SOCIETY. INTEGRATION. EDUCATION
Proceedings of the International Scientific Conference. Volume II, May 24th, 2024. 140-155

TOWARDS EDUCATION 2050: METHODOLOGICAL OBSERVATIONS

Andreas Ahrens
Hochschule Wismar, Germany

Jelena Zascerinska
Centre for Education and Innovation Research, Latvia

Anastasija Bikova
Centre for Education and Innovation Research, Latvia

Mihails Zascerinskis
Centre for Education and Innovation Research, Latvia

Abstract. *Education 2050 is a determining factor of Future 2050. Therefore, different attempts to envision Education 2050 have been undertaken, and their results have been presented to the wider public. However, the scientific view on Education 2050 is under-represented, and the methodology of envisaging Education 2050 remains under-explored. The aim of this paper is to analyse methodologies applied to the projection of Education 2050. The exploratory research is employed in this work. Data were collected via observations and processed via content analysis. Findings were structured, summarized and compared, and allowed concluding that the use of methodologies in the works selected for analysis of Education 2050 is fragmentary. Only some methodology's elements are leveraged for shaping Education 2050 in the analysed works. The aspect of Information and Communication Technologies prevails in projecting Education 2050 in the works available for analysis. The analysed works have more differences than similarities in the use of methodological elements related to the design of Education 2050. A new research question has been formulated: What is a methodology for envisioning Education 2050? Limitations of the research have been presented. Further work has been proposed.*
Keywords: *education 2050, methodology, observation, practice, principles, procedures, world.*

Introduction

Every day our world changes in a tangible and an intangible way, thereby the world develops. The changes, including tangible and intangible effects, in the world are inter-connected. A small shift can bring a big effect. It also works in an opposite way: a big change may lead to a little effect.

Science is well-recognized to be the driver of moving the world to a better future for all. Science and research (the basis of science) are aimed at solving the dilemma of cause, on the one side, and effect, also known as change, on the other side.

https://doi.org/10.17770/sie2024vol2.7848

By world, the unity of external and internal components (Zascerinska, 2011) is meant. The notion of the term "world" is wide as the world includes everything what exists. Table 1 gives an overview of the world's external and internal components (ChatGPT, 2023; Cambridge Dictionary, 2023).

Table 1 ***Overview of the World's External and Internal Components*** *(the authors)*

External Components	Internal Components
Other planets Stars Galaxy Objects	The earth The people Places Physical entities Culture Ideology

Source: The authors.

Some of the world's components are tangible, e.g. stars, people, etc. Some of the world's components are intangible, for example culture, galaxy and others. Tangible and intangible elements can be found in both, namely the world's external and internal components. Figure 1 shows the world and the external components such as stars.

Figure 1 ***The World and external components*** *(pexels.com)*

Figure 2 illustrates the world's internal components such as human being (the hand is visible in the picture), animal, and nature. In Figure 2, the interaction between human being, animal, and nature is recognizable. These three components, namely human being, animal, and nature, are relevant to different domains of our life.

Figure 2 ***The World and internal components*** *(pexels.com)*

Life is defined as a subset of the world (ChatGPT, 2023b). Life has different aspects of functioning (Moore, 2021), also known as domains. Figure 3 demonstrates some of the domains of our life.

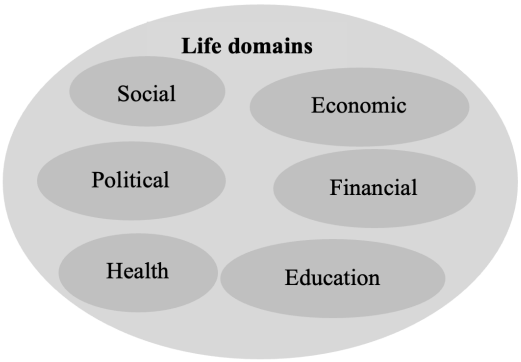

Figure 3 ***Life domains*** *(the authors)*

Life domains interact with each other. By interaction, obvious or non-obvious influence on each other in the process of interaction is meant (Ņikiforovs, 1994). Table 2 presents types of interaction between the external and internal components of the world.

Table 2 ***Types of Interaction Between the World's External and Internal Components*** *(the authors)*

Nr.	Types of Interaction
1.	Between the external components only
2.	Between the internal components only
3.	Between the external and internal

Source: The authors.

Here, the world development can be discussed as a permanent process. The development process brings a change into one of the domains of our life. This change in one domain of our life impacts the other domains of our life and the overall world progress and evolution.

