# WHY DO YOU WANT ME TO LEARN CONNECTIVELY BUT TEST ME INDIVIDUALLY? SOCIALLY EMBEDDED LEARNING AT THE UNIVERSITY

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***Abstract.*** *Connectivism concept introduced by George Siemens seems to be accurate when considering current-learning processes in higher education. The author emphasises the role of socially embedded learning that can take place out of human bodies, in devices. The main aim of this work was to analyse students' and academic teacher's experiences related to cooperating through a network and creating mind maps as a result of learning in the frame of the conducted course at the University. The data was collected during the course through Mentimeter tool, which enabled the author to learn students' opinions, reflections and associations related to the process of working on electronic mind maps. Students were also asked to write reflective essays where they described their experiences associated to the mind map that were significant from the perspective of learning at the University. The results of the analysis were presented below.*
***Keywords:*** *Connectivism, higher education, mind maps, networking, social media.*

## Introduction

The idea of mind mapping originates from brain studies that were in the focus of interest of many scientists. For example Roger Sperry, who received a Nobel Prize in 1981 for his empirical research on cerebral hemisphere, argued that the left brain is responsible for logical and analytical thinking (words, sets and linearity) while the right brain controls imagination, creative thinking, colours, and emotions (Sperry, 1975). Nowadays some scientists contradict these earlier studies and claim that, for instance, semantic representations may not be lateralized only in the left hemisphere (Huth et al., 2016). Tony Buzan emphasised that when people prepare a mind map they use both: left and right brain, and as a result, the process of noting and remembering is more effective. According to him, the access to man's memory is enabled by key words and key images that activate all associative contexts (Buzan, 1984). A mind map would be then something like a thinking tool that reflects what is in an individual's head.

Unfortunately, as a pupil and later as a university student I have never had a chance to prepare a mind map during my formal education. My daily observations, during work at the University, allowed me to assume that contemporary young adults (Strelau, 2003) do not know the idea of mind mapping either. At least, these university students who I meet with at the Faculty of Social Sciences. As a young academic teacher, I can definitely agree with Czachorowski who argues that what we do nowadays at the university didactic is outdated and still based on traditional committing notes to paper (Czachorowski, 2016). Furthermore, students are tested each semester to confirm their social skills and subject matter knowledge individually, even though academic curricula are set on collaboration. What I did was establishing educational-goaled discussion groups in the social media with them (mainly on Facebook) (Bielinis, 2017), but in the end it appeared that I tested my students traditionally, separately, so anyway it deprived them of a chance to cooperate during the learning process. Additionally, here in Poland, 'collaboration' has pejorative associations and means mainly cheating during exams.

In the past Autumn I started my regular classes with students in the frame of the course called General Pedagogy. It is intended for master degree students of Pedagogy and is mainly based on critical meta-reflection on Education and Pedagogy in general. My observations allowed me to assume that the course gives students a hard time. There are many texts to read, research reports to analyse, so that they are generally scared, when they see the course curricula for the first time. Moreover, I must force them to write tests after each bigger part of material[1]. I used to do it traditionally, according to my own experiences as a student. They had to pass writing or speaking test, individually. The last Autumn I proposed them to pass their tests connectively in small groups. I found a tool called *Mindmeister*, which is a site enabling people to work collaboratively on one mind map. I invited each of them for sharing the specific map, which was created as a result of two or three previous classes. Students brought their own laptops or tablets (one device for each team) and worked on problems, questions or matters that I prepared them as a review of few classes. Each team was able to see changes that were entered into the map by other teams. They could also finish their work at home or somewhere else. What they needed was a device connected to the Internet. As a result of their work I was able to print their maps and notes in a PDF file which was a vast document including their reflections, pictures, PDF articles, links to websites or movies, so it looked like a huge source of information and knowledge.

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[1] General requirements for each course at the Polish Universities are determined in syllabuses, where learning outcomes and requirements for students are precisely set. In this course academics are obliged to examine students' knowledge, skills and competencies regularly.

