sciendo

Acta Educationis Generalis
Volume 12, 2022, Issue 2

DOI: 10.2478/atd-2022-0011

The Teaching Dimension of Digital Education due to COVID-19 in the Light of a Survey in Hungary

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Received: February 4, 2022; received in revised form: April 28, 2022;
accepted: May 2, 2022

Abstract:
Introduction: In the information society, the stimulus threshold for learners has changed, which requires a novel education strategy. Today, it is no longer what attracts students' attention that it was 20 years ago. In addition to the rapid development of ICT, public education cannot go either. We believe that advanced teacher digital competence can be one of the keys of finding common ground with students and doing effective teaching work.
Methods: In our research we examine the level of digital competence of public education teachers before the pandemic and during the 2nd wave in Hungary (2020 autumn). We examine the development of digital competence, student performance, and the effectiveness of education outside the classroom in the spring period based on teacher experience. Data from the completed forms were evaluated by using basic statistical indicators.
Results: According to the data received, the pandemic revealed serious shortcomings in the level of development of the digital competence of both teachers and students. However, it also opened the way for catching up on both sides. Teachers were already better prepared during the second wave, so they were able to solve education more efficiently. Regional development differences and a lack of digital tools have widened the gap between students.
Discussion: The COVID-19 pandemic has exposed these shortcomings in education. For here the process of teaching had to be placed in digital space from one moment to the next.
Limitations: The research shows data valid only for Hungary.
Conclusions: Expected result is the demonstrable development of competences.

Key words: Hungary, digital competence, digital education, COVID-19, extracurricular learning.

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Introduction

Over the past 20 years, the technical conditions of digital education have been developed in several programs in Hungary, just as in other European countries. The concept of digital competence has also been gradually introduced in the materials regulating Hungarian public education (243/2003. (XII. 17.) Korm. rendelet, 2003; 110/2012. (VI. 4.) Korm. rendelet, 2012; 5/2020. (I. 31.) Korm. rendelet, 2020) and the necessity of its development. However, the digital coercion transition, which appears to be well prepared on paper, nevertheless caused many problems in spring 2020, not only for schools, but also for families, who have taken over part of the school's function.

Hungary's Prime Minister announced that schools had switched to digital education on 16 March 2020 due to the COVID-19 virus. One day to the next, teacher digital competence has become extremely important and gaps in competencies and techniques were revealed. With the closing down of the educational institutions a decentralized situation emerged (Litvack, 2019; Haug, 2009). This situation requires a lot of innovations, creative solutions and digital competencies from both teachers and students in education. According to the theory of digital Darwinism, it is not necessarily the smartest and the strongest that survives, but the one who is best able to adapt to changes in his environment (Racskó, 2017; Kreutzer & Land, 2015) and this situation required that. From the teachers' point of view the digital pedagogy has not been developed yet, and it is widespread only in a narrow segment. The reason for this could be complex, although the tools have been available for some time, but due to significant territorial economic differences in the regions of the country, (e.g. network coverage), there has not been a time of necessity, which would have made the use of digital pedagogy mandatory, its incorporation into the learning process was slow. A large improvement in teacher digital competence can be seen, but student performance has declined. Eurostat's 2019 survey shows that Hungary's digital skills level is below that of other European countries (Table 1).

Table 1

The level of basic digital skills of the entire population in Europe (2015-2019) (Eurostat, 2021)

GEO/TIME	*2015*	*2016*	*2017*	*2019*
Iceland	:	:	85	85
Norway	80	75	77	83
Netherlands	72	77	79	79
Switzerland	:	:	76	77
Finland	74	73	76	76
United Kingdom	67	69	71	74

Sweden	72	69	77	72
Germany (until 1990 former territory of the FRG)	67	68	68	70
Denmark	75	78	71	70
Austria	64	65	67	66
Luxembourg	86	86	85	65
Estonia	65	60	60	62
Czechia	57	54	60	62
Belgium	60	61	61	61
European Union - 28 countries (2013-2020)	55	56	57	58
Spain	54	53	55	57
France	57	56	57	57
Malta	53	50	57	56
Lithuania	51	52	55	56
European Union - 27 countries (from 2020)	54	54	55	56
Slovenia	51	53	54	55
Slovakia	53	55	59	54
Ireland	44	44	48	53
Croatia	51	55	41	53
Portugal	48	48	50	52
Greece	44	46	46	51
Hungary	**50**	**51**	**50**	**49**
Serbia	32	:	39	46
Cyprus	43	43	50	45
Poland	40	44	46	44
Latvia	49	50	48	43
Italy	43	44	:	42
Turkey	23	28	34	36
North Macedonia	37	34	32	32
Romania	26	28	29	31
Bulgaria	31	26	29	29
Montenegro	:	:	50	:

From among the European countries with similar experience, only the basic knowledge of the Romanian and Bulgarian populations is worse than that of Hungarians, and the situation is similar among young people aged 16-24. According to the measurements, 68% of Hungarian young people (16-24) 68% have basic digital knowledge, while the EU average is 80% (Lehman, 2019) and there is no improvement in this area. Based on the data of previous years, it can be said that the basic digital knowledge of young people in Hungary has not developed, or even decreased (10%), compared to 2015 data (Eurostat, 2020). In 2015, 78% of Young Hungarians had basic digital knowledge, by 2019 this

figure had become 68%. In contrast, Romania and Serbia have seen an increase in the share of people with digital skills (Eurostat, 2020). This data could assume that Hungarian families can take the obstacles smoothly in digital education, since they can support each other, but the territorial differences were significant.
Disadvantaged pupils were also disadvantaged in terms of digital competence during the first wave. According to Nóra L. Ritók (head of the Foundation for the Support and Support of Disadvantaged Children and Families living in Extreme Poverty), even though the technical conditions necessary for the implementation of digital education are present in almost all Hungarian or disadvantaged families, e.g. smartphones, if there is a lack of knowledge on how to use them for educational and learning purposes. According to the head of the foundation, 20% of children did not join digital education in the spring, but this could be a higher proportion in distanced areas (Figure 1). The technical background alone is not enough to make digital education effective, there is presumably no space and tranquility for home learning, and there is a lack of basic skills that are essential for self-study.

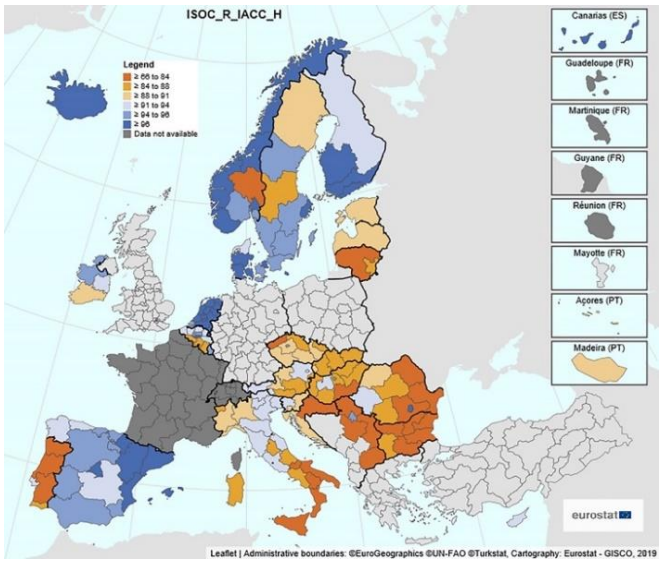


Figure 1. Households with access to the internet at home (https://ec.europa.eu/eurostat/databrowser/view/isoc_r_iacc_h/default/map?lang=en).

In the case of student digital competence deficiencies, we are talking not only about user problems, but also about the lack of tools in the absence of resources

in the first place. Thus, at the beginning of our research, we assumed that the individual differences in the level of digital competence would show quite a large territorial difference in the case of teachers and students, as well as in families. Reinforcing social segregation, digital segregation is emerging, which will have a strong impact on students' later lives, increasing the already huge social disparities but we will be able to study these effects in the future. In the absence of tools, an effective learning-teaching process in the online space is difficult to implement, almost impossible.

Marshall McLuhan (2001) was the first to say that, in addition to the rise of television, book-based teaching will become ineffective and irritable in education, so the new electronic culture should be put in the place of book culture. The generation that grows up on TV and socializes is already struggling to adapt to the traditional education and education system. McLuhan recognized this situation as early as the 1960s, which has become timely intensifying today. In addition to television, households were inundated with electronic devices that provided information. Phones and computers are almost standard equipment in a student backpack. This situation presents new challenges and expectations for education. This does not mean that book culture, writing or reading must be completely ignored, in our opinion, this is an essential condition for navigability in the media-centric information world. It is necessary to create an educational environment that provides space for innovative teaching methods for an effective teaching and learning process.

In addition to the family background, it is also important to talk about the fact that many educators only used the school's digital background to teach, because their own children used home devices. Thus, the school conditions also severely limited the possibilities of teachers. According to an international survey, which uses questionnaire and interview methods to draw an idea of the situation in Hungary in 2019, the supply of our schools is far below the EU average at all levels of public education. The difference is more than 50% (European Commission, 2019). In addition, the ever-renewing smart devices, if any, are not the most modern, fastest types, because the market cannot be tracked so quickly by public education and neither can families (Medzini et al., 2014).

Another important aspect is the tools that students have. In this area, too, we can say, based on national and international research results (Figure 2), that the situation is not satisfactory (Századvég, 2021; European Commission, 2019). Based on the research results of Századvég, 87.3% of the participants used their own device in the digital learning environment. Only 1.8% of the school received tools to get through digital education. The loss of jobs and reserves caused by COVID-19 also did not support the possibility of replacing the assets.