Education is a crucial domain of our life (Zascerinska & Ahrens, 2016). Education is impacted by other domains such as economy and finance, on the one hand, and, on the other hand, education influences many other domains of our life such as social, financial, political, health, education (Zascerinska & Ahrens, 2016). Due to the importance given to education in tackling challenges faced by the world, education attracts a lot of attention from the scientific community, industrial stakeholders, and political representatives, futurists, etc. Therefore, different attempts to envision Education 2050 were undertaken, e.g. by Haste & Chopra (2020), UNESCO (2021), ElanWave (2022), B-Lessons Academy (2022), NewsReports (2022), International Education Forum (2023), etc. Education 2050

as a cause is expected to bring a desirable, viable and feasible effect in future. From the scientific point of view, the methodology plays a decisive role to project Education 2050. Methodology allows for building a logical and sequential Education 2050 (Andreeva, Zaščerinska, Zaščerinskis, & Aļeksejeva, 2014). Methodology also gives an opportunity to realize in a fast manner in which step and what exactly have to be updated and improved (Andreeva, Zaščerinska, Zaščerinskis, & Aļeksejeva, 2014) in Education 2050 preparation and implementation. However, the methodology of envisaging Education 2050 remains under-explored.

The aim of this paper is to analyse methodologies applied to the projection of Education 2050.

Research Methodology

The enabling research questions were put forward:

1. What methodologies are leveraged to envision Education 2050?
2. Are there any similarities and differences between the methodologies in published works used for analysis?

The study purpose was

- To decompose the collected methodologies,
- To measure their scientificity, and
- To compare their similarities and differences.

The exploratory study was implemented in September 2023. The exploratory study was chosen as the emphasis is on perspective and relative importance (Edgar & Manz, 2017). The exploratory studies are largely an inductive process to gain understanding (Edgar & Manz, 2017). The exploratory study is undertaken to analyse a phenomenon that of interest for a researcher (Zainal, 2007). The exploratory study embraces the phenomenon that is under-explored (Ahrens & Zascerinska, 2021). When the experimental process goes from a general theory to an understanding in specific, exploratory studies observe specific phenomena to look for patterns and arrive at a general theory of behaviour (Edgar & Manz, 2017). The emphasis is on evaluation or analysis of data, not on creating new designs or models (Edgar & Manz, 2017).

The exploratory study proceeded in three phases (Ahrens, Bassus, & Zaščerinska, 2013; Hariharan, Zaščerinska, & Swamydhas, 2013). Phase 1 intended to collect the data. For this, the materials for analysis were collected. The materials included published documents, research papers, newspaper articles, blog articles, conference key notes, conference panel discussions and etc. The published materials were reached via google search. The conferences video recordings kept on youtube were investigated, too. Table 3 summarizes the materials, found published between 2017-2023, for analysis in this work.

Table 3 ***The summary of published materials used for analysis*** *(the authors)*

Nr.	Concept	Authors
1.	The futures of education for participation in 2050: educating for managing uncertainty and ambiguity	Haste & Chopra, 2020
2.	Life in 2050: A Glimpse at Education in the Future	Williams, 2021
3.	Education 2050: A Glimpse at the Future	B-Lessons Academy, 2022
4.	Predictions on How Education Will Look Like in 2025, 2030, and 2050	ElanWave 2022
5.	Glimpse at How Education Will Possibly Look Like in 2050	Hill, 2023
6.	The Future of Education – A 2050 Projection	NewsReports, 2022
7.	Global Citizen Education	GENE, 2022
8.	Education in the 21st century	Steinberga & Špona, 2017
9.	Future 2050	Forum, 2022
10.	Megatrends and the Future of Skills	Hiltunen, 2023

Source: The authors.

Data were collected via observation in Phase 1. Observation allows for building of an adequate picture that emerges from the research setting as a social system described from a number of participants' perspectives (Geertz, 1973).

Phase 2 focused on data processing, analysis and interpretation. Content analysis was used for the collected data processing and analysis. Pedagogical interpretation employed in the present study means that only the data, that are of pedagogical interest, are processed and analysed (Zascerinska, Emet, Usca, & Bikova, 2023). Interpretation was carried out by the researchers involved in the present research and study (Ahrens, Purvinis, Zaščerinska, Miceviciene, & Tautkus, 2018). The data were structured, summarised, and compared.

Phase 3 related to the formulation of an updated research question.