## Why connected learning through the network? Theoretical framework

Continuous explorations of the area related to learning concepts and theories, dedicated for adult learners, brought me to the point in which I am able to understand deeper the phenomena of digital, connected learning amongst students at the University. This was a result of twofold searches. On the one hand, I studied papers of researchers who explained the phenomenon associated with an emerging new generation of people, named differently – *Digital Natives* (Prensky, 2001), *Net Generation* (Jones & Shao, 2011) or *App Generation* (Gardner & Davis, 2013). On the other hand, I perused texts of authors who introduced the theory of Connectivism (Siemens, 2005; Downes, 2012) and explained the learning process in the digital era. These days, the digital space has dominated the environment and a lifestyle of people to such an extent that recent research findings allowed coining new terms for the generation of people born on the turn of the 20ᵗʰ and 21ˢᵗ centuries. The specific notions: digital natives and digital immigrants were introduced in Marc Prensky's article, titled 'Digital Natives, Digital Immigrants'. He claimed that the first one is an active user of Internet, games and computer language (Prensky, 2001). Nowadays, we are able to add tablets, smartphones and mobile applications to the above list. Contrarily, the author assumed that a digital immigrant is a person who had to learn the new technology and had to adapt to the new, digital life conditions (Prensky, 2001). The author noticed that contemporary pupils are diametrically different from the previous generation. They are no longer the people who educational system was designed to teach. He also emphasised that as a result of growing up in totally different living environment, the pupils' brains differ from brains of people who were born and lived in the pre-digital era (Prensky, 2001). Similarly, the notion Net Generation (Jones & Shao, 2011) refers to the dynamics of intergenerational changes. The author of this notion – Don Tapscott – claimed that the appearance of Internet has changed our world radically, and that all educational systems require reforms in response to these changes (Jones & Shao, 2011). According to Gardner and Davis (2013), we should call the people who are skilled to use the newest technology as representatives of the App Generation. They emphasised that the sociological or biological understanding of the term 'generation' as a group of people who were born and living about the same time or as descendants had to be extended into understanding the 'generation' notion as a group of people who is able to use the modern technology (Gardner & Davis, 2013). Noteworthily, it is highly likely that contemporary university students are indeed those digital natives, net or app generation representatives. According to R. J. Havighurst, university students may be defined as a group called young adults, including persons aged between 18ᵗʰ and 25ᵗʰ-30ᵗʰ years (Strelau, 2003). Developmental psychology researchers claim that young adults perform a high level of the ability

to learn and are generally in their highest intellectual abilities (Ziółkowska, 2005). Moreover, the processes associated with increasing mobility allowed them to explore different areas of the world due to communication mediated by the computer. The digital space offers favourable conditions for learning and transforming their skills (Ziółkowska, 2005).

Connectivism described by G. Siemens (2005), who introduced it as a learning theory for a digital era, highligthed its specific rules. He believes that the essence of learning is the latest and up to date knowledge, and also that it is more important to *know where* to find information than to *know what* and *know* how to learn, which are only very well known slogans. He also claims that learning is based on different opinions and is a process of connecting specialized nodes and sources of information. The major issue is that the learning process can take place out of human bodies – in devices. Additionally, Siemens stressed that the constantly changeable reality determines the learning of an individual who is permanently forced to make choices of what to learn. The process of making decision what to learn is being an essence of the Connectivism concept (Siemens, 2005). The author referred also to adult education. According to him, young adults experience learning by participation, knowledge extension and active actions, which are important in the context of dynamic socio-cultural and technological transitions. Thus, it is very important for learners to know how to act in scattered, incomplete information, in different teams, cultures, worldviews etc. (Siemens, 2005). S. Downes (2012) also explains the nature of the Connectivism theory which is, in some point, related to the socially based learning and to the idea of using technology to connect. The author understands the theory as the thesis that knowledge is distributed across a network of connections, which are formed by actions and experience (Downes, 2012). However, he signalises the existence of three knowledge types, with Connectivism being an exemplification of the new, third type of knowledge. Downes based his beliefs on an assumption that at the beginning of the 21st century there needs to be something more than only qualitative and quantitative knowledge, and finds the solution in connective knowledge. This one is not independent of knowledge derived from senses or calculation of logic and mathematics but it is assumed as knowledge of connections that appear in the world, and are created in that world as well as knowledge of impact that those connections have on the entities. The other significant aspect of connective knowledge is the fact that the idea of connections is considered as a way of knowing, so it is our understanding of what we know and how we know it (Downes, 2012). The author defines networks as a set of connections between a collection of things that may contain information. Networks that involve people may be represented by, amongst others: human brains, societies or social networks. What is very important, when considering a network is the fact that when we influence it, the connections of the obejcts in it

change and this also affects the storage of information (Downes, 2012). Connective knowledge is constituted by four major elements which are autonomy, diversity, openess, and interactivity. The reality that used to be presented to us in books, newspapers or by teachers in classrooms is not up to date anymore. And even if it still is, we unarguably live in a fragmented world, where we are able to collect information from many sources. This may afford us new opportunities in the learning process. If academics stop treating themselves as experts in every field and give students the chance to experience the content of numerous sources, it is more likely that our learners will become critical thinkers and will develop the ability to learn continuously (Downes, 2012). The aforementioned collaborative, electronic mind map tool, may – in may opinion – constitute a network of people who are autonomous, open, interacting and different from one another, and this may impact the development of developing students, their knowledge and societies in certain, connected ways. Today, I think we should search for answers to questions which are highly important when considering higher education, namely: 1/ How, when and where learning happens to contemporary young adults? 2/ How may we release learning amongst university students that are assumed to be digital natives? 3/ What may we do to support their learning process in a way tailored to their language and their understanding of the reality?

