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MARIANN VÁRALJAI

EXAMINATION OF INFORMATION SEEKING HABITS IN CHANGING LEARNING ENVIRONMENT

Empirical research among students of the University of Dunaújváros

Theses of Doctoral (PhD) Dissertation

SUPERVISOR:

DR GIZELLA CSERNÉ ADERMANN

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The Importance of the Topic

In the era of information society and instant communication, with the emergence of modern technologies there are immediate and revolutionary changes in all areas of human life-industry, economy, employment and education. From childhood throughout life the task of education is to help the individual in acquiring knowledge. The technology embodying as a characteristic of the information society has an increasing impact on the education sphere. As a result of the emergence of modern technologies, even the modern technologies have a decisive role during the learning process in the changing learning environments.

As long as we consider the learning process as an information processing procedure, the information acquisition as the first stage of this procedure is decisive for effective learning, and consequently the individual's information search strategy is crucial in this phase. Information is the first element of the process, the input (ie the input). Its characteristics, especially its quality, determine the outcomes of the learning process, thus affecting the success of learning. Learning is such an individual activity and is realized in a diverse form and in a diverse environment. The learning process itself can be done individually and separately or in collaboration with the peers, but the appropriately chosen source and method greatly influences the success of learning. Students' information retrieval strategy - used to collect information connected to their studies or comes from their personal interest - may influence how they will approach to a scientific problem later.

With the habit inquiry, I have discovered those information gathering habits that set within the learning activities during the teaching / learning process. The subject of my research was to examine the information gathering habits of our time, focusing on the student's side. We live in a time where technological progress has a strong impact on the members of society in all part of their lives. In the research designing period, I wished to study the world of education, including it I wanted to focus on information gathering habits of students in higher education as in the context of formal, institutionalized education. I did not undertake a full Examination, so I nominated my institute, the University of Dunaújváros as the location of my research.

The Structure of the Dissertation and the Research

In the introductory part (*Introduction*), the motivation for choosing the subject of the dissertation, in which the focus is on the student who participates in the educational process, is reviewed. The dimensions of the study include the use of modern technologies in the field of education, the changing learning environment and the information seeking or acquisition habits in a changing learning environment.

The introductory section is followed by the chapter "*Scenario Analysis and Problem Exploration*", which includes an overview of the Hungarian social situation, which emerged as a result of the information revolution due to technological development innovation in the time of the research from the aspect of education. On one hand, the assessment of the situation evolves through the review of those learning theories that affect the current learning methods, on the other hand through the exploration of the relationship between the impact of modern technologies on information seeking and the evolution of the quality of life. The dissertation emphasizes the importance of focusing on the individual's quality of life, since well-being and individual satisfaction have a significant impact on learning efficiency.

Chapter Three "*An Overview of the Relationship between Learning Environment, Technology, Information and Social Connectivity*" aims to provide a framework for the research in nexus with the situation analysis. In the thesis, firstly the comparison of different interpretations of learning styles and learning environments, then the milestones of education and technology interconnection is presented in the dimension of technological development and finally the demonstration of their impact on the educational process from the student's view. The information seeking phase of the learning process is the first step on the way to reach the effective output, based on the logic thread of the thesis. This is the center of the thesis.

The focus of the thesis is on the relevant literature review of the general model of learning process and applied information search techniques which is followed by the describing of the individual - community relationship. These all are based on the generation characteristics of the student population since these characteristics are dominant in terms of the study. The focus of individual - community relationship has become a priority during studying individual well-being, so this chapter introduces previous research results related to the topic.

The conditions of the research are summarized in the following chapter. Once the hypotheses of the dissertation have been set, the dissertation also describes the circumstances of the research. The results of the research were analyzed in several dimensions in accordance

with the research questions and the research hypotheses. I summarize the results of the research and confirm / reject the hypotheses in the final chapter. This chapter presents the proposals for future research needed to answer the additional questions raised during the processing of research results and the further development effort to expand this research.

The study of information seeking habits took place in several phases during the 2011, 2014 and 2015 academic years. I applied questionnaire for data collection. The online electronic questionnaire method was favoured during the whole research, by random sampling among the active students of the University of Dunaújváros. Besides the e-questionnaire method I expanded my examination by analyzing the results of worksheet exercises in electornic environment.

