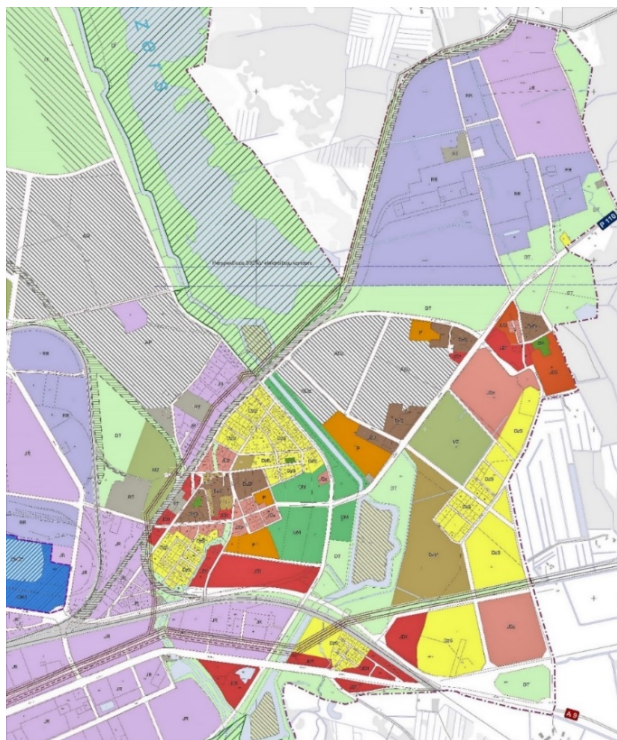


*8.attēls. SIA Grupa 93. Spēkā esošā Liepājas zemes lietojuma plāna fragments ar dzīvojamo rajonu “Zaļā Birze” un “Jaunā Pasaule” teritorijām. 2010–2022 (LPB-8)*

*Figure 8 “Grupa 93” Ltd. Fragment of valid exploitation plan of Liepaja land with residential areas “Green Grove” and “New World”*

SIA „Grupa 93” izstrādāja Liepājas zemes lietojuma plānu (8. att.), un to izmantoja “Liepājas teritoriju plānotās (atļautās) izmantošanas plāna” (9. att.) izveidei, lai precizētu teritoriju izmantošanu: turpmākās izpētes un apbūves

teritorijas no Kapsēdes ielas uz austrumiem (7. att.) un ražošanas un noliktavu teritorijas Kapsēdes ielas abās pusēs noteica kā ražošanas un noliktavu apbūves teritoriju (RR), bet purvaino apvidu no Grīzupes ielas uz ziemeļiem Liepājas–Ventspils dzelzceļa rietumpusē un Ploču, Sūkņu un Kuldīgas ielu apkaimē paredzēja jaukta darījumu apbūvei ar ražošanas funkciju (JR). Mazdārziņu teritorijas starp Slimnīcas un Grīzupes ielām iecerēja izmantot mazstāvu dzīvojamai (DzM) un savrupmāju apbūvei (DzS) (9. att.).



*9.attēls. SIA Grupa 93. Liepājas pilsētas Būvvaldes vadītāja Agrita Kulvanovska, Plānošanas daļas vadītājs Arvīds Vitāls, Liepājas pilsētas teritorijas plānojuma izstrādes vadītāja Sarmīte Lesiņa, kartogrāfs Viesturs Laiviņš. “Liepājas teritoriju plānotās (atļautās) izmantošanas plāna” fragments ar dzīvojamā rajona “Zaļā Birze” un “Jaunā Pasaule” teritorijām. 2012 (LPB-6)*

*Figure 9 “Grupa 93” Ltd. Head of Liepaja City Building Board Agrita Kulvanovska, Head of Planning Department Arvīds Vitāls, Manager of Liepaja City Territorial Planning Development Sarmīte Lesiņa, cartographer Viesturs Laiviņš. Fragment of planned (allowed) exploitation plan with residential areas “Green Grove” and “New World”. 2012*

Aspazijas birzi (7. att.) Grīzupes ielas abās pusēs pārvērtīšot par mežparku (DM) (9. att.), bet apstādījumu teritorija uz austrumiem no slimnīcas (7. att.) un mežparku teritorijas no slimnīcas un Grīzupes ielas uz ziemeļiem, Cukura un Grīzupes ielu krustojuma apkaimē (7. att.), kā arī mazstāvu dzīvojamās apbūves teritorija no slimnīcas uz ziemeļiem Grīzupes ielas dienvidpusē kļūs par dabas teritoriju (DT) (9. att.). Dabas lieguma teritorija no “Jaunās Pasaules” apbūves uz

rietumiem kļūs par savrupmāju apbūves teritoriju (DzS) (9. att.), kāda būs arī “Jaunā Pasaule”, teritorija uz ziemeļiem no Aspazijas birzes 14. novembra bulvāra un Liepājas–Ventspils dzelzceļa krustojuma dienvidpusē, kā arī uz dienvidiem no Liepājas–Rīgas dzelzceļa un uz dienvidiem no slimnīcas (9. att.).

Dzīvojamās apbūves attīstības teritorijai (ADz) piemēroti būšot dumbrāji no 14. novembra bulvāra un cietokšņa kanāla uz austrumiem, kā arī Ploču ielas apkaime no Grīzupes ielas uz dienvidiem Aspazijas birzī rietumpusē (9. att.). Daudzstāvu dzīvojamās apbūves teritoriju iecerēja izveidot dzīvojamā rajona “Zaļā Birze” pirmajā mikrorajonā un no Cietokšņa kanāla uz austrumiem Grīzupes ielas abās pusēs (7. att.), taču dienvidpusē pārvērtīs par jaukta darījumu apbūves teritoriju ar dzīvojamo funkciju (JDz) un mazdārziņiem (Mz), bet ziemeļpusē tā kļūs par dzīvojamās apbūves attīstības teritoriju (ADz) un daudzstāvu dzīvojamās apbūves teritoriju (DzD) (9. att.). Vidējās mācību iestādes vietā pie Aisteres ielas būs sabiedriskā iestāde (P) (9. att.), taču sabiedrisko un darījumu iestāžu teritorija pirmajā mikrorajonā Grīzupes ielas ziemeļu un dienvidu pusē kļūs par jaukta darījumu apbūves teritoriju ar dzīvojamo funkciju (9. att.). No Cietokšņa kanāla uz austrumiem Grīzupes ielas dienvidaustrumu pusē paredzēta dzīvojamā apbūve (9. att.).



10.attēls. Liepājas kartes fragments ar dzīvojamā rajona “Zaļā Birze” un “Jaunā Pasaule” teritorijām. 2012 (Lielais, 2012, 253)

Figure 10 Fragment of Liepaja map with territories of residential areas “Green Grove” and “New World”. 2012

Liepājas teritorijas plānojumā lielākā daļa applūstošo teritoriju (395,3 ha) atrodas ārpus LSEZ robežām, bet tikai ļoti neliela daļa aizņem LSEZ un atrodas ārpus ostas un industriālajām teritorijām. Applūstošās teritorijas redzamas Lielā Latvijas atlanta kartē, kuru papildina reljefu raksturojoša informācija (Lielais, 2012, 253) (10. att.). Liepājas ezera piekrastē (98,1 ha) un Tosmares ezera piekrastē (297,2 ha) regulārā applūduma robežas nosaka vējuzplūdu ietekme no jūras, pavasara pali un ilgstošas lietavas (LSEZ, 2017, 31).



11.attēls. *Veloceliņš Grīzupes ielā. 2019. gada 3. februāris (Silvijas Ozolas foto)*  
*Figure 11 Bicycle path on Grīzupes Street. February 3, 2019*

Liepājas zemes lietojuma plānā, izmantojot “Liepājas pilsētas attīstības plāna (1996.g.) izvērtējuma” funkcionālo shēmu (LPB-1), kur nav uzrādīts Cietokšņa kanāls, bet krāsu laukumiem nav izmantots topogrāfiskais uzmērījums (5. att.) ar reljefa un dabas elementu apzīmējumiem, SIA “Grupa 93” nesniedz priekšstatu par kvalitatīvas telpiskās vides veidošanu. Radikāli un brīvi mainot teritoriju atļauto lietošanu, nav iespējams radīt kvalitatīvu dzīvesvidi. Liepājas teritoriālajā plānojumā, iezīmējot Cietokšņa kanāla aprises, vismaz aptuveni ir iespējams salīdzināt dzīvojamā rajona “Zaļās Birze” dažāda laikmeta kartes.

Latvijas Republikas simtgadi sagaidot, tika labiekārtota Grīzupes iela un līdz Liepājas Reģionālajai slimnīcai izveidoja veloceliņu (11. att.).

### **Liepājas jaunā cietuma būvniecības iecere** ***The construction of the new prison in Liepāja***

Latvijā 2007. gadā sāka izstrādāt ieslodzījuma vietu reformas koncepciju, kas paredz jaunu cietumu būvniecību ieslodzījuma vietu infrastruktūras attīstībai,

ko valdība apstiprināja 2013. gadā (Studente, 2017). Ministru Kabinets nolēma pirmo cietumu neatkarīgajā Latvijā būvēt Liepājā, tādēļ 2013. gadā atbalstīja rīkojumu "Par valsts nekustamā īpašuma Pērkones ielā 32, Liepājā, nodošanu Liepājas pilsētas pašvaldības īpašumā un nekustamā īpašuma Alsungas ielā 29, Liepājā, pārņemšanu valsts īpašumā", lai plānotu Tiesu namu aģentūras nozīmīgākā nekustamā īpašuma projekta – cietuma būvniecību tuvu autoceļiem līdz šim neapgūtā teritorijā ar piemērotu infrastruktūru – 14. novembra bulvārī 5,6 km attālumā no Liepājas centra (Tieslietu, 2013). Vietā, kas atbilst jauno cietumu izvietojanas principiem (Hāka, 2016), būvēs cietuma kompleksu, kurā strādās vairāk nekā 400 darbinieku un ietilps nodarbinātības centrs un dzīvojamie korpusi 1200 ieslodzīto izvietojšanai, izglītības centrs garīgām un sporta nodarbībām, daudzfunkcionāla ēka ieslodzīto pieņemšanai, medicīnas daļa, pastiprināta režīma aizturēšanas telpas, sanāksmju telpa, personāla ēdnīca, palīgtelpas (Vēl, 2016). Liepājas mērs Uldis Sesks uzskata cietuma būvniecību par iespēju uzņēmējiem iesaistīties saimniecisku pakalpojumu sniegšanā, jo investīcijas būšot Liepājai ieguvums infrastruktūras sakārtošanai (Sesks, 2014). Kompleksa perimetram jāveido taisnstūri (12. att.), kuram apkārt ir drošības josla, bet tiešā tuvumā nedrīkst atrasties dzīvojamā apbūve un dzelzceļš, pa kuru transportē bīstamas kravas.

Liepājā 2014.g. 22. jūlijā Tieslietu ministrijas parlamentārais sekretārs Gaidis Bērziņš un Ieslodzījuma vietu pārvaldes priekšiece Ilona Spure kopā ar Liepājas domes vadību un Būvvaldes ekspertiem apskatīja jaunā Kurzemes cietuma būvniecībai rezervēto zemes gabalu Alsungas ielā 29 (13. att.) un ar pašvaldības vadību parakstīja nodomu protokolu par iespējamo sadarbību cietuma būvniecībā (Papildināts, 2014).



12.attēls. Makets cietuma būvniecībai zemesgabalā Alsungas ielā 29. 2014

(<https://i.ytimg.com/vi/SQrA7KINMY4/maxresdefault.jpg>)

Figure 12 Model for prison construction in 29 Alsunga Street





*13.attēls. Liepājas pilsētas mērs Uldis Sesks, Liepājas pilsētas domes priekšsēdētāja vietnieks pilsētas attīstības un sadarbības jautājumos Gunārs Ansiņš kopā ar Tieslietu ministrijas parlamentāro sekretāru Gaidi Bērziņu 2014. gada 22. jūlijā apskatīja zemesgabalu cietuma būvniecībai Alsungas ielā 29 (Andra Gertsona foto)*

*Figure 13 Liepāja City Council Chairman Uldis Sesks, Vice Chairman of Liepāja City Council in urban development and cooperation affairs Gunārs Ansiņš together with the Parliamentary Secretary of Ministry of Justice Gaidis Bērziņš visited in life the land envisaged for prison construction in 29 Alsunga Street on July 22, 2014*

Igaunijas valsts uzņēmums „Riigi Kinnisvara AS” un Daugavpils uzņēmums SIA „REM PRO” 2015. gada 20. martā parakstīja līgumu par Liepājas cietuma projektēšanu (Jaunā, 2015), bet Tieslietu ministrija 2016.g. nogalē saņēma saskaņotu cietuma kompleksa būvprojektu, kur katrs no astoņiem korpusiem būs savā krāsā, lai personāls teritorijā vieglāk orientētos. Pastaigu laukumus izveidos uz ēku jumtiem, bet ieslodzītos izmitinās divvietīgās kamerās. Jaunajā cietumā pazemes tuneļus aizstās īsākas, labāk pārrēdzamas galerijas otrā stāva līmenī. Liepājas cietuma būvniecības starptautiskajā iepirkumā pieteikumus iesniedza divas Latvijas kompānijas – "Re & Re" un AS "UPB". Saskaņā ar likumu Liepājas cietumu klasificē kā valsts noslēpumu saturošu būvprojektu, tādēļ pretendentiem ar pieredzi un labiem finanšu rādītājiem papildus prasīja industriālās drošības sertifikātu (Jauno Liepājas cietumu, 2017). Vienīgā Latvijas firma, kas atbilda Liepājas cietuma būvniecības iepirkumā iekļautajām prasībām, bija "UPB", kam bija atbilstošs apgrozījums un spēkā esošs industriālās drošības sertifikāts (Liepājas cietumu, 2017). Būvniecību paredzēja sākt 2017. g. otrajā pusē, bet objektu nodot ekspluatācijā ne vēlāk kā četrus gadus pēc būvniecības uzsākšanas (Atlāce-Bistere, 2017). Liepājas pilsētas Būvvaldē uzskata, ka iesniegtā jaunā vārienīgā cietuma būvprojekta būvniecību neizdosies pabeigt iepriekš plānotajā termiņā (Jaunā cietuma, 2016). Jaunajam Liepājas cietumam plāno piešķirt nacionālā interešu objekta statusu (Jaunajam, 2015). Ņemot vērā, ka būvnieku

iesniegtie piedāvājumi Liepājas cietuma celtniecībai pārsniedz projektam pieejamo finansējumu, attiecīgo iepirkumu plāno pārtraukt, lai tā vietā sludinātu jaunu. Būvniecības izmaksu pieauguma dēļ piedāvājumi ir lielāki nekā projektam pieejamais finansējums (Plānots, 2017). Nepārceļot Liepājas cietuma būvniecības projektu, valdība budžeta izstrādē nonāktu lielu dilemmu priekšā (Kučinskis, 2017), bet, pagarinot jaunā cietuma būvniecības projekta īstenošanas termiņus, pastāv risks, ka ikgadējā budžeta izdevumi par ieslodzījuma vietu ēku un telpu remontiem turpinās pieaugt (Kavēšanās, 2017). Liepājas cietuma būvniecība sadārdzināsies par 50 miljoniem eiro, bet atbildīgās amatpersonas ar būvniekiem kaulēties negrib un ir nostājušās būvnieku pusē, kuri neesot gatavi būvēt lētāk. Valdībai bija jālemj, kur atrast trūkstošos līdzekļus (De facto, 2017). Atliekot Liepājas cietuma kā investīciju projekta būvniecības īstenošanu, finansējumu varētu piešķirt demogrāfijas problēmu risināšanai (Liepājas cietuma projektu, 2017). Valdošās koalīcijas politiķi atlika Liepājas cietuma būvniecības projekta īstenošanu, lai rastu papildu līdzekļu avotu (Vienojas, 2017). Pēdējo trīs gadu laikā ieslodzītajiem par sliktiem dzīves apstākļiem izmaksā kompensācijas, kas ir lieka līdzekļu tērēšana (Maksā, 2017). Nemainot jaunā Liepājas cietuma projektu, "UPB" neredz iespējas samazināt būvniecības izmaksas (UPB, 2017), tādēļ iepirkumā no jauna meklēs būvnieku Liepājas cietumam (Iepirkumā, 2017), kura būvniecību, ņemot vērā projekta īstenošanas termiņa atlikšanu, iecerēja sākt 2020. gadā (Liepājas cietumu iecerēts, 2017). "Vienotības" pārstāvja Valda Dombrovska valdībā par aptuveni 2008. gada summām 2013. gadā akceptēto, bet dārdzības dēļ oficiāli atlikto Liepājas cietuma projektu esot bloķējusi partija "Vienotība", cīnoties par būvniecības industriālās drošības sertifikāta iegūšanu "Vienotību" atbalstošiem uzņēmējiem. "Vienotības" priekšsēdētājs Arvils Ašeradens uzskata, ka ļoti neveiksmīgi un neprofesionāli veiktā iepirkuma dēļ jāizdara jauns efektīvāks iepirkums. Projektu uztaisīja tā, lai to varētu būvēt tikai kompānija ar industriālo sertifikātu, kāds šobrīd Latvijā ir divām būvkompanijām. Veidot iepirkumu, lai pilnīgi visu, arī cietuma sadzīves sektorus varētu būvēt ar drošības sertifikātu, bija kļūda (Rasnačs, 2018). Agris Balodis, VAS "Tiesu namu aģentūra" Liepājas cietuma projekta vadītājs informēja, ka aģentūra atkārtoti izsludināja konkursu par jaunā Liepājas cietuma kompleksa būvniecību. Piedāvājumus iesniedza būvuzņēmumi SIA "Abora", AS "UPB" no Latvijas un viens no Igaunijas vadošajiem būvuzņēmējiem AS "Merko Ehitus Eesti". Jaunā cietuma būvniecības iecere, kas aizstāja arhitektes Irēnas Rubauskas ideju par dzīvojamā rajona "Zaļā Birze" izveidi, Liepājai būšot interesanta.