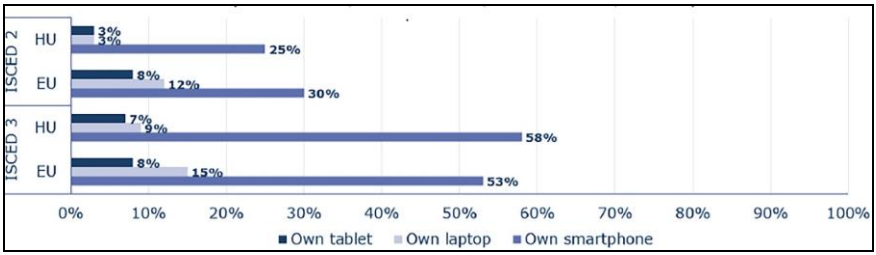


Figure 2. Own equipment used for learning during lessons ISCED 2 and 3 2017-2018 (European Commission, 2019).

Based on the survey, differences in issues relating to the quality of digital competences for parents, teachers and pupils were not as significant as for issues relating to the supply of tools, in fact, responses to parents had higher results than the EU average (European Commission, 2019).

ICT as a formal definition of the European Union, expresses the convergence and integration of information technology and electronic communications (Nemzeti Fejlesztési Minisztérium, 2014). ICT includes tools, applications, technologies and the effective application of the listed units from state level to individual level. Question is, what we mean by digital education? Digital education is not primarily about the use of tools, but about the strategy and management of information provision (Nicholson, 2000; Racskó, 2017).

According to György Molnár (2018), in an ever-changing and evolving world, the scientific mission of digital pedagogy is to explain the challenges, innovation opportunities and tasks which today's digital citizens are faced with. The key to prosperity in the digital world is the acquisition and effective application of digital competences. One of the main protagonists in education is the teacher, who, in addition to his existing knowledge and competences, must constantly acquire new skills and knowledge to create a learning environment adapted to emerging needs. A high level of knowledge transfer should be ensured in line with the increasingly computer and Internet-centric approach of learners (Racskó, 2017).

It is also necessary to incorporate new innovative opportunities in geography education. In the field of digital education, we would prefer real-time observations and measurements to analyze data, but we are not fully prepared for this even in teacher training, let alone in public education. We suspected that teachers who had already been given insight and could test themselves in the digital education space more and more easily use these techniques in their teaching process (digital techs, remote sensing, etc.) (Curtis, 2019; European

Commission 2019), as has already been confirmed by other foreign investigations (Medzini et al., 2014; Ávila et al., 2020).
In the research, the following groups of questions are framed as the answer:
- questions related to teacher actions in digital education,
- student performance questions,
- questions about teacher digital competence.

Our hypothesis is that teacher digital competence has evolved during digital education (will be judged to be at least 5% better), and student performance in digital education may vary nationwide depending on how economically advanced (GDP per capita by county) the county is where the student lives. Our hypothesis was based on the following sentences. Economic and social development is closely linked. In more developed counties, GDP is much higher, and the number of graduates is much higher than in economically underdeveloped counties (Nemes, 1997). GDP and graduate ratios are related to differences in student performance in each area. Outstanding student performance is found in the north-west counties of the country and is mainly seen in the metropolitan agglomeration. Low student performance is observed in the north-eastern counties and in the southern part of Transdanubia (Figure 1) (Hegedűs, 2016).

1 Materials and methods

For the research, we prepared two questionnaires. With the first questionnaire, we assessed the experience of the digital competence of students and teachers before digital education in the spring, and the experience of the second in digital education, and we examined the extent to which teachers' digital competence has developed. The second questionnaire was launched at the beginning of the 2020/2021 school year.
Compilation and evaluation of the questionnaire was based on the theories of Babbie's (2001) and Lengyelné's (2013) research methodology. The questionnaire was created using Google forms, so it was available online. The form consists of 22 questions, of which 3 are open ended and 19 are closed partly by comparative ranking and partly by semantic differential scale (Babbie, 2001). We used a Likert scale for requesting teachers' opinions and attitudes. Teachers took part in filling in the questionnaire.
Selection was random (Babbie, 2001; Vitál, 2006). With a confidence interval of 95% accepted in pedagogical research, the sample was compiled with a 5% margin of error in mind. In the survey we reached 173 people. The arcs would have been suitable for researching social contexts on the basis of status issues: social stratification (age, workplace, residence, geographer previous education etc.), however, the geography degree could not be analysed on the basis of the

replies received. Processing done with Excel, SPSS 21.0. During the analyses, basic statistical indicators (standard deviation, mode, distribution)), significance test to detect correlations (χ2-test) (Ketskeméty & Izsó, 2005) and analysis of variance was performed between the parameters given by the status questions and the responses.