## Methodological aspects of research

To find starting points in the search for answers to the above-mentioned questions, I decided to analyse the area related to students' cooperation during the University courses. I was specifically focused on observing their work on the electronic mind map and analysing their experiences related to that kind of cooperation. My intention was also to collect their statements, opinions and reflections so that I could draw some conclusions, which may be useful during the didactic process at the University and make further actions more transparent due to students' learning outcomes and their sense of learning. This situates the study in an evaluation research model. I understand evaluation after H. Mizerek, who defines it as a kind of social practices intended to change the existing state of things for a better one (Mizerek, 2017). According to him, evaluation generally appears after some action fulfilment. He argues that, practically, evaluation more often has a retrospective character, in which subjects of a reflection are effects of actions undertaken in the past or currently undertaken activities. He based his considerations on D. Schön's model, in which there were introduced two types of reflection: *reflection in action* and *reflection on action* (Mizerek, 2017). Actions that may be undertaken by a person who is a teacher and an evaluator (a researcher) at the same time, may be called the self-evaluation. This means that a

person, individually, collects data on the results of his or her own actions (Mizerek, 2017). My main aim was to find answers to the two following questions: 1/ What are students' opinions, experiences and reflections related to the socially embedded, collaborative learning during preparing electronic mind maps? 2/ In what areas courses at the University based on the Connectivism theory may release learning amongst young adults?

To gather empirical material, I used data triangulation, which made it possible to collect data from different sources and also allowed for better understanding the emerging categories (Konecki, 2000), and finally allowed me to find answers for previously-posed research problems. The data was collected through the *Mentimeter* tool (https://www.mentimeter.com), which is free, interactive presentation software, which allows preparing a set of slides, where a researcher may put several questions, tasks or assignments. The audience is able to answer these tasks online within using their mobile devices, which guarantees their anonymity. Moreover, both the researcher and the audience are able to see the results immediately after voting. I used the tool twice in each student's group after work on the mind map. For the first time I asked two questions. I was interested in students' assessments given on the electronic mind map as a learning tool. I used a Likert scale (point values from 1 to 5), where 1 meant very poor mark and 5 meant – excellent mark. I was also interested in participants' associations related to the electronic mind map, so I asked them to write three associations, which were presented as a word cloud. I was able to see the mostly appearing words and phrases related to the topic. During the second experiment, I used the same two tasks and additionally I asked students to write a short comment about their work with the mind map. To order my reflections related to the initiative I also decided to ask participants to write reflective essays (Kyles & Olafson, 2008) at the end of the course. I started with one initiating sentence, where I asked to describe their experiences gathered during work with the mind map and to think of situations or moments that were important from the perspective of their learning at the University. The *Mentimeter* software enabled the frequency analysis of the mostly used associations related to the map and also correlated statistical data. I also used SPSS software for statistical analysis. The short comments and reflective essays were analysed with using axial coding, according to significant, emerging categories as well as relations identified between them (Konarzewski, 2000).

## Connected learning – leads and clues stemming from gathered research material and analysis

### The statistical ones…

The categories, which determined the respondents and researched tool relationship, had Likert scale point values assigned. In each analysed group and term (altogether – 4 variants), a comparison was made with the $X^2$ test between the expected and observed frequencies. All analysed variants showed the observed frequency to differ significantly from the expected ones ($X^2 =$ from 71.11, $p < 0.001$ to 125.31, $p < 0.001$). Additionally, mean values equaled 3.82 (Tab.1). This means that the tested tool was positively assessed by the respondents. The prevalence of choosing the specific answers for all variants is presented in Table 1.

Table 1 **Prevalence of choosing answers**

| Point value | Answer | Prevalence | Percentage | Cumulative Percentage |
|---|---|---|---|---|
| 1 | Very poor | 0 | 0 | 0 |
| 2 | Poor | 0 | 0 | 0 |
| 3 | Fair | 32 | 40.5 | 40.5 |
| 4 | Good | 29 | 36.7 | 77.2 |
| 5 | Excellent | 18 | 22.8 | 100 |
| | Total | 79 | 100 | |

### First impressions, opinions and associations

The analysis of first associations related to the electronic mind map tool brought interesting findings. The word clouds showed the biggest words or phrases, which means that participants used them most commonly as associations. Additionally, I decided to enumerate synonymic words (that were also used by students) in brackets. It turned out that in the students' group 1 (GR. 1) there were similar associations in both terms of testing but they were not the same. The dynamics of changes were observed in exchanging places of the most commonly indicated words. In the first term, they highly acknowledged the following connotations: INTERESTING (pretty, intriguing), TECHNICAL PROBLEMS (difficult, problematic), MODERN (new, something new), TRANSPARENT (clarity, detailedness), COOPERATION (collaborative work, fast team work, integration), CREATIVITY (imaginative), ENTERTAINING (education plus fun). While in the other term, they indicated the role of: COOPERATION (collaborative work, it simplifies cooperation, sharing duties), TECHNICAL PROBLEMS (problematic, difficulties, problems, confusion, weak signal, bad faculty conditions), INTERESTING (pretty), and CREATIVITY (creative, innovativeness).