## **Secinājumi** *Conclusions*

Garīgi bagātāki un stiprāki ir tie, kas ciena iepriekšējo paaudžu veikumu. Jo stiprākas ir tradīcijas, jo pilnvērtīgāka ir sabiedrība, bet nožēlojami ir tie ļaudis, kas noliedzot veco, nespēj vietā likt ko jaunu, labāku.

Pēc Latvijas Republikas atjaunošanas Liepājai ir izstrādāti dažādi "attīstības" dokumenti un projekti, kuros rūpes par iedzīvotāju labklājību ir formulētas lozungu veidā, bet nav prioritāte. Dzīvojamā rajona "Zaļā Birze" un apbūves kvartāla "Jaunā Pasaule" iedzīvotāju dzīvesvidē būtiskas pozitīvas pārmaiņas 21. gadsimtā nav raksturīgas, jo Liepājā daudz lielāku uzmanību pievērš Liepājas SEZ problēmu risināšanai un ieslodzījumu vietu reformas īstenošanai. Iedzīvotāju vajadzības bieži tiek atstātas novārtā, un tas ir vērojams arī Liepājas attīstības projektos, kur liepājnieku mājokļu būvniecībai tiek piedāvātas problemātiskas teritorijas. Analizējot dažāda laikmeta Liepājas pilsētas plānus var secināt, ka attīstības projektu izstrādāšanas kvalitāte pēc Latvijas Republikas atjaunošanas Liepājā nav iepriecinoša: projektēšanas institūtos inženieru un arhitektu agrāk izstrādātie projekti netiek analizēti, un mūsdienās plānošanas dokumentus izstrādā arī personu apvienības.

## **Summary**

After restoration of Republic of Latvia on 4 May 1990, the controversially evaluated period in development of Liepaja started: the urban space was transformed without any historical planning analysis. Changes of the ownership promoted functional fragmentation of Liepaja planning, lobbying interests of individual entrepreneurs and companies. Without looking for successful solutions for Liepaja and its inhabitants, lots of manufactures were destroyed in a short time. However, on 4 March 1997, the President of Latvia Guntis Ulmanis approved the "Liepaja Special Economic Zone Law" passed on February 17. In Liepaja Special Economic Zone (SEZ) was formed, leaving behind the territorial border of the residential area "Green Grove", where according to the Detailed Plan building of the first and second housing estate was started. In 2001, under Liepaja SEZ territorial planner Iveta Ansonē's guidance the individual company "Architect Edgars Bērziņš's Office" in compliance with the order by the Canadian Company "Dillon Consulting Limited" worked out the development concept of Naval Port residential area and detail plan of the industrial park development.

In Liepaja territorial planning, without applying the topographical survey with symbols of natural elements and even not showing the Fortress Canal, territories of the residential area "Green Grove" have been shown in a very schematic way. Architect Irēna Rubauska's intention included in the detail plan of the residential area "Green Grove" has not been implemented. Also the architectonically spacious composition of building is not being resolved any longer. After having done the amendments in Liepaja

territorial planning, the outlines of the Fortress Canal have been marked, which enables us only approximately to compare cartographic materials of different ages with territories of the residential area “Green Grove”. Liepaja territorial zoning with very schematic colour patches, where the topographic survey with the relief and elements of natural symbols has not been used for the base and water courses have not been shown. The outline of the Fortress Canal is too approximate, does not give an impression of a qualitative architectonic special environment creation. Changing radically and freely the functional application of territories without analysing and even denying qualitatively developed solutions, disrespect is shown to the colleagues’ creative achievement and quality of the people’s habitat environment significantly reduced.

In 2017, in Latvia development of the reform concept of imprisonment places was started with an intention to build a new prison. The Cabinet of Ministers decided that the first new prison in the independent Latvia should be built in Liepaja. In 2013 the order “About conveyance of the state real estate in 32 Pērkone Street, Liepaja to Liepaja City Municipality ownership and conveyance of the real estate in 29 Alsunga Street, Liepaja to the state ownership” was approved, in order to plan the prison construction on the vacant area where there is appropriate infrastructure – in 14<sup>th</sup> November Avenue not far from the main roads, but 5,6 km from Liepaja City centre. The place complies with the prison location principles stated in the concept. The prison complex consists of residential buildings to place 1200 prisoners, employment centre for prisoners, education centre with rooms for spiritual and sports classes, a multifunctional building for the prisoners’ reception, medical department, reinforced regime retention facilities, meeting rooms, canteen for the staff and other auxiliary rooms. Mayor of Liepaja Uldis Sesks thinks construction of the prison will give entrepreneurs a chance to participate in various kinds of economic service provision, but the investments will be a benefit for the city infrastructure.

On 22 July 2014, Parliamentary Secretary of Ministry of Justice Gaidis Bērziņš and Head of Imprisonment Administration Ilona Spure together with the management of Liepaja City Council and experts of Building Board attended the earmarked piece of land for prison building in 29 Alsunga Street. They signed the letter of intent with the municipality executives about the possible cooperation in the prison building. The complex perimeter has to be a rectangle, surrounded with a security belt, but neither residential areas nor a railway, along which hazardous cargos are transported, can be near it. Estonian State Company “*Riigi Kinnisvara AS*” and Daugavpils Company “*REM PRO*” Ltd. signed a contract on 20 March 2015 about Liepaja prison design, but in late 2016 Ministry of Justice received an already approved building project for the prison complex, in which there will be eight buildings. Each building will be in a different colour to make it easier for the staff to find their way. Walking grounds will be made on the rooftops, but prisoners will stay in double cells. In the new prison, the underground tunnels will be replaced with shorter, better visible and financially more profitable galleries on the second floor level. In the new prison complex more than 400 employees will work. The intention of the prison started at the beginning of the century and replaced architect Irēna Rubauska’s intention about the formation of the residential area “Green Grove” is going to be exciting for Liepaja. Implementation of the project for the sums

of 2008 approved by "Vienotība" chaired by Valdis Dombrovskis in 2013, has been postponed at the moment in order to find the necessary funds for building.

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# MŪZIKAS KLAUSĪŠANĀS STARPDISCIPLINĀRĀ SKATĪJUMĀ

## *Music Listening in Interdisciplinary View*

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**Abstract.** *Very few researches focus on music as an activity and most often it is linked to music perception, therefore – music psychology. Similarly the theories on this question are developed. Interrelations between music therapy and music psychology, as well as the role of listening and music listening in music pedagogy, psychology and music therapy are little researched. The goal of this article is to intentionally draw attention to the significance of this very common thing in our everyday lives – listening – in communication, development of cognitive and phenomenological skills and abilities (perception, recognition, describing, explaining). These skills and abilities are necessary in the work of pedagogue and psychologist, and especially music therapist.*

**Key words:** *listening types, music listening, music therapy.*

### **Ievads**

#### **Introduction**

Mūziku dzirdēt un klausīties nav viens un tas pats – iekšējo psihisko procesu ziņā ir liela atšķirība starp „dzirdēt” un „klausīties” (Nelsone & Paipare, 1992). Dzirdēt – tā ir fiziska spēja apzināties vai uztvert skaņu ar dzirdes receptoriem, nepievēršot tai papildus uzmanību. Klausīties savukārt nozīmē pievērst uzmanību skaņām, ko dzird, koncentrēties uz skaņu. Cilvēks nevar kontrolēt, vai viņš dzird skaņu, viņš var izlemt, vai klausīties skaņās (Schacter, Gilbert, & Wegner, 2011). Mūzikas klausīšanās ir dinamisks process, kas izraisa sarežģītu garīgo un intelektuālo darbību, jo tas no personas prasa piepūli un koncentrēšanos – dzirdētais ir jāuztver, jāsaprot un jāpatur atmiņā. Paralēli šis process pilnveido uztveres prasmi, koncentrēšanās spēju un emocionālo atsaucību. Var uzskatīt, ka tieši mūzikas klausīšanās veido muzikālajai attīstībai nepieciešamo primāro pieredzi – muzikālās pieredzes pamatu. Mūzikas klausīšanās dod iespēju iepazīstināt klausītāju ar daudzveidīgiem skaņdarbiem un to vērtību, bagātināt viņa muzikālo pieredzi un mācīt sevis izteikšanu mūzikas pavadībā. Skaņdarbs kā informācijas sniedzējs ietekmē cilvēka prāta, jūtu un gribas attīstību, vienlaikus sniedzot zināšanas, prasmes, iemaņas, veidojot attieksmi un iekšējo motivāciju,



kā arī apmierina pašizteikšanās un pašapliecināšanās vajadzības (Krasinska, 1979; Mackēviča, 2001). Skaņdarba klausīšanās laikā var aktīvi izmantot iztēli, asociāciju, uzmanību, atmiņu un citas prāta spējas, kā arī attīstīt abstrakto un konkrēto domāšanu, gaumi un asprātību, koncentrēšanos un uzmanību (Deutsch, 1999). Klausīšanās procesā savijas uztverto muzikālo skaņu un saskaņu skaistums, klausītāja iepriekšējā pieredze un atbildes reakcija, kura izraisa muzikālo tēlu attīstību. Atbildes reakcija ir atkarīga no tā, cik zinošs un sagatavots ir klausītājs.

Šodien mūzika un tās klausīšanās ir viena no svarīgākajām problēmām mūzikas pedagogijā un psiholoģijā, tā skar gan komponistu, gan izpildītāju un klausītāju, un no šī viedokļa dalās mūzikas radošajā (komponists), atskaņotājmākslinieka (izpildītājs) un klausītāja uztveres psiholoģijā (arī šī uztvere daļēji ir "līdzradīšana"<sup>1</sup>). Mūzikas klausīšanās zinātniskajā literatūrā tiek definēta arī kā muzicēšana (angl. *musicng*) (Small, 1998). Mūzikas uztveri, tātad arī klausīšanos, ietekmē gan muzikālie, gan ārpus muzikālie faktori. Katru cilvēku, kurš klausās mūziku, ietekmē dažādi muzikālie faktori, kuri arī nosaka izmaiņas tajā, kā cilvēks klausās mūziku, ko viņš klausās, cik bieži klausās, cik skaļi, un kopumā – cik lielā mērā tiks ietekmēta viņa labizjūta. Tie ir mūzikas klausīšanās tiešie ietekmes faktori un ārpus muzikālie ietekmes faktori (Bastian, 2000). Mūzikas klausīšanās ietekmes tiešie faktori jeb mūzikas pamatelementi un izteiksmes līdzekļi, kuri atstāj zināmu ietekmi uz cilvēku, ir mūzikas žanrs/stils, skaņkārta, ritms, metrs, temps, melodija, harmonija, dinamika, tembrs, instrumentācija. Ārpus muzikālie faktori sevī ietver individuālos faktoros un situatīvos faktoros.

Raksta mērķis ir apzināti pievērst uzmanību ikdienā tik parastās lietas, kā klausīšanās, nozīmei saskarsmē, kognitīvo un fenomenoloģisko spēju un prasmju (uztvere, atpazīšana, aprakstīšana, izskaidrošana) attīstībā. Šīs spējas un prasmes nepieciešamas gan pedagoga, gan psihologa, bet īpaši mūzikas terapieta darbā.

### **Ārpus muzikālo mūzikas klausīšanās ietekmes faktoru iedalījums** *Classification of influencing non-musical factors in music listening*

Iedalījums ir autores veidots, pamatojoties uz M. Paipares starptautiskās zinātniskās konferences materiāliem.

- 1) **Individuālos faktoros** veido cilvēka vecums, dzimums, personības tips un raksturs, mūzikas priekšroka/preference, garastāvoklis, veselības stāvoklis, ģimenes statuss, sociālais statuss, iegūtā izglītība, audzināšana, reliģiskā, kultūras piederība, iedzimtība, domas, asociāciju un iztēles bagātums, u.c.

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<sup>1</sup> Arī mūzikas klausīšanas zinātniskajā literatūrā tiek saprasta kā muzicēšana (*musicng*) (Small, 1998)

2) **Situatīvos faktorus** veido: laiks, vieta, interjers, sociālā vide, akustiskā vide, neformālas grupas, mediji, u.c. (Paipare, 2012)

Praktiskajā pedagoga un mūzikas terapeita darbā galvenā uzmanība ir atvēlēta prasmei klausīties, taču veidi kā mēs klausāmies joprojām nav pietiekami izpētīti. Nesenā “skaņu pieeja” aktualizēja jaunus fenomenoloģiskos un gnozeoloģiskos jautājumus un metodoloģijas attiecībā uz skaņu, klausīšanos un tradicionālo skaņu uztveres veidu izvērtēšanu.

Uzsvars praktiskajos pētījumos ir vērsts vairāk uz sadarbības pieeju ar mērķi saprast citu piedzīvoto muzikālo pieredzi un refleksīvo metodoloģiju, kas ietver vērtību izpēti, pieņēmumus un prāta ieradumus, kurus cilvēks praktiski pielieto (Titon, 2008).

Helena O'Shea (2017) secina, ka *refleksīva un atvērta klausīšanās* praktiskajos pētījumos sevi pierāda kā pārāku par *koncentrētāku un analītisku klausīšanos*.

Klausīšanās ir īpašs veids, kā atrasties pasaulē un atzīt mūsu attiecības ar apkārtējo pasauli un cilvēkiem tajā. Mūsu ikdienas uzskati par to, kas ir labs klausītājs balstās uz Aristoteļa koncepta par cilvēku komunikāciju kā tikumu, kas nav ne pārspīlēts, ne nepietiekams un ir labu nodomu motivēts. Džons Djūvijs (*John Dewey*) apraksta *operacionālo klausīšanos* darījumu klausīšanās (*transactional listening*) visās balsīs sarunas laikā, lai nodrošinātu sadarbību (Waks, 2011). Mārtina Būbera (*Martin Buber*) *receptīvais klausītājs* “pieņem” runātāju ar nedalītu uzmanību, lai saprastu viņu, tā vietā, lai ierobežotu sapratni, koncentrējoties uz paša klausītāja raizēm (Gordon, 2011).

*Analītiskā klausīšanās*, kas ir atvasināta no Platona filozofiskās prakses, ir pilnīgi pretēja un koncentrējas uz jautājuma, kas sagādā raizes klausītājam, noskaidrošanas, izjautājot sarunu biedru, kā arī bieži viņu pārtraucot, izdarot slēdzienus un tad tos kritiski izvērtējot. Šis dialektiskais process balstās uz klausīšanos, kas ir gan analītiska, gan logocentriska<sup>2</sup> (O'Shea, 2017).

Kad klausāmies mūziku, mēs neuztveram tikai patvaļīgas skaņu secības, bet gan ritmisko un melodisko vienību hierarhiskos līmeņus. Ēriks Klarks (Clarke, 1988) pievērš uzmanību diviem dažādiem mūzikas atskaņošanas virzieniem, atkarībā no tā vai mūzika ir (iepriekš) komponēta vai tiek atskaņota vai improvizēta<sup>3</sup>.

Viens aspekts – mūzikas (muzikālā) struktūra tiek attēlota/reprezentēta, iesaistot mūsu motoro sistēmu, atskaņojot/spēlējot šīs mūzikas struktūras, kas mums ir prātā.

Otrs aspekts – mūzikas izpildījuma izteiksmīgums pievērš uzmanību un

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<sup>2</sup> Logocentrisms ir uzskats, ka valoda spēj attēlot realitāti. Aristoteļa pieeja, savukārt, darbībā ir mazāk vērsta uz runātāju pašu, bet gan viņa runas saturu.