1.1 Sociometry data of the sample

36% of the teachers completing the questionnaire teach in primary school (ISCED 2), 22% in secondary school (ISCED 3), and 21% in lower secondary school (ISCED 1A) (Figure 3). Almost a fifth of fillers (22%) work in other types of educational establishments, e.g., vocational schools, or higher education institutions. (ISCED 3-4) (European Commission, 2021). The fillers have been working as teachers for an average of 22 years.

There were 75,428 teachers in primary schools in 2019, while the number of secondary and vocational school teachers was also lower than 35,376 (Central Statistical Office, 2019). Therefore, the results of the study show the picture of primary and secondary education.

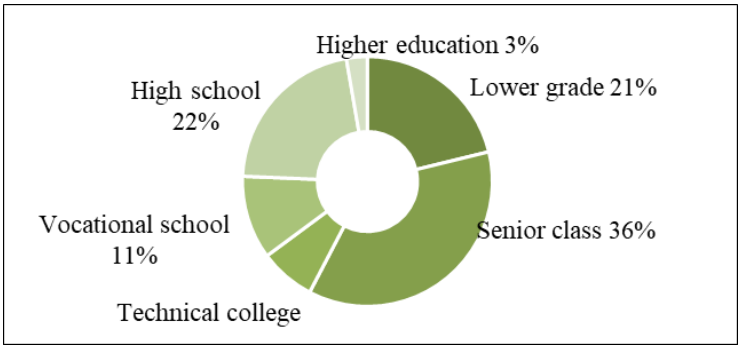


Figure 3. Respondents' workplace.

In terms of territorial distribution, 28% of the forms was sent back from Tolna County (Figure 4). The questionnaire was sent out from Tolna county, so a larger number of respondents was expected compared to the other counties. Pest County and Budapest have an extremely high completion rate: 21%. The fewest number (1 person) came from Hajdú-Bihar County (Figure 4). The county-level fill rate showed too much variance, so we were only able to partially conduct regional surveys.

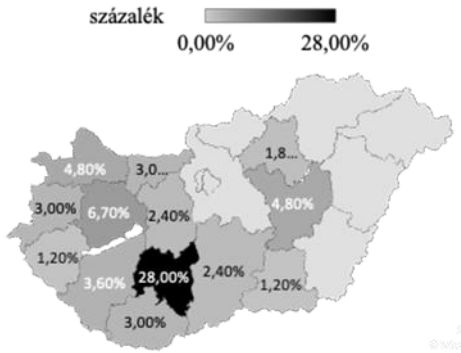


Figure 4. County-wide distribution of respondents.

2 Results

2.1 Teacher aspect of digital education

Almost half (49%) of the teachers, who filled in the questionnaire, used Google Classroom, the online interface to connect with students (Figure 5). This educational tool is included in Google Apps education suites. This educational tool is included in Google Apps education suites. One of the reasons for the high rate is that this platform has been available since 2014 and was already known to many teachers. It is free of charge and easy organization and collection of tasks contributed to the success of the application. In addition to Google's digital classroom, 12% of teachers did their teaching and teaching related work through Facebook. The teachers we interviewed, who chose Facebook, said that they can communicate the most and it provides the fastest way to communicate with students, and for both the teacher and the student, it is one of the easiest-to-use interfaces. It seems a convenient solution, but social media has often distracted students from other content. According to social psychologists Jonathan Haidt, researchers in many cases consider social media as sugar. If consumed in small amounts, it is harmless, but if children get it in high doses, then it is harmful (Haidt & Allen, 2020). With this solution, teachers opened the way to harmful stimuli, which could have harmed students' mental health. Teams and Kréta (Basic System of Public Education Registration and Studies) system were marked in 11-11% by teachers (Figure 5). 3% of the fillers worked on multiple surfaces at the same time e.g.: Moodle, E-mail, Redmenta, Skype, Zoom. One third of the students accessed the listed interfaces from a mobile phone, two thirds from a tablet or computer.

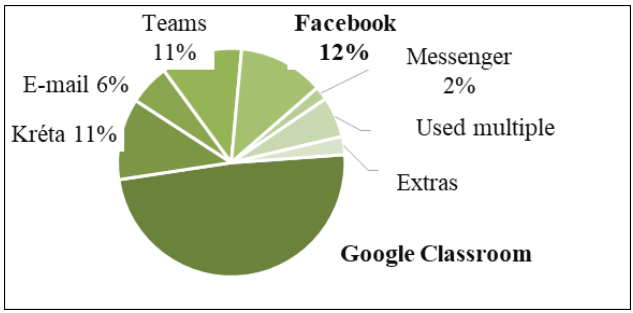


Figure 5. Form of communication during digital education.

