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Examining the initial experiences of the transition to a digital out-of-classroom education system among Hungarian secondary school teachers, students and their parents

Theses of Doctoral (PhD) Dissertation

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Content

1. Introduction

Globalisation has led to economic, social and cultural processes that have fundamentally changed the way the world works (Kozma, 2004). The rise of computers, augmented reality, artificial intelligence and robotics have triggered processes that have also affected the world of education (Buda, 2017; Rajcsányi-Molnár-András, 2013). In the 21st century, knowledge has essentially become a commodity in the economic context, thus emphasising the question of what human resources with knowledge can meet labour market needs (Jakab, 2019; McKeown, 2016). This has also had an impact on the expectations of knowledge that can be acquired in schools. The focus has shifted from learnable knowledge, largely consisting of memorisation of specific knowledge, to the ability to learn and to apply knowledge flexibly in different situations (Prievara, 2015; Lei, H. & - Jian, H., 2015).

Digitalisation and the spread of computers have brought about a change of a different scale and form than before (Buda, 2017). Some experts believed from the beginning (e.g. White, 1985; Papert, 1988; Negroponte, 1995) that their application would raise the quality of education, but they themselves did not expect that the 'users', in this case teachers, would not be so enthusiastic about the benefits of technology in the classroom. The initial fear that machines would soon take over the role of the teacher in the classroom, and that the need for school in the traditional sense would diminish, was soon dispelled (Tóth-Mózer & Kárpáti, 2016), but scepticism and

aversion to digital tools persisted, exacerbated by the lack of tools in schools, the low number of methodological training courses and the minimal availability of digital content (Buda, 2017).

The internet is the primary source of information for the majority of today's children, and schools cannot fail to respond to the presence of digital tools and the need to share knowledge on online platforms (Szőke-Milinte, 2019). It is essential to use modern methods such as collaborative and problem-based learning, project work, cooperative group work (Molnár, 2018). In addition, assessment is playing an increasingly important role: the need for formative, developmental functions is increasing in contrast to the qualitative, summative type.

Effective education of the younger generations also requires a new kind of learning environment, as the efficiency and effectiveness of the learning process can be significantly influenced by the real or virtual space through which formal or informal learning takes place (Komenczi, 2009; Racsko, 2016).

However, digital culture not only has an opportunity aspect, but also an inequality-enhancing effect. Traditional socio-cultural disadvantages are equally manifested in the information space, whereby the former social divide becomes even more stratified (Varga, 2015; Csótó, 2017). In vain do they create access to tools and networks, which in themselves do not contribute to improving the quality of digital content and activities (Rab-Z. Karvalics, 2017; Cserti Csapó, 2019).

What, then, could be the main keys to the future of education? The knowledge content of existing disciplines will continue to be needed, but it is important to adapt the content and delivery methods to specific cultures, ages and competence goals. This will require a huge responsibility on the part of the 'doers' of education, the teachers, who, digital world or not, will continue to be indispensable in teaching (Lannert, 2018).

Thanks to the various HEFOP, TIOP, TÁMOP and other EU projects launched since the early 2000s, preparing teachers in our country to use new tools in the teaching-learning process has become a process, albeit a slow one, but the most difficult task seems to be attitude formation (Námesztovszki, 2013). Before 16 March 2020, no one would have imagined that this change in methodology and attitudes would be driven by a global epidemic at record speed. Hungary, following the prevention strategy of European countries, has also closed its educational institutions from mid-March 2020. The Hungarian teaching community has had a weekend to make the switch from face-to-face teaching to digital work outside the classroom. It was a revolution in education that even a set of previously established projects calling for

methodological innovation would not have been able to achieve, especially not in such a short time.

In the three months of the quarantine, the progress in the use of digital technologies was measurable in years, and the main result was that it changed people's thinking in this area forever (Czirfusz-Misley-Horváth, 2020). New habits were formed and we had to realise how many areas and how diverse the applications of digital tools were (Ősz, 2020).

The research in this dissertation investigated the evolution and changes of this initial period, based on interviews with teachers, students and their parents who teach in secondary schools. I chose secondary school students because I felt that they had sufficient experience of schooling to be able to give a relatively objective account of what was happening, and I included teachers and parents because I thought that the picture would be complete if I asked all those involved about their experiences.

2. Purpose of the research

Objectives of the dissertation:

- To summarise the main international and national expectations for digital competences of teachers by reviewing the literature.

- To examine how teachers' existing teaching practices - tool use, methodology and learning management procedures - have been affected by the introduction of the digital work system outside the classroom due to the pandemic, with a particular focus on the development of teachers' digital competences.

- To assess how secondary school students experienced the change related to the transition, how they perceived and evaluated their teachers' online teaching practices, especially in terms of teachers' digital competences.

- To conduct a survey on how parents of secondary school students perceive the process and effectiveness of teaching and learning in the online space.

The summary data of the studies carried out in this research are presented in the table below:

Researches	*Survey of secondary school teachers*	*Survey of secondary school students*	*Survey of parents of secondary school pupils*
Size of the sample	N=180	N=422	N=35
Method of data collection	online survey (national)	online survey (national)	half-structured interviews online using the snowball method
Research topics and questions	the use and ownership of digital tools; the emergence of ICT tools in teaching practice; the impact of digitalisation on teaching methodology and digital competences; learners in the online space - changes, challenges	use and ownership of digital tools; availability of material conditions for digital education; resources (technical, learning); perception of new education (advantages/disadvantages)	readiness for the transition to digital education (resources); information and support provided by institutions; perception of teachers' work; impact of the new education on the child (advantages/disadvantages)

Table 1: Summary table of research studies (own editing)

With my thesis, I would like to contribute to the research in the field of education in Hungary, which focuses on the issues of education in the 21st century, especially with regard to the expected competences of teachers. I hope that the correlations identified will support the findings of studies that shed light on the characteristics and challenges of the education system that has been transformed into a digital work system, primarily with a view to making it more effective in the future, if necessary.