Research Results

Research Methodology. Methodology is the main component in research (Zogla & Lubkina, 2020). Research is the procedural basis of science (Ahrens & Zascerinska, 2015a). Figure 4 demonstrates the relationships between science, research, and methodology.

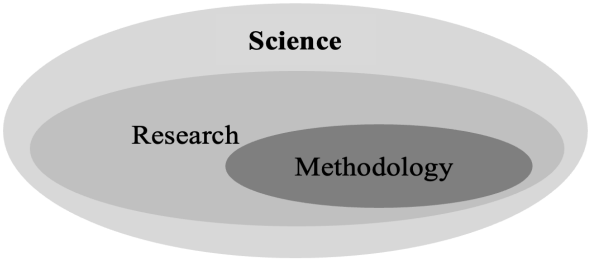

Figure 4 ***Relationships between science, research, and methodology*** *(the authors)*

Science means the knowledge about the world: the notion, structure and processes of different world's phenomena (Ahrens et.al., 2023). Research is a means of broadening scientific knowledge about the world. Research is the process (Ahrens & Zascerinska, 2015a). Methodology represents the rationale and procedures of the research process implementation.

By methodology, the combination of principles, practices, and procedures applied to any specific branch of knowledge is meant (Karapetjana, 2008; Ahrens & Zascerinska, 2015a). Figure 5 presents the methodology elements.

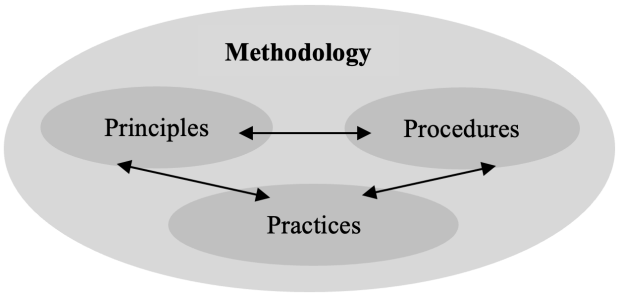

Figure 5 ***Methodology elements*** *(the authors)*

Principle means an individual combination of beliefs and assumptions that determine researcher's attitude to the world, his/her behaviour's norms and actions (Ahrens & Zascerinska, 2015b). Principle is also a condition of activity (Beļickis et.al, 2000) and explains how a phenomenon works (Zogla, 2019).

Practice appears when two people with entirely different actions, e.g., learning and teaching in education, are involved by research (Zogla, 2018).

Procedures are traditionally described as an algorithm or a number of steps (Ahrens & Zascerinska, 2015a).

Table 4 summarizes the methodological elements and sub-elements.

Table 4 ***The summary of methodological elements and sub-elements*** *(the authors)*

Nr.	Element	Sub-element
1.	Principles	-beliefs -assumptions -condition of activity
2.	Practices	-vision -definitions -trends -values -skills
3.	Procedures	-algorithm -formula

Source: The authors.

A research methodology gives research legitimacy and provides scientifically sound findings (Indeed Editorial Team, 2023). It also provides a detailed plan that helps to keep researchers on track, making the process smooth, effective and manageable (Indeed Editorial Team, 2023). A researcher's methodology allows the reader to understand the approach and methods used to reach conclusions (Indeed Editorial Team, 2023).

The benefits of the use of the research methodology in research are (ChatGPT, 2023c):

- Validity: Research methodology helps to ensure that the research is conducted in a way that is valid, meaning that it measures what it is supposed to measure and that the conclusions drawn from the research are based on accurate and reliable data.
- Reliability: Research methodology helps to ensure that the research is conducted in a way that is reliable, meaning that it produces consistent results and that the conclusions drawn from the research are based on data that is consistent and reliable.
- Generalizability: Research methodology helps to ensure that the research is generalizable, meaning that the conclusions drawn from the research can be applied to other populations and settings.
- Objectivity: Research methodology helps to ensure that the research is conducted in an objective way, meaning that it is free from bias and that the conclusions drawn from the research are based on data that is unbiased and accurate.
- Efficiency: Research methodology helps to ensure that the research is conducted in an efficient way, meaning that it uses the least amounts of resources necessary to achieve the research objectives.

The structural elements of methodology (principles, practice, and procedures) served as an inspiration for determining the levels of scientificity (the scientific status of the research work) to be used for the analysis of research works, e.g., published materials in this research, are defined and shortly described in Table 5. The description was based on a number of methodological elements used in a research work.