<sup>3</sup> Mūzikas terapijā improvizācija ir viena no pamatmetodēm. Literatūrā bieži: *klīniskā improvizācija*

atklāj izpratni par skaņdarba muzikālo struktūru. N.Kuks (Cook, 1990) tādējādi diferencējis “muzikālo” un “muzikoloģisko” klausīšanos.

*Muzikālā klausīšanās* ir klausīšanās priekam, kas dod iespēju klausītājam aizmirsties mūzikā. Šī mūzikas klausīšanās īpatnība ļauj it kā `ieiet` citā realitātē<sup>4</sup> un tā nav duālistiska, tajā mūsu apziņa ir it kā savādāka – tā atdala mūziku no realitātes un ārējās pasaules.

*Muzikoloģiskā klausīšanās* attiecas uz jebkuru klausīšanos ar noteiktu mērķi. Tā atklāj faktus par mūziku, stila un struktūras aspektus, atskaņošanas tehniskās īpatnības, kā arī formulē teorijas par mūziku. N.Kuks (Cook) un E. Klārks (Clark) ir nonākuši pie secinājuma, ka mūzikas terapeits klausās ne tikai muzikāli un/vai muzikoloģiski, bet personāli un interpersonāli, t.i. visādi, kas iespējo pilnīgu klausīšanās pieredzi (Pavlicevic, 2005).

Literatūrā ir atrodamas vairākas hipotēzes par mūzikas ietekmi uz emociju un uzvedības maiņu, bet precīzs mehānisms joprojām nav noskaidrots. Fizioloģiski mūzika, šķiet ietekmē tikai klausīšanās uztveri, taču izjūtu izpausmes pārsniedz klausīšanos (Solanki, 2012). Muzikālās aktivitātes un pieredze, kas ir papildīta ar emocionālām asociācijām, var pamodināt un mainīt dažādas emociju izpausmes (MacRae, 1992, citēts pie Solanki, 2012). Atsaucoties uz M. Steklera (*Steckler*) un S. Najaka (*Nayak*) veiktajiem pētījumiem par mūzikas terapijas efektivitāti, Solanki ir secinājis, ka „mūzikas ritms spēj strukturēt uzvedību vienlaicīgi, ietekmējot emocijas un mainot tādas fizioloģiskas funkcijas kā sirds ritmu, muskuļu tonusu, asinsspiedienu un elpošanu” (citēts pie Solanki, 2012).

M. Solanki ar kolēģiem savā pētījumā ir apskatījuši arī vairāku citu mūzikas terapeitu pētījumus (Sacks, 2006; Peretz & Zatorre, 2005; Koelsch et al., 2006), kuri rāda, ka mūzikas klausīšanās palielina kognitīvās un emocionālās izpausmes, kas atspoguļojas dažādos neironu savienojumos, un mūzika ir pazīstama kā viena no visspēcīgākajiem dzirdes stimulācijas avotiem uz cilvēka smadzenēm. Tādi autori kā P. Apdaike (Updike, 1990), J. Kaminskis (Kaminski, 1996) un O. Lī ar kolēģiem (Lee, 2005) katrs savā neatkarīgā pētījumā ir apskatījuši veģetatīvās nervu sistēmas izmaiņas mūzikas ietekmē un secinājuši, ka mūzikas ietekmē parasimpātiskā nervu sistēma sāk dominēt pār simpātisko nervu sistēmu, kā rezultātā organisms nomierinās, elektroencefalogrammā tas parādās kā alfas smadzeņu viļņu frekvenču palielināšanās, un fizioloģiski izpaužas muskuļu relaksācijā ar regulāru dziļo elpošanu un pazeminātu pulsu (citēts pie M. Solanki 2012).

Klausīšanās veidi un to klasifikācija ietver aktīvo, produktīvo, uzmanīgo u.c. D. Diderihsens<sup>5</sup> (*Diedrich Diederichsen*) runā par četriem klausīšanās tipiem: rekonstruktīvais, referenciālais, "ritmiski-telpiskais," un "ekspresīvi-

<sup>4</sup> Mūzikas terapijā šādu stāvokli sauc: mainītas apziņas stāvoklis

<sup>5</sup> Diederichsen D. Listening, Listening again, Quoting. BBooTTSSLL## 52 0210413 M JAUrn 2100 1122:3329 PPM

dinamiskais". Mēs klausāmies jaunas skaņas vai dziesmas, garīgi tās rekonstruējot, tas ir, imanentā (iekšējā, tikai prātā notiekošā) veidā. Bet mēs klausāmies to, ko mēs jau zinām "attiecīgi" (referenciāli) – tas ir, attiecībā uz citu vietu un laiku, vienalga vai tas būtu objektīvs, skaidri formulējams piemērs, vai mazāk loģiska, subjektīva sastapšanās.

Savā “Jaunās Mūzikas Filosofijā” (angļu. *Philosophy of New Music*) Teodors V. Adorno (Theodor W. Adorno) izšķir divus klausīšanās tipus: "ritmiski-telpisko," un "ekspresīvi-dinamisko". Pirmajā, tā kā ritms "virtuāli pārtrauc" laiku, sadalot to vienādās taktīs, tas padara mūziku telpisku, tāpat arī klausītāji, kas seko līdz ritmam. Savukārt, otrais klausīšanās tips koncentrējas uz laika apstrādi ar paša dziedāšanas spējām kā izejas punktu. Abi tipi pieder pie "rekonstruktīvās klausīšanās", kas virza klausītāju līdz mūzikai. Šai ziņā, tie ir kā "nefokusēta" klausīšanās – klausīšanās pēc kaut kā jau pazīstama, kas koncentrējas uz neesamību (piemēram, kādu iepriekšējo klausīšanās pieredžu apstākļu trūkums). Šīs klausīšanās identificējošās formas rada attiecības starp dotajiem muzikālajiem vēstījumiem un trūkstošo saturu, kā, piemēram, pirmās audiālās pieredzes notikuma vieta, dažādos, ļoti atšķirīgos veidos.

Mūzikas terapeita praksē mūzikas klausīšanos var klasificēt dažādi. Mūzikas terapijā: klausīšanos var aplūkot arī kā intervences terapeitisku kvalitāti.

Līdzās sociālpsiholoģijas attīstībai arī mūsdienu mūzikas terapijā parādās tendences saprast mūziku kā “emocionālu komunikācijas formu”, kā “kontaktlīdzekli”, kura terapeitiskā iedarbība pamatojas tā “komunikatīvajā funkcijā”.

### **Mūzikas terapija: klausīšanās kā terapeitiska kvalitāte**

#### ***Music therapy: listening as a therapeutical quality***

Mūzikas terapijas prakse pie mums, Latvijā, ir vēl ļoti jauna, it īpaši – tās zinātniskajā un praktiskajā veidā. Īsumā var raksturot dažus, praksē jau pārbaudītus, mūzikas terapeitiskos aspektus.

Kā zināms, vai ikkatra psihiska jeb somatiska saslimšana ierobežo, apgrūtina pacienta dzīvi. Slimniekam uz laiku jāatsakās no sava darba, ierastās vides un saskarsmes. Šādās un līdzīgās situācijās iespējams izmantot sekojošas mūzikas terapijas koncepcijas: psihoanalītisko (uz Freida un Junga teorijām balstīto), regulatīvo (K. Švābes (*Schwabe*) muzikālās relaksācijas un refleksijas teorijas) un radošo (P. Nordofa un K. Robinsa aktīvas muzikālās darbošanās – muzicēšana un dialogu veidošana)<sup>6</sup>. Mūzikas klausīšanās šajās terapijās tiek lietota gan tās aktīvajā, gan arī receptīvajā veidā.

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<sup>6</sup> Vairāk var lasīt: Paipare, M. (2011). Mūzikas terapija. No: *Mākslu terapija*. Sast. K. Mārtinsons. Rīga, RaKa. 340.lpp

Aktīvās klausīšanās metode radošās terapijas procesā nozīmē, ka pacients un terapeits veido, piemēram, muzikālu dialogu, abiem pārmaiņus muzicējot. Te izmanto dažādus instrumentus ar atšķirīgiem tembriem un skaņas augstumiem; veidot saskanīgu dialogu nozīmē “atbildēt” līdzīgā tembrā un skaņas augstumā, adekvāti reaģēt uz mūzikas raksturu. Tādējādi mūzika kļūst par svarīgu neverbālu komunikācijas līdzekli ar emocionālu iedarbību pat tādos gadījumos, kad vārdiskas sarunas nav iespējamas. Tā kā mūzikas iedarbība notiek ar smadzeņu zemgarozas sistēmu palīdzību, tad tās uztverei un reproducēšanai ir lielas priekšrocības. Mūzika spēj kompensēt arī emocionālu diskomfortu kritiskās situācijās.

Receptīvā ar uztveri saistītā klausīšanās nozīmē, ka pacients nesaņem uzdevumu tieši ieklausīties mūzikā, lai spētu spriest, analizēt vai izteikties par to, bet mūzikas skanējums veido terapeita prasmīgi ievirzītu skaniski emocionālo fonu pacienta atbrīvošanai, domu un asociāciju raisīšanai, kam var sekot vēlme un iespēja pašizteikties, pašapliecināties fantāzijas tēlos. Šī pašizteikšanās var liecināt par pacienta psiholoģisko stāvokli, domāšanas veidu, kompleksiem vai brīvību, bet vienlaikus darboties arī kā emocionāls vai sasprindzinājuma “ventilis”, kad uzkrātās problēmas, negatīvās emocijas u.tml. psiholoģiskais diskomforts netieši tiek likvidēts vai mazinās.

Līdzīgas metodes un paņēmienus meklē un pielieto mūzikas terapeiti, kuri darbojas pēc citām pieejām un skolām: psihoanalītiskajā, regulatīvajā, A. Tomatis terapijā un citās. Tātad mūzikas klausīšanās iespējas un tās iedarbības aspektu izmantošana vēl nebūt nav izsmelta vai pilnībā izpētīta, tomēr skaidras dažas būtiskās nostādnes: aktīva, labvēlīga tā sauktās "klasiskās" mūzikas klausīšanās cilvēku bagātina visdažādākajos veidos – no tīri fizioloģiskā vai bioloģiskā, līdz emocionālajam un augsti intelektuālajam. Saprast un pamatot šīs daudzveidīgās iedarbības mehānismus, prast pielietot tos pedagoģiskajā un psiholoģiskajā praksē mūzikas terapijā nozīmē palīdzēt pilnvērtīgas, harmoniskas personības veidošanā, kas ir veselīgas sabiedrības priekšnoteikums. Ne velti senatnes domātāji – Aristotelis un Platons, arī stoīķi – uzskatīja, ka mūzika un muzicēšana ir valstiski svarīga nodarbe. Gluži citādi mūzikas klausīšanās process tiek aplūkots mūzikas terapijas zinātniskajos pētījumos, kur tiek runāts par klausīšanās sekvencēm un perspektīvām.

K. Arnasone (*Carolyn Arnason*) apraksta pētījumu procesu un rezultātus kvalitatīvam pētījumam (intervijas), kas veikts 2 gadu laikā ar pieredzējušiem mūzikas terapeitiem, kuri darbā pielieto klīnisko improvizāciju kā metodi. Pētījuma primārais mērķis bija atklāt, kā mūzikas terapeiti klausās klīniskās improvizācijas, kuras kopīgi veidojuši ar saviem klientiem/pacienti.

Balstoties uz interpretatīvo analīzi, K. Arnasone izdala piecus klausīšanās veidus mūzikas terapijā. Tos varētu apzīmēt vienkārši kā klausīšanās līmeņus, kuros pieredzējuši mūzikas terapeiti klausās klīniskās improvizācijas no dažādiem

aspektiem un ar dažādu attieksmi. Tas nozīmē, ka mūzikas terapeitam ir jāklausās citādi sesijas laikā un vēl savādāk, klausoties improvizāciju ierakstus.

1. klausīšanās līmenis: klausoties mūziku un muzikālās atbildes reakcijas.

Analītiski klausoties, improvizācijās var saklausīt dažādus muzikālus elementus (skaņas, intervālus, ritmu vokalizācijas motīvus, basa līniju, struktūru). Tomēr mūzikas terapeits klausās ne tikai to, bet interpretē mūziku aprakstošā līmenī. Interpretācija var ietver gan klienta muzikālo raksturojumu, gan muzikālo intensitāti. Mūzikas terapeits var arī vērst uzmanību uz muzikālo dialogu starp viņu un klientu/pacientu.

2. klausīšanās līmenis: klausīšanos ietekmē atmiņa, muzikālā pieredze, transparentā klausīšanās, savaldība.

Klausoties improvizāciju, mūzikas terapeitam raisās atmiņas, kas saistās ar iepriekšējiem klientiem/pacientiem – tendences, tēmas veidi, kā tās attīstās, dažādi muzikāli motīvi u.c. Transparentā klausīšanās nozīmē vēlreiz pārdzīvot improvizāciju, klausoties to ierakstā. Tas nozīmē mēģināt atbrīvot sevi no muzikāliem un klīniskiem aizspriedumiem un ieklausīties mūzikā no jaunas perspektīvas vai cita skatu punkta. Klausīšanās ar *savaldīšanos* nozīmē klausīties vidē, kur neviens netraucē, iekšējā klusumā un koncentrējoties. Muzikālā pieredze nozīmē mūzikas terapeita muzikālo izglītību, kultūru, dzimtas saknes, pieredzi kā mūziķim, arī pieredzi kā mūzikas klausītājam.

3. klausīšanās līmenis: klausīšanās klīniski vērojot, jūtot un domājot.

Šie trīs jēdzieni ir savstarpēji saistīti, un tie izmanto gan prātu, gan ķermeni, piemēram, uztveri ar mūsu sajūtām. Mūzika var tikt sajusta arī fiziski jeb ķermeniski. Mūzikas terapeits klausās, vērojot klienta ķermeņa kustības, žestus, elpu, skatienu, darbošanos. Pamatojoties uz šiem vērojumiem, mūzikas terapeits interpretē klienta garastāvokli, sejas izteiksmi, ķermeņa valodu, arī klienta – terapeita attiecību kvalitāti.

4. klausīšanās līmenis: klausoties nozīmību, tēlainību un netveramību.

Klausoties nozīmību, mūzikas terapeits pievērš uzmanību terapeitiskiem mērķiem, jau iepriekš paredzot un sagaidot, ka notiks kaut kas būtisks darbā ar klientu, darbs virzīsies uz priekšu. Tā ir kā *klausīšanās vīzija*, kad mūzikas terapeits klausās uz izmaiņām klienta atbildes reakcijās. Tēlainība (metaforas, stāstījumi, sāgas, mīti, garīgi tēli, simboli, asociācijas, atmiņas u.c.) ir svarīgs terapeitiskās un muzikālās informācijas avots. Klausoties mūzikas netveramību, ir iespējama piekļuve garīgām dimensijām improvizācijas radīšanas laikā. Šis līmenis ir transpersonāls.

5. klausīšanās līmenis: klausīšanās koncentrējoties uz mūziku, konteksta jūtīgumu un attieksmi pret improvizāciju.

Šī perspektīva var tikt nosaukta par mūzikas terapeita klausīšanās viedokli/uzskatu un viņa ticību mūzikas spēkam. Šeit atklājas teorētiskā sapratne vai sagatavotība, izglītība, dzīves un muzikālā pieredze, kultūra. Būtiski ir tas, ka

muzikālā improvizācija tiek uzskatīta par iedvesmas avotu, kreatīvu atjaunošanos un mūzikas izpratni. Šādai izpratnei ir nozīme klienta radītās mūzikas dažādo kontekstu tulkojumos (Arnason, 2003).

## **Secinājumi** **Conclusions**

Praksē pierādījies, ka mūzikas apzināta un ieinteresēta – gan asociatīva, gan analītiska klausīšanās – jūtami ietekmē personības vispusīgu attīstību. Šādas attīstības izpausmes faktori var būt sekojoši:

1. Paaugstinās personības radošās spējas un vispārējā inteliģence;
2. Psihoemocionālā elastība un atsaucība veicina sociālās kompetences un empātijas veidošanos; mūzika palīdz veidot tā saukto “emocionālo inteliģenci”. Psiholoģijā mūziķus nereti apzīmē kā “drosmīgos, iejūtīgos intravertus”;
3. Mūzikas klausīšanās aizvien plašāk tiek izmantota kā iedarbīgs terapeitisks faktors: mūzika var līdzsvarot psihisko nestabilitāti un jūtami ietekmēt dažādu slimību profilaksi, gan arī līdzdarboties kā rehabilitācijas līdzeklis un sekmēt harmoniskas personības integrāciju sabiedrībā.

## **Summary**

Music listening more and more is being applied as an effective therapeutical factor: music can balance mental disbalance and influence prevention of various illnesses, help in rehabilitation and facilitate integration in society.