Figure 1. **Word Cloud – group 1 (second term)**

The other word cloud allowed me to clarify that technical problems were probably more related to the University back shop than to the lack of students' abilities to work on the tool. It is also important to say that in the second term they moved toward associations related to cooperation and creativity. This means that the participants recognised the value of collaborative work. There were also some statements (in both terms), which were not the most commonly indicated but seem to be significant from the perspective of learning at the University. Students pointed out (amongst others): educational, scientific, science, activities during classes, the most important information, searching for information, easier learning, news, easy way of studying, pedagogy, it forces to think, concentration, involvement, openness, PDF version, availability, preciseness, and technological advance. The associations coincided with their short comments that I asked them to write later. The following statements represent the groups of their previous associations. The highest number included contents related to the words interesting and modern. These two statements exemplify participants' reflections: *Thanks to that, the classes are interesting and different from others (GR. 1 St. 1). It is intriguing and I am very pleased to work on the map (GR. 1 St. 2).* There were many statements where students stressed the technical problems out. This time I was sure that on the one hand students had some objections to the tool functioning but on the other hand they pointed out the University technical conditions as a problem. These sentences present their reflections: *Although working with the mind map is an interesting form of collecting knowledge, it poses many problems, for example: moving or deleting the maps' elements (GR. 1 St. 4). I really like the mind map as a method, but the University conditions does not favour the effectiveness of work on it (GR. 1 St. 5).* Also the aspects related to the

tool functioning were interesting. Although the tool allowed us to work collaboratively on one mind map, even at the same time, there were some problems with using it properly. For instance, when somebody deleted something accidentally all of users had to log out from the map so the person could cancel his or her last action. It also happens that some of them deleted somebody else's work by coincidence and the team lost its foregoing results. It was important especially when they had the first contact with the tool. It seems to me that later on, students felt more confident and these problems were not the most important for them. They reported that they prepared some notes in a word file firstly, saved them on the laptops and then entered them into the map. That is why I reckon mixed statements in many of their comments, including information that however there were technical problems, the method of learning was still interesting for them: *The map is something new and interesting, but there are some problems related to using it. It goes down during the work (GR. 1 St. 6).* There were also some comments related to cooperation, creativity and technological advance in the first group. Students admitted that: *Working with the mind map is very pleasant and thanks to it we can cooperate with our colleagues and improve relations with them (GR. 1 St. 7). It shows that classes may look different (better) than I could observe at the University so far (GR. 1 St. 8). I think that the mind map was well developed. It was casually to work with it. The more you commune with it, the less problems you have (GR. 1 St. 9).* I was surprised that one of them admitted that the map was useful for exams passes. The strand connected to the learning process was emphasised in the following statement: *It is easier to prepare a note in the map, so you can learn faster (GR. 1 St. 10).*



Figure 2. **Exemplary short comments of participants**

Both terms in the second group (GR. 2) resulted in most common indicated association, which was COOPERATION (community, team work, integration, collaborative work, team, action). The most important words or phrases in both terms were also: INNOVATION (innovativeness, modern, modernity, novelty, ingenuity, and innovative), REVIEW (a collection of information, thoughts, perpetuation of the news, all in one place, summary, gathering information, revision, orderliness), TECHNOLOGY (online, Internet, virtuality, e-learning, visualisation), LEARNING (knowledge, general pedagogy, thinking, associations, a note, notes, a collection of thoughts, a tip, all in one place, educational tour guide, good way for learning, it is easy to line it out, concrete information, effectiveness), CREATIVITY (fertileness, variety), and LINKS. There were also a few words mentioning the rough time with the map: difficult, complicated, and a challenge. In comparison to the first group, there were not many associations indicating technical problems related to using the tool. At this point, group 2 was more focused on emphasising the learning and cooperation aspects of the *Mindmeister* software. That fact was acknowledged by students' short comments: *It is better to study from the source, in which all is gathered together (GR. 2 St. 1). It is a cool way for collaborative work, exchanging beliefs or opinions on the topic as well as reviewing subject matter knowledge (GR. 2 St. 2). Gathered and saved information in PDF file is a great revision (GR. 2 St. 3). At the beginning it was quite hard to work with the map, but it has changed when I get used to the tool. (…) Cooperative effort allowed us to do a lot more (GR. 2 St. 8).* The above-cited statements indicate that the surveyed students may be the representatives of the Digital Natives generation (Prensky, 2001), which does not have to adapt to the new life conditions. These young adults were perfectly content with the possibility of having the gathered information in one place as well as of the fact that they may use PDF files (prepared as a result of their learning through the mind map tool) as notes for learning. This also corresponds with the theory of Connectivism (Siemens, 2005), especially with its part related to the *know where* (to find information) slogan. Although participants emphasised the important role of cooperation and learning through the mind map, their short comments exposed some technical problems that were mentioned in the group 1. They reported the following difficulties: *It is hard to work on the mind map, because in an easy way you can delete the whole entered text (GR. 2 St. 9). The biggest problem is the fact that we are unable to undo the accidently deleted 'clouds' (GR. 2 St. 10).* Those comments do not indicate that there was a problem associated with a low level of technical equipment of the University building. I remember that classes with group 2 took place in a better-equipped classroom at the Faculty. I interpret those comments as the inconvenience for participants arising from their lack of knowledge of how to use the researched software, which was new for them. Indeed, the students met the tool for the first