Table 2

Lessons by live stream or recording (%)

Settlement type	*The filling teacher held live streams or recorded lessons.*	
	yes	*no*
Capital	88	12
County seat	53	47
Big-, or middle town	67	33
Small town	57	43
Villages	36	64

Our next question was about using live or recorded lessons. We were curious to see if the type of settlement could affect the response, we received in terms of the percentage indicators in the table (Table 2) teachers working in the capital had the highest number (88%) live lessons or by broadcasting recorded hours. Only 36% of educators teaching in the municipalities chose this form of digital education. An interesting observation is that the use of live lessons or recorded lessons decreases in proportion to the decrease in the size and rank of the settlement (Simonyi & Homoki, 2020).

Teachers who answered yes to the above question on a scale of 1 to 5 graded the success of live or pre-recorded lessons (1: It was not successful at all, 5: It was completely successful). Based on the results, 20% of teachers said they were fully successful, with 52% nominated grade 4 of the scale. There was no teacher who felt completely unsuccessful in holding live lessons. In pre-lessons, teachers can use some of their best practices, success also depends on the tools of the learners and on taking this form of education seriously enough. However, lack of feedback and constant contact can be a problem. Many teachers have had difficulty speaking in front of a camera, so they say there is significantly less

interaction, students ask less questions than in contact classes, so feedback is difficult to achieve.

We were looking for a link between the school type and the effectiveness of digital education, but according to the single-point variance analysis (ANOVA) there is no significant inter-group difference in the extent to how effective they felt about digital education what type of school they teach (F=1.664, =.186).

The lack of correlation may be due to the low number of sample items and the disproportionate distribution. We expected negative results in terms of efficiency in lower primary school. Due to the characteristics of the age group, students are unable to learn effectively online without parental help. In this age, instant feedback and continuous reinforcement are very important, which is not achieved in the digital environment (Lénárd, 2019), and it can reduce motivation and, proportionately, performance.

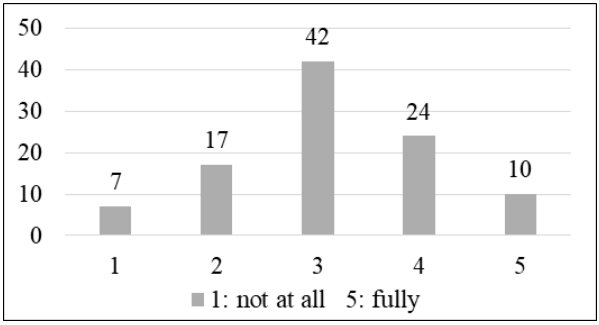


Figure 6. How prepared were the students for digital education? (%).

According to almost one half (42%) of filling teachers two thirds of pupils were not prepared for digital education (Figure 6). Categories 3-4 are the most typical (66%), but the mode is 3 and its frequency is 71. The average is 3.1. The lack of preparedness was mainly not due to the tools, but also highlighted the shortcomings of student digital competence. 10% of fillers experienced maximum preparedness. In primary school (ISCED1) pupils have little or no IT skills, in this case, the help of the parent was essential. In primary and secondary schools, the digital competence of students is already improved, but they are often limited to knowledge learned in IT classes. In many cases, during digital education the tools and applications must be managed alone by students at user level, but there are still many shortcomings e.g.: searching and filtering for information, managing information and netiquette. Based on experience, the IT subject could provide an opportunity to prepare for digital education. It would be

worth incorporating the shortcomings identified in the current situation into the curriculum.

Based on the data, the effectiveness of spring term digital education is unlikely to have approached the minimum level. "Three months of blind spots" (in most cases) characterizes the knowledge acquired by students in primary and secondary education systems in most cases. This was not revealed to other groups of the society only because of the instruction to repeat the year, but the majority of parents and educators clearly feel this in the autumn semester.

The fact how long an educator has been working as a teacher is slightly positively related to how effective he felt compared to his previous practice ($r=.176$, $p<0.05$), the same does not show a significant relationship with becoming more prepared. And those who felt effective in digital education in the spring also felt more prepared in the fall, which manifested itself as a mild positive significant link in the test ($r=.206$, $p<0.01$). Young teachers are already digital immigrants, and their digital competence is assumed to be at a higher level than that of older teachers. Yet they did not feel that education was more effective in the online space, which may be due to methodological unpreparedness.

It is very important that teachers and parents learn about the characteristics of the digital environment, especially those which are different from the usual social environment, with all the advantages and opportunities that the digital environment can offer (Lénárd, 2019).

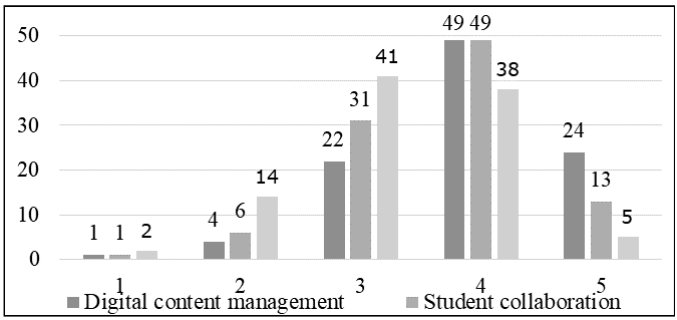


Figure 7. Characterisation of student performance (%) (1: Not at all, 5: Fully).