Aim of this article is to attract attention to the significance of listening in communication and development of cognitive and phenomenological skills (perception, recognition, describing, explaining). These skills and abilities are necessary for working pedagogues, psychologists and especially for music therapists.

Music hearing and listening is not the same – there is a big difference in their intrinsic psychological processes (Nelson & Paipare, 1992). Music listening is a dynamic process that provokes complex mental and intellectual activities because it takes concentration and effort – heard music has to be perceived, understood and remembered. This process also improves perception skills, concentration skills and emotional responsiveness.

Music perception and listening is influenced by both musical and non-musical factors (Bastian, 2000). Musical factors influence how people listen to the music, what they listen, how often how loudly and in general – how much their wellness will be influenced. Musical factors are music genre/style, mode, rhythm, meter, tempo, melody, harmony, dynamics, timbre, instrumentation etc. Non-musical factors include person's individual and situational factors.

There are various hypothesis how music influences the change of emotions and behaviour but precise mechanisms has not yet been found. Musical activities and experience that is filled with emotional associations can awaken and change various emotional expressions (MacRae, 1992, cited by Solanki, 2012).

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# IZZINOŠI INTERAKTĪVA SPĒLE KOMUNIKĀCIJAS NODROŠINĀŠANAI AUGSTSKOLAS REKLĀMAS PASĀKUMOS

## *Game Design for Interactive Communication at Advertising Events of University*

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**Abstract.** *The aim of the article - to study the essence of game design and the possibilities of usage games in the pedagogical-psychological context, to justify the choice of the game as tool of university advertising. Research methods - theoretical - research of literature and internet resources; empirical - interviews of experts. Since the aim of the projected game is to test and supplement the knowledge about Rezekne Academy of Technologies (RTA) and create interest in studying at RTA, the degree of research of the topic has been done by analyzing publications about the place of game in advertising, as a educational tool, as well as scientific articles about game design, its development process. The concept of advertising game includes the substantiation of the content, organizational, constructive and graphical solution.*

**Keywords:** *advertising, game, design, university, interview.*

### **Ievads**

#### ***Introduction***

Mūsdienās katra uzņēmuma mārketinga nozīmīga sastāvdaļa ir reklāma. Reklāmas uzdevumos ietilpst veidot ilgstošu un noturīgu produkta un/vai uzņēmuma tēlu, informēt par jauniem produktiem un tml. Viens no komercireklāmas veidiem ir uzņēmuma reklāma, iepazīstoties ar kuru tiek gūta informācija par atrašanās vietu, personālu, tehnoloģijām, tradīcijām un kultūru, darbības veidiem un darbības rezultātiem. Arī mācību iestāde mūsdienās tiek pozicionēta kā uzņēmums, kas sniedz noteiktus pakalpojumus un potenciālais lietotājs var izvēlēties saviem kritērijiem atbilstošāko.

Mūsdienu informācijas un tehnoloģiju laikmetā ir mainījusies attieksme pret dažādiem reklāmas veidiem. Informatīvajos pasākumos dažkārt ir grūti piesaistīt mērķauditorijas uzmanību. Standarta reklāmas līdzekļi – bukleti un brošūras bieži vien iegulst apmeklētāju somās tā arī neapskatīti. Vēl sarežģītāk ir panākt to, lai

mērķauditorija atcerētos iegūto informāciju. Iespējams, ka risinājumu var rast pedagoģijas laukā, kur skolēnu motivācijai un intereses uzturēšanai tiek izmantotas interaktīvas mācību metodes ar mērķi zināt un mācīties darot. Viens no šādiem interaktīvas komunikācijas veidiem reklāmas pasākumos, kas sekmē izziņas procesu, var būt spēle, kurā tiek iesaistīti apmeklētāji. Šāda veida spēle var kalpot vairākiem mērķiem: tā piesaista apmeklētāju uzmanību, pateicoties vizuāli pievilcīgam noformējumam; izglīto, ieinteresē un nodrošina nepieciešamo informāciju, pateicoties informatīvajam saturam, rada notikumu spēles dalībnieka dzīvē.

Raksta mērķis - izpētēt spēļu dizaina būtību un spēļu izmantošanas iespējas pedagoģiski psiholoģiskajā kontekstā, pamatot spēles kā augstskolas reklāmas līdzekļa izvēli.

Pētījuma metodes - teorētiskās – literatūras un interneta resursu izpēte; empīriskās – ekspertu intervijas.

### **Spēļu dizaina pētījumu aktualitātes** *Topical issues in game design research*

Izvēloties spēli kā vienu no augstskolas reklāmas veidiem, būtiski izprast tās saturisko, organizatorisko un konstruktīvi ergonomisko risinājumu. Mūsdienās, kad tehnoloģijas turpina strauji attīstīties, lielu popularitāti ir guvušas datorspēles. Taču aizvien vairāk tiek popularizētas klasiskās spēles (galda, grīdas u.c.), kurās iesaistoties, tiek veidota tieša komunikācija gan starp dalībniekiem, gan starp dalībniekiem un spēles vadītāju, kas augstskolas reklāmas spēlē ir īpaši būtiski.

Tā kā projektējamās spēles mērķis ir gan pārbaudīt, gan papildināt spēlētāju zināšanas par Rēzeknes Tehnoloģiju akadēmiju (RTA) un radīt interesi par studijām RTA, tēmas izpētes pakāpes analīze veikta, meklējot publikācijas par spēles vietu reklāmas līdzekļu klāstā, par spēli kā izglītojošu rīku, kā arī zinātniskos rakstus par spēles dizainu, tā izstrādes procesu. Veicot ar spēļu dizainu un reklāmu saistītu pētījumu apskatu zinātniskajās datu bāzēs, var secināt, ka šāda veida tematika, dažādos aspektos, pēdējā desmitgadē ir kļuvusi populāra. Ja 2004.gada publikācijā autoru kolektīvs (Salen & Zimmerman, 2004) norāda nepieciešamību skatīt spēļu dizainu kā atsevišķu jomu, jo, salīdzinot spēļu dizainu ar citām dizaina jomām kā arhitektūru vai grafikas dizainu, tas netiek izdalīts, neskatoties uz spēļu izcelsmes vēsturiskumu, nav iespējams iegūt grādu spēļu dizainā un atrast sadaļu bibliotēkas plauktā, tad vēlākos gados jēdziens ‘spēļu dizains’ tiek lietots itin bieži.

Spēļu dizains ir dizaina un estētikas pielietošanas māksla, lai izveidotu spēli izklaidēm vai izglītojošiem, fiziskiem vai eksperimentāliem nolūkiem. Arvien vairāk spēļu dizaina elementi un principi tiek piemēroti arī citām mijiedarbībām, it īpaši virtuālām. Izstrādājot spēles dizainu (galda spēles, kāršu spēles, kauliņu

spēles, kazino spēles, lomu spēles, sporta, videospēles, kara spēles vai simulācijas), tiek izvirzīti mērķi, noteikumi un uzdevumi, kas rada vēlamo mijiedarbību starp tās dalībniekiem un, iespējams, skatītājiem (Nicholson, 2011).

Akadēmiski spēļu dizains ir daļa no spēļu studijām, bet spēļu teorija pēta stratēģisko lēmumu pieņemšanu (galvenokārt ārpus spēles situācijām). Vēsturiski spēles ir iedvesmojušas pētījumus varbūtības, mākslīgā intelekta, ekonomikas un optimizācijas teorijas jomās.

Izglītojošo spēļu izmantošana mācību vidē kļūst arvien nozīmīgāka tendence. Pasaulē daudzi zinātnieki ir pievērsušies izglītojošo spēļu izmantošanas rezultātu analīzei visos vecumposmos. Tā, piemēram, zinātniskajos rakstos ir pētītas uz spēlēm balstītas mācīšanās motivācijas iezīmes. Spāņu zinātnieki (Moreno-Ger, Burgos, Martínez-Ortiz, Sierra, & Fernández-Manjón, 2008) analizē dažas būtiskas prasības izglītojošo spēļu konstruēšanai tiešsaistes izglītībā, kā arī tiek piedāvāta vispārīga spēles dizaina metode, kas ietver adaptācijas un novērtēšanas funkcijas.

Spēles tiek izstrādātas dažādu mācību priekšmetu mācīšanai. Galda spēles ir kļuvušas par vienu no mācību līdzekļiem. Daudzi pedagogi ir izvēlējušies izmantot galda spēles, lai uzlabotu kursa satura apguvi (Azman Ab., Sabri, & Nurkhamimi, 2018). Apgūstot informātikas algoritmus, tika novērots, ka ar spēles palīdzību palielinās skolēnu motivācija tēmas apgūvē. Spēles sociālā mijiedarbība ļauj skolēniem sadarboties vai konkurēt spēlējot, padarot mācīšanos daudz aizraujošāku (Battistella, Wangenheim, Wangenheim, & Martina, 2017). J. Farzads (Farzad, 2018) apstiprina video izglītojošās spēles lomu angļu valodas apgūvē, akcentējot atcerēšanās efektivitāti eksperimenta grupā.

Pētnieki K.D. Valentine un L.J. Jensens (Valentine & Jensen, 2018) veica gadījumu izpēti, analizējot jauniešu (11-17 gadi) pieredzi spēļu dizaina nometnē, apgūstot video spēļu dizaina pamatus. Iegūtie rezultāti pierāda, ka spēļu dizaineri balstās uz savu spēlētāja pieredzi. Pētījumā gūtie novērojumi par jauniešu domāšanas procesiem tiks ieteikti spēļu projektēšanā. Galda spēles kā rūpnieciski ražota produkta izgatavošana, iesaistoties dažādu profesiju speciālistiem, tiek analizēta kā mācību tēma 4.-6.klases skolēniem (Moon & Bartholomew, 2018) un var tikt izmantota kā dizaina procesa paraugs. Tāpat galda spēli var izmantot konkrētu teritoriju izpētei un zināšanu ieguvei, kā to apraksta M. Kosa un M. Džilmezs (Kosa & Yilmaz, 2017) savā pētījumā par galda spēles dizaina izstrādes procesu par Amerikas Savienoto Valstu teritorijām.

Itālijas pētnieku zinātniskā publikācija (Amaro et al., 2006) izstrādāta ar mērķi pārbaudīt autoru radītās spēles *Kalèdo* iedarbību uz uztura zināšanu un uztura lietošanas uzvedības izmaiņām izmēģinājuma pētījumā, kas tika veikts iesaistot pusaudžus no trīs vidusskolām Neapolē.

Publikācijā „Kā spēles un simulācijas var izmantot augstākās izglītības jomā” izklāstīts process, kurā skaidri jānosaka šāda veida uzdevuma

nepieciešamība, kam seko pamatnostādnes jaunas idejas izstrādei: (1) satura izvēle; (2) formāta izvēle, piemēram, vienkāršs manuāls treniņš, kāršu spēle, galda spēle vai datorizēta spēle; (3) fiziskās slodzes kopējās struktūras izvēle, piemēram, lineāra, zarojoša, radiāla, cikliska, interaktīva vai saliktās struktūras; un (4) kā izmantot šīs struktūras katrā no dažāda veida formātiem (Ellington, 1997).

Izglītojošo spēļu popularitāti medicīnas studijās pierāda zinātnieku grupas pētījums (Trevino et al., 2016), kura mērķis ir salīdzināt izglītojošas galda spēles efektivitāti, tās atbilstību interaktīvajiem didaktiskajiem norādījumiem.

Profesijā svarīgu prasmju apguvi ar spēļu palīdzību koledžas mācību procesā skata W. Huang un J.C. Ho (Huang & Ho, 2018) norādot, ka ņemot vērā uzņēmuma ierobežoto laiku un resursus, ir nepieciešama efektīva mācību metode, kas uzlabo darbinieku spēju pieņemt ētiskus lēmumus. Nozīmīgus secinājumus par izglītojošajām spēlēm sniedz S. Nikolsons (Nicholson, 2011). Viņš akcentē spēlētāja iesaistīšanās jēdzienu. Izveidojot spēli, ir svarīgi domāt par to, kā visi spēlētāji var būt iesaistīti spēlē, cik bieži vien iespējams. Šī koncepcija ir novērota daudzās modernās galda spēlēs un to var piemērot arī izglītojošām spēlēm.

Jaunākajos pētījumos pozitīvi novērtēta arī galda izglītojošo spēļu ietekme uz spēlētāju. D.A. Koils, C.L. Ettingers un J.A. Eisens (Coil, Ettinger, & Eisen, 2017) analizē, kā pirmoreiz, bez iepriekšējās pieredzes, radījuši izglītojošu un izklaidējošu spēli un iesaka citiem pievērst uzmanību spēļu attīstības un loģistikas jautājumiem, akcentējot dizainu un ražošanu. Kā ļoti nozīmīga atzīmēta daudzkārtēja spēles testēšana, tajā iesaistot cilvēkus ar dažādu pieredzi, tostarp tādus, kas labi pārzina spēļu zinātņi, kā arī cilvēkus, kuri daudz spēlē galda spēles.

Reklāma un galda spēle ir atslēgas vārdi rakstā „*Media Smart* uzsāk reklāmas galda spēli”. Spēle māca bērnus domāt kritiski par reklāmu un, kā atzīmē tās veidotāji, nav vērsta uz informēšanu par karjeru reklāmā (*Media Smart launches advertising board game*, 2005).

Zinātnisko rakstu izpēte ļauj secināt, ka spēles, tai skaitā galda spēles, plaši tiek izmantotas izglītojošos nolūkos gan formālajā, gan neformālajā izglītībā. Pētnieki uzmanību pievērš spēles dizainam, izstrādes procesam un iespējamajiem uzlabojumiem, taču spēles izmantošana augstskolas reklāmai nav pētīta, kas apliecina šī pētījuma aktualitāti.

### **Ekspertu interviju analīze** *Analysis of experts' interviews*

Ar mērķi noskaidrot ekspertu viedokli par spēles izmantošanas iespējām augstskolas reklāmā, tika veiktas ekspertu intervijas.

Intervija ir visplašāk izmantotā kvalitatīvo datu vākšanas metode. Intervijas pamatotība nozīmē ne tik daudz patiesības atklāšanu intervijas laikā, cik

sabalansētu intervijas aprakstu un interpretāciju. Nevienu interviju nevar iepriekš paredzēt. Intervijā atklājas subjektīvā jēga, nevis standarta formā izraisīta reakcija (Pipere, 2011).

Pēc formas tika izmantota strukturēta intervija, kuru veido speciāli sagatavoti jautājumi. „Šādām intervijām ir konkrētas priekšrocības. Tās rada iepriekš strukturētu informāciju, ir mazāk laikietilpīgas un vieglāk analizējamas” (Kristapsone, 2008, 265). Klasificējot pēc distances, tika izmantota attālinātā intervija. Respondentiem anketas ar jautājumiem tika nosūtītas uz e-pastiem. Kā mīnuss šādām intervijām minēts neverbālo elementu trūkums un ierobežotība laikā. Pēc intervējamo skaita, izmantotas individuālās intervijas – anketa adresēta atsevišķi katram intervējamajam.

Ekspertu atlase izvēlēta atbilstoši to profesionālajai pieredzei spēļu dizaina jomā. Anketas tika nosūtītas 11 ekspertiem no astoņiem uzņēmumiem. Tika saņemtas četras anketas ar atbildēm uz intervijas jautājumiem. Ekspertu pārstāvēto uzņēmumu sarakstu skat. 1. tabulā.

*1.tabula. Ekspertu pārstāvēto uzņēmumu saraksts*  
*Table 1 List of companies represented by experts*

Nr.	Uzņēmums	Valsts
1.	„Brain Games”	Latvija
2.	„Wolff Designa”	Latvija
3.	„Hub Games”	Lielbritānija
4.	„Исповед”	Krievija

Ekspertiem tika uzdoti jautājumi par viņu pieredzi spēļu dizaina jomā, par šī brīža aktualitātēm un tendencēm, grafiskā dizaina ietekmi spēles izvēlē, kā arī par spēļu izmantošanu reklāmas nolūkos.

Raksta ietvaros tiks detalizētāk apskatītas ekspertu atbildes uz jautājumiem par spēļu dizainu un reklāmas spēlēm, jo tas ir svarīgi autorēm jaunas spēles dizaina izstrādē.

Interesants fakts, ka, runājot par tendencēm spēļu dizainā, eksperti pieminēja spēļu mehānikas, konstrukcijas u.c. raksturīgas īpašības, neizceļot noformējumu jeb grafisko dizainu. Vārdnīcas terminu „dizains” skaidro kā „vides un priekšmetu māksliniecisku projektēšanu un konstruēšanu” (Aldersons, 2011, 74). Acīmredzot šis jēdziena skaidrojums atbilst galda spēļu industrijai, jo jomas speciālisti lieto jēdzienu „spēles dizains”, kad raksturo spēli kopumā – tās konstrukciju, projektu, mehāniku, izskatu utt.