Table 5 ***Levels of scientificity of research works*** *(the authors)*

Level Nr.	**Level**	**Use of methodological elements**
1.	Scientific	Use of 3 methodological elements (principles, practices, and procedures)
2.	Almost scientific	Use of 2 methodological elements
3.	Somewhat scientific	Use of 1 methodological element
4.	Non-scientific	No use of any methodological elements

Source: The authors.

Methodological observations. In total, 10 materials published between 2017-2023 were used for methodological observations. The focus of methodological observation was on the analysis of methodologies. Observations did not intend to analyse Education 2050 projections in detail to find out how realistic the projections are.

In most of the online publications (Morelli 2020; Williams 2021; B-Lessons Academy, 2022; ElanWave 2022; Hill, 2023) selected for observation and analysis, no methodology is presented. These works focused mostly on the aspect of the use of Information and Communication Technologies (ICT) in Education 2050.

The methodology of the work entitled "The Future of Education – A 2050 Projection" (NewsReports, 2022) was based on the identification of current trends in ICT: 1.The Metaverse Trend. 2.Trend in Data Privacy Regulations. 3.Microservices and Cloud-native Platforms. 4.Mergers and Acquisitions Brought on by Labor Shortages in the Tech Industry. 5.AI Research and Development.

The methodology of Global Citizen Education (GENE, 2022) was built on the implementation of the following key steps:

1. A shared vision on the basis of existing international agreements in a host of documents that serve as the foundation for the new Declaration was shaped.
2. A renewed definition of global education was created.
3. Analysis of challenging global context via the identification of core values of human rights, sustainability, justice, equality, peace, international understanding with the focus on the interconnection between local and global dimensions of issues affecting people and planet; between generations; between cultures and between past and present and future was carried out.
4. Global Education was increased and improved via the commitment to pedagogical practices that are inclusive, participatory, inspire hope, enable critical thinking, and do justice to the primacy of the learners.

This methodology was based on the engagement and consultation processes during meetings with policymakers, international institutions, youth, researchers, global critical friends, and civil society organizations, and other key stakeholders implemented from June 2021 to November 2022. The consultations were a partnership to consider specific views, needs and possibilities of each stakeholder (GENE, 2022).

Finally, the Dublin Congress was organized in 2022. The Congress brought together over 300 participants, representing ministries and agencies, youth organizations, civil society, local and regional governments, academia, and international organizations. For the adoption of the new Declaration on Global Education to 2050, several measures were taken (GENE, 2022): high level political interventions and inspiring keynotes; panels on policy coherence, public

engagement; on common visions, universal access and on new paradigms; parallel Sessions for different stakeholder streams and for differing locii of global education; spaces for networking and for structured dialogue between policymakers and stakeholder; and formal inter-ministerial session with national statements and commitments.

Observations on the topical aim of education in the 21st century highlighted a free, independent and responsible personality (Steinberga & Špona, 2017). According to human development, the principles of Education in the 21st century are free choice, independence and responsibility (Steinberga & Špona, 2017).

Observations aimed at understanding of methodologies applied to shape Education 2050 during Forum "Steering Education: From Imagination to Impact" (2022) revealed that Future 2050 would be value challenging time (Forum, 2022). During Forum 2022, it was stated that societies are based on values (Forum, 2022). There was discussion about what do not have to be changed in Education 2050 (Forum, 2022). Three principles in relation to Future 2050 and, consequently Education 2050, were proposed to be the principle of simplicity, the principle of centricity, and the principle of humility (Forum, 2022). A concrete operational strategy for an institution was presented during the Forum (2022): dialogue, identity challenges, design solutions, experiments with solutions, and Evaluation (Forum, 2022).

During the Forum "Steering Education: From Engagement to Empowerment" (2023), the futurology formula for anticipating the future was presented: facts plus imagination plus mega trends (Hiltunen, 2023). It should be pointed that the presented futurology formula, based on imagination, offers weak plausible reasoning without use of qualitative and quantitative methods (Pirozhkova, 2016). Mega trends are big global long-lasting trends that will affect the future (Hiltunen, 2023). The present mega trends include (Hiltunen, 2023) climate change; ecocrises and loss of biodiversity; increase of population; demographic change; urbanization; globalization; increase of wealth and consumption; increase of inequity; digitalization; and technological development.