„A word shouted into the desert" this is the problem that characterises student performance in digital education for answers to an open question. The distribution shifts towards the right compared to the normal distribution but there is no maximum satisfaction (Figure 7). In primary school, teachers needed parental help, so the measurement of performance was not authoritative, it was

influenced by a strong parental background. In the case of upper primary and especially secondary education, problems in managing digital content hindered the effectiveness of teaching. 27% of respondents were dissatisfied with digital content management (Figure 7). The 4.5 category covers 73%, the mode is 4, and the average is 3.9. So, there have been better results in terms of content management than in terms of collaboration and meeting deadlines. Student cooperation has not been fully achieved. The frequency of value 4 is 84, mode is 4, average 3.69.

Several teachers felt that students experienced the extraordinary educational situation as a summer break, only 13% of respondents said there was a maximum level of cooperation. Meeting with deadlines was one of the crucial problems, continuous monitoring was hindered by students' ignoring deadlines. In this case, the mode is 3 and its frequency is 70. Average 3.3. Among the questions related to the characterisation of student performance, the respondents were the least satisfied with the deadline. Maximum points, only 5% marked. 55% of teachers perceived the problem which hindered their day-to-day work.

Several people have asked the question before, whether we need schools and teachers in the 21st century. In the information society, almost all information can be found via the Internet, therefore, knowledge no longer comes from the teacher, but from the information super-highway. An important consequence of the digital revolution is a change in the role of teachers and students' attitudes towards school, knowledge acquisition and learning (Kóródy et al., 2020). The COVID-19 situation has demonstrated that teachers and schools are needed because, although digital natives are assumed to have high level of digital competence, experience shows otherwise. According to Prensky (2001), people are called digital natives who have lived among advanced digital devices since birth, and managing the devices is not a problem because they grow up living up to technological advances.

Almost half of the teachers had at least one, but typically more students who could not participate in digital education (Figure 8). In disadvantaged large families, there were times when three students had one computer.

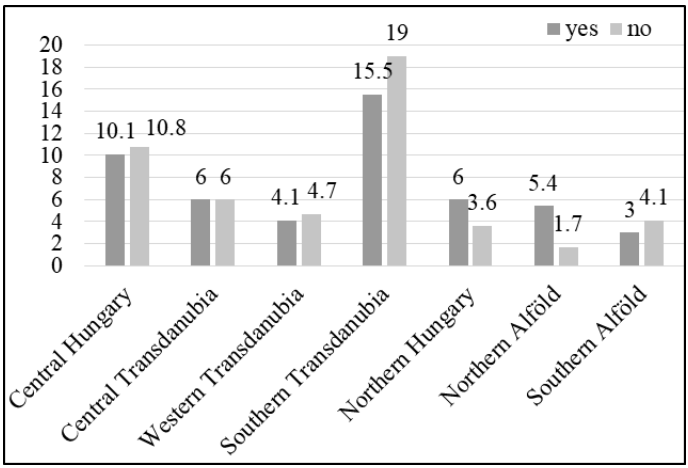


Figure 8. Students who were unable to participate in digital education (%).

According to another survey, the students were subject to technical conditions. According to parents, 86.5% of students had unlimited access to the Internet at home. If the students did not have their own device, the school gave them, for example, a laptop or desktop computer (Századvég, 2021). According to our survey, there were one or more students in each region who could not participate in digital education. Teachers have tried to manage this problem several ways. Students were contacted on paper, often by post, personal face-to-face consultations, year-end individual catching up, text messages, or telephone contact, often by mail, but this was a special burden for teachers (52%). Students who could not be reached anyhow and disappeared during digital education unfortunately failed (3%). Catching up with pupils who have not been able to participate in digital education will be a major problem in the future. According to a nationwide survey where teachers were also asked about their experiences during digital education, four-fifths of the students from Budapest participated in digital education, while only 65 percent of students were involved in the villages. According to the survey data, the higher the proportion of students with multiple disadvantages, the lower the proportion of participants in digital education. The main reason for this is the lack of adequate infrastructure, internet access or equipment. One in five teachers says children don't take part in digital education because they have a lot of adult tasks to solve e.g. supervision of a younger brother or housework (Partners Hungary, 2020).