Chapter 5.1 aka "*Examination of individual information seeking activity in electronic learning environment*" section adumbrates research results of 2011 academic year in parallel with the results of 2014 academic year in the topic of information seeking habits. Respondents were randomly selected. The study primarily analyzed the device availability of the students and the way of information acquiring from the aspect of modern technology.

Chapter 5.2 aka "*Examination of individual digital information seeking activity*" places the individual students' achievements in the course of "Informatics" in 2011 academic year in parallel with the students' achievements of year 2014 from the aspect of digital competence. In the first part, it is described, that the information literacy, which is achieved by the development of digital competence, is closely related to device literacy and willingness to usage. The development of digital competence was monitored through solving worksheets. The Examination was conducted on the basis of the instructions, individually, computer-based in the electronic learning environment.

I interpreted the results of the Examination presented in Chapter 5.3 aka "*Examination the impact of modern technology on the learning process from the aspect of the subjective well-being*" from the aspect of subjective well-being. According to a universal understanding of learning, learning is an individual activity whose community dimension is decisive as it takes place in a social context. Throughout the activity in community space, the individual can acquire information that contributes to his / her own individual development. Accordingly, one of the most important elements of my research is the examination of the relationship between the individual and the community, the new technology has benefical effects due to its characteristics such as: providing connectivity, independence in time and place, virtuality and continuity.

As a result of the personal deepening in the research and the institutional adjustment to the innovation process in parallel with passage of time, the spectrum of the research has expanded with a new focus area in the academic year of 2015. In Chapter 5.4 aka "*The special features of developing a new learning environment*" I presented the results of the online questionnaire survey taken in 2015 academic year. The initial steps of the University of Dunaújváros in a virtual learning environment have therefore motivated the expansion of individual research through the inclusion of a new information seeking alternative in education. The novelty of the virtual university / laboratory concept has attracted the curiosity of the student society of the University of Dunaújváros and contributes to the results of the further phase of the research with their constructive opinions.

The presentation of the parts of the research and the results obtained and processed in the thesis, due to the complexity of time and information searching habits, is illustrated in the following table. The aspects of approaches are: learning environment, technological supply and openness to technology-use, digital competence and individual – community relationship.

The aspects of approaches	The time interval of examination	The main characteristic of research	The place of results in the thesis
Examination of individual information seeking activity in electronic learning environment	Academic year 2014	E-questionnaire in electronic learning environment Number of respondents: 145 (in 2014)	Chapter 5.1
Examination of individual digital information seeking activity	Academic year 2011 Academic year 2014	Solution of individual worksheets in electronical environment Number of respondents: 165 (in 2011) 95 (in 2014)	Chapter 5.2
Examination the impact of modern technology on the learning process from the aspect of the subjective well-being	Academic year 2011 Academic year 2014	E-questionnaire in electronic learning environment Number of respondents: 182 and 328 (in 2011) 145 (in 2014)	Chapter 5.3
The special features of developing a new learning environment	Academic year 2015	E-questionnaire on electronic training organization platform Number of respondents: 391 (in 2015)	Chapter 5.4

Situation Analysis and Bibliography

Modern technology results significant changes in all areas of life, such as education, employment, economics or family life in the information society. It is unavoidable to embrace technology in education, therefore the acquisition of learning methods are gaining an increasingly important role, besides the acquisition of knowledge that can only be achieved through a permanent learning as a characteristic of the knowledge-based society, in adapting to changing circumstances. The predominance of formal education systems is reduced, while the role of non-formal and informal frameworks increases. The focus of subject-centric, content-delivering function of the school is shifted to the development of individual learning abilities, which can be done in several ways. According to David Gardner, however, "we always have the right to have excellent schools while we are actually satisfied with the average." (Gordon Dryden, Jeanette Vos, 2005) The statement of the American Richard L. Measelle and Morton Egol is probably also true of Hungary: "The time of the traditional education system It surpassed."

The specialty of the information society that is emerging as a result of the information and communication revolution is, inter alia, that the emerging electronic media changes the lives of society's members, affects their attitudes and the changes in their actions, according to Marshall McLuhan, a Canadian communication theoretician. (McLuhan, 2010) The importance of communication is inherent in its feature. As in the general sense it means the flow of information within the system where the information passes from the transmitter to the receiver in some encoded form.