3. Hypotheses of the research

In the survey of teachers

H1: The majority of teachers lacked the digital competences to teach digitally outside the classroom.

H2: The majority of teachers' methodological culture has changed during the transition from traditional teaching to digital working outside the classroom.

H3: The majority of teachers had problems in providing teaching tools and using digital platforms in the transition from traditional classroom to digital in the classroom.

H4: Teachers found the process of monitoring and evaluation much more difficult when teaching digitally outside the classroom.

In the survey of students

H1: Students did not turn to their teachers for help when they had problems during the transition to digital learning outside the classroom.

H2: Students perceived that it was much more difficult to meet the requirements during the transition to digital learning outside the classroom than before.

H3: Students perceived teachers' use of digital tools and competences to be inadequate during the transition to digital learning outside the classroom.

H4: Learners attributed the reasons for their absence from digital education to their inadequate tooling.

In the survey of parents

H1: Parents found it more challenging to support their children's learning in a digital learning environment than in a traditional classroom setting.

H2: Parents reported that it was more difficult for their children to process learning material independently in the digital learning environment outside the classroom than in the traditional classroom environment.

H3: Parents perceive the quality of digital learning outside the classroom to be lower than that of traditional classroom learning

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4. Methods used in the research

The research used quantitative and qualitative research methods. In terms of quantitative methods, I worked with pre-specified, well-defined variables and aimed to exclude unwanted effects, with the aim of confirming the hypotheses (Cserné, 1999).

The *questionnaires were administered* in March and April 2020. At that time, I could not rely on questions from studies already conducted on the topic, because in the initial phase of education shifting to digital work, ongoing research had not yet been published.

The *data collection* took place between 20 April and 15 May 2020, a period chosen because it was long enough after 16 March for teachers to have overcome the initial panic of the situation and to be able to provide relevant insights in the light of their first experiences. The timing of the questionnaires to students was based on the same thinking.

I chose the secondary level of education because different types of institutions provide different types of education and therefore the content and purpose of education is different, so I thought that the picture that emerges from my research questions would be more complex than if I had looked at primary institutions. As the focus was on the practice of public education, tertiary institutions were not included in the research sample.

I conducted a **quantitative research** *among secondary school teachers and students* using an **online questionnaire** edited on Google Forms with an access-based sampling method. The questionnaires were distributed online on social media platforms, Facebook and Instagram, and I also sent the link to the questionnaire by e-mail to teacher colleagues and parents who are involved in the education of the target age group.

The questionnaire was completed on a voluntary basis, with access granted to anyone who came across it through social media shares or email enquiries. Questionnaire data collection can provide a lot of data in a relatively short period of time, and in addition, due to the quarantine situation caused by the pandemic, face-to-face meetings and data recording were not possible. However, the disadvantage of this method is that it is difficult to influence the composition of the respondents according to the characteristics of the volunteer research population, which in the case of the dissertation research was due to the fact that the questionnaire was not accessible to those without digital devices or internet access, and thus participation was not possible.

The teacher questionnaire contained 25 questions and the student questionnaire contained 26 questions. In both cases, responses were anonymous. In terms of question type, there were simple and multiple-choice, closed-ended multiple-choice, Likert-scale questions, and one open-ended free-choice question each.

There were **180** completers among **teachers** and **422** among **students**. The survey is not representative of Hungarian secondary school teachers and students, and the results are only valid for the survey participants, but it contains sufficient information to draw some expected conclusions for the whole teacher community, which could provide a basis for a future national representative survey.

The responses received were processed using the statistical analysis software SPSS, which, in addition to descriptive statistical analyses, was used for cross-tabulation, principal component analysis, cluster analysis, Pearson correlation analysis and analysis of variance. The data were imported into Excel and the graphs and tables were created using Excel.

I conducted **qualitative research** among **parents of secondary school students**, using semi-structured interviews in the form of online discussions in MS Teams and Google Meet. Sampling was done using a snowball method, i.e., in addition to interviewing personal acquaintances, I reached out to additional parents of high school students based on their recommendations. In favour of the qualitative method was the fact that interviews provide more nuanced and detailed information on the researched topic, on the other hand, the advantages of personal acquaintance can be exploited, thus involving more people in the interview.

The research involved **35 interviews**. Before starting the interviews, I compiled a set of questions that served as a reference point for me to ask about the areas of research and to obtain answers to confirm or reject the hypotheses. To process the responses, I created categories based on the aspects that were asked and recorded the responses of each respondent, based on the quantity of responses, and calculated a mathematical average to summarise the results. I sought to ensure objectivity by involving parents from all types of schools and proceeding along a given set of questions throughout the interview, with continuous clarifying feedback. The questions were well-defined and could be answered with precise answers.

5. Summary of research findings

Based on the results of the questionnaire research and the interviews with the parents, the following answers can be given to the hypotheses formulated at the beginning of this dissertation.

In the survey of teachers

Presentation of the sample:

The majority of the teachers who participated in the study (N=180) belonged to Generation X (41-55 years old), with almost two thirds having been in the profession for at least 15 years, i.e. they have considerable professional experience. Three quarters of the sample (75,5%) work in institutions in Budapest or in larger cities (over 20,000 inhabitants), which is in the more favourable category in terms of infrastructure in the municipalities. 89,5% of the teachers surveyed said that they teach in upper secondary schools and vocational upper secondary schools, where students with higher academic results go and where their parents' backgrounds are more likely to be more highly educated.