„Hub Games” pārstāvis Maikls Fokss, uzsvēra, jāsaprot, kas tiek domāts ar vārdu dizains. Ja jēdziens tiek lietots runājot par spēles prezentēšanu un izskatu (grafiskais dizains), protams, cilvēki parasti dod priekšroku spēlēm, kas izskatās saistoši. Ja jēdziens tiek lietots attiecībā uz spēles mehānismiem, dizainam var

nebūt tik liela ietekme. Piemēram, daudzi cilvēki nepērk spēli ar sarežģītiem noteikumiem, ja tā ir paredzēta ģimenes atpūtai. Tā vietā viņi izvēlas kaut ko ātru, vienkāršu un jautru.

Savukārt veikalu tīkla „*Игровед*” pārstāvis piekrita tam, ka spēles noformējums ietekmē pieprasījumu, jo cilvēki sākotnēji novērtē ārējo izskatu. Tā, piemēram, attiecībā uz bērnu spēlēm, priekšrocība būs tai spēlei, kuras noformējums ir spilgtāks un pievilcīgāks. Bet Jānis Grunte no uzņēmuma „*Brain Games*” uzskata, ka sākumā rodas dizains, un tad izdevējs strādā pie tā, lai radītu pieprasījumu. Artjoms Ničipurovs izteica līdzīgu viedokli, un piebilda, ka tirgū ir vieta gandrīz jebkurai spēlei.

Atbildot uz jautājumu par spēles izmantošanu augstskolas reklāmas nolūkos, visi eksperti bija skeptiski. Artjoms Ničipurovs atzina, ka ir grūti atbildēt uz šo jautājumu, jo viņš nezina tādas spēles, kas reklamētu augstskolu, bet jebkurā gadījumā spēlei galvenokārt jābūt saistošai. Pretējā gadījumā neviens to neatcerēsies un tā „nestrādās” kā reklāmas līdzeklis. Eksperts atzina arī to, ka spēli viņš neattiecina uz reklāmas materiāliem, bet nevar apgalvot, ka tas nav iespējams. Arī veikalu tīkla „*Игровед*” pārstāvis izteica viedokli, ka var pamēģināt integrēt spēles reklāmā, bet paliek jautājums, kā šādu spēli realizēt, jo parasti tematiskās spēles izgatavo kā dāvanu konkrētā uzņēmuma darbiniekiem vai lai atbalstītu jau esošo produktu (piemēram, multfilmas, seriālu utt.).

Tā kā ekspertiem no „*Wolff Designa*” un „*Игровед*” bija grūti atbildēt uz šo jautājumu, jo viņi nav veidojuši reklāmas spēles un iedomājās, ka tā varētu būt galda spēle, saražota nelielā tirāžā, ar mērķi dāvināt informatīvo pasākumu apmeklētājiem, tāpēc ekspertiem no „*Brain Games*” un „*Hub Games*” tika nosūtīti spēles „*Ko tu zini par RTA*” sākotnējā varianta fotoattēli, kas tika uzņemti spēles aprobācijas laikā.

Jānis Grunte atzīmēja, ka ļoti reti reklāmas nolūkos radītās spēles ir spējīgas izdzīvot. Parasti tām tiek pielāgota kāda jau esoša spēle (Cirks, Monopols), kuras jau pēc savas būtības ir novecojušas. Un līdz ar to, ja pati spēle nav interesanta (kas, protams, ir subjektīvi) tad arī fakti vai informācija zaudē savu spēju efektīvi sasniegt savu auditoriju. Pēc šī eksperta uzskata, būtu labāk reklamēt augstskolu citā veidā, kurš neprasa laiku (noteikumu iegaumēšanai un spēlēšanai) no mērķauditorijas.

Maikls Fokss izteica viedokli, ka spēles, kas tiek izmantotas produkta vai vietas reklāmai, parasti nav labi novērtētas. Ir neskaitāmas „*Monopola*” versijas, kas tiek izmantotas, lai popularizētu šovus, karikatūras, pilsētas vai sporta komandas, bet to pamatā ir viena tā pati spēle. Maikls Fokss atzina, ka var mēģināt reklamēt augstskolu ar spēles palīdzību, tomēr piebilda, ka nav garantiju, ka spēle tiks labi pārdota. Bet, kad eksperts saņēma spēles prototipa attēlus un attiecīgus paskaidrojumus, viņš saprata spēles izmantošanas iespējas. Maikls Fokss vairākus gadus nodarbojas ar spēļu izstrādi un parasti specializējas spēles mehānikas

izstrādē, vērojot, kā dažādi spēļu elementi savstarpēji mijiedarbojas. Pēc atsūtītajiem attēliem viņš secināja, ka spēlei ir parasta spēlēšanas mehānika, un cilvēki varēs ātri un viegli saprast noteikumus, kas ir ļoti svarīgi. Ekspertu pārsteidza spēles tehniskais risinājums – laukuma pārvešana vertikālajā plaknē, banera un magnētisko elementu izmantošana. Maikls Fokss atzina, ka, mainot novietojumu, saglabāt laukuma labo izskatu mēdz būt ļoti sarežģīti, bet RTA spēles gadījumā, tas ir izdevies.

Kopumā var secināt, ka spēļu industrijā nodarbinātie eksperti, vairāk ir ieinteresēti spēļu pārdošanas rādītājos, tāpēc speciāliem gadījumiem domātu spēļu, kas attiecas uz atsevišķu uzņēmumu reklāmu, radīšanai, komerciālu izdevīgumu nesaskata. Vairākums reklāmas spēles saprot kā dāvanas darbiniekiem un viesiem. Ekspertu intervijās tika gūts apstiprinājums izstrādātās spēles konstrukcijas dzīvotspējai.

### **Spēles „RTA STUDIJU SPĒLE” koncepcija** *Concept of the game "RTA STUDY GAME"*

Spēles koncepcija ietver saturiskā, organizatoriskā, konstruktīvā un grafiskā risinājuma pamatojumu. Spēles saturs un organizācija paredz, ka spēlēšanas laikā dalībnieks ne tikai pārbauda savas zināšanas par Rēzeknes Tehnoloģiju akadēmiju, bet arī uzzina jaunus faktus – informāciju, kas reklamē studijas akadēmijā. Mehānika, kas aizgūta no galda spēlēm, iesaista dalībniekus procesā, veicina to interesi iziet spēli. Tādā veidā, jo ilgāk reklāmas pasākuma apmeklētājs piedalās spēlē, jo vairāk informācijas par studiju iespējām viņš iegūst.

Spēles laukums veidots kā akadēmijas vēsturiskās ēkas stilizēts plāns. Spēlētājiem tiek piedāvāts iejusties studenta dzīvē un iegūt priekšstatu par to, kā notiek studijas augstskolā, kādas aktivitātes un iespējas tiek piedāvātas. Šajā kontekstā spēle ir kā ieskats akadēmijas piedāvātajās iespējās vai sava veida ekskursija. Spēli nevar uztvert kā studiju modeli vai ceļvedi, kas pilnībā atainotu studiju procesu. Šajā gadījumā „RTA studiju spēle” ir reklāmas informācijas pasniegšanas veids.

Spēle „RTA STUDIJU SPĒLE” ir daļa no Rēzeknes Tehnoloģiju akadēmijas reklāmas materiāliem, kura tiks izmantota pasākumos. Tās noformējumam jāatbilst akadēmijas vienotam stilam, jo tieši pārdomāts, saturisks un vienots stils rada labu priekšstatu par organizāciju.

„RTA STUDIJU SPĒLES” dizains balstās uz futuristiskiem un tehnoloģiskiem motīviem, tādā veidā uzsverot akadēmijas aktīvo darbību un attīstību tehnoloģiju zinātņu jomā. Spēles grafiskajā dizainā tika izmantotas ģeometriskas formas, kā arī zilās krāsas toņi, kas ne tikai saskaņojas ar akadēmijas logo toņiem, bet arī asociējas ar tehnoloģijām, kvalitāti un simbolizē uzticību, gudrību. Zilā krāsa uzvedina uz domām par attīstību un meistarību (Daliba, 2007; Ozola, 2015). Zilās krāsas toņu gradients tika izmantots kā fons, bet par otro pamatkrāsu spēles



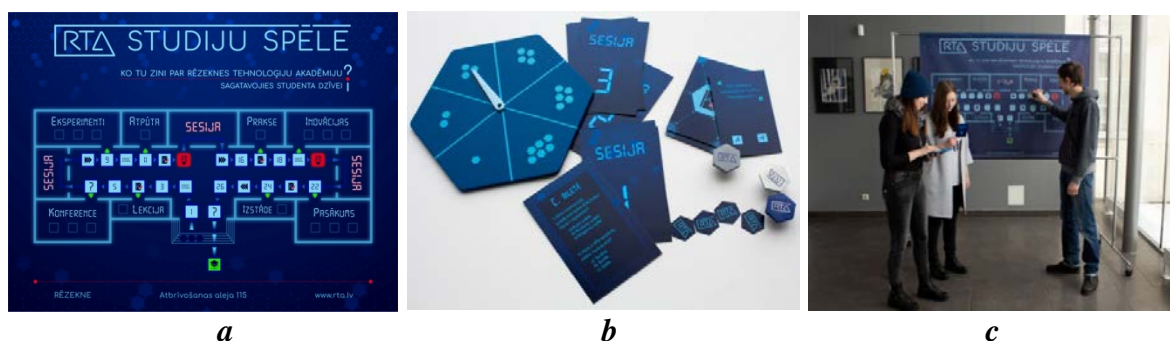
paletē kļuva tā saucamā „elektriskā” gaiši zilā krāsa. Akcentiem tika izmantota arī sarkanā un zaļā krāsa.

Fonā tiek izmantotas sešstūra figūras, kas saskaņotas ar pārvietojamajām figūriņām. Šī forma rada asociācijas ar molekulāro tīklu. Daudziem objektiem tika pievienota spīduma ilūzija, lai pastiprinātu asociācijas ar datorprogrammas lietotāja saskarni jeb *interfeisu*.

Spēlē izmantotās kārtis tika izstrādātas vienotā stilā ar laukumu. Spēlē tiek izmantotas divu veidu kārtis: Sesijas biļetes (90 mm x 140 mm) un Kontroldarbu uzdevumi (70 mm x 110 mm). Kārtis ir divpusējas. Savukārt diplomi, kas tiek izsniegti spēlētājiem spēles beigās, ir vienpusēji, arī to dizainā ir ievērots vienots spēles dizaina stils. Žetonu noformējums – RTA logotips uz tumša fona.

Spēles materiālos tiek izmantoti divi šrifti: „*Comforta*”, kas saskaņoti ar izmantoto RTA logotipa variantu, un „*Technology*”, kas ir bezserifu dekoratīvais fonts un harmoniski iekļaujas futūristiskajā dizainā.

Svarīga spēles īpatnība, kuru var uzskatīt arī par spēles unikalitāti, ir tās konstruktīvais risinājums. Sākotnēji, izstrādājot variantus, bija iecere radīt grīdas spēli – paklāju, kas ir līdzīgs spēlei „*Twister*”, un figūriņas būtu paši spēlētāji. Attīstot šo ideju, kļuva skaidrs, ka tāda aktivitāte var aizņemt pārāk daudz vietas, bet informatīvajos pasākumos biežāk katrai iestādei ir atvēlēts ierobežots laukums. Tieši tāpēc pēdējā variantā spēles laukums ir pārnests vertikālajā plaknē: kā jau bija minēts iepriekš, spēlē „*RTA STUDIJU SPĒLE*” atbilst galda spēles principam un mehānikai, bet vertikālais izvietojums ir ērts tās izmantošanai publiskos pasākumos. Lai nodrošinātu figūriņu pārvietošanu vertikālajā spēles laukumā, banera aizmugurē tika izveidotas kabatiņas metāla plāksnīšu ievietošanai. Savukārt ar 3D printeri izgatavotajām figūriņām, tika pielīmēta magnēta plāksnīte, kas nodrošina iespēju figūriņas novietot uz noteiktiem laukumiem. Tāds spēles izvietojanas paņēmieni ļauj ievērojami ietaupīt vietu, kas ir svarīgi ierobežotās telpas apstākļos. Jāatzīmē arī to, ka spēle kalpo arī kā reklāmas baneris un piesaista apmeklētāju uzmanību (skat. 1.att.).



1.attēls. Spēle „*RTA STUDIJU SPĒLE*”, a - Spēles laukums, b - Spēles piederumi, c - Spēles vertikālā konstrukcija (foto M. Justs)

Figure 1 Game „*RTA STUDY GAME*” (photo M. Justs)

## **Secinājumi** **Conclusions**

- Spēļu industrija nepārtraukti attīstās. Spēļu dažādība iziet ārpus sadzīves līmeņa un pāriet sociālajā, garīgajā un mākslas kultūrā. Zinātniskajās datu bāzēs atrodamie pētījumi liecina, ka galda spēles tiek izmantotas pedagoģijas, psiholoģijas un sociālo zinātņu nozarēs.
- Spēļu industrijā nodarbinātie eksperti ir ieinteresēti spēļu pārdošanas rādītājos, tāpēc speciāliem gadījumiem domātu spēļu, kas attiecas uz atsevišķu uzņēmumu reklāmu, radīšanai, komerciālu izdevīgumu nesaskata. Vairākums reklāmas spēles saprot kā dāvanas darbiniekiem un viesiem. Viens no ekspertiem atzinīgi novērtēja RTA reklāmas spēles konstruktīvo risinājumu un piedāvāto spēles mehāniku, kas ir vienkārša un saprotama dažādu vecumu pārstāvjiem.
- Organizācijas tēlam ir svarīga loma, no tā ir atkarīgs, kā sabiedrība reaģēs un izmantos uzņēmuma pakalpojumus, tāpēc, savienojot spēļu un dizaina funkcionālītātes var panākt labu rezultātu, izmantojot spēli reklāmas nolūkos, tādējādi veidojot organizācijas tēlu.
- Informatīvās spēles „RTA STUDIJU SPĒLE” galvenais uzdevums - atraktīvā veidā, iesaistoties savu zināšanu pārbaudē un papildināšanā par Rēzeknes Tehnoloģiju akadēmiju, ieinteresēt potenciālos studentus informatīva pasākuma vai izstādes laikā.
- Ar spēles palīdzību var piesaistīt apmeklētāju uzmanību, pateicoties vizuāli pievilcīgam noformējumam. Izstrādātā spēle nodrošina komunikāciju un informē pasākumu apmeklētājus par studiju iespējām akadēmijā, kā arī atbilst iestādes vizuālās identitātes stilam.

## **Summary**

The image of the organization plays an important role, depending on how the people will react and use the services of the company. Combining the effects of game design and graphic design can achieve good results by creating a game for an organization's ad.

The gaming industry is constantly evolving. The variety of games goes beyond the household level and goes into the social, spiritual and artistic spheres. Research in scientific databases shows that board games are used in the fields of pedagogy, psychology and social sciences.

Experts' surveys show that gaming industry experts are interested in game sales figures, so the creation of special-purpose games for individual companies does not see any commercial advantage. Most ad games are understood as gifts for employees and guests. One of the experts appreciated the constructive solution of the advertising game

of Rēzekne Academy of Technologies (RTA) and the proposed game mechanics, which is simple and understandable for players of different ages.

The main task of informative game „RTA STUDY GAME” - during an informative event or exhibition to interest potential students, engaging in the examination and supplementing of their knowledge about Rezekne Academy of Technologies in an attractive way.

With the game we can attract the attention of the visitor by a visually appealing design. The developed game provides communication and informs the visitors of the events about the possibilities of studies at the RTA. The design of game corresponds to the style of the institution's visual identity.

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# THE IMPACT OF NON-FORMAL ARTISTIC DANCE EDUCATION ON THE COMMUNICATION AND ORGANIZATIONAL ABILITIES OF ADOLESCENTS

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**Abstract.** *The impact of non-formal artistic dance education for adolescents communication and organizational abilities is a relevant issue that should be explored. The aim of this research was to determine the impact of non-formal artistic dance education on the communication and organizational abilities of 12-13-year-old adolescents. The results showed that adolescents engaged in non-formal artistic dance education meet better communicative and organizational abilities. Most dancers have a "higher than average" and "high" level of these abilities. Adolescents, who did not attend any non-formal artistic classes, were mostly at the levels that complied with lower communication and organizational abilities. To sum up, we can say that the activities of non-formal artistic dance education undoubtedly affect communication abilities of 12-13-year-old adolescents.*

**Keywords:** *non-formal education, dance, adolescents, communication abilities, organizational abilities.*

## Introduction

It is very important to encourage adolescents joining the organizations where they would be able to solve different problems. Adolescents care about the opinion of contemporaries of the group that is close to them, their style of communication and values. Good relations between adolescents and their contemporaries are one of the most important factors of successful socialization (von Tetzchner, Launonen, Batorowicz, Nunes, Walter, Oxley, & Deliberato, 2018).