Based on the futurology formula for anticipating the future, metaskills for the future were emphasized (Hiltunen, 2023): general education; media literacy and media criticism; teamwork skills; empathy; stress management and pressure tolerance; creativity; problem solving; learning the new and unlearning the old; environmental skills; cultural knowledge; technology understanding; cyber security skills; digital skills; entrepreneurship and self-management; presentation and communication skills; flexibility and adaptability; and anticipation skills.

The observations revealed that half of the published materials used a methodology.

Study Findings and Discussion

Table 6 highlights the use of methodological elements, namely principles, practice, and procedure, in the published materials used for analysis.

Table 6 ***The use of methodological elements in the published materials used for analysis*** *(the authors)*

Concept	Author(s)	Used element
The futures of education for participation in 2050: educating for managing uncertainty and ambiguity	Haste & Chopra, 2020	None
Life in 2050: A Glimpse at Education in the Future	Williams, 2021	None
Education 2050: A Glimpse at the Future	B-Lessons Academy, 2022	None
Predictions on How Education Will Look Like in 2025, 2030, and 2050	ElanWave 2022	None
Glimpse at How Education Will Possibly Look Like in 2050	Hill, 2023	None
The Future of Education – A 2050 Projection	NewsReports, 2022	-Practice (trends)
Global Citizen Education	GENE, 2022	-Practice (vision, skills, values) -Procedures (steps)
Education in the 21st century	Steinberga & Špona, 2017	-Principles
Future 2050	Forum, 2022	-Principles -Procedures (operational strategy)
Megatrends and the Future of Skills	Hiltunen, 2023	-Practice (trends, skills) -Procedures (formula)

Source: The authors.

Our observation shows that both practice and procedures were addressed the same number of times, namely three. However, practice and procedures are governed by principles. Our finding here is the practical and procedural aspects of Education 2050 prevail in the published materials chosen for analysis.

A level of scientificity of each published work was identified based on the summary of the use of the methodological elements and sub-elements pointed in Table 6. Table 7 presents the overview of the levels of scientificity of the published materials used for the analysis in this work.

Table 7 ***The summary of scientificity levels of published materials used for analysis*** *(the authors)*

Level	Concept	Author(s)
4	The futures of education for participation in 2050: educating for managing uncertainty and ambiguity	Haste & Chopra, 2020
4	Life in 2050: A Glimpse at Education in the Future	Williams, 2021
4	Education 2050: A Glimpse at the Future	B-Lessons Academy, 2022
4	Predictions on How Education Will Look Like in 2025, 2030, and 2050	ElanWave 2022
4	Glimpse at How Education Will Possibly Look Like in 2050	Hill, 2023
3	The Future of Education – A 2050 Projection	NewsReports, 2022
2	Global Citizen Education	GENE, 2022
3	Education in the 21st century	Steinberga & Špona, 2017
2	Future 2050	Forum, 2022
3	Megatrends and the Future of Skills	Hiltunen, 2023

Source: The authors.

Five published materials are determined to be non-scientific, two of 10 as almost scientific, three of 10 as somewhat scientific.

Table 8 summarizes the study results related to the analysis of principles, practices, and procedures of Education 2050 in the published materials used for analysis.

Table 8 ***Principles, practices, and procedures of Education 2050 in the published materials used for analysis*** *(the authors)*

Methodological element	Short description of the element	Reference
Principles	-Principles of Future 2050 -Education in the 21st century principles	-Forum 2022 -Steinberga & Špona, 2017
Practices	-A shared vision - A renewed definition -Megatrends -Current trends in technology -Core values -Metaskills	-GENE, 2022 -GENE, 2022 -Hiltunen, 2023 -News Reports, 2022 -GENE, 2022 -Forum, 2022 -Hiltunen, 2023
Procedures	- Formula for the anticipating the future	-Hiltunen, 2023

Source: The authors.

The finding of our study is that the interest to Education 2050 is growing every year. In 2017-2021, only one material on Education 2050 was published. In 2022, already five. The present study reveals that the published works on

Education 2050 used for analysis in this research are not fully scientific. They only contain some of the methodological elements and sub-elements. The presented concept of methodology consisting of principles, practices and procedures, has not been fully employed in the published materials chosen for analysis.

The description of ICT aspect prevails in the presented concepts of Education 2050. ICT aspects of Education 2050 are presented without the use of methodology and its elements as well as sub-elements.

Similarities in the methodologies used to project Education 2050 refer to the emphasis on the importance of the identification of core values (GENE, 2022; Forum, 2022) when predicting Education 2050.