H1: *The majority of teachers did not have an adequate level of digital competence for teaching outside the classroom in a digital work system.* ***Partially justified.***

The majority (58,3%) had already participated in methodological training to develop their digital competences, some had also completed other courses in IT, but almost one fifth of the respondents (17,2%) had never participated in any such development. The comparative studies show that the more digital competence training a person had participated in, the less negative their experience of digital education.

In terms of digital devices, they mainly had a smartphone (90%) and a laptop (85,6%) before the switchover, which they used for preparation, collecting materials, making presentations and following professional websites. When it came to digital education, they did not feel that they could not manage using digital tools or new platforms; they could also count on professional help. They denied that they had not used digital tools during traditional education due to a lack of methodological training.

The majority therefore owned and used digital tools in their daily lives, had already attended some training to develop digital competences and had not so far not used digital tools in their lessons due to a lack of skills.

H2: *The methodological culture of the majority of teachers has changed during the transition from traditional classroom-based to digital-based teaching.* ***Justified***.

Before digital education, teachers mostly had traditional internet usage habits ("surfing", keeping in touch), but few of them used the tools for specific pedagogical purposes (creating online materials, online assessment, etc.).

The biggest difference between the two periods was in the use of online assessment, online writing of papers and online production of learning materials. These three activities were the least frequent in teachers' practice during classroom teaching, whereas they played a significant role during digital teaching, so there was a methodological shift in this respect.

Teachers' knowledge of digital assessment methodology was rated the lowest: they were forced to give feedback online, but were not aware of the possibilities and the variety of ways of using it, as they had probably not used it before. A positive development in the light of 21st century learning design expectations is that the tasks given out are perceived by teachers to encourage collaboration and the search for new ways of working with students.

Teachers' methodological culture has changed, as the educational environment has changed and they have had to adapt their methodology, but they themselves admit that they were not necessarily familiar with new, modern knowledge (e.g. online learning materials, online assessment).

H3: *The majority of teachers had problems in providing the necessary tools for teaching and using digital platforms in the transition to digital working outside the classroom.* ***Rejected.***

Almost all of the teachers interviewed had broadband internet at home, so the network connection needed for digital teaching was available to almost all of them. More than 80% of the respondents had smartphones and laptops, which were much needed, as the level of support from the institutions for the use of these devices was negligible.

When they were stuck, respondents could rely mostly on help from within the profession, with colleagues, their work group and online professional communities being the top four sources. Teachers did not feel that they could not cope with using digital tools or managing new platforms, and their work was not hindered by a lack of digital tools.

H4: *For teachers, the process of monitoring and evaluation has become much more difficult during the transition to digital working outside the classroom.* ***Justified.***

A significant factor in teachers' perceptions of digital education was that it became impossible to reach students who did not have appropriate digital tools, and therefore, without a connection, it was impossible to keep up to date with their academic progress. This problem was most pronounced for disadvantaged families. For pupils with learning or behavioural difficulties, there was also agreement that online access was not providing the help these pupils needed.

According to teachers, students whose parents were unable to provide meaningful help with their learning were also disadvantaged, falling behind with the material, which most of the respondents felt that schools were unable to address effectively. Several of the responses to the open-ended question confirmed this assumption.

The results of the comparative studies showed that teachers in vocational schools had the most negative perceptions of digital education. The pupils in these types of schools are mainly classified as SNI and BTMS, and much of their training is practical, so it is understandable why most teachers in vocational schools felt challenged by the situation, as described earlier. Similarly, teachers in institutions providing practical training (vocational secondary schools, vocational upper secondary schools) also rated the situation negatively.

In the survey of students

Presentation of the sample:

The majority of the 422 respondents attend state-run upper secondary schools and vocational upper secondary schools. The average age of the respondents is 16 years, most of them in grades 9, 10 and 11. Nearly 40% of respondents live in the capital and in large or medium-sized cities, a third in a village (32,7%) and a quarter (24,6%) in a small town. The majority have a settled family background, with more than half of students (56,9%) living with both parents. In terms of parents' educational attainment, most have a secondary school leaving certificate, with nearly 38% of mothers and 33% of fathers having a higher level of education. The socio-demographic characteristics of respondents were generally favourable.

Almost a third of students (34,4%) were enrolled in general education, only 13,5% were enrolled in a few IT-related courses and only 6% were enrolled in some form of non-formal IT education. In terms of digital competences relevant to online education, only one fifth of students (19,5%) had additional IT knowledge and skills.

H1: *Students did not turn to their teachers for help in case of problems during the transition to digital learning outside the classroom. **Justified.***

Based on the socio-demographic background data of the students participating in the study, more than half of the respondents have an intact family structure, and in terms of the education of mothers and fathers, the proportion of those with a high school diploma or higher is around 60% for both groups.

Almost everyone had a smartphone before the introduction of digital education, two thirds had a laptop and half had a computer. Nearly one fifth had a mobile network with unlimited data, and more than 60% had unlimited data.

When they switched to digital, most of them (81%) had all the necessary equipment at home (computer/laptop, camera, microphone, etc.), so the majority were fully equipped. This was necessary because they could hardly rely on their institutions for help, and the missing equipment was mainly provided by parents.

In the case of technical and learning problems, pupils mostly tried to find a solution themselves, and if they had a problem, they turned to friends and acquaintances and then to their parents. The class teacher and other teachers were only ranked fourth, which means that even when they had a learning problem, they were not often asked for help.