time in our class. There was no tutorial or anything like this before. I explained them everything during the first review and I was helping them constantly when they reported me any problems back. However, it is worth adding that this was also my first experience with using the tool collaboratively. Previously, I used the tool during workshops for schoolteachers beyond the University, but at this moment I understand that it was not enough experience. For instance, I was really surprised that we were unable to undo the last action (on the map) if there were other people logged in. Although the collected material at this point allowed me to get to know the first impressions, associations and opinions of students related to using the electronic mind map, I was still not able to answer the question about the areas in which connected work could release learning amongst researched participants. That was the main reason of carrying out the further explorations. At the end of the course I asked students to write reflective essays in which I called on them to describe their experiences related to the topic and report moments or situations that were the most significant from the perspective of their learning at the University. The analysis of the gathered empirical material is presented below.

## Analysis of the contents of students' reflective essays

### *Sense of the new experience and difficulties associated with it*

Meeting the tool for the first time in our classes resulted in two main threads that were appearing in students' essays. Firstly, they emphasised the novelty of the experience: *These were my first classes with using this technique of learning (Gr. 1 St. 9), In my experience, the mind map is undoubtedly, entirely new technique (Gr. 2 St. 5).* Secondly, I was able to discover first reactions as well as emotional states that emerged from the written stories. These were mainly curiosity and surprise: *I have never had an opportunity to work using the mind map software (I had no idea that anything like this even existed) (Gr. 2 St. 22), It was new, I met it for the first time at any classes at the University (Gr. 1 St. 11), Doing that kind of review interested me very much (Gr. 2 St. 16).* One of them developed longer story about the novelty of the technique used. She said that right after the first class with the mind map she told about it her cousin who lives in England. She stressed the fact of completely modern learning. The reaction of a cousin was following: *'You really have not tried it before at Uni? We employ mind maps in most classes!' (Gr. 2 St. 11).* This means that preparing mind maps is a novelty only to the surveyed Polish students, and at the same time that the technique was being used for a longer period at British Universities (at least at one). This also sets us (academics) in front of a challenge of introducing students as many elements of new educational methods as possible. Nevertheless, the novelty and new experiences do not have to mean that participants felt happy with the new technique in all cases. Many of them reported difficulties that they

experienced during working with the mind map tool, which was thought out as a matter of the Connectivism concept. The empirical material gathered from students' essays allowed me to single out three groups of technical problems that they encountered most commonly. These were problems related to the tool limits, University back shop, and unfamiliarity of the tool. Some testimonies were also mentioned in students' short comments, which were analysed above. Students had a chance to explicate their thoughts in essays, where they pointed out: *(…) something may be deleted, something may be moved. It is a waste of time and I lost a good idea for a few times because of this. (Gr. 1 St. 13), All users had to stop their work and log out from the mind map, to recover an element that was accidently deleted. That disorganises work very much (Gr. 1 St. 5).* There were many statements similar to these and as I mentioned before I was extremely surprised and disappointed when these situations happened during the class. I was not able to predict them even if I had tested the tool before, however I must admit that the students were right. The only thing I could do was to help them to recover lost files or explain them the usage of the tool again so they were getting used to it more and more in each class. I also decided that I would not mark them for preparing the first map as a review. I observed that this decision made them feel more comfortable and distressed. The other mentioned difficulties were connected to the University amenities: *The only one drawback, which is quite important for me, is the fact that our Faculty is not adapted to the situation that all students participating the class may use their own devices at the same time. What I mean is the lack of power sockets. (Gr. 1 St. 10).* Although the student admitted that it was the only one disadvantage, later on she continued the story associated with technical problems at the Faculty: *The other barrier is the lack of Wi-Fi at academy. It hampers the work quite strongly. (Gr. 1 St. 10), It is important to have a good Internet connection, because although we add some elements into the map, they do not appear there (Gr. 1 St. 5), This technique has got many pluses, the conditions of conducting classes effected on us adversely. That is why I have mixed feelings (Gr. 1 St. 9).* There should be two comments added here. As I mentioned before, students' group 1 definitely had much more technical problems related to that kind of work because of the worse equipped room that they had classes in. The sockets were broken twice during our review. The other comment concerns the first reflection that I had after reading their essays. According to some of their statements, I should reconsider organisational issues next year. I believe I can book a better classroom in the Faculty building. The most surprising aspect of that part of the analysed material was the fact that the participants (both groups included mostly women) reported impediments in the matter of attending on the tool. Although only two students mentioned about difficulties with the tool language, which was English: *It is a pity that the map is written in English, for me – a person who poorly knows that language it causes little inconvenience,*