With digital technology, the spread of network communication and the emergence of computing, humanity has entered the new media era. The Internet is a digital space opened by the interconnected open system, and also the field of electronic communication in which there is no central perspective. The control panel is always there, where the user is. Speech, written text, image, animation, sound and music are accompanied in the web of which text and image are currently dominated. (Csepeli, 2008) In this respect, it is an active participant in communication situations that supports direct communication within the community.

The emergence of a number of new teaching and learning methods is the result of the application of modern technology built into the educational process. With them, the process of education can be more efficient. New learning methods are related to different learning interpretations and learning theories. Numerous learning theories have evolved in the past decades of mankind, in case of modern learning methods, for the interaction between the

individual and the environment, the social interaction is also taken into account as a learning factor. In the second half of the 20th century, representatives in the field of pedagogy are increasingly focusing on knowledge-based cognitive behavior. The learner is in the center, the focus is on the learning process in the learning processes. Instead of the teacher's knowledge transfer activity - in which the learner as a passive recipient gets involved – the knowledge-based student activities become important. Decisions and problem-solving activities are increasingly focused.

Skill development gets top importance besides knowledge transfer in modern pedagogy. The process of learning then appears as a construct, where participants interprets new information through their existing knowledge. According to the constructivist approach to learning, the learner is knowledge recipient and creator in effect who builds cognitive models of his environment. Learning is then an active inner construction process and knowledge is the result of it. (Shuell, 2013) The focus is on the process of learning in view of constructivism. Technology supported toolbox of reform pedagogies, that suitable for building new knowledge also appears in constructivist learning environments.

The learning environment is characterized by openness and involvement of new technologies in education, the creation of a network-based learning environment. Decentralized, multichannel, irregularly organized learning form encourages active participants to cooperative and collaborative learning in the learning process to develop their creativity. During co-operative work, the individual works independently and alone, and communicates the acquired information and the processed results to his associates who, similarly, worked independently. The individual shares information that is interpreted and processed in his / her own perspective during publishing. Co-operative work and collaboration are a very useful learning technique in an online learning environment supported by modern technology.

Technology affects the quality of individual's life, therefore it has an influence on subjective well-being in the information society however, its extent and in terms of quality, shares the judgment of the scientific community. The notion of prosperity and well-being is separated in scientific literature. The researchers of other disciplines, such as medicine, psychology, sociology, economics, besides the philosophy, have started to deal with this topic over the last decades. A number of studies explore the use of different technologies among individuals during the lifelong learning process, but fewer studies are examining the social impact of these technologies, especially the aspect of well-being. As a result of technology-

supported access to information, an individual is able to focus on self-development and keep community relationships, which contributes to subjective well-being.

The learning environment, which surrounds the individual during the learning process, is decisive in the learning outcomes. Apart from social, economic and technological development, the social and physical environment, the learning environment, and learning style have an impact on learning. The "Nature of Learning: Using Research to Inspire Practice" study by the Organization for Economic Co-operation and Development (OECD), of which Hungary is also member, has identified the explicitly educational principles of the learning environment as follows: student-centered , structured and well-designed, profoundly personal, inclusive and community-based. (Hannah Dumont - David Istance - Francisco Benavides, 2010)

Keeping pace with technological advances, e-learning is becoming more decisive in the field of education as a new form of education supported by modern information and communication technology (shortly ICT). However, the spread of the Internet meant a qualitative leap in education as well. The interaction between students in space and / or time, and the formation of cooperative learning groups are supported by it. The possibility of communication transformed the way of learning. Students are no longer studying isolated, but can also interact with their computer-supported peers and tutors over the Internet. Thus, there is a possibility of combining different technologies and pedagogical methods in order to achieve the given educational goal. This type of learning is identified as combined or blended learning. One of the most important elements of the knowledge-based society is lifelong learning, as well as life-wide learning. The range of available forms of training has also widened, education outside of educational institutions (non-formal learning), or informal learning also wide-spread, besides institutionalized education (formal learning).

Nowadays, students in the educational process require the support of community learning, knowledge management and professional communities. A learning-supporting framework suite for expectations combines classical e-learning with its online impetus, where online video, online video games, simulations and captivating virtual experiences enrich interactivity in the learning process. (Bersin, 2009) The circumstances in the virtual environment are sufficiently deep for the individual to create a comfortable working environment, which makes him confident and self-confident. The action in the learning process is a procedure on individual's level, in which an individual realizes the learning along his or hers own thoughts, the information acquisition, the information processing, or even the problem solving is also realized on his or her individual level. (Havas, 2003)

Objectives, hypotheses

Research Questions that are Awaiting Answered

a. How does the learning environment change when the new technology appears?