H2: *Learners perceived that it was much more difficult to meet the requirements during the transition to digital work outside the classroom than before.* ***Justified.***

More than a third of respondents had a grade point average above 4,00 at the end of the last semester, and almost half of respondents had a grade point average between 3,00 and 4,00. In the context mentioned earlier, it could thus be assumed that the students in the survey had adequate or high levels of independent learning effectiveness. The necessary tools for learning were also available.

In terms of perceptions of digital education, the majority agreed that they often felt lost between tasks from multiple sources on a daily basis (mean rating on the five-point Likert-scale = 3,1) and disagreed that they had to learn as much during digital education as before. The quality of education tended to have declined according to respondents and most of them miss the old, traditional education (average rating on the 5-point Likert-scale=3,5).

The negative impact of the new education system was more than 50% of those who complained about spending more time in front of a computer and having to do too many tasks on their own, and almost as many felt they had to study much more than before. Almost a third of respondents also felt that the amount of written tests had increased. Almost a quarter of the responses to the

open-ended question also mentioned the sudden increase in the number of assignments and many complained about the lack of online lessons and teacher explanations, which made it difficult for them to understand the material and do homework.

H3: *Students felt that teachers' use of digital tools and competences were not adequate during the transition to digital work outside the classroom.* ***Justified.***

When asked about their perceptions of digital education, respondents mostly perceived that those who had previously used digital tools in their teaching were better at digital education. There was only slight agreement that teachers were well adapted to digital teaching and even lower percentages of respondents who would have considered the tasks teachers were expected to do to be clear and easy to follow.

Most of the respondents to the questionnaire recorded their answers in May, but after a month and a half of digital education, many places still do not have a common platform for teaching. This is likely to be one of the reasons for the problem that students found it overwhelming to keep up with the many different sources of information. There was little agreement among students that teachers were coping with digital tools and using technology in a variety of ways. Half of respondents thought that the negatives of digital teaching included teachers' insecure use of tools and fewer opportunities for connectivity, which they attributed mainly to the lack of online lessons. There were also responses to the open-ended question about teachers' low digital competences.

H4: *Students attributed the reason for their absence from digital education to their inadequate equipment.* ***Justified.***

Pupils' responses indicated that there were peers with whom they had completely lost contact after the digital switchover, i.e. who did not engage in lessons delivered online. With regard to the attitude of their peers, it was considered true that many of their peers did not take this type of education seriously and that the reason for the "disappearance" was not the lack of technical equipment, which they did not consider to be a problem (the answers on technical equipment also confirmed this). The open-ended question also included responses that criticised the behaviour of peers who were looking for any excuse to stay away from classes.

The absence of students from a more favourable socio-demographic background was therefore not due to lack of resources, but was simply used as a reason for absence, the veracity of which could not be verified by teachers.

Presentation of the sample:

Of the 35 respondents, 30 were mothers and 5 were fathers. 21 parents had a daughter and 14 had a son. In terms of type of institution, their children attended the following: upper secondary school: 18 persons, vocational upper secondary school: 10 persons, upper secondary vocational school: 5 persons, vocational school: 2 persons.

In terms of the distribution of their children by grade, 9th grade: 14 persons, 10th grade: 10 persons, 11th grade: 9 persons, 12th grade: 2 persons.

The majority (20 persons) have a child in some subject (humanities/languages/computer science/engineering), 15 persons do not.

H1: *Parents found it more challenging to support their children's learning in a digital learning environment than in a traditional classroom-based learning environment.* ***Partially justified.***

For the questions on providing conditions at home, the majority had their own digital device, so the technical equipment for learning was given. In terms of support for learning, the majority said that they did not need to help their child at all to process the learning material - their children had a high grade point average and mature learning routines, who could manage their time for learning appropriately. However, almost half of the respondents felt that much more parental support was needed (registering on online platforms, uploading learning materials, collecting information/materials from multiple platforms, writing submissions). Digital learning also proved that those who had already developed an established independent learning strategy could manage on their own to meet the requirements and schedule tasks, so the point was not true for everyone.

H2: *Parents reported that their children had much more difficulty with independent learning in the digital workload outside the classroom than in the traditional classroom-based learning.* ***Partially justified.***

Parents' perceptions differed on the question about the amount of schoolwork. Half of the respondents said that their child learned much more during digital education, and similar to the students' responses, they complained about the increased amount of assignments and the inconsistent attitude of teachers: some gave online lessons (they are fewer), while the majority just sent assignments without explanation. They also said that teachers did not take into account students' other subject loads and that assignments were sent after school hours. Some teachers

complained that teachers did not use a single educational platform, and that the multiple interfaces and the collection of assignments from different sources also made it difficult for their children.

However, the other half of parents were positive about the change: they felt that less time was wasted on schoolwork, as travel time and extra lessons were eliminated, so they could complete their requirements sooner, and that the education had many other benefits: it encouraged children to manage their time better, developed their digital skills and taught them independence in learning and processing. This statement was also influenced by the learning habits of the individual and the subjective perception of parents, who considered the increased amount of learning material as a positive factor in getting their children to learn more.

H3: *Parents perceive the quality of education outside the classroom, which has been converted to digital work, as lower than traditional classroom education. **Justified.***

There were almost unanimous responses to this question. All but two respondents considered the quality of education to be much lower than the previous, traditional education. The lack of online lessons, personal contact and explanation did not complete the learning, the processing of information was impaired, as was the understanding and assimilation of the material.