*because I had to fly blind (Gr. 1 St. 14);* many of them reported emotional states that accompanied them as a result of not knowing the tool: *First encounters related to technical problems and poor understanding of this software made me feel disaffected (Gr. 1 St. 1), At the beginning I was sceptic to the idea, because I was never able to learn with using the media (Gr. 2 St. 5).* According to many statements that reported those difficulties, I initially assumed that probably not all of contemporary students are able to use the newest technology, and are the representatives of the App Generation (Gardner & Davis, 2013) or Digital Natives (Prensky, 2001). Nevertheless, many subsequent declamations contradicted my first considerations. I believe that accumulated aspects, which were: lack of Wi-Fi and sockets, tool's options limits and first emotions related to using something entirely new for them, might affected their impressions and reflections. Their ulterior statements proclaimed that they needed a little bit of time to get used to the tool, so they felt more comfortable with it and were using it with any problems: *Everyone was using the application much better after several tries and then less problems came up (Gr. 1 St. 4), The second review went smoothly. Creating files and adding new contents to the map gave us a lot of satisfaction (Gr. 2 St. 11).*

*'Knowledge in a nutshell' from surmounting difficulties to learning process optimisation*

Detailed analysis of essays confirmed my belief that the more familiar students were to the tool; the more practical applications of it were detected by them. These issues were mainly associated with the utilitarian value of learning in the course that is designed on the basis of Connectivism. Participants emphasised the role of simplicity of preparing notes as a result of their work presented in a PDF file: *It saves our time, we can learn from the PDF file straight away (Gr. 1 St. 8).* Some statements convinced me that what they needed was a well-prepared, short and concrete report, which is relevant to a specific topic: *The mind map gathers the most important information that is easy to remember. So we do not waste our time for general things but particular ones that are concerned with the topic (Gr. 2 St. 1).* I would actually call it as one of them declared: *In my opinion it is 'knowledge in a nutshell', which literally means that everything what we need to know is there (Gr. 1 St. 2).* It is worth adding that the mind map was a brilliant tool for those who represent visual learning style and like to fix something in their brain graphically: *For me it is easier to remember something if it is written with using etiquettes, if it is coloured and drawn up (Gr. 1 St. 7), For instance, when I was learning about the globalisation process, I reminded myself the green colour and its location in the map straight away (Gr. 2 St. 12).* Also colours, emoticons and map's branches supported the process of remembering knowledge: *Additionally, to remember the part of material there are symbols available in the tool that may be used according to our associations (Gr. 2 St. 12).* In further students' statements there were phrases that indicated

their awareness of theoretical background related to scientific knowledge about the brainwork. Some of them admitted that the process of mind mapping involves both hemispheres of the brain: *The map allows using both cerebral hemispheres (Roger Sperry wrote about it), so it is not enough that we had an opportunity to connect knowledge gathered during classes, but additionally we improved our brain (Gr. 2 St. 1).* Probably, this resulted in remembering where to find specific information or part of material that was needed by students night or day: *Few weeks later after first review (…) I had to refer to the example, which was mentioned in our map – stages of a lifecycle. I did not remember what was the name of the theory that introduced that topic. So I logged into the map, opened it and then I could make inquires without long searches or any problems (Gr. 2 St. 11).* I reckon G. Siemens would say that this is the essence of Connectivism – know where to find the needed knowledge, which in his belief is more important than to know what and how to learn. Although participants' essays included mostly statements that convinced me to continue my action in the future, I must admit not all of them were only positive. Some students said that even if they were quite happy with using it during our classes, it still seems unpractical in their everyday life. Two of them emphasised that it is much better to prepare a map just by them, so it is more readable and understandable for an individual person: *We do not know all the times what was in somebody else's head and what he or she was thinking of. Some people use shortcuts that are not understandable for others (Gr. 1 St. 5), It is important for more effective learning to create a map individually, because everyone learns differently. Then the 'journey' through the map is easier and we are orienting better on it (Gr. 2 St. 22).* These statements may indicate the fact that young adults represent different learning styles, and even if we offer them classes that include elements of new media or new technologies, which are generally very popular among the new generation, it does not mean we are permitted to do it without any reflection on the learning styles that are represented by students.

### *Reinvented learning, and arising cooperation*

Non-traditional form of testing the students' background in General Pedagogy course had an effect on their longer testimonies related to a matter of contemporary learning process at the University. Three groups of codes: emotional statements, educational advancement and stopping the monotony were interchanging with two other groups of codes, which were called variety of opinions and sources as well as places, spaces and time of learning. The participants' emotions expressed in essays were mainly enjoyment, happiness, and amazement. Here are some students' statements: *Step by step I was learning how to use the software, which made me jolly, and it was mainly the springboard out of our grey, University everyday life (Gr. 1. St. 1), I really liked leaving the monotony of classes. First lesson resulted in highly positive perception and*