Our study reveals that the use of methodological elements when shaping Education 2050 was different: in the selected materials different methodological elements were leveraged. That can be explained that there are different cultural backgrounds of different intellectual traditions in education (Zogla, 2021).

Conclusions

The theoretical modelling facilitated the conclusion that science, research, and methodology are inter-linked. The methodology is the key component in the supply chain of research and science. The theoretical analysis informed that methodology is the central component that drives both - research and science. The significance of methodology in moving research and science reveals the importance of the use of methodology in phenomena envisioning, projection, prediction, and similar, too. The use of methodology in research and in studying a phenomenon is beneficial as the methodology ensures validity, reliability, generalizability, objectivity and efficiency of the research and study implementation.

The results of the present research allow concluding that the scientific view on Education 2050 is under-represented. The lack of scientific perspective on Education 2050 might lead to a one-sided Education 2050 projection, for example with the focus on ICT in education only. This might affect the process of Education 2050 implementation and its results in an unintended way.

The empirical study shows that the use of methodologies in the works selected for analysis of Education 2050 is fragmentary. Only some methodology's elements are leveraged for shaping Education 2050 in these works. ICT aspect prevails in projecting Education 2050. The prevalence of practical and procedural aspects in envisioning Education 2050 has to be aligned with the principles of their governing.

The analysed works have more differences than similarities in the use of methodological elements related to the design of Education 2050. The increase in

similarities when discussing Education 2050 will make them a trend, and a trend helps project Education 2050 (Zascerinska, 2023).

An updated research question has been put forward: What is a methodology for envisioning Education 2050?

The present research has some limitations. A limitation is that the links between science, research, and methodology have been set. The established inter-connections between principles, practices and procedures as methodological elements might be a limiting parameter, too. The observations are limited by the number of investigated materials related to Education 2050. Four levels of scientificity might limit the research findings, too.

Implications for the scientific community imply the enhancement of researchers' competence of the design and application of methodologies in scientific research.

The recommendation for researchers is to increase their efforts in leading the envisioning Education 2050 on the scientific basis. Another recommendation here is to strengthen the concerted efforts of researchers, policy makers, stakeholders, and the wider public in discussion of Education 2050.

In future research, the role of Education 2050 has to be described. Involvement of researchers from different scientific disciplines in investigation of the application of methodologies in shaping Education 2050 would be beneficial. Further research could also shed light on the leverage of ChatGPT as a research method. Ethical concerns related to the use of ChatGPT as a research method could be disclosed in more detail.

Acknowledgement

The presented work has been carried out within the Project "Emotional Distance Learning", Erasmus+ KA220-ADU – Cooperation partnerships in adult education, Project Number 2021-1-DE02-KA220-ADU-000026099; and Project "Mapping Adult Trainers' Qualifications and Competencies in twin transition to SMART future / SMART MAP" supported by Nordplus Adult 2023.

References

Ahrens, A., & Zaščerinska, J. (2015a). "Methodology of Sampling in Educational Research in Higher Education". In: L. Daniela & L. Rutka (Eds). *Selected Papers of Association for Teacher Education in Europe Spring Conference*, pp. 22-31. Cambridge Scholars Publishing.

Ahrens, A., & Zaščerinska, J. (2015b). „Principles of Sampling in Educational Research in Higher Education". Proceedings of the International Scientifical Conference *Society, Integration, Education,* Volume 1 Higher Education Pedagogy, May, 22nd-23rd, 2015, pp. 25-35. – Rēzekne: Rēzeknes Augstskolas Izdevniecība, 2015. p 468. DOI: http://dx.doi.org/10.17770/sie2015vol1.310.

Ahrens, A., & Zaščerinska, J. (2021). "Social Sciences' Transformation in Light of COVID-19". *Education Reform: Education Content Research and Implementation Problems*. Volume 1 (2021), pp. 7-18. Rezekne: Rezekne Academy of Technologies. DOI: https://doi.org/10.17770/ee2021.1.6495, 2021.

Ahrens, A., Zaščerinska, J., Bikova, A., Aleksejeva, L., Zascerinskis, M., & Gukovica, O. (2023). A New Development Model of Sustainable Communication for Higher Education Institutions. *Education. Innovation. Diversity, 2*(6), 30-48. DOI: https://doi.org/10.17770/eid2023.1.7175, 2023.

Ahrens, A., Purvinis, O., Zaščerinska, J., Micevičienė, D., & Tautkus, A. (2018). "*Burstiness Management for Smart, Sustainable and Inclusive Growth: Emerging Research and Opportunities"*. IGI Global. DOI: 10.4018/978-1-5225-5442-4, 2018.