Non-formal education is an accepted field of education that affects the formation of the world-view of children and adolescents and develops a public-spirited, conscious and creative person that can be integrated into the modern environment successfully (Romi & Schmida, 2009). When the social culture changes, there is a rise of different forms of artistic education that are mostly based on particular conceptions, theoretical grounds and various conceptions of the purpose of artistic education. Thus, artistic education is a particular medium for the maturation of personal culture (Bonbright & McGreevy-Nichols, 2012). Dancing is one of the forms of non-formal artistic education that was chosen for

the analysis in this research. During dance classes, constant presence among the contemporaries and especially training in a couple or in small groups allows cognizing the own weaknesses and strengths of communication and enables learning to understand, listen to another person and improve the communication in this way (Smith, Hodges Kulinna, Vissicaro, & Fredrickson, 2016; Wakamatsu, 2016). When dancing, the body language says all that we may never say aloud and it helps to reveal the problems that should be realized and solved (Munsell & Bryant Davis, 2015). In the period of adolescence, it is especially important to have a possibility to give expression of the own feelings, say all ideas, not to retire into oneself and it is sometimes much better to do it without words (Lazaroff, 2001; Maraz, Király, Urbán, Griffiths, & Demetrovics, 2015).

Scientists (Romi & Schmida, 2009; Merrell & Gimpel, 2014; von Tetzchner et al., 2018) analyse the peculiarities of communication in various aspects. However, in Lithuania there is a lack of research in what way dancing affects the communication of adolescents. There is little data in the literature about the peculiarities of communicative and organizational abilities of dancers of different age. There is a big lack of scientific data about the impact of dancing on the communicative and organizational abilities of adolescents. Thus, the impact of non-formal artistic dance education on the communication of adolescents and the study of their communicative and organizational peculiarities is a relevant issue that is worth analysing. We suppose dancing should have a positive impact on the abilities of communication of adolescents.

The research aim – to determine the impact of non-formal artistic dance education on the communicative and organizational abilities of 12-13-year-old adolescents.

## **Methodology**

200 adolescents participated in the questionnaire survey: 90 (40 boys and 50 girls) attended dance and 110 (50 boys and 60 girls) did not attend any non-formal artistic education circles.

The methodology by B.A. Fedorishin and V.V. Siniavski (Rogov, 1999) was compiled for the diagnostics of potential human possibilities in the development of their communication and organizational inclinations. It is based on the principle of the reflection and assessment of certain behaviour peculiarities of the researched in different situations (which are known to the researched on the basis of his/her personal experience).

The structure of organizational inclinations is characterized as the ability to affect people, successful solution of tasks and reaching for certain goals, ability to ascertain the “situational” human interaction expeditiously and push it to the

necessary direction, reaching for the expression of the initiative and fulfilment of social work.

Personal communication inclinations are characterized as the ability to get friendly contacts with people quickly and easily, reaching for the development of communication fields, participation in social or group events satisfying the needs of people for wide, intensive communication.

This methodology foresees two variants of answers to 40 questions, which determine the meanings of evaluative coefficients with the help of keys. The evaluation scales are used for the qualitative standardization of the results of this research and a certain evaluation (Q) or communication or organizational inclination level “very low”, “low”, “average”, “over average” and “high” comply with a certain range of quantitative indexes (K).

The evaluative coefficient of communication or organizational inclinations (K) becomes obvious according to the ratio between each kind of inclination and the maximum possible coincidence (20). In this case, it is convenient to apply the formula  $K=P/20$  or  $K=0.05*P$

Where: K – value of the evaluative coefficient;

P – number of answers, which comply with the “key”.

The analysis of communication and organizational inclinations allows reviewing their structure by emphasizing certain components, which can be indicators of appropriate abilities.

The SPSS 22.0 program package was used for the analysis of the research data. The Student (t) and chi-square ( $\chi^2$ ) criteria were used to check the hypothesis of mathematical statistics and evaluate the reliability of the difference between the researched groups. Our scientific hypothesis was checked by choosing the significance level  $\alpha = 0.05$ . The averages of the analysed variables were evaluated by using 95 per cent confidence intervals. The differences between appropriate indexes were considered statistically significant if the calculated statistical significance was  $p < 0.05$ .

## **Research results**

The methodology by B. A. Fedorishin and V. V. Siniavski was compiled for the diagnostics of possibilities of adolescents in the development of their communication and organizational inclinations. It is based on the principle of the reflection and assessment of certain behaviour peculiarities of the researched in different situations (which are known to the researched on the basis of his/her personal experience). The answers of the researched were developed on the basis of the self-analysis of experience of their behaviour in a certain situation.

The questionnaire survey of 12-13-year-old adolescents and the statistical data analysis showed that the communication abilities of non-formal artistic dance

education attending boys and girls were higher ( $p < 0.05$ ,  $\chi^2 = 37.21$ ;  $p < 0.05$ ,  $\chi^2 = 34.66$ ) compared with those, who do not attend any non-formal artistic activity-related circles (Table 1). The communication abilities of even 40.00 per cent dancing boys and 31.50 per cent dancing girls complied with the “high” evaluation level. Meanwhile, the highest percentage distribution of the boys and girls, who did not attend non-formal artistic dance education, complied with the “average” communication ability level, 25.50 per cent and 25.50 per cent, respectively.

Non-formal artistic dance education has a positive impact on the improvement of organizational abilities of adolescents, too (Table 2). The indexes of dancing boys and girls are better ( $p < 0.05$ ,  $\chi^2 = 33.00$ ;  $p < 0.05$ ,  $\chi^2 = 25.79$ ). The organizational abilities of even 41.00 per cent dancing boys and 23 per cent dancing girls complied with the “high” evaluation level. The highest percentage distribution (24.50%) of the boys, who did not attend non-formal artistic dance education, complied with the “low” organizational ability level. Most (27.90%) of the girls, who did not attend non-formal artistic dance education, also complied with a “low” organizational ability level.

**Table 1 Indexes of communication abilities (in per cent) of adolescents, who attend and do not attend in non-formal artistic dance education**

Subjects	Communicative abilities evaluation level					$\chi^2; p$
	Very low	Low	Average	Higher than average	High	
Boys-dancers	2.2	10.3	25.5	22	40	$\chi^2 = 37.21$ ; $p < 0.05$
Boys	22.5	24.5	25.5	10	17.5	
Girls-dancers	0.8	12.2	29.5	26	31.5	$\chi^2 = 34.66$ ; $p < 0.05$
Girls	22.5	24.5	25.5	10	17.5	

**Table 2 Indexes of organizational abilities (in per cent) of adolescents, who attend and do not attend in non-formal artistic dance education**

Subjects	Organizational abilities evaluation level					$\chi^2; p$
	Very low	Low	Average	Higher than average	High	
Boys-dancers	2.2	9.5	26	21	41	$\chi^2 = 33.00$ ; $p < 0.05$
Boys	20	24.5	20.5	19	16	
Girls-dancers	4	15	30.5	27.5	23	$\chi^2 = 25.79$ ; $p < 0.05$
Girls	23	27.9	19.4	14.5	15.2	



## Conclusions

After performing the analysis of the results, we determined that the adolescents, who attend non-formal artistic dance education, had better communication abilities. The “higher than average” and “high” levels were characteristic to most dancers. The adolescents, who did not attend any non-formal artistic classes, were mostly at the levels that complied with lower communication and organizational abilities. It allows stating that dancing adolescents have the ability to get official and friendly contacts with people quickly and try to develop their circle of communication. Better communication abilities mean person’s flexibility, self-confidence and orientation in the communication with people. I can state that their non-formal artistic education dance classes have an undoubted impact on it because adolescents accustom to their group mates and keep constant friendly relations with their peers.

Also I can ascertain that adolescents who attend non-formal artistic classes had higher organizational abilities, too. Non-formal artistic dance education has a positive impact on the initiative and high energetic level of adolescents and it is characteristic to their organizational abilities. Dominance and risk are expressed in dancers during the performance when the implementation of set goals and self-confidence are the most important things.

To sum up the indexes of organizational and communication abilities of 12-13-year-old adolescents, I can state that non-formal artistic dance education has an undoubted impact on the communication abilities of adolescents. An important function of this activity is a proper way of leisure time, a certain activity of entertainment and relaxation. In the social and cultural aspect, dance art is understood as a way of communication, wellness activity, a certain form of entertainment and factor for creativity development.

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## DIZAINA IDEJU RADĪŠANA UN ĪSTENOŠANA MĀCĪBU PROCESĀ: GADĪJUMA IZPĒTE

### *Design Idea Creation and Implementation in Learning Process: Study Case*

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**Abstract.** *In the 21<sup>st</sup> century design thinking or problem-solving methodology has obtained a wide response in product development and service provision. It is a way of thinking which takes us to changes. Currently, in Latvia the schools which implement vocational secondary education art and design education programmes and also vocational orientation education programmes in art and design area have obtained the broadest experience in design acquisition. Taking into account the significance of problem-solving in learners' development, design has been included in the comprehensive education content. Teachers need a new skill – to organize the design process so that their pupils would acquire problem-solving skills in a practical action. How have the teachers organized the design process? What learning methods have been applied? How is the design thinking developed? Goal analyse theoretical knowledge in design thinking and teachers' experience of learning technologies in design acquisition which has been acquired in art education of vocational orientation. The Latvian National Culture Centre has compiled the experience of art teachers in methodological material "No Tēla līdz dizainam. Putns" ("From Image to Design. Bird"), it can look at 24 individual or pedagogical workgroup design process methodology for primary school pupils. Using designer IDEO group 3 I model – Inspiration, Ideation, Implementation, in the methodological material, development of design thinking has been described with 10 different techniques. The author's analysis conveys the possible competences, what knowledge and skills pupils acquire in the design process, what techniques and methods the teacher applies in the learning process in design acquisition. The methodological material used in the research is one of the first for elementary school pupils' design thinking development in Latvia, it enables us to identify problems and needs for school teachers.*

**Keywords:** *design thinking, design process and teaching methods.*

### **Ievads**

#### **Introduction**

21.gadsimtā dizaina domāšana jeb problēmrisināšanas metodoloģija ieguvusi plašu rezonansi produktu izstrādē un pakalpojumu sniegšanā. Ne tikai tautsaimniecībā, bet arī izglītībā „ir noderīga dizainpratība un dizaina domāšana” (Ābele, 2018). K. Čimmels (*Tschimmel*, 2012) uzskata, ka dizaina apguve ir

„domāšanas veids, kas noved pie pārmaiņām, evolūcijām un inovācijām, jauniem dzīves veidiem un jauniem uzņēmējdarbības vadības veidiem”. Ņemot vērā problēmrisināšanas nozīmi izglītojamo attīstībā, dizains ir iekļauts vispārējās izglītības saturā. Šobrīd Latvijā vislielāko pieredzi dizaina apgūvē ir ieguvušas skolas, kurās īsteno profesionālās vidējās izglītības mākslas un dizaina izglītības programmas un arī profesionālās ievirzes izglītības programmas mākslas un dizaina jomā. Latvijas nacionālais kultūras centrs nodrošina izglītības programmu īstenošanu, t.sk., tā pārvaldībā organizēti ikgadējie Valsts konkursi mākslā vai dizainā, kas sniedz priekšstatu par mācību tehnoloģiju zināšanām un prasmēm.

Dizaina domāšanas metodoloģija apvieno „kreatīvu un analītisku procesu vadību un veicina starpdisciplināru sadarbību” (Solovjova, 2016), tā „ļauj rast risinājumus, par kuriem neviens cits iepriekš nav iedomājies” (Saimons, 1992.) un „praksē pārbaudītus risinājumus un secinājumus” (Kupča & Vītola, 2018). I. Baranovska uzskata, ka „dizains mūsdienās provocē sabiedrību domāt un rīkoties...” (Baranovska, 2018). Dizaina domāšana ietver „cēloņu noskaidrošanu, sakarību izprašanu, risinājumu meklēšanu un atrašanu” (Ābele, 2018).

Dizaineru uzskati atšķiras dizaina procesa tehniku un paņēmieni lietojumā. Dizaineru grupa IDEO (2001) saprata ne tikai dizaina produkta kvalitāti, bet dizaina domāšanas nozīmi. IDEO grupa izstrādāja dizaina domāšanas modeli **3I - iedvesma, ideja, īstenošana** (*Inspiration, Ideation, Implementation*), kam pakārtotas vairākas aktivitātes:

- I. - problēmas vai iespēju identificēšana,  
- tēmas izstrāde komandas darbu projektēšanai,  
- mērķa grupas novērošana sadzīvē;
- II. - starpdisciplinārās komandas iegūtās informācijas analīze un izmaiņu plānošana/risināšana, ideju vizuālā atspoguļošana;
- III. - ideju īstenošanas un rīcības plānošana.

Dizaineri T. Brauns, A. Vjats (Brown & Wyatt, 2009) atzīmē, ka liela nozīme ir prototipēšanai, pamatojot ideju īstenošanas procesu. Izmantojot prototipus, tiek testētas, atkārtotas un uzlabotas jaunas idejas un materiālu risinājumi.

Latvijas mākslas izglītības centra „Trīs krāsas” izglītības speciālistes I. Kupča un I. Vītola izveidojušas mācību modeli ar 3 posmiem:

- tēmas izpēte;
- ideju attīstīšana;
- risinājumu izstrāde.

Katrā procesa posmā notiek izvērtēšana: izmēģināšana, testēšana, apspriešana. Mācību procesā īpaši nozīmīga ir skolotāja vadīšanas prasmēm, pielietojot dažādas mācību metodes un nodrošinot iedvesmojošu vidi (Kupča & Vītola, 2018). Savukārt, I. Bitbīrs un R. Fulings (Byttebier & Vullings, 2015)

raksturo dizaina metodes radošo darbību, uzsverot idejas formas nozīmi, t.i., veidojot aprakstus, uzdodot jautājumus jebkurā posmā, vizualizējot zīmējumus vai diagrammās. Process iedvesmo un rada jaunas idejas vai atklāj tās trūkumus.

Pētījuma mērķis: pamatojoties uz teorētiskām atziņām, analizēt pedagogu mācību tehnoloģiju pieredzi dizaina apguvē, kas iegūta profesionālās ievirzes mākslas izglītībā.

Izmantotās pētījuma metodes: pētnieku, dizaineru un izglītības speciālistu teorētisko atziņu analīze par dizaina domāšanas. Pedagoģiskā praksē balstīta dizaina domāšanas mācību tehnoloģiju gadījumu metode un analīze.

Praktisko pētījuma bāzi veido Latvijas nacionālā kultūras centra apkopotais mākslas pedagogu mācību metodiskais materiāls „No tēla līdz dizainam. Putns” 2015./2016. mācību gadā.

### **Dizaina mācību tehnoloģiju analīze** *Design learning technology analysis*

Latvijas Republikas kompetenču pieejas attīstīšana (Skola, 2030) Tehnoloģijas jomā iekļauta dizaina apguve vispārējās izglītības saturā, tāpēc pedagogiem nepieciešama jauna prasme- organizēt dizaina procesu, lai skolēni apgūtu problēmrisināšanas prasmes praktiskā darbībā. Dizaina procesā skolēni apgūst intelektuālās, tehnoloģiskās un sadarbības prasmes, pētot problēmas un meklējot radošas pieejas ideju radīšanai un īstenošanai.

Katru mācību gadu Latvijas nacionālais kultūras centrs (turpmāk LNKC) organizē Latvijas izglītības iestāžu profesionālās ievirzes izglītības mākslas un dizaina jomas programmu audzēkņu Valsts konkursu, kurā ir skolas un valsts līmeņa kārtas. Turpat tiek apkopti metodiskie materiāli, kas izstrādāti, gatavojoties profesionālās ievirzes mākslas skolu audzēkņu Valsts konkursam, atklājot skolotāju metodiskos paņēmienus dizaina procesa organizēšanā. Pētījumam izvēlēts metodiskais materiāls „No tēla līdz dizainam. Putns” (LNKC, 2016).

Konkrētajā gadījumā LNKC Valsts konkursa nolikums paredz - konkursa mērķi, t.i., novērtēt profesionālās ievirzes mākslas izglītības kvalitāti un tālākās attīstības vajadzības un iespējas, sekmējot starpdisciplināru tēmu apguvi radošā mācību procesā.