The training institution must also adapt to changes if this environment varies, for the sake of effective learning. In accordance with the training profile, most of the higher education institutions recognize that the training is primarily intended to serve the labor market, so emphases the cooperation with the industrial sector. The University of Dunaújváros is up-to-date to support education in parallel with the aim of introducing dual training, thus providing the most up-to-date learning environment for the students that is also well-respected by the industry. Does the continuous updating of curriculum and learning-related information by trainers, not only by content but by adapting it to the learning environment influenced by technological change, make the students' learning activity more effective than ever?

b. Is the student able to take advantage of technology, thus making the information seeking activity more effective in the changing learning environment?

c. How does the new, changing learning environment affect the relationship between the individual and the community?

The methods of information seeking, with what the students have got familiar in their secondary school studies, are definitely widened with the opportunities provided by the training institution. It supplies broader palette for the individual. Freshmen will meet the diversity of e-environments from the very first moment of their university citizenship at the University of Dunaújváros such as an institutional website, a unified learning system, an electronic learning environment The website of the institution and the unified learning system provide the possibility of vertical exchange of information, the electronic learning environment allows vertical and horizontal relationships, thus the flow of information between student-student and student-student groups can be realized. In addition to formal platforms, students also have a wealth of opportunities to share additional information about their studies, as well as professional and community forums, mailing lists, chat rooms and similar electronic interfaces for individuals. Does the learning society recognize that individuals and communities are able to take advantage of the benefit of the modern technologies, as an integral part of their lives, during the learning process, prioritizing in the acquisition of information?

d. Does the information seeking habit change with the appearance of the new technology?

Is the device itself a determinative interface to help in the information seeking process? Are the existing habits widened or replaced with the emergence of new opportunities, or may their priorities change only? Those members of the student community who took part in the survey during the research are the member of the X and Y generations as generation marketing titles them, but the next generation of Z is preparing for the higher education as well. The major group of student community in the University of Dunaújváros at the survey time was therefore the students of Y generation. There were several tools and equipment presented in education at the time of their birth that have been used today, such as TV, radio, telephone, and network. Their upgraded and / or improved version and their up-to-date developments are also integrated into their learning environment with time and innovation. The question is whether the search for information supported by the new technology is consistent with the previously used method, or does a new habit begin to evolve?

e. Is it possible to set up a method in a constantly changing student environment?

Thinking ahead the previous question, does the resource management primarily depend on the individual, or the learning environment, or the information you are looking for, when searching for information?

Hypotheses of the research

I assume that:

− The student chooses more dynamic elements in the student learning environment for information seeking with the appearance of the new technology, depending on the immediate availability he or she mostly uses the virtual space. (Hypothesis 1)

− There are some competencies that were previously used in the e-learning process and are also suitable for students in acquiring knowledge during their learning process in the new environment, but new competencies and capabilities can be added to their potential as well. (Hypothesis 2)

−The information seeking and / or sharing activity is transmitted to the virtual space in terms of the relation between the individual and the community. (Hypothesis 3)

− Student's activity is re-evaluated in the changing learning environment, compared to previously experienced. (Hypothesis 4)

Summarizing the Results of the Research

The following summarized responses can be provided to confirm the hypotheses introduced in the dissertation after processing and evaluation of the results of the research.

Hypothesis 1: The student chooses more dynamic elements in the student learning environment for information seeking with the appearance of the new technology, depending on the immediate availability he or she mostly uses the virtual space.

Based on the research results evaluated in Chapter 5.1 *(Examination of individual information seeking activity in electronic learning environment.)*, in relation to the changing learning environment, it can be concluded that the learning society of higher education at the time of the research considers radically different values in their socialization, behavior, attitudes than other age groups. The commitment to technology is very strong, to which the technology influenced diverse learning environment provided by the educational institution greatly contributes to the variety of learning support tools.

Understanding the learning needs of the new generations makes clear to the educational site that the education have to be matched with these expectations.