Andreeva, N., Zaščerinska, J., Zaščerinskis, M., & Aļeksejeva, A. (2014). "A Methodology of Evaluation of Police Officers' Professional Outcomes". In A. Vilks (Ed), 3rd International Conference „*The Role of the Law Enforcement Institutions in Guaranteeing Public Safety and Security*", pp. 16-29. Riga, Latvia: State Police College. ISBN 978-9934-14-186-7.

B-Lessons Academy, (2022). "*Education 2050: A Glimpse at the Future*". Retrieved from: https://www.linkedin.com/pulse/education-2050-glimpse-future-b-lessons-chile/, 2022.

Beļickis, I., Blūma, D., Koķe, T., Markus, D., Skujiņa, V. (vad.), & Šalme, (2000). *Pedagoģijas terminu skaidrojošā vārdnīca. Termini latviešu, angļu, vācu, krievu valodā*. Rīga: "Zvaigzne ABC", 2000. — 248 lpp.

Cambridge Dictionary. (2023). *World*. Retrieved from: https://dictionary.cambridge.org/us/dictionary/english/world#.

ChatGPT. (2023a). "*World*". *Definitions for World*. Retrieved from: https://www.definitions.net/definition/World.

ChatGPT. (2023b). "*What is the difference between the world and life?"* Quora. Retrieved from: https://www.quora.com/What-is-the-difference-between-the-world-and-life.

ChatGPT. (2023c). "*What are research methodology benefits*?" Quora. Retrieved from: https://www.quora.com/What-are-research-methodology-benefits.

Edgar, T.W., & Manz, D.O. (2017). Chapter 3 - Starting Your Research, Editor(s): Thomas W. Edgar, David O. Manz, *Research Methods for Cyber Security, Syngress*, 63-92. Elsevier Inc. DOI: https://doi.org/10.1016/B978-0-12-805349-2.00003-0.

ElanWave, (2022). "*Predictions on How Education Will Look Like in 2025, 2030, and 2050*". Retrieved from: https://www.elanwave.com/blog/predictions-on-how-education-will-look-like-in-2025-2030-and-2050/, 2022.

Forum "Steering Education: From Imagination to Impact" (2022). "*First panel discussion*. Retrieved from: https://www.youtube.com/watch?v=EXXpAnxbR2M&list=PLymB9KFvY5xDsB7tpWTD8C3Itm9HnYGSi&index=4

Geertz, C. (1973). "*The Interpretation of Cultures*". London: Hutchinson.

GENE. (2022). *European Declaration on Global Citizenship Education to 2050*. Retrieved from: https://static1.squarespace.com/static/5f6decace4ff425352eddb4a/t/64835ed41b579f3ca762f2ac/1686331105060/GE2050-declaration.pdf.

Hariharan, R., Zaščerinska, J., & Swamydhas, P. (2013). A Comparative Study of Methodologies of Teaching Web Technologies to Prospective Teachers in India and Latvia. International *Journal of Modern Education Forum (IJMEF) Volume 2,* Issue 4 (November 2013), pp. 84-91. Retrieved from: http://www.ijmef.org/AllIssues.aspx.

Haste, H., & Chopra, V. (2020). "*The futures of education for participation in 2050: educating for managing uncertainty and ambiguity*", UNESCO. Retrieved from: https://unesdoc.unesco.org/ark:/48223/pf0000374441.

Hill, R.R. (2023). "*Glimpse at How Education Will Possibly Look Like in 2050*". Retrieved from: https://studycrumb.com/future-of-education.

Hiltunen, E. (2023). "Megatrends and the Future of Skills". *Forum "Steering Education: From Engagement to Empowerment"*. Retrieved from: https://www.youtube.com/watch?v=lxYZ0LE-UM0&t=302s, 2023.

Indeed Editorial Team, (2023). "*What Is Research Methodology? (Why It's Important and Types)*". Retrieved from: https://www.indeed.com/career-advice/career-development/research-methodology#:~:text=Why%20is%20a%20research%20methodology,process%20smooth%2C%20effective%20and%20manageable.

International Education Forum in Riga - Futures 2050. (2023). "*Steering Education: From Engagement to Empowerment"*. www.futures2050.lv. Retrieved from: https://www.youtube.com/watch?v=lxYZ0LE-UM0.