*curiosity (Gr. 1 St. 9), I am glad that we begin to use that kind of 'news' at our University increasingly and we move with the times (Gr. 1, St. 17).* Participants from the group 2 emphasised the issue connected with stopping the monotony much earthier than the first group participants: *The classes were non-standard as most of them. It is a good move, in terms of strong and fast new technology development (Gr. 2 St. 24), (…) we used the electronic form, which is rarely practised during studies, because most of teachers are rather focused on the traditional forms of learning (Gr. 2 St. 1).* Students also indicated educational advancement during assessing the tool. They understood the advancement as combining the educational process with the newest technology. Here is the statement that represents this issue: *The mind map connects education with technology, which is a huge step forward and advancement in our country and in Polish education at all. Anyone else (…) has not entered me into that model of teaching and conducting classes before (Gr. 2 St. 17).* Furthermore, the participants stressed the fact that education shall be based on creating knowledge through apposing different points of views, opinions and information sources, which took place during our classes with the electronic tool. That experience was raised in majority of participants' essays: *Thanks to that we are able to create a conversation for a specific topic, because each of us has got distinct opinion, he or she interprets some things/matters in a different way – it is very important (Gr. 1 St. 3), We did not have to focus only on stark theory, but we also had to use a variety of movies, and articles that were in the Internet and reflected a specific topic. (Gr. 1 St. 4).* Siemens (2005) argued that adult education has its specific rules in connected environment. Some of them are: active participation in the process of learning, extending the scope of knowledge and using different sources when an individual learns. He also emphasised that in the digital era, the learning may take place in devices. I reckon this issue clearly emerged in the stories of participants. Additionally, they described different spaces, places and time of learning, which are not so obvious nowadays and may not be limited to the University or library building walls: *It was pretty that we were able to modify the map many times and in all places. What you needed was only a mobile phone, and the time of work was not precisely specified (Gr. 1 St. 4), You do not need to sit at home or in the library, but you may have a look into the map in each free moment – even in a bus on the way to classes (Gr. 1 St. 5), I mostly liked the fact that we could fill it in at home, during the breaks between classes or in a tram (Gr. 1 St. 8).* The last statement made me think of issues related to the cooperation amongst young adults during the classes. The student said: *We could fill it in (…),* which literally means that she was not doing it just by herself; there were definitely some of them working on the map. Frankly speaking (even as a researcher), I was not interested how many of them were working together. I assume the most important thing was the fact of cooperation at all. Further

participants' stories brought me to the point, in which I can certainly say that a lot of them were *learning the cooperation*, and what is more important they were *learning due to cooperation*. I presume that probably the first contact with the tool that demonstrated them how to work together could initiate the process of learning the cooperation, and then work teams were learning due to cooperation. Following fragments of students' stories may depict the fact of learning the cooperation: *We could learn to cooperate. It was not based on the rule 'I am thrown back on myself' (Gr. 1 St. 3), Mind mapping allowed us to develop collaborative work skills (Gr. 1 St. 6), This form of work realised me that other people, who were members of the team had their own opinions and we needed to take them into account (Gr. 1 St. 12).* On the other hand, these statements support the track related to the process of learning due to cooperation: *The way our map is created intrinsically involves all participants of a meeting, stimulates into thinking, associating, searching for relationships. These are difficult to receive in traditional learning conditions (Gr. 1 St. 10), We shared problems with each other, and we solved them together (Gr. 1 St. 6), We could debate on many interesting topics, argue a little bit, but then we developed the best version of the discussed topic together (Gr. 2 St. 24).* Additionally, some of them suggested that I should share the idea of mind mapping and collaborative work with other academics: *I would like other teachers to use that form of testing, because I learn best through the contact with other person (Gr. 2 St. 7).* 'It's a pity' describes best many of participants' testimonies related to the fact that not many academics use new technologies and collaborative work techniques during University classes.

## Benefits and imperfections of connected learning

The idea of carrying this research out originates from my former students' opinions related to testing them at the University. The students of our Faculty are used to preparing projects and presentations together, but this only results in a single mark, which is a part of their final grade received from the course's teacher. That is why, I assume, some of them asked me many times: Why do you want me to learn connectively but finally you test me individually? The answer to this question probably depends on academics' own experiences and usual habits, University curricula requirements or something else, which actually may be a good idea for further investigations. This one included only questions regarding students' opinions and reflections related to using the new, electronic technique of work and the areas associated with releasing learning among young adults through the courses that were based on the Connectivism concept. The collected and analysed material showed that there were some areas, which seemed to be significant from the perspective of releasing learning amongst adult learners. First of all, it was a positive perception of the proposed technique of revising material.