2.2 Development of teacher digital competence

The development of teacher digital competence has been positively impacted by the closure of schools. Two-thirds of teachers (78%) felt that their digital competence had developed during that time. Their use of digital tools has become more confident, and digital toolkits have grown. Society reacted quickly to the situation. In the autumn, digital education already had more online interfaces and digital content available to teachers than before, which greatly helped teachers. And teachers have made greater use of these opportunities. There is a significant positive link between the development of teacher digital competence and the effectiveness of digital distance learning ($r=.214$, $p<0.01$). This result can be attributed to the fact that teachers, who were able to use new methods during their extra-curricular teaching work, were forced to switch to ICT tools to achieve an effective teaching-learning process. However, it was a common mistake for several educators to carry over the usual methods of contact lessons into the online space, which reduced efficiency in many cases, as new approaches and methodological solutions are needed in the digital space.

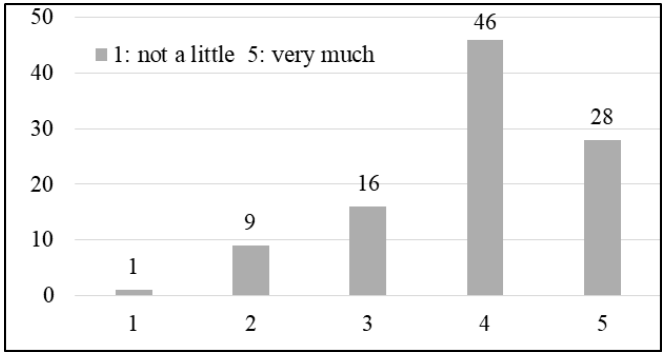


Figure 9. Level of preparedness compared to digital education in spring.

At the beginning of the 2020/20201 school year, digital education was expected to be reintroduced. Nearly two-thirds of teachers (71%) felt more prepared than in the spring (Figure 9). Categories 4-5 cover 74%, mode 4. The frequency of 4 is 78. The average is 3.9. Teacher digital competence evolved after the first digital education. Slightly for less than a third of the teachers the spring digital education period was no longer a problem, and their digital competence was probably stable. Teacher digital competence was certainly well affected by the spring transition. Due to the constraint situation, the tested competence developed mainly in an independent way. The cooperation and helpfulness of the teaching society has facilitated the development. Teachers shared their

experiences, helped each other, and prepared self-made content available to each other, thereby facilitating development.

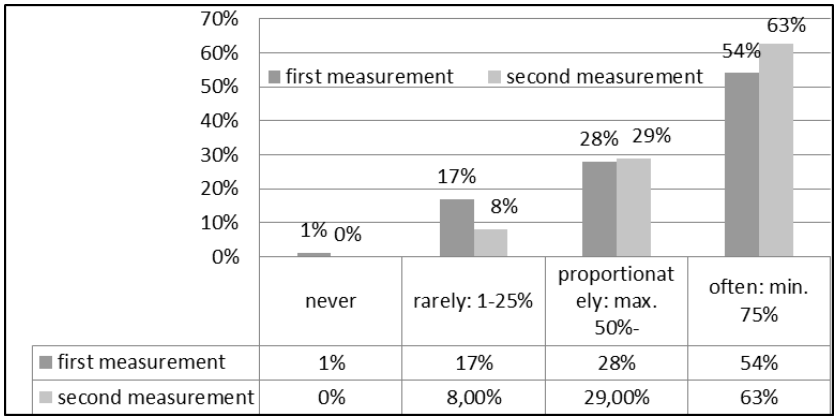


Figure 10. Rate of use of ICT tools and digital content in lessons.

Most of the teachers responded to the new situation in a way that was appropriate of their vocation. In a previous questionnaire study, only 54% of filling teachers used ICT tools, because of the switch to digital education, 63% of digital content was introduced into education during the second measurement on a minimum of 75% (Figure 10). These proportions are partly due to the necessity of the situation. However, there are teachers who are much more confident using ICT, many teachers have come to know new content, created self-edited digital content and task sheets, which they will use in normal contact lessons in the future. Progress is numerical; however, it should be mentioned how mentally and physically this situation has exhausted both teachers and students. Educational work was limited only to education, thus wasting valuable time from the students' point of view, which could have been spent on students' personal development.

3 Discussion

In the case of issues related to the teaching activities of digital education, it can be said that a significant number of teachers had difficulties in the course of digital education in the spring and in fact digital education was not implemented. The methods remained the same, they just moved to online space (Figure 11). Those who held live classes were usually dominated by verbal communication, but a significant proportion of teachers did not even take it. In this case, he only

published the page number of the textbook, the assignments he had to send to the students. In many cases, students did not meet with the teacher for 3 months. The interface was the Google Classroom they used. It was not possible to make live videos here at the time.