8. Summary of research findings and recommendations for pedagogical practice

The research results show that teachers did not agree that they could not cope with using digital tools or managing new platforms, and that their work was not hindered by the lack of digital tools because they had them in their homes. The change in teachers' methodological culture was mainly due to the change in the educational environment, but they were not necessarily familiar with the new, modern methodology. Taking into account the students' and parents' opinions, most teachers' (new) methodology could not be applied because, in the absence of online lessons, they preferred to use only the assignment of curricula and tasks. According to them, teachers were not ready for the introduction of digital education, they did not have a standardised teaching platform even a few months after the transition, and they did not use the potential of digital tools, making it difficult for them to master the material. A student's perception of digital education depended to a large extent on the extent to which they had already developed independent learning strategies. Parents' responses also showed that those

who had not previously been independent in this area were the most likely to need help with their child's learning.

Teachers perceived that students whose parents were unable to provide them with the tools to help them learn were the ones who dropped out, while students with a favourable socio-demographic status perceived that their peers were more likely to abuse the opportunities offered by online education and that the reason for their absence was not the lack of conditions.

In the light of the results, the following recommendations for pedagogical practice were made:

- Since many of the problems with the transition to digital education have been caused by the unexpected situation for which teachers were not prepared, I would consider it important for all educational institutions to have a so-called transition policy or plan that sets out exactly how the school will proceed if it is forced to go digital again.

- I believe it is necessary to draw up a list at institutional level for disadvantaged pupils who have previously been excluded from digital education, including a list of the ways in which they can be reached by non-digital means. An assessment should be made of which families would need a digital device in the event of a switchover, so that any equipment that may be available in the institution can be lent to the right place on such an evening.

- It would be important to consider the content and format of teacher training. It would be more effective if the teacher were to prepare the digital content for his/her lessons during the training, i.e. the practical experience would give the teacher a deeper knowledge and a ready-made, developed curriculum.

- At the institutional level, I consider it useful to create a digital curriculum library/task bank. Such a task bank could not only be used for digital teaching in the school, but could also be given to students as an extra task or exercise in the case of in-class teaching, with appropriate motivational assessment.

- As the research has shown that even at secondary school level not everyone has mature learning strategies, there is a need for lessons and sessions where learning is taught, i.e. where students learn effective learning techniques. This kind of support for low achievers could reduce early school leaving and learning failure in the long term.

9. Further possible research directions

In my research, I have primarily sought to provide a cross-cutting, approximately realistic picture of the changes in education in 2020, but I believe that there are a number of issues that could be explored in their own right.

The use of platforms by educators in the online space and the related methodologies to investigate these are further exciting questions, but I would also find it useful to conduct a survey of the areas of the DigCompEdu framework after the two waves and compare the results with previous studies along similar lines.

Comparative analyses could also be carried out between the first and second waves on the situation of digital drop-outs and early school leavers, and a study of international and national good practices could be useful to show who and how has tried to address the situation and what resources, both internal and external, have been mobilised to tackle the problem.

The results of my research could also contribute to educational studies aimed at mapping and developing pupils' independent learning strategies, including at secondary school level, as the correlations identified have highlighted the importance of this.

Although the target group of the research was the secondary school age group, I believe that the results can also serve as good background indicators for the education of students entering higher education, as the responses highlighted the factors that today's Generation Z young people consider necessary for their effective acquisition and processing of knowledge. These needs should also be taken into account by colleagues in higher education, as they can have a decisive influence on the effectiveness of teaching and the success of students.

10. Literature cited in the thesis

Buda, A. (2017). *IKT és oktatás. Együtt vagy egymás mellett?* Szeged: Belvedere Meridionale Kiadó.

Czirfusz, D., **Misley**, H. & **Horváth**, L. (2020). A digitális munkarend tapasztalatai a magyar közoktatásban. *Opus et Educatio*, 7 (26).

Csapó, B. (2003). Oktatás az információs társadalom számára. *Magyar Tudomány,* 2003 (12), 1478-1485.

Cserné, Adermann G. (1999). *A tanulás- és kutatásmódszertan alapjai*. Pécs: JPTE. FEEFI.

Cserti Csapó, T. (2019). Az uniós roma oktatáspolitika – magyar tanulságok. *Educatio*, 28 (1), 58–74.

Csótó, M. (2017). Aki (információ)szegény, az a legszegényebb? Az információs szegénység megjelenési formái. *Információs társadalom*, 17(2). 8-29.

Duga, Zs. (2013). *Tudomány és a fiatalok kapcsolata*. Irodalomkutatás. Pécs: TÁMOP-4.2.3-12/1/KONV-2012-0016 Tudománykommunikáció a Z generációnak. Letöltés ideje: 2021.02.10. forrás: file:///C:/Users/Windows10/Desktop/Tanulas_tanulmany_DugaZs.pdf

Jakab, Gy. (2019): „Iskola a határon" - A digitális médiumok elterjedésének oktatási vonatkozásai. *Új Pedagógiai Szemle*, 2019 (11-12). 5-16.

Komenczi, B. (2009). *Elektronikus tanulási környezetek*. Budapest: Gondolat Könyvkiadó, Kognitív Szeminárium Sorozat.

Kozma, T. (2004): *Kié az egyetem? A felsőoktatás nevelésszociológiája*. Budapest: Új Mandátum Felsőoktatási Kutatóintézet.

Lannert, J. (2018). *Nem gyermeknek való vidék. A magyar oktatás és a 21. századi kihívások.* TÁRKI. Társadalmi Riport.