Secondly, initial associations and short comments testified that the mind map as a tool was mainly connoted with cooperation, novelty, creativity, technology, and learning at the University. Unfortunately, as a result of both: unfamiliarity with the tool and technical inconvenience of our Faculty, students experienced difficulties related to using the *Mindmeister* tool. I believe this might inhibited the process of learning and releasing learning amongst them. Similar issues were also observed and described by M. Spitzer in his book titled 'Digital Dementia'. However, detailed analysis of participants' essays allowed me to conclude that preparing classes based on the Connectivism concept that includes usage of mobile devices, laptops, Internet collaborative work, and creating a set of connections, may release learning in some areas. The following ones seem to be the most interesting from the perspective of previously asked research questions. Though connecting traditional methods of conducting classes with the latest technology was a beneficial experience, learning through the tool disconvenienced students somehow. This was a result of insufficient tutorial and the lack of WiFi in a few classrooms at our Faculty building. This draws a conclusion to think of limits and problems that may appear in the process of carrying out classes before their start. However, the matter related to familiarising students with the new technique may be solved spontaneously if academics give some attention to them. In the text, I presented that the participants got used to the tool quite smoothly with time and additionally they spied some learning improvements that the software offered them as learners. These were mainly: graphical options, which supported remembering, issues related to saving time and having notes in a PDF file that assured them where to find the needed information. The map was especially utile for students who probably represented visible learning styles, which may be a piece of advice for those academics who know their students quite well. A good orientation may be helpful when we choose optimal ways of working for students' groups. On the other hand, introverted students may feel uncomfortable with this technique. The greatest finding was the fact of learning the cooperation within students' groups and as a result of this, learning due to cooperation. Students' essays evidenced that they were hungry for cooperation during University education because it did not happen to them very often. Different places and time of learning as well as variety of sources that are highly needed in the process of their learning draw my attention to the need of further explorations in the area concerning informal learning or non-formal education at all. Also the matter of cooperation during University classes requires deeper insight.

# References

Bielinis, L. (2017). FB, they and me – the attempts of using social media as tools for reflective learning and communicating at the University. *Proceedings of the International Scientific Conference May 26ᵗʰ-27ᵗʰ, Volume 1*. 46-62.

Buzan, T. (1984). *Use your head*. London: Guild Publishing.

Czachorowski, S. (2016, November 2). Ryślenie, czyli myślograficznie i lapbookowo. *Edunews.pl*. Retrieved from: https://www.edunews.pl/narzedzia-i-projekty/narzedzia-edukacyjne/3649-ryslenie-czyli-myslograficznie-i-lapbookowo

Downes, S. (2012). *Connectivism and connective knowledge. Essays on meaning and learning networks*. [Adobe Reader]. Retrieved from: http://online.upaep.mx/campusvirtual/ebooks/CONECTIVEKNOWLEDGE.pdf

Gardner, H., & Davis, K. (2013). *The App Generation. How today's youth navigate their Identity, intimacy and imagination in a digital world*, New Heaven and London: Yale University Press.

Huth, A. G., de Heer, A., Griffiths, T. L., Theunissen, F. E., & Gallant, J. L. (2016). Natural speech reveals the semantic map that tile human cerebral cortex. *Nature*, *vol. 532*, 453-473.

Jones, Ch., & Shao, B. (2011). *The Net Generation and Digital Natives. Implications for Higher Education*. [Adobe Reader]. Retrieved from: http://oro.open.ac.uk/30014/

Konecki, K. (2000). *Studia z metodologii badań jakościowych*. Warszawa: Wydawnictwo Naukowe PWN.

Konarzewski, K. (2000). *Jak uprawiać badania oświatowe. Metodologia praktyczna*. Warszawa: Wydawnictwa Szkolne i Pedagogiczne Spółka Akcyjna.

Kyles, C. R., & Olafson, L. (2008). Uncovering Preservice Teachers' Beliefs About Diversity Through Reflective Writing. *Urban Education, 43 (5)*, 500-518. Retrieved from: http://uex.sagepub.com

Mizerek, H. (2017). *Ewaluacja edukacyjna. Interdyskursywne dialogi i konfrontacje*, Kraków: Oficyna Wydawnicza "Impuls".

Prensky, M. (2001). *Digital Natives, Digital Immigrants. On the Horizon, 9 (5),* 1-15. Retrieved from: http://dx.doi.org/10.1108/10748120110424816

Siemens, G. (2005). Connectivism: A learning theory for the Digital Age. *International Journal of Instructional Technology and Distance Learning*, *Vol. 2 No. 1*, 3-10.

Sperry, R. W. (1975). Left-Brain, Right-Brain. *Saturday Review*, *9/8/75*, 30-33.

Spitzer, M. (2016). *Cyfrowa demencja. W jaki sposób pozbawiamy rozumu siebie i swoje dzieci*, Słupsk: Wydawnictwo Dobra Literatura.

Strelau, J. (2003). *Psychologia. Podręcznik akademicki, t. 1 – Podstawy psychologii*. Gdańsk: Gdańskie Wydawnictwo Psychologiczne.

Ziółkowska, B. (2005). Okres wczesnej dorosłości. Jak rozpoznać potencjał młodych dorosłych? In: A. I. Brzezińska (Eds.), *Portrety psychologiczne człowieka. Praktyczna psychologia rozwojowa* (pp. 423-468). Gdańsk: Gdańskie Wydawnictwo Psychologiczne.