Konkurss ir komplicēts, sastāv no vairākām daļām, paredzot dizaina domāšanas attīstīšanas posmu un telpiska objekta gatavošanas posmu veidošanā vai tēlniecībā. Konkursa uzdevumi (daļa):

- attīstīt audzēkņu telpisko izpratni, izprotot formas, faktūras un citu izteiksmes līdzekļu nozīmi trīs dimensiju objekta veidošanā;
- veicināt audzēkņu izpratni par dizainu kā procesu, par secīgu dizaina idejas attīstību, tās atbilstību funkcijai un mērķauditorijai;

- attīstīt audzēkņu prasmes veidot telpiskus objektus...;
- attīstīt audzēkņu prasmes strādāt grupā (LNKC Nolikums, 2015).

Kā pedagogi organizē dizaina procesu? Kādas mācību metodes izmanto? Kā attīsta dizaina domāšanu? Metodiskajā materiālā var apskatīt 24 individuālus vai pedagogu darba grupu izstrādāto dizaina procesa metodiku pamatskolas vecuma skolēniem, kurā atklāti ir gan īstermiņa, gan ilgtermiņa stundu / tematu plāni. Analizējot mācību mērķus, uzdevumus un darba norisi, autore L. Veita izveidoja tabulu par dizaina domāšanas attīstīšanu mācību procesā (skat. 1.tab.), izvirzot dizaina procesa trīs posmus un dizaina procesa tehnikas un paņēmienus, kurā atklātas skolēnu un skolotāju praktiskā darbība.

1.tabula. *Dizaina domāšanas attīstīšana mācību procesā*  
 Table 1 *Developing design thinking in the learning process*

gr.	Iedvesma. Problēmas identificēšana	Ideja	Īstenošana	Dizaina procesa tehnikas un paņēmieni
1.	Pēta putnu daudzveidību: analizē formu, savstarpējās proporcijas, raksturo vizuālo tēlu, īpašības, uzbūvi, salīdzina ar ģeometriskām formām. Pēta tehnoloģijas. Zina informācijas avotus	Skicē putnus, ievēro proporcijas, raksturo izskatu. Pieņem lēmumu par labāko ideju. Veido kompozīciju noteiktai tehnoloģijai. Noskaidro ergonomikas pamatus, funkcionalitāti	Veido 3 dimensiju objektu mālā. Vingrinās un rada plastiskas formas, kustības formas, iespaidus, veido raksturu, pielieto faktūras. Vērtē un analizē savu darbu, radoši papildina skici	Ierosmes avota – dabas formas izpēte; Materiālu tehnoloģiju izpēte; Informācijas avotu un nosacījumu lietošana; Idejas vizualizēšana skicē; Individuāls darbs; Radošs praktiskais darbs materiālu tehnoloģijā; Darba procesu vērtēšana; Telpiska objekta gatavošana un prezentēšana
2.	Pēta dabas formu: analizē putna proporcijas, kustību (knābi, spārnus u.c.), salīdzina ar apkārtējo priekšmetu funkcijām	Skicē putnus dažādās kustībās, apspriež un modelē lietišķus priekšmetus. Maketē mērogā 1:1. Pārbauda funkcionalitāti		Ierosmes avota- dizaina izstrādājumu un dabas formas izpēte; Metodiskā materiāla prezentācija; Darbs pāri/grupās; Idejas vizualizēšana; Apspriešana; Idejas maketēšana, funkcionalitātes pārbaudīšana
3.	Pēta apkārtējos priekšmetus. Izvēlas nepieciešamos materiālus. Plāno darba etapus	Skicē skicē bloku, izmantojot apkārtējos priekšmetu attēlus		Ierosmes avota- priekšmetu vides izpēte; Materiālu un darbu plānošana; Individuāls/grupas darbs; Idejas skicēšana; Idejas grafiska attēlošana

4.	Pēta gatavus putna objektus, lai izveidotu krēslu noteiktai darbībai (zobārsta krēsls, čipšu ēšanas krēsls u.c.)	Skicē krēslus, raksturo darbības un plāno potenciālam lietotājam, prezentē; skolotāju uzdevums - atraisīt ideju plūsmu, attīstīt iztēli		Ierosmes avotu – dabas formas izpēte, priekšmeta raksturošana- saskatīt kopīgo un atšķirīgo; Idejas vizualizēšana un raksturošana; Individuāls darbs; Darbu plānošana; Idejas prezentēšana
5.	Pēta dabu: putnus, augļus, ogas, kokus, mākoņus u.c., Salīdzina mākslinieciskos izteiksmes līdzekļus dabā un mākslas darbos	Salīdzina formas, krāsas, faktūras. Skicē putnus un izsaka priekšlikumus par māksliniecisko izteiksmes līdzekļu izmantošanas iespējām materiālā	Veido telpisku objektu un izsaka viedokli par savu un citu darbu	Ierosmes avotu – atšķirīgu dabas formu izpēte; Māksliniecisko izteiksmes līdzekļu un dabas formu raksturošana; Idejas vizualizēšana; Individuāls un pāru darbs; Pārrunas par izteiksmes formu, gatavošanas paņēmieniem; Telpiska objekta gatavošana un prezentēšana
6.	Apkopo, analizē informāciju par lietotāju. Pēta analogus, Novēro citu un pieraksta savu pieredzi	Skicē rotaļlietas vai spēles maziem bērniem. Modelē un raksturo idejas. Pārrunā lietošanas darbību un noformējumu		Problēmas identificēšana – rotaļlieta mazam bērnam; Mērķgrupas raksturošana; Informācijas apstrāde; Analogu izpēte; Pāra darbs; Idejas vizualizēšana un modelēšana
7.	Skicē skolas ikdienas priekšmetus, pieraksta to funkcijas (Individuāli)	Izvēlas objektus, apvieno to formu, izveidojot unikālu priekšmetu. Skicē, raksturo priekšmeta lietderību, veic aptauju. Jaunā produkta reklāmas plakāta izveide, norādot: produkta nosaukumu un reklāmas saukli, produkta izskatu, mērķauditoriju, kā radās jaunā produkta ideja		Priekšmetu vides novērošana un raksturošana; Vairāku priekšmetu sintezēšana vienā, jaunā priekšmetā; Aptauja; Individuāls un grupu darbs; Idejas vizualizēšana; Idejas raksturošana un prezentēšana

		(kādas vajadzības apmierina), kā tas darbojas un kā to lieto, no kādiem materiāliem to varētu gatavot		
8.	Pēta putnu tēlus; Pēta materiālu	Skicē un stilizē putnus: ar skaldītām formām; ar noapaļotām formām. Diskutē par stilizācijas paņēmieniem materiālā. Vērtē darba procesā	Putna formu veidošana no ģeometriskām formām materiālā: 1.kārta – plastalīnā; 2.kārta – akmens masa; Putna forma veidošana izmantojot papīra īpašības: locīšanu, griešanu, savienošanu	Ierosmes avots – dabas formu izpēte; Materiālu izpēte; Idejas vizualizēšana; Diskutēšana un darba procesa vērtēšana; Modelēšana apvienojot ģeometriskas formas un tēlu; Individuāls un grupas darbs; Vingrinājumi materiālā; Telpiskas formas gatavošana
9.	Apspriež problēmu jautājumus, kas kopīgs putnam un grāmatzīmei. Atbild uz jautājumiem: Kas? Kāpēc? Kādā veidā? Kam? Pēta putnu tēlus. Pēta grāmatzīmes paraugu	Skicē grāmatzīmes, veidot aprakstus, pārrunā idejas. Ievēro praktisko un estētisko nozīmi. Apkopo un izveido ideju grāmatīņu ar aprakstu par putniem	Izgatavo grāmatzīmes un pārbauda funkciju	Problēmas identificēšana – dabas formas, kustības raksturošana un priekšmeta pielietojuma izpēte; Idejas vizualizēšana un stāsta veidošana; Individuāls un grupas darbs; Diskusijas par darba procesu; Izstrādājuma gatavošana, testēšana un prezentēšana
10	Pēta putnus Analizē priekšmetus (trauki, iesaiņojuma maisiņi u.c.)	Stilizē putnus, meklē faktūras, gatavo kompozīciju.	Maketē, mēra, pārbauda. Gatavo atšķirīgus izstrādājumus	Ierosmes avoti – dabas formas izpēte; Dažādu priekšmetu lietošanas un māksliniecisko izteiksmes formu izpēte; Idejas vizualizēšana; Maketa izgatavošana, pārbaude; Objektu gatavošana un prezentēšana

Izmantojot dizaineru IDEO grupas 3 I modeli, metodiskajā materiālā „No tēla līdz dizainam. Putns” dizaina domāšanas attīstīšanu raksturo 10 atšķirīgi paņēmieni. Analīze atklāj iespējamās kompetences, kādas zināšanas un prasmes



skolēni apgūst dizaina procesā, kādas mācību tehnoloģijas skolotājs pielieto mācību procesā dizaina apgūvē.

### Secinājumi Conclusions

1. Ja par pamatu izvēlas dizaina domāšanas modeli 3 I, posmi – ierosme, ideja, īstenošana, atklājas mākslas pedagogu dizaina domāšanas procesa divas pieejas:
  - 1.1. no ierosmes līdz idejas maketēšanai/modelēšanai;
  - 1.2. no ierosmes līdz idejas īstenošanai.Konkrētajā gadījumā 5 grupas dizaina domāšanas procesu attīsta no ierosmes avota līdz gatavam izstrādājumam. Katrā pieejā pedagogi organizē mācību darba aktivitātes, paredzot individuālo, pāru vai grupu darbu.
2. Ierosmes posmā mākslas pedagogi izvēlas pētīt dabas formas, analogus, ģeometriskas figūras, tos izmanto tēlu stilizēšanā kā māksliniecisku izteiksmes formu. Domāšanas process ir radošs, bet nerisina dizaina problēmu.
3. Ja produkta vai izstrādājuma idejas izveidē kā ierosmes avots ir tēls, tad to analīze ir savstarpēji cieši saistīta: tēla proporciju novērošana, skicēšana un atbilstoša materiālu tehnoloģiju noskaidrošana un izvēle. Ierosmes avots kļūst par idejas posma sastāvdaļu. Autore izveidoja jaunu dizaina modeli – **idejas īstenošana** un **idejas radišana**, kas radošā mācību darbā vienkāršo izpratni par dizaina procesu un atvieglo darba plānošanu gan skolotājam, gan skolēnam.
4. Problēmjaautājumu risināšanu un ar to saistīto izpēti - anketēšanu, aptauju u.c. pētījumu metožu pielietojumu, izvēlējās divas mākslas pedagogu grupas. Pieļaujams, ka sarežģītumus rada ārpuskolas mācību priekšmetu šaurā specializācija un laika ierobežojums. Vispārējās izglītības skolās dizaina domāšanas attīstīšanai ir iespējams izmantot starppriekšmetu saikni.
5. Dizaina procesā skolēni apgūst intelektuālās, tehnoloģiskās un sadarbības prasmes: pēta, salīdzina, analizē, raksturo, diskutē, argumentē, aptaujā, vērtē, iegūst informāciju no atšķirīgiem avotiem, zīmē, skicē, modelē, maketē, stāsta, veido formas un faktūras no dažādiem materiāliem, griež, loka, līmē, prezentē utt.
6. Mākslas pedagogi dizaina domāšanas attīstīšanā pielieto dažādas mācību metodes: pēta dizaineru darbu, apgūst metodiku, gatavo uzskati, metodiskos materiālus un prezentāciju, organizē skolēnu darbību katram dizaina procesa posmam, lai skolēni aktīvi iesaistītos darbu izstrādē, pārrunās, vērtēšanā un strādā individuāli ar talantīgajiem skolēniem.

Pētījumā izmantotais LNKC metodiskais materiāls „No tēla līdz dizainam. Putns” ir viens no pirmajiem pamatskolas skolēnu dizaina domāšanas attīstīšanai Latvijā, tas ļauj saskatīt problēmas, vajadzības un risinājumus izglītības saturā, mācību tehnoloģiju izvēlē. Radošu mācību darbību nodrošina dizaina domāšanas tehnikas un paņēmieni dažāda lietošana.

### Summary

Designers' opinions differ regarding application of design process techniques and methods. The designers' group IDEO (2001) understood not only the quality of the design product, but also the significance of the design thinking. The IDEO group developed the design thinking model **3I** – *Inspiration, Ideation, Implementation*, to which several activities have been subordinated:

- I. – identification of the problem or opportunities,
  - development of the theme for the team work designing,
  - observation of the target group in social life;
- II. – information analysis obtained by the interdisciplinary team and planning/solving of changes, visual reflection of the ideas;
- III. – implementation of ideas and action planning.

Prototyping is of great importance on the basis of the idea implementation process. Applying prototypes, new ideas and material solutions are tested, repeated and improved (Brown & Wyatt, 2009).

Education specialists of the Art Education Centre of Latvia “Trīs Krāsas” I. Kupča and I. Vītola have made a learning model with 3 stages:

- research of the theme;
- development of ideas;
- development of solutions.

Assessment is carried out in each stage of the process: experimenting, testing, discussion. The teacher's leadership skills are of great importance in the learning process, applying various learning methods and providing an inspiring environment (Kupča & Vītola, 2018).

If the design thinking model 3I, stages – inspiration, ideation, implementation, has been chosen as the base, then two approaches of the art teachers' design thinking process are revealed:

- 1) from inspiration to layout design/modelling of the idea;
- 2) from inspiration to implementation of the idea.

Teachers organize activities for the learning work in each approach, envisaging individual, pair or group work. In the inspiration stage art teachers choose to explore natural forms, analogues, geometrical shapes, they are used in the image stylization as the artists' form of expression. The thinking process is creative, but does not solve the design problem. Only 2 groups solve the problem issues.

In the design process pupils acquire intellectual, technological and cooperative skills: they study, compare, analyse, describe, assess, discuss, justify, survey, obtain

information from different sources, draw, sketch, model, layout, tell, make forms and textures from different materials, cut, bend, glue, present, etc.

Art teachers in design thinking development use different learning methods: study the designers' work techniques and products, acquire methodology, prepare visuals, methodological materials and a presentation, organize pupils' activity for each design stage so that pupils would get involved actively in the work development, discussions, assessment, work individually with the talented pupils.

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## NATURE AND THE SPECIFIC FEATURES OF THE DEVELOPMENT OF POLYPHONIC HEARING

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***Abstract.** Polyphonic hearing is a component of musical hearing. Polyphonic hearing implies the ability to perceive a simultaneous motion of two or more separate voices within the general sound fabric of a musical piece. Polyphonic hearing can be developed like all other sides of musical hearing. The development of polyphonic hearing can be enhanced by different work forms at the lessons in sol-fa: intoning, analysis by ear, many-voiced music dictation. The development of different sides of musical hearing during the process of work on solfeggio is really essential for a future musician-professional. Research aim: to determine the specific features of polyphonic hearing and characterize its developmental stages.*

*On the basis of long pedagogical experience, this paper reveals the specificity of polyphonic hearing, identifies and characterizes its developmental stages in the process of work on sol-fa.*

***Keywords:** polyphonic hearing, canon, polyphony.*

### Introduction

The presence and development of musical hearing is part and parcel of any musician-professional. Teachers-musicians are constantly seeking for new forms and methods for its development. Pure and rhythmic intoning by notes, a correct perception and reproduction of a music text belong to a musician's professional skills.

The contemporary research devotes much attention to the theoretical substantiation of the perception of pitch (Hallam, Cross, & Thaut, 2009; Карасева, 2009; Cook & Fujisawa, 2006; Swanwick, 2002; Петрушин, 1997; Essens, 1994; Gillespie, 1995; Narmour, 1990; Назийкинский, 1972), as well as analyzes the features of musical hearing and offers recommendations for its development (Урванцева, 2014; Hiner, 2011; Масленкова, 2003; Erickson, 1975; Desportes, 1970). In many of these works the term pitch describes a psychoacoustic sensation of the auditory system (Loeffler, 2006). However, the problems of theoretical substantiation are still insufficiently studied and research on the development polyphonic hearing is not extensive either. This situation

hinders making more essential corrections in the system of training professional musicians.

Music science does not provide a uniform classification of musical hearing. B. Teplov classifies musical hearing into two classes: melodic (the skill of recognizing a melody and intoning it precisely) and harmonic (perception of sounds, ability to perceive many sounds simultaneously as a single sound); also absolute and relative (Теплов, 1947). J. McDermott & A. Oxegem (Mcdermott & Oxegem, 2008), D. Kirnarska (Кирнарская, 2004), M. Starceusa (Старчеус, 2003), F. Lerdhal (Lerdhal, 2001), V. Petrusins (Петрушин, 1997) distinguish such forms (or sub-forms) of musical hearing as: that of the pitch (absolute and relative), mode, tonal, melodic, harmonic, intoning, rhythmic, architectonic, timbral, dynamic, textural, polyphonic etc.