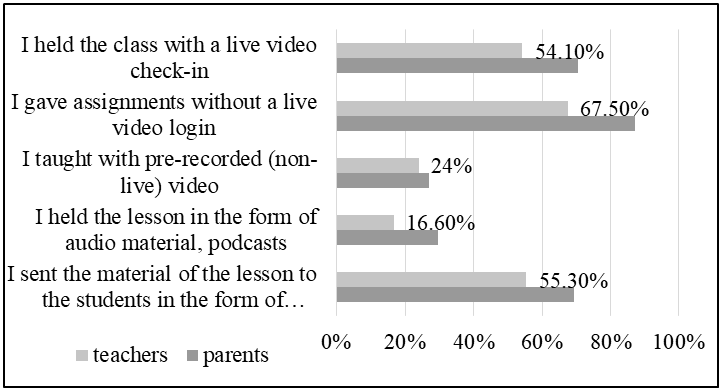


Figure 11. How to keep lessons (several possiblen answers) (Századvég, 2021).

65% of respondents were more dissatisfied with student performance. Although it should be stated here that their research covered both semesters and that the autumn period was already better than the spring period. Dropouts and deficiencies are quite significant, especially among those living on the periphery. However, through school leadership, public education leaders have restricted the publicity of real data on backlogs. In our own teaching experience, a significant number of students joined in, but in many cases at the other end of the line we did not know what they were doing because they did not connect a camera. The illegal use of resources was also discovered several times during the audits and reports. Despite all these biases, a significant number of educators focused not only on the curriculum, but also on the mental state of the children, so they also devoted more time to conversations once they had taken on online lessons.

Conclusion

Institutions and educators who used different digital platforms and ICT tools before the 'virus' have taken advantage of those who only later began to deal with digital competence and the possibilities of digital education under duress. Teachers who lacked digital literacy, based on our questionnaire study, tried to catch up behind others by striving to catch up, thus avoiding falling behind in the digital world. Teacher digital competence has developed measurably over the

period under review. In the second round of digital education, which has since been reintroduced, a further rapidly positive change in this competence can be assumed.

During the second wave, the world was a little more prepared for the fact of the new closure, including Hungary. Teachers prepared in spirit for the possibility of hybrid education, which occurred several times in the 2020/21 school year even in classes 1 - 4. Based on the measurement carried out in the autumn semester, the proportion of teachers providing online lessons above 50% increased by 10%, and the repertoire of applied surfaces and software has also been expanded. This result was confirmed by the contact tests. And that those who felt digital education was more effective were teachers who were more self-friendly users and felt a stronger development in their abilities. The pandemic highlighted the truth of what Mátyás Turós said about the operation of Waldorf schools and IT: "a more and more crucial task for human beings is to embed technology into the world through the intellect" (Turós, 2022, p. 106).

During that time, teachers and parents faced a new problem which we believe is a common task to solve. Students were in front of the computer all day, which may involve dangers. Excessive internet use and the online world can alienate children from real social connections. It may become a primary social factor among learners (Amichai, 2003). Negative opinions online can have a devastating effect on the emerging self-image of young people in public education (Valkenburg et al., 2006). The emerging self-image of young people in public education can be affected by negative reviews online (Valkenburg et al., 2006). The threat factor is growing in digital education, by often allowing students into the online school schedule without external supervision.

According to another research, looking at the specificities of the teaching and learning process in the digital work schedule, it is important to mention that teachers spent much more time preparing for their lessons in proportion. While previously 6-10 hours were spent preparing weekly (33% of the fillers), during the digital work schedule, up to 26 hours or more time spent preparing (21%) (Századvég, 2021). This fact confirms that there is room for improvement in the field of digital competence.

Regional differences in pupil performance could hardly have been established due to the territorial distribution of the sample, but it decreased based on the teacher's experience, in which in many cases the lack of equipment or motivation played a role. However, from the interviews started as a continuation of the research, the picture can be seen, which was reflected in Table 2, that the territorial hierarchy has a very much influence on the performance and participation rate of students in digital education. This problem needs to be addressed as soon as possible, as the intensification of segregation in the digital education space will only happen after years, and then we will not be able to

remedy it. According to some estimates, a third of disadvantaged pupils were unable to participate in digital education (Kende et al., 2021). In Budapest, the proportion of students involved in digital teaching is 80%, while in the villages it is 65%. According to the data, the higher the proportion of students with multiple disadvantages, the lower the proportion of people in digital education. In relation to the causes of the outage, most people mentioned the lack of adequate infrastructure, computers and internet connections. In many cases, contact teaching was provided in these segregated schools during quarantine to reduce backlog.

The other problem to be solved is the transformation of teacher training and further training, where teachers and teacher candidates must now be specifically prepared to stand up in a similar educational environment, to comment on mental problems, to deal with them. In this respect, several foreign research results can be used (Medzini et al., 2014; Ávila et al., 2020), examples of digital opportunities within the framework of geography on certain topics, in our case. However, we must add that the standard of living of the majority of Hungarian society is an obstacle in their application, as in many cases students' tools are not suitable for the use of these innovations and conditions.

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