My research, which I completed at the University of Dunaújváros in the first half of the 2010s, proved that our students, like members of the wired and technology-committed generation, Internet search is the most popular way of accessing information. The current formal educational environment assists them, as it provides the current technology support so the leading virtual learning space can be reached for all university citizens. It has also been shown, our students do not rely solely on the tools and equipment of the educational institution, but as multi-device owners, they are willing to participate actively both in formal and informal education if it is available immediately and permanently. They prefer online resources in case of information seeking connected to their studies and also to additional information in possession of their mobile devices and Internet access options.

The use of electronic learning and training platforms provided by the institution has become commonplace among students and is an integral part of their daily lives. They also use electronic systems during studying at home work, whether it is individual or group activity. Their information seeking process is dominant, they are almost capable of turning to the electronic source at the same time with the aim of information emerges, and most of the time they use the Internet for that, whether the information seeking aim is directed or free-will. Their responses reflect that although they prefer to record the information in printed form (book, own

notes, or companion notes), they can participate more effectively in virtual environment during the information seeking as the first phase of the learning process.

It can be concluded that **Hypothesis 1***: The student chooses more dynamic elements in the student learning environment for information seeking with the appearance of the new technology, depending on the immediate availability he or she mostly uses the virtual space,* is a correct statement. The student generation is trying put the available technology support of modern devices in their service in the information acquisition phase of the learning process, giving priority to the virtual space.

Hypothesis 2.: There are some competencies that were previously used in the e-learning process and are also suitable for students in acquiring knowledge during their learning process in the new environment, but new competencies and capabilities can be added to their potential as well.

The examination of information acquisition habits is also justified by the fact that information is an independent value of today's information society. However, the competencies needed to find and / or produce proper and reliable information have not changed radically. Everything is in line with the pedagogical principles of the centuries. The net generation does not require new educational processes, it only requires educational processes adapted to the needs of the age.

It is declared from the aspect of electronic competence and from several school-year horizons that the students participating in the research have been more successfully fulfilled the tasks of "Informatics" lesson. These tasks set also on digital literacy, search for information, storage information, processing and generating new content from the infromation, not focus only on the use of devices. Examining information retrieval and storage tasks, an improvement can be noticed in the students' performances. There were still some people in 2011 who have failed in this topic, but all the results were satisfying in the 2014 academic year. The worst result (66%) is in the middle of the range. By comparsion, the worst result did not reach 50% three years earlier in similar circumstances and with a similar measuring worksheet. Similarly, there is an improvement in shaping satisfactory results, as the "excellent" grade is significantly higher than the "good" in 2014 academic year.

The fact, that there are still students in the middle range shows that the further development of digital competence is necessary. This phenomenon is much more powerful in terms of digital literacy and content generation than information acquisition and storage. The

presented results of the word-processing tests turned much wider in both academic years. The improvement in this topic can be felt by examining the results of 2011 and 2014 years, with fewer students whose results are lower than the expected level. It can be stated that the key competence of the 21st century is that competence, which have already being possessed by the students during their previous studies and in e-learning. Adding that the continuous development of this digital competence is desirable for everyone.

Results of the Examination of the individual's digital competence, as described in Chapter 5.2. (*Examination of individual digital information seeking activity*) suggest that Hypothesis 2 (*There are some competencies that were previously used in the e-learning process and are also suitable for students in acquiring knowledge during their learning process in the new environment, but new competencies and capabilities can be added to their potential as well.*) is partially correct. Given that the opportunities offered by dynamically developing technology should be used for efficiency and effectiveness at every stage of the educational process in the continuously changing world with methodological renewal, so the change in skills can also be monitored by the individual. The research results of Chapter 5.2. are presented that there was a displacement in the digital competence of the learning society that is adapting to the changing needs of the changing age. The results of Chapter 5.4. (*The special features of developing new learning environment*) set the need to develop such a kind of competencies that are vitally necessary to exploit the opportunities provided by the learning environment extended to the virtual space. The emergence of new competencies is also indispensable to overcome individual fears with personality roots, but the owned competenceies are required in the virtual space as well.

Hypothesis 3.: The information seeking and / or sharing activity is transmitted to the virtual space in terms of the relation between the individual and the community.