Karapetjana, I., (2008). "*English for Specific Purposes Teaching Methodology*". Akadēmiskais apgāds of the University of Latvia, Riga, Latvia, 2008, 67. Lpp.

Moore, T. (2021). "*Life Domain Balance: What Is It and Why You Should Care*". Retrieved from: https://www.linkedin.com/pulse/life-domain-balance-what-why-you-should-care-tom-moore-ph-d-/.

Morelli, A. (2020). "*Education for the Future – Which Skills Will Be Essential for 2050*?". Retrieved from: https://youthtimemag.com/education-for-the-future-which-skills-will-be-essential-for-2050/?utm_content=cmp-true, 2020.

NewsReports, (2022). "*The Future of Education – A 2050 Projection*". Retrieved from: https://www.newsreports.com/the-future-of-education-a-2050-projection/.

Ņikiforovs, O. (1994). "*Lomu mijiedarbības sistēma „Skolotājs-skolēns" ietekme uz skolēnu tuvākās attīstības zonas kognitīvajiem komponentiem*". Latvijas Universitātes Promocijas darbs (vispārīgā psiholoģija) [Unpublished doctoral dissertation].

Pirozhkova, S. (2016). "Prediction, forecast, scenario: on question about diversity of prognostic research's results". *Philosophy of Science and Technology 2016, vol. 21*, no 2, pp. 111–129, DOI: 10.21146/2413-9084-2016-21-2-111-129.

Steinberga, A., & Špona, A. (2017). "Action Approach in Promoting the Development of the Learner's Personality". *Signum Temporis 2017; 9*(1): 63–70, DOI 10.1515/sigtem-2017-0008.

UNESCO International Commission on the Futures of Education, (2021). "*Reimagining our futures together: a new social contract for education*". Retrieved from: https://unesdoc.unesco.org/ark:/48223/pf0000379707, 2021.

Williams, M.S. (2021). Life in 2050: *A Glimpse at Education in the Future*. IE. Retrieved from: https://interestingengineering.com/life-in-2050-a-glimpse-at-education-in-the-future.

Zainal, Z. (2007). "Case study as a research method". *Jurnal Kemanusiaan bil.9*, Jun 2007.

Zascerinska, J. (2023). *Emotions in Education 2050*. Retrieved from: https://edl-erasmus.site/blog/emotions-in-education-2050/.

Zascerinska, J., Emet, S., Usca, S., & Bikova, A. (2023). "STEM Education: A Comparative Study of Platforms in Selected Countries," *2023 International Interdisciplinary PhD Workshop (IIPhDW),* Wismar, Germany, 2023, pp. 1-6, doi: 10.1109/IIPhDW 54739.2023.10124402.

Zaščerinska, J. (2011). "Language Acquisition and Language Learning: Developing the System of External and Internal Perspectives", In: Zuģicka I., sast. Proceedings of the *52nd International Scientific Conference of Daugavpils University*, pp. 412-417, Daugavpils: Daugavpils Universitātes Akadēmiskais apgāds „Saule", 2011, Latvia. Retrieved from: http://www.dukonference.lv/files/zinatniski_petnieciskie_52konf.pdf.

Zaščerinska, J., & Ahrens, A., (2016). "A Comparative Study of Teacher and Student Use of Social Media for Interaction with Other People", In P. Ordóñez de Pablos and R.D. Tennyson (Eds), *Impact of Economic Crisis on Education and the Next-Generation Workforce*, Chapter 10, pp. 214-238. IGI Global. DOI: 10.4018/978-1-4666-9455-2.

Zogla, I. (2018). „Science of Pedagogy: Theory of Educational Discipline and Practice", *Journal of Teacher Education for Sustainability, vol. 20*, no. 2, pp. 31ñ43, 2018. DOI: 10.2478/jtes-2018-0013.

Zogla, I. (2021). "From Research Skills to Researcher's Transversal Competence ". *Education Reform: Education Content Research and Implementation Problems*, DOI: https://doi.org/10.17770/er2021.1.5421.

Zogla, I., & Ļubkina, V. (2020). "Doctoral Student's Research Competence." *Education Reform: Education Content Research and Implementation Problems, 2020*(1), 42-55. Red. S.Ušča. Rēzekne: RTA, REGI.

Žogla, I. (2019). "Principles of Learner Learning-Centred Didactic in the Context of Technology-Enhanced Learning", // Daniela, L. (Ed). *Didactics of Smart Pedagogy*. Springer: Nature Switzerland AG. pp. 71-94. DOI 978-3-030-01551-0_4.