On analyzing the typology of musical hearing offered by different authors, we can state that the development of timbral, dynamic, polyphonic, textural, analytical and other types of musical hearing can be put into practice as a special task only if the foundations of pitch hearing, e. g. melodic and harmonic types of hearing, have been developed.

In this paper, the object of our attention is the so called polyphonic hearing and its development in the context of ensemble music-making at sol-fa classes.

The problem of the development of polyphonic hearing, which has always been topical, is especially acute in the contemporary reality, since the contemporary music is polyphonic by its very nature. Studies of polyphonic music are a vital and necessary condition for a harmonic development of a musician of any speciality. The development of this type of hearing relates to the skill of being able to simultaneously hear in the sound fabric the movement of two or more voices. A developed polyphonic hearing helps an orchestral musician to hear what the other instruments play when he performs his own part, and a pianist or a chorister – to hear besides the basic melody all other textural elements of the bass movement, supporting voice, but in a polyphonic work – not only the upper, but also all other voices as well. Especially important here is the skill of hearing the originality and individuality of every single voice in a polyphonic piece when a multi-voiced work is performed.

Research aim: to determine the specific features of polyphonic hearing and characterize its developmental stages.

Research method: the analysis of pedagogical experience, the comparison of contemporary methodologies worked out for developing polyphonic hearing.

### **Polyphonic Hearing as One of Musical Hearing Types**

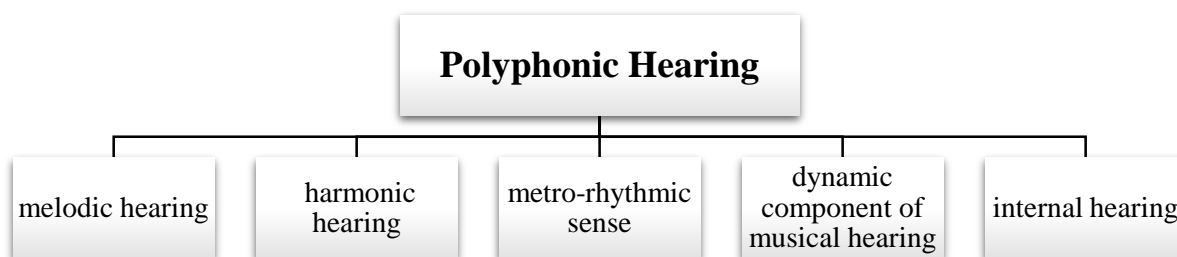
According to J. McDermott & A. Oxegem, polyphonic hearing is *Examples of music in which multiple sequences of tones are heard as separate “streams”*

*are commonplace* (McDermott & Oxege, 2006). G.M. Cipin, in his turn, defines polyphonic hearing as “musical hearing in its manifestations in relation to texture formed by at least of two voices ...” (Цыпин, 1984). A.G. Kauzova considers polyphonic hearing “as an especially complicated but the single ability oriented towards an integral perception of specific features of polyphonic music and polyphony as a common and essential feature of music of many voices” (Каузова, 2001). On the whole, the concept of polyphonic hearing involves the ability of hearing, following up and correlating the movement of several simultaneously developing melodies, melodic lines and textural layers.

This type of musical hearing, being a special ability, is seldom discussed in psychological-pedagogical studies on problems of musical development. In theoretical literature, this term is used to denote one of the components of harmonic hearing (Теплов, 1947; London, 2004; Кирнарская, 2004; McDermott & Oxege, 2008). At the same time, this concept as an independent concept is widespread among teachers- practitioners, who deal with auditory perception and interpretation of polyphonic pieces in performing practice. Polyphonic hearing is a complex of a number of different musical abilities. It involves melodic hearing (polyphony consists of melodies), as well as harmonic hearing (melodies form up in harmony), timbral-dynamic hearing (each voice is characterized by its own timbre and dynamics different from others), sense of rhythm (in the combining lines of voice which are rhythmically different), sense of musical logic, ability of “grasping a form” and internal perception of these intricate complexes. We have to note that all these components of musical hearing are in an active internal interaction and manifest themselves as one whole.

### **Components of Polyphonic Hearing**

In the process of the development of polyphonic hearing several vital components of musical abilities can be singled out (see Fig. 1):



*Figure 1 Components of polyphonic hearing*

At teaching melodic hearing, attention is first of all focused on the ability to hear a melody as an integrated whole, the basis for the formation here being the revealing of melody's principal features – melodiousness, dynamic development; in addition, the skill of comprising a long melody is being developed as well.

In polyphonic music, a special difficulty at perceiving a melody is created by the necessity to hear and reveal its individual uniqueness within the context of the whole. This is enhanced by the specific features of harmonic hearing as one of the principal hearing in the development of polyphonic hearing. In polyphony, a chord is the result of the movement of voices and this requires a clear perception and hearing of the harmonic side of the components of melody's polyphonic vertical line.

Polyphonic hearing, based on melodic, provides for hearing the horizontal multi-component musical texture, while harmonic hearing ensures hearing chords, their correlations and the whole vertical organization of texture.

At teaching polyphony, a metro-rhythmic sense also has its own specific feature. First of all, a clearly pronounced metric pulsation and harmonies are absent in polyphonic perception, they are replaced by the rhythm of breathing. The structure of a polyphonic line is free of the accent symmetry, its characteristic feature is the method of accents which is not based on measure relations, but rather on the melodic plastics itself. Besides, the culminant points here require the strongest dynamic emphasis, thus evoking the sense of the increase of energy in the linear movement. In polyphony, the diversity of the rhythmic pattern of voices corresponds to the variety of metric patterns, and this requires even a higher developmental level of the sense of rhythm and appears possible only due to an intensive development of memory and the ability "to hear before" the succeeding movement of a music material.

Dynamics of polyphonic pieces creates a feeling of tension, motion, impression of approaching and moving away, as well as a feeling of space throughout the whole musical piece.

On the one hand, polyphonic practice requires a high level of internal hearing, on the other hand, it creates an opportunity for its development. In other words, it transforms this hearing from a passive form into an active form. Highly developed forms of internal hearing create the base for the sense of musical form. Here not only the correlation between the horizontal – vertical line is implied, but also the awareness about a form as a construction, and the comparison of components and planes are meant. And this enables comprehending the structure of a musical piece in its integrated whole.

The process of comprehending polyphonic music involves not only the creation of specific images in our consciousness, but also generalization of the perceptions about complexes, about polyphony as a specific kind of music.

Performance of many-voiced polyphonic music, be it an instrumental or vocal piece, requires a special developmental level of coordination, memory, perception and other abilities.

### **Specific Features of the Development of Polyphonic Hearing**

The development of polyphonic hearing, or the ability to perceive (hear) in a differentiated way and reproduce in a musical-performing activity (playing an instrument, conducting some musical collective, many-voiced singing etc.) sound lines somewhat matching each other in a simultaneous development is one of the most essential and complicated parts of musical development.

Developed polyphonic hearing is vital for choral singing. As a kind of collective music making, choral singing is an integral part of Latvian culture, an inestimable and irreplaceable, during centuries approved factor of the spiritual and creative growth of Latvian nation (Zavadska, 2015). The above mentioned traditions of Latvian musical culture are closely related to the development of musical hearing, especially of harmonic hearing (as well as polyphonic hearing), since the choral repertoires (arrangements of folk songs and original compositions by Latvian authors) include compositions with polyphonic elements.

Musical classes on sol-fa offer unique opportunities for developing polyphonic hearing, since singers (solo singing is implied), wind instrument players are always restricted by the frames of musical monophony. String – bow instrument players are in principle able to play elements of polyphony, however their abilities are more modest than those of pianists or choral singers, which actually leaves an imprint on their repertoire. Within the context of this paper we will consider the development of polyphonic hearing in the process of a collective music making (ensemble or a choir) and writing a dictation.

At all stages of teaching sol-fa, an effective means of the formation and development of intoning skills is singing in an ensemble, since the harmonic coordination in polyphony, and the auditory orientation towards the structure which is developing vertically enhance a correct reproduction of melodic tones constituting the polyphonic fabric. In polyphony, musical pattern is represented as an integral system, in the result of which a 2, 3, and 4-voiced singing actively promotes the development of melodic and harmonic hearing, as well as the sense of harmony and rhythm. Writing a many-voiced musical dictation that includes the elements of polyphony (supporting voice, imitating elements) also enhances the development of polyphonic hearing.

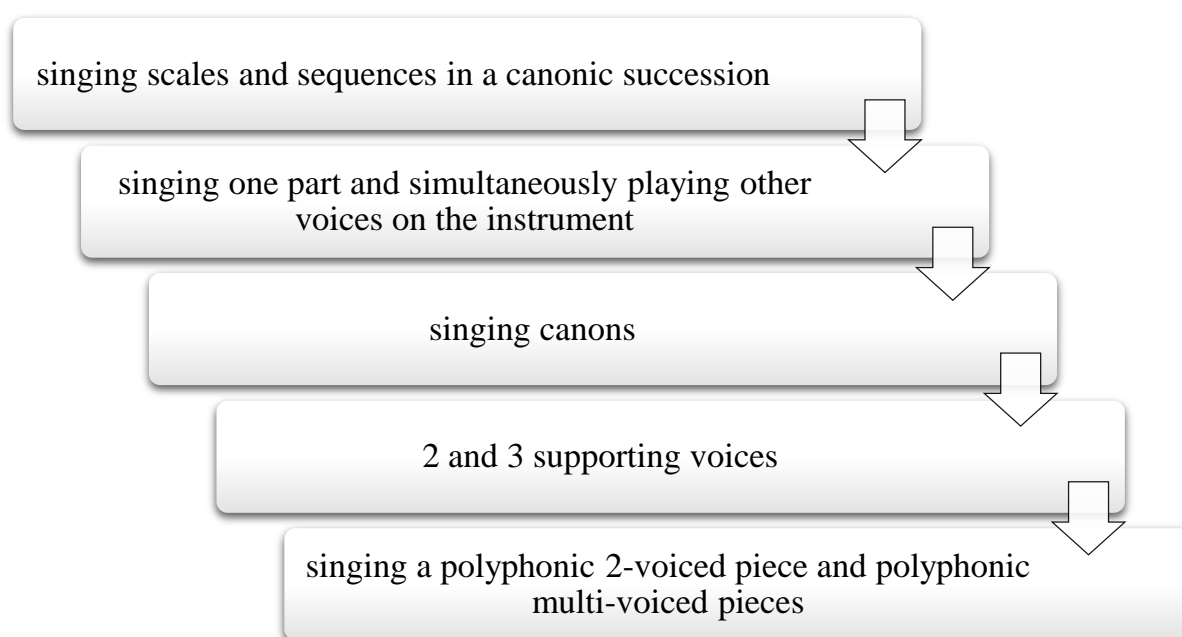


## Stages of the Development of Polyphonic Hearing in the Process of Ensemble Music-Making

The development of polyphonic hearing is one of the most essential and complicated parts of the development of musical hearing. It involves the formation of skills of a multi-plane perception, differentiated-integrated hearing and comprehending of polyphonic many-voiced texture.

We have to note that polyphonic hearing is a higher level of the development of musical hearing. Work on its development begins when melodic and harmonic hearing, musical memory, differentiated perception of voices (layers) and other musical abilities are already relatively developed. Therefore, it is not possible to specify the age of the group with which you can begin to work on the development of polyphonic hearing.

On the basis of our long pedagogical experience gained during our work in secondary and higher music education institutions we offer the following sequence of work on the development of polyphonic hearing in the process of ensemble music-making (see Fig. 2):



*Figure 2 Sequence of work on the development of polyphonic hearing*

Work on the development of polyphonic hearing, perceiving and understanding the polyphonic elements of musical language can be started from singing scales in a canon. Besides enabling to understand a canon, this exercise will contribute to the purity of intoning major and minor, and will be a useful practice in singing parallel thirds with a transposition of voices in addition. Performing in ensemble trains learners' hearing to get accustomed to the situation

where a live vocal intonation sounds, and also develops the skill of adjusting themselves to one another in the situation of a various timbral combination of voices.

The next stage of the development of polyphonic hearing is singing one part and simultaneously playing other voices on the instrument. In this way, sounding of one voice is adjusted to the sounding of other parts, awareness about a harmonic vertical line. At first, this work involves 2, but later 3 and 4 voices. This type of work cannot replace singing in ensemble. Performing in ensemble trains singer's musical hearing to get accustomed to the situation where a live vocal intonation sounds and develops the skill of adjusting to each other in the situation of a various timbral combination of voices.

At the initial stage of developing learners' skills of singing in a polyphonic ensemble, singing canons has an especial importance. A canon is a strict imitation where each voice, performing one and the same melody, joins in with some delay in regard to the previous one. Singing canons, on the one hand, seems an easy task, since it is enough for all to learn one melody and you can sing it in many voices. However, actually to perform a canon qualitatively appears to be no simple task. Singers' undeveloped hearing does not allow them to hear other parts and entwine their melody into the melody of other voices. Here, the auditory orientator is the imitated voice rather than harmonic intervals, though they too have an important role. At first, a task of imitating on an octave (in unison) is offered, then - on the fifth and only after that on different other intervals. Interesting and useful might be singing in canon well-known folk songs (see Fig. 1 – example of notes), since known folk melodies are intoned more precisely. Singing of canons gives the opportunity to better comprehend the nature of polyphonic fabric.

In the process of the development of polyphonic hearing, 2 and 3 supporting voice singing has an essential role. In such melodies, voices now move concurrently, now merge into unison, and now create independent lines. In samples of this kind, at the moment of their dividing into 2 and 3, voices melodically move as if independently, but are tightly tied together by harmonic consonantal intervals. The thirds and the sixths in a concurrent movement of voices, unisons, octaves at the point of their merging, as well as the fifths which often are the intonation support, serve as auditory coordinators for those singing in ensemble. Thus, singing of 2 – 3 supporting voices is as if a transition link towards singing polyphonic works.

## Bēdu manu, lielu bēdu

Kanons

Latviešu tautas dziesma

The image shows a musical score for a canon in 2/4 time, written in G major. It consists of four staves, each with a measure number in a box at the beginning: 1, 5, 9, and 13. The lyrics are written below the notes. The melody is simple and repetitive, characteristic of a canon. The lyrics are: "Bē - du ma - nu, lie - lu bē - du, es par bē - du ne - bē - dāj'." and "Ram - tai ram - tai ra - di - ri - di rī - di, ram - tai rī - di ral - la - lā, Ram - tai ram - tai ra - di - ri - di rī - di, ram - tai rī - di ral - la - lā."

Figure 3 Latvian folk song “Bēdu manu, lielu bēdu”

Singing polyphonic 2-voiced and later multi-voiced music is a new stage in the development of polyphonic hearing. In polyphonic works, every voice develops relatively independently, but at the same time all voices in their combination create an integral musical form, the intoning of each voice separately is based on regularities of a melodic horizontal structure: on identifying in the process of intoning the structures of constructions, on hearing similar tones, creating inertia and overcoming it. A horizontal coordination of voices in polyphony occurs first of all at the supporting moments of form: on the strong metric parts, in cadenced parts of episode constructions, in episodes where the role of harmony is really obvious.

At singing in ensemble examples of polyphonic kind based on intonations of non-canonic type, the orientator for hearing is a thematic material. When working on polyphony, we have to bear in mind the fact that the functions of voices in such music are constantly changing: in every voice sometimes a theme is being developed, sometimes - a contra-formation, and each of them sometimes plays a leading role, but sometimes – the accompanying role.

At the classes on sol-fa, mostly vocal music is used for singing in ensemble, while in work on polyphonic multi-voiced music instrumental works are employed. Convenient for the use are some 2-voiced (*C dur*, *a moll*, *d moll*, *B dur*) and 3-voiced (*a moll*, *d moll*) interventions, J.S. Bach’s fugues from *Das Wohltemperierte Klavier*, fugues for the organ.

During the process of work on the development of polyphonic hearing, we gained general perceptions about complexes and about polyphony as a specific kind of music.

### Conclusions

- Polyphonic hearing is a kind of harmonic hearing and an ability to hear, follow and correlate the movement of several simultaneously developing melodies, melodic lines, and texture layers.
- The development of polyphonic hearing is related to the development of other individual's abilities: melodic, harmonic kinds of musical hearing, metro-rhythmic sense, the dynamic component of musical hearing and internal hearing.
- Work on the development of polyphonic hearing starts when melodic and harmonic hearing, musical memory and a differentiated perception of voices (layers) have already been relatively developed.
- The stages of the development of polyphonic hearing during the process of ensemble music making might be as follows: singing scales and sequences in a canonic succession, singing one part and simultaneously playing other voices on the instrument, singing canons, 2 and 3 supporting voice pieces, singing polyphonic 2-voiced and multi-voiced music.

The process of forming and developing polyphonic hearing is effective and successful in case work on it is gradual and purposeful.

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