In addition to technological support, the choice of appropriate learning strategy can increase learning efficiency in the learning environment, during the individual learning process. Given digitally inclusive schools, one of the effective learning strategies is the co-operative strategy as it can utilize the opportunities offered by the computer-assisted virtual environment. This provides such a learning situations where cooperation is not primarily between teachers and students, but with peers. During group work or peer work, participants are required to work together to solve the problem. Peer work develops the individual's capacity of social co-operation, gives space to their creativity and their social problem-solving skills can also evolve.

In order to reach the desired goals in on-line learning environment, the focus is on the active creative work and cooperative work of the consciously or deliberately formed learning communities. Co-operative work, alongside the professional development of an individual, is also an opportunity to develop autonomy and sense of responsibility, as well as the practice of community behaviors. The learning process can only be realized effectively through a fundamental change in the mindset for the self-organized learning community, out from the supervision of a teacher, as it can only be realized in cooperation with the peers and in respect of the opinions and attitudes of the others. Through continuous interaction-based learning suppoerted by the virtual learing environment individual spends more time with collaborative and co-operative work and with communication.

After evaluating the results of the study described in Chapter 5.2, it can be stated that community-based information seeking process is remarkable significance among the members of the learning society in higher education. Social-based community search strengthens co-operation with peers. Collaboration leads the individual effectively through the learning process, so that he / she can maintain his or her individual autonomy in a flexible space and time, but it allows approach of a content from multiple aspects (and from perspective of peers) to unite the gathered information units. The statement of Hypothesis 3. (*The information seeking and / or sharing activity is transmitted to the virtual space in terms of the relation between the individual and the community*) has been justified. Virtual space has become the dominant feature of horizontal and vertical information seeking and sharing process with the unlimited availability of modern technology. As a member of online communities, individuals can realze the information seeking process more effectively, in an active content generating or sharing role. The relationships in the online communities of virtual spaces and the individual activity realized through these relationships have many beneficial effects on the subjective well-being of the individual.

Hypothesis 4.*: Student's activity is re-evaluated in the changing learning environment, compared to previously experienced.*

Virtual space is a central part of the growing-up generation life, so they are also an active participants in this space during the learning process. It can be stated that, if students have the opportunity to presence virtually, they prefer to exploit and dominate the space. Their activities realize through community interaction in virtual space, their information seeking activity moves into the virtual space according to the available possibilities. Collaboration with peers is also more powerful in the electronic learning environment, in addition, they are more open and

willing to search for information and / or share information in this environment. They are active members of online communities, in which they seek information either closely related to their studies, or additionally related to the studies.

Network offers virtual communication, which also supports self-studying. Students can ask questions, ask for help in case of unresolved problems, and support each other with advices, assist thoughts and information in the learning process.

Summarizing the results of the research from the apect of the impact of technology use on students' well-being during the educational process has the following conclusions:

- ICT has a beneficial impact on students' social relationships. (social network)

- Students are more likely to turn to their peers for information connected to their studies and / or with complementary aims due to ongoing online presence as a member of at least one community site.

- The Internet provides virtual communication, so it has a beneficial effect on self-directed learning as well.

The statement fourth hypothesis (*Hypothesis 4*.: *Student's activity is re-evaluated in the changing learning environment, compared to previously experienced*) can be considered justified according to the results of the research analyzed and showed in Chapter 5.2. and Chapter 5.4. as it has become apparent that the learning society is much more active both in individual work and in social co-operation in the electronic learning environment. The constant availability of digital content motivates students to actively participate in the educational process beyond the compulsory time of formal education, scheduling them according to their individual needs. Individual is entrepreneurial and more open to co-operation in an e-learning space that is highly supportive of co-operative work, greater willingness appears in the digital environment than in traditional contexts. The occurrence of the exploration of individual aspects, the flow of information and communication with peers shorten.

Description of Possible Future Research Directions

The examination of digital competence and digital divide represents a possible way of further research. Number of previous researches has been considered in this topic, but this research proposal could be emphasized in the context of finding relevant information. It is important to examine the methods of information seeking habits of the growing student society in order to establish the goodness of information therefore decision-making methods can be developed from the results generated after the evaluation that help students to be the most secure in making decision.

An interesting yield can be a similar type of exam for the tutor. Participants in the education process are active in real and virtual space as well. The research results revealed that students prefer electronic resources in the first phase of their learning process and are increasingly developing their digital competence. They are willing to deal with their studies beyond compulsory school time and also prefer to choose the virtual space as a learning space. It is not possible to circumvent the fact that the generation of the future is taught by former generations. Particularly in the 21st century, it is interesting to examine in the information society that those who develop curricula for the digital society and provide an education platform, possessing their competences and their habits in innovative education, are willing to use the tools to meet the expectations of the next generation.