Lei, H. & - **Jian**, H. (2015). The Revolution of Communication Media and Its Impact on Education. *Open Journal of Social Sciences*, 2015(3). 123-127.

McKeown, A. (2016). *Overcoming Digital Poverty*. Chandos Publishing.

Molnár, Gy. (2018). *Hozzájárulás a digitális pedagógia jelenéhez és jövőjéhez (eredmények és perspektívák)*. MTA-BME Nyitott Tananyagfejlesztés Kutatócsoport Közlemények. Letöltés ideje: 2021.03.21. forrás: http://real.mtak.hu/86246/1/Hozz%C3%A1j%C3%A1rul%C3%A1s%20a%20digit%C3%A1l is%20kor%20pedag%C3%B3gi%C3%A1j%C3%A1hoz_MTA%20nyitott_kiadv%C3%A1ny .pdf

Námesztovszki, Zs. (2013). *Tanítás és tanulás a virtuális térben*. Szabadka: Újvidéki Egyetem – Magyar Tannyelvű Tanítóképző Kar.

Negroponte, N. (1995). *Being Digital.* Alfred A. Knopf, New York.

Ősz, R. (2020). Hogyan alakíthatjuk át az online oktatást a járványhelyzet értékelése után. *Civil Szemle Különszám*, 2020. 143-153.

Papert, S. (1988). *Észrengés. A gyermeki gondolkodás titkos útjai*. Budapest: Számítástechnikai-alkalmazási Vállalat.

Prievara, T. (2015). *A 21. századi tanár*. Budapest: Neteducatio Kft.

Rab, Á. & **Z. Karvalics**, L. (2017). Harmadik generációs információs írástudás-fejlesztés a gyermeki életesélyek javításáért. *Információs társadalom*, 17 (2). 69.

Racsko, R. (2016). *Összehasonlító vizsgálatok a digitális átállás módszertani megalapozásáról.* PhD-értekezés. Eszterházy Károly Egyetem Neveléstudományi Doktori Iskola Digitális pedagógia alprogram.

Rajcsányi-Molnár, M. & **András**, I. (2013). *Online képzési stratégia és nemzetközi piacfejlesztés felsőoktatási környezetben*. In: Rajcsányi-Molnár, M. & András, I., Metamorfózis – Glokális problémák három tételben. Új Mandátum Könyvkiadó. Budapest.

Ribble, M. (2011). *Digital Citizenship in Schools*. Second Edition. International Society for Technology in Education. Eugene, Oregon, Washington, D.C.

Szőke-Milinte, E. (2019). A Z generáció megismerése – megismerés a Z generációban. In: Kaposi, J. & Szőke-Milinte, E., *Pedagógiai változások – a változás pedagógiája*, (pp.: 130–144.) Budapest: Pázmány Péter Katolikus Egyetem.

Tóth-Mózer, Sz. & **Kárpáti,** A. (2016). A digitális kompetencia kognitív dimenziója és összefüggésrendszere egy empirikus kutatás tükrében. *Magyar Pedagógia* 116 (2). pp. 121–150.

Varga, A. (2015). *Az inklúzió szemlélete és gyakorlata*. PTE-WHSz, Pécs. Letöltés ideje: 2021.02.20. forrás:https://pea.lib.pte.hu/bitstream/handle/pea/23810/varga-aranka-az-inkluzio-szemlelete-es-gyakorlata-2015.pdf?sequence=1&isAllowed=y

White, M. A. (1985). Az elektronikus tanulás forradalma: kérdések, melyeket fel kell tennünk. In: Csoma, Gy., *A közoktatás világproblémái. (Válogatás az UNESCO Perspectives c. folyóiratából 1978-1984)*, (pp.: 224-236.). Budapest, Gondolat.

11. Publications complementary to the subject of the doctoral thesis

Szabó, Cs. M. & **Csikósné Maczó**, E. (2022): How generations see each other: The reality of generation stereotypes. *Hungarian Educational Research Journal (HERJ),* 12 (1). 108–120.

Csikósné, Maczó E. (2021). Aki kimarad, az lemarad?: A digitális munkarendre átállt oktatás megítélése a hátrányos helyzetű tanulókra nézve. In: Berke, József; Kozma-Bognár, Veronika (szerk.): *XXVII. Multimédia az oktatásban online nemzetközi konferencia.* Budapest: Neumann János Számítógép-tudományi Társaság Multimédia az Oktatásban Szakosztály (NJSZT MMO): 267 p. 47-54.

Szabó, Cs. M. & **Csikósné Maczó**, E. (2021). Ok, boomer! Ok, zapper? – avagy a generációs sztereotípiák nyomában. *Képzés és Gyakorlat,* 19 (1–2). 49–57.

Szabó, Cs. M. & **Csikósné Maczó**, E. (2021). Egymás tükrében: a generációs sztereotípiák nyomában. In: Balázs, László (szerk.): *Digitális kommunikáció és tudatosság.* Budapest: Hungarovox Kiadó. 54-64.

Csikósné, Maczó E. & **Rajcsányi-Molnár**, M. (2021). Roma tanulók helyzete és esélyei a felsőoktatásban. *Civil Szemle,* 18. 93-104.

Csikósné, Maczó E. (2020). Experience of Generation Z About Online Teaching-Learning. In: Horák, R., Kovács, C., Námesztovszki, Zs. & Takács, M.: *Új nemzedékek értékrendje: A Magyar Tannyelvű Tanítóképző Kar Tudományos Konferenciáinak tanulmánygyűjteménye.* Szabadka. 289-299.