A possible future research direction with interesting conclusion would be the comparance of rsults of more Hungarian and international researches in this topic.

References

Bersin, J. (2009, 05 24). *Modernize Corporate Training: The Enterprise Learning Framework*. Retrieved from www. bersin.com: http://www.bersin.com/blog/post/Modernize-Corporate-Training--The-Enterprise-Learning-Framework.aspx

Csepeli, G. (2008, május 2). *Wiki-tudás.* Retrieved from http://www.csepeli.hu/pub/2008/csepeli_wikitudas_kritika_2008_4.pdf

Csoma, G. (2009., 06 17). *A tanulás értelmezése és funkciói (OFI - A tanulás kora)*. Retrieved from Oktatáskutató és Fejlesztő Intézet: http://ofi.hu/tudastar/tanulas-kora/tanulas-ertelmezese

Dorner, H. (2007). Kollaboratív tudásépítés számítogéppel segített tanulási környezetben - A tudásépítő interakciók elemzése. *MultiMédia az Oktatásban 2007 konferencia.* Budapest: Budapesti Műszaki Főiskola.

Gordon Dryden, Jeanette Vos. (2005). *A tanulás forradalma - A tanulás és a gondolkodás forradalmi módszerei.* Budapest: Bagolyvár Könyvkiadó.

Hannah Dumont - David Istance - Francisco Benavides. (2010). *The Nature of Learning: Using Research ot Inspire Practice.* OECD Secretary-General.

Havas, P. (2003, március 2003. máricus). Az iskolai tanulás motivációja. *Új Pedagógiai Szemle*, pp. 39-45.

McLuhan, M. (2010, 08 20). *Technológiai determinizmus.* Retrieved from Communicatio: http://www.communicatio.hu/hg/kommelm/texts/eg_23a.pdf

Nahalka, I. (1998). A tanulás. In F. I. (szerk.), *Didaktika* (pp. 117-155). Budapest: Nemzeti Tankönyvkiadó.

OKTOPUSZ Alapítvány. (2004). *Oktopusz.* Retrieved from Az e-learning módszertani kérdései: http://www.oktopusz.hu/mss/alpha?do=9&st=42&pg=222&m288_doc=271&m223_act=1

Shuell, T. (2013, 07 19). *Education.com.* Retrieved from http://www.education.com/reference/article/theories-of-learning/

Publications and Presentations of the Author in Connection with the Dissertation

INTERNATIONAL CONFERENCE PRESENTATIONS

[1] Mariann Váraljai: Establish innovative learning environment by virtual lab concept. IEEE 7th International Conference on Cognitive Infocommunications (CogInfoCom) Wroclaw Lerngyelország, 2016. október 16-17.

[2] Mariann Váraljai: The role of ICT use in changing learning environment and its impact on well-being. IRI Interational Educational Conferece, International Research Institute s.r.o. Komarno Szlovákia, 2014. október 17-21.

[3] Rita Ősz – Mariann Váraljai – János Fodor: New Methods of the education int he e-learning's dimensions. IEEE 11th International Conference on Emerging eLearning Technologies and Applications (ICETA). 421p Stará Lesná Szlovákia, 2013.

CONFERENCE PRESENTATIONS

[1] Váraljai Mariann: Információszerzés szokások vizsgálata a változó tanulási környezetben. – Empirikus kutatás a Dunaújvárosi Egyetem hallgatói körében Dunaújvárosi Egyetem Tehetségnap, Dunaújváros, 2017. május

[2] Váraljai Mariann: Információ-megosztási szokások a változó tanulási környezetben. – Az oktatói oldal vizsgálata. Dunaújvárosi Egyetem Tudomány Hete rendezvénysorozat, Dunaújváros, 2016. november

[3] Váraljai Mariann: Az innovatív tanulási környezet megteremtése a tanulási tér kibővítésével. Dunaújvárosi Egyetem Tehetségnap, Dunaújváros, 2016. május

[4] Váraljai Mariann: Felderítő kutatás a tanulási tér kiterjesztéséről. Innovatív tanulási környezet - virtuális egyetem/laboratórium. Horizontok és dialógusok II. neveléstudományi konferencia, Pécsi Tudományegyetem Ifjúság úti Campus, Pécs, 2016. május 4-6.

[5] Váraljai Mariann: Az új generációk tanulási szokásai. Dunaújvárosi Egyetem Tudomány Hete rendezvénysorozat, Dunaújváros, 2015. november

[6] Váraljai Mariann: Technológiahasználat hatása a hallgatói jóllétre az oktatási folyamat során. IV. Trefort Ágoston Szakmai Tanárképzési Konferencia, Óbudai Egyetem Trefort Ágoston Mérnökpedagógiai Központja, Budapest 2014. november

[7] Bozsó Renáta – Váraljai Mariann: A felsőoktatás minőségi szempontjai hallgatói szemmel – Tanulási környezetek, körülmények hallgatói megítélése. III. Trefort Ágoston Szakmai Tanárképzési Konferencia, Óbudai Egyetem Trefort Ágoston Mérnökpedagógiai Központja, Budapest 2013.

ARICLES IN HUNGARIAN SCIENTIFIC JOURNAL

[1.] Váraljai Mariann: A nevelés tagadása felé vezető úton a gyermek, mint a nevelési törekvések középpontja. In Lükő István, Molnár György (szerk.) A Szakképzés-, és

környezetpedagógia elektronikus szakfolyóirat. 5. évfolyam 2015/4. szám BME-GTK Műszaki Pedagógia Tanszék Budapest 2015 (ISSN: 2062-3763) pp. 80-99

[2.] Váraljai Mariann: Az új generációk tanulási jellemzői Dunakavics – A Dunaújvárosi Főiskola online folyóirata. 2015. III. évfolyam IX. szám Dunaújvárosi Főiskola Dunaújváros 2015 (ISSN 2064-5007) pp. 17-27.

[3.] Váraljai Mariann: Inklúziós törekvések a változó tanulási környezetben. Dunakavics – A Dunaújvárosi Főiskola online folyóirata. 2014. II. évfolyam XII. szám Dunaújvárosi Főiskola Dunaújváros 2014 (ISSN 2064-5007) pp. 27-37.

ARICLES IN HUNGARIAN SCIENTIFIC CONFERENCE VOLUME

[1] Váraljai Mariann: Technológiahasználat hatása a hallgatói jóllétre az oktatási folyamat során. In: Tóth Péter, Ősz Rita, Várszegi Ágnes (szerk.): Pedagógusképzés – személyiségformálás, értékközvetítés, értékteremtés IV. Trefort Ágoston Szakmai Tanárképzési Konferencia Tanulmánykötet, Óbudai Egyetem Trefort Ágoston Mérnökpedagógiai Központja, Budapest 2014. november (ISBN 978-615-5460-05-0) pp. 124-141

[2] Bozsó Renáta – Váraljai Mariann: A felsőoktatás minőségi szempontjai hallgatói szemmel – Tanulási környezetek, körülmények hallgatói megítélése. In: Tóth Péter, Ősz Rita (szerk.): Új kihívások a felsőoktatásban és a pedagógusképzésben III. Trefort Ágoston Szakmai Tanárképzési Konferencia Tanulmánykötet. Óbudai Egyetem Budapest 2013 (ISBN 978-615-5018-90-9) pp.57-70.

ARICLES IN INTERNATIONAL SCIENTIFIC JOURNAL

[1] Mariann Váraljai: Establish innovative learning environment by virtual lab concept. IEEE 7th International Conference on Cognitive Infocommunications (CogInfoCom) Wroclaw Lerngyelország, 2016. október 16-17. pp. 373-377 (WoS 000392535000063)

[2] Rita Ősz – Mariann Váraljai – János Fodor: New Methods of the education in the e-learning's dimensions. In: Jakab Frantisek, Aikó Szakál (szerk.) IEEE 11th International Conference on Emerging eLearning Technologies and Applications (ICETA). 421p Seattle: IEEE Computer Society Press, 2013. pp. 305-311. (ISBN: 978-1-4799-2161-4; 978-1-4799-2162-1)

ARICLES IN INTERNATIONAL SCIENTIFIC CONFERENCE VOLUME

[1] Mariann Váraljai: The role of ICT use in changing learning environment and its impact on well-being. IRI Interational Educational Conferece, International Research Institute s.r.o. Szlovákia, 2014.