Csikósné, Maczó E. & **Rajcsányi-Molnár**, M. (2020). The Situation and Chances of Roma students in Secondary and Tertiary Education in Hungary. *Central European Journal Of Educational Research,* 2 (1). 26-35.

Csikósné Maczó, Edit (2019). A gamifikáció lehetőségei a felsőoktatásban. In: Fodorné, Tóth Krisztina; Németh, Balázs (szerk.): *Felsőoktatási innovációk a tanulás korában: A digitalizáció, képességfejlesztés és a hálózatosodás kihívásai.* Pécs: MELLearN Egyesület. pp.40-49.

Csikósné, Maczó E. (2019). A gamifikáció felsőoktatási alkalmazásának lehetőségei. *Képzés és Gyakorlat*, 17 (3–4). 23–32.

12. Conference abstracts

Csikósné Maczó, E. (2021). Az online oktatás hatása a pedagógusok digitális kompetenciájára. In: Bacsa-Bán, Anetta; Juhász, Levente (szerk.): *Neveléstudományi Konferencia „Tudomány: iránytű az élhető jövőhöz"*. Programfüzet és absztraktkötet. Dunaújváros: DUE Press, 35 p. 18-19.

Csikósné Maczó, E. (2021). Középiskolai pedagógusok digitális kompetenciáinak eltérő megítélése a digitális oktatás során tapasztaltak tükrében. In: Molnár, Gyöngyvér; Tóth, Edit (szerk.): *A neveléstudomány válaszai a jövő kihívásaira: XXI. Országos Neveléstudományi Konferencia.* Program, előadás összefoglalók. Szeged: MTA Pedagógiai Tudományos Bizottság, SZTE BTK Neveléstudományi Intézet. pp. 243.

Csikósné Maczó, E. (2021). Addig nyújtózkodj, ameddig a wifid ér!: Esélyek és egyenlőtlenségek a digitális oktatás idején. In: Podráczky, Judit (szerk.): *14. Képzés és Gyakorlat Nemzetközi Neveléstudományi Konferencia*. Kaposvár: Magyar Agrár- és Élettudományi Egyetem Kaposvári Campus. pp. 131.

Szabó, Csilla Marianna & **Csikósné Maczó,** Edit (2021). Reflecting Each Other: Recognizing Generation Stereotypes. In: Balázs, László (szerk.): *Digitális kommunikáció és tudatosság*. Budapest: Hungarovox Kiadó. 228 p. pp. 222.

Csikósné Maczó, Edit (2020). Online oktatás a digitális bennszülöttek szemével. In: Bacsa-Bán, Anetta; Szabó, Csilla Marianna (szerk.): *Neveléstudományi Konferencia 2020. Pedagógiai kihívások a 21. században*. Dunaújváros: DUE Press. 39 p. pp. 22-23.

Csikósné Maczó, Edit (2020). Középiskolai tanárok digitális kompetenciájának alakulása a koronavírus idején. In: Engler, Ágnes; Rébay, Magdolna; Tóth, Dorina Anna (szerk.): *Család a nevelés és az oktatás fókuszában: XX. Országos Neveléstudományi Konferencia.* Debrecen: Debreceni Egyetem, MTA Pedagógiai Tudományos Bizottság, Kopp Mária Intézet a Népesedésért és a Családokért. 475 p. pp. 112-112.

Csikósné Maczó, Edit & **Szabó**, Csilla Marianna (2020). Ok, Boomer! Ok, Zapper?: avagy a generációs sztereotípiák nyomában. In: Józsa, Krisztián (szerk.): *Neveléstudomány – Válaszlehetőségek az új évezred kihívásaira.* 13. Képzés és Gyakorlat Nemzetközi Neveléstudományi Konferencia. Gödöllő: Szent István Egyetem. pp. 82.

Szabó, Csilla Marianna & **Csikósné Maczó**, Edit (2020). Generációs sztereotípiák a zapperek szemével. In: Engler, Ágnes; Rébay, Magdolna; Tóth, Dorina Anna (szerk.): *Család a nevelés és az oktatás fókuszában: XX. Országos Neveléstudományi Konferencia*. Debrecen: Debreceni Egyetem, MTA Pedagógiai Tudományos Bizottság, Kopp Mária Intézet a Népesedésért és a Családokért. 475 p. pp. 379-379.

Csikósné Maczó, Edit (2019). Változó generációk - új játékszabályok, avagy a gamifikáció felsőoktatási lehetőségei. In: Varga, Aranka; Andl, Helga; Molnár-Kovács, Zsófia (szerk.): *Neveléstudomány – Horizontok és dialógusok. XIX. Országos Neveléstudományi Konferencia.* Pécs: MTA Pedagógiai Tudományos Bizottság, Pécsi Tudományegyetem Bölcsészet- és Társadalomtudományi Kar Neveléstudományi Intézet. 618 p. pp. 375-375.

Csikósné Maczó, Edit (2019). Az IKT-eszközökben rejlő motivációs lehetőségek alkalmazása egy felsőoktatási gamifikált kurzus keretében. In: Kővári, Attila; Katona, József (szerk.): *MAFIOK 2019 Matematikát, fizikát és informatikát oktatók 43. országos konferenciája.* Dunaújváros: DUE Press. 48 p. pp. 40-40.

Csikósné Maczó, Edit (2019). Megváltozott játékszabályok, avagy a gamifikáció felsőoktatási lehetőségei. In: Ács-Bíró, Adrienn; Maisch, Patrícia; Szabó, Hajnalka Piroska (szerk.): *Horizontok és Dialógusok V. konferencianapok*. Pécs: Pécsi Tudományegyetem Bölcsészet- és Társadalomtudományi Kar Neveléstudományi Intézet. 177 p. pp. 28-28.

Csikósné Maczó, Edit (2018). Making education a fun or teaching the new generation with the help of gamification: Az oktatás játékosítása, avagy gamifikációval az új generáció képzéséért. In: Matolcsi, Renáta (szerk.): *III. East-West Cohesion International Scientific Conference.* Dunaújváros: Scientific Association for Spatial Development. 70 p. pp. 66-66.

13. Conference presentations related to the topic of the doctoral thesis

Csikósné Maczó, Edit (2021). *Generációs ellentétek: útmutató egymás megértéséhez a baby boomerektől az alfákig.* Mindenki Egyeteme „Kalandozások a Társadalomtudomány és a Pedagógia világában". Dunaújváros, 2021. november 20.

Csikósné Maczó, Edit (2021). *Addig nyújtózkodj, ameddig a wifid ér!: Esélyek és egyenlőtlenségek a digitális oktatás idején.* 14. Képzés és Gyakorlat Nemzetközi Neveléstudományi Konferencia. Kaposvár, 2021. szeptember 2-4.

Csikósné Maczó, Edit (2021). *Aki kimarad, az lemarad: A digitális munkarendre átállt oktatás megítélése a hátrányos helyzetű tanulókra nézve*. XXVII. Multimédia az oktatásban nemzetközi konferencia. Dunaújváros, 2021. június 10–11.

Csikósné Maczó, Edit (2020). *Középiskolás tanulók tapasztalatai az online oktatásról*. Kutatók Éjszakája. Dunaújváros, 2020. november 27.

Csikósné Maczó, Edit (2020). *Középiskolai tanárok digitális kompetenciájának alakulása a koronavírus idején*. Család a nevelés és az oktatás fókuszában XX. Országos Neveléstudományi Konferencia. Debrecen, 2020. november 5–7.

Csikósné Maczó, Edit (2020). *Experience of generation Z about online teaching-learning*. 14th International Scientific Conference. Subotica, 2020. október 15.

Csikósné Maczó, Edit & **Szabó**, Csilla Marianna (2020). *Ok, Boomer! Ok, Zapper?: avagy a generációs sztereotípiák nyomában*. 13. Képzés és Gyakorlat Nemzetközi Neveléstudományi Konferencia. Mérések az oktatásban szekció. Kaposvár, 2020. október 1-3.

Szabó, Csilla Marianna & **Csikósné Maczó**, Edit (2020). *Generációs sztereotípiák a zapperek szemével.* XX. Országos Neveléstudományi Konferencia Család és nevelés az oktatás fókuszában. Ifjúságot érintő kérdések a XXI. században szekció. Debrecen, 2020. november 5-7.

Szabó, Csilla Marianna & **Csikósné Maczó**, Edit (2020). *Egymás tükrében –a generációs sztereotípiák nyomában.* XIII. Tudatosság a kommunikációban Online kommunikációs tudatosság a pedagógiai munkában Országos szakmai-módszertani tanácskozás. Eger, 2020. május 15-16.

Csikósné Maczó, Edit (2019). *Változó generációk – új játékszabályok, avagy a gamifikáció felsőoktatási lehetőségei*. XIX. Országos Neveléstudományi Konferencia. Pécs, 2019. november 7-9.

Csikósné Maczó, Edit (2019). *Az IKT-eszközökben rejlő motivációs lehetőségek alkalmazása egy felsőoktatási gamifikált kurzus keretében*. Matematikát, Fizikát és Informatikát Oktatók 43. Országos Konferenciája MAFIOK 2019. Informatika és oktatás szekció. Dunaújváros, 2019. augusztus 27.

Csikósné Maczó, Edit & **Budai**, Gábor (2019). *Mobilokat bekapcsolni! - Applikációkkal az élményszerűbb tanórákért.* Kutatók Éjszakája. Dunaújváros, 2019. szeptember 27.

Csikósné Maczó, Edit (2019). *A gamifikált oktatás felsőoktatási lehetőségei.* XII. Tudatosság a kommunikációban: Személyközi és médiakommunikációs tudatosság az iskolában. Országos szakmai-módszertani tanácskozás. Eger, 2019. május 17-május 18.

Csikósné Maczó, Edit (2019). *Az oktatás játékosítása, avagy digitális módszerekkel az új generáció képzéséért.* Mindenki Egyeteme „Kalandozások a Társadalomtudomány és a Pedagógia világában, Dunaújváros, 2019. május 11.

Csikósné Maczó, Edit (2019). *Megváltozott játékszabályok, avagy a gamifikáció felsőoktatási lehetőségei.* Horizontok és dialógusok V. Iskola a társadalmi térben és időben X. IKT szekció. Pécs, 2019. május 8.

Csikósné Maczó, Edit (2019). *A gamifikáció lehetőségei a felsőoktatásban.* Felsőoktatási innovációk a tanulás korában: a digitalizáció, képességfejlesztés és a hálózatosodás kihívásai 15. Nemzeti és nemzetközi lifelong learning konferencia. Szekció I. A digitalizáció hatása - Modern digitális módszertani megoldások a felsőoktatás bázisán. Dunaújváros, 2019. április 25.

Csikósné Maczó, Edit (2018). *Az oktatás játékosítása, avagy gamifikációval az új generáció képzéséért.* East-West Cohesion III. Nemzetközi Tudományos Konferencia. Tanárképző Központ szekciói: Oktatási innovációk Új trendek és új kihívások - Innováció az oktatásban (magyar nyelvű szekció). Dunaújváros, 2018. november 12.