

Digitalization of education during the COVID-19 pandemic and its impact on students

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Abstract

The article deals with the analysis of a survey of Slovenian students' views on the COVID-19 pandemic and distance learning. Some advantages and disadvantages are highlighted. More precisely, we present the issue of three particularly emphasized concepts from the survey responses and their impacts. These problems were communication, concentration, and motivation. We also present the importance of digitalization and learning digital literacy in the Slovenian school system, which is important for the further development of a responsible society.

Keywords: digitalization, digital literacy, school system, motivation, communication, concentration, COVID-19

Digitalizacija izobraževanja v času epidemije Covid-19 in njen vpliv na študente

Povzetek

Prispevek obravnava analizo ankete pogleda slovenskih študentov na epidemijo covid-19 in šolanje na daljavo. Izpostavljene so nekatere prednosti in slabosti. Natančneje predstavlja problematiko treh izrazito izpostavljenih pojmov, ki sva jih zasledili v odgovorih ankete, ter njihove vplive. Ti problemi so bili komunikacija, koncentracija in motivacija. Prav tako predstavlja pomen digitalizacije in učenja digitalne pismenosti v slovenskem šolskem sistemu, kar je pomembno za nadaljnji razvoj odgovorne družbe.

Ključne besede: digitalizacija, digitalna pismenost, šolski sistem, motivacija, komunikacija, koncentracija, odnosi

1 Presentation of selected challenges

Digitalization of the school system is a process that state institutions have been trying to carry out for some time now. European Union launched the DigCompEdu project, which gives guidelines for promoting digital literacy of pupils at different levels of education (elementary school, high school, college). Within the project, 6 areas were designed – those were supposed to guide educators in teaching the 21 general competencies from the DigComp framework with the main objective to achieve digitally competent individuals, who would use digital resources confidently and critically. The digitalization tendencies and the importance of digital literacy did not go unnoticed, even before the COVID-19 pandemic.

When the pandemic started, it became clear that the countries of the European Union were falling behind the objectives of the project, especially when they had to digitize the learning process and move it to an online environment in a very short time. At that point, the importance of digitizing the school system became apparent, but so did the difficulties and unwillingness of teachers to adapt to the new system. The core of their problems was the lack of knowledge when it came to digital platforms, such as MS Teams, Zoom, e-classrooms (Moodle) and other applications. Students, on the other hand, adapted quickly to the new way of teaching that involved the use of technology. The fact that students adapted so quickly to the online learning process is no surprise, given that we live in a time, in which technology plays such an important role at every step of our lives. Nevertheless, the problem, which became more apparent, was the poor digital literacy of students – the exact problem the DigCompEdu project wanted to prevent. The pandemic has thus shown that education cannot function without digitalization and shone the light on the radical changes caused by the digitalized education.

To examine the issues related to the digitalization of education caused by the coronavirus pandemic, we surveyed distance education in which students answered questions about their perception of distance learning and its impact on them. To gain an overall picture of the students' perspectives on distance learning, the survey results were compared to the results of three foreign studies: the international study *A Global Outlook to the Interruption of Education Due to COVID-19 Pandemic: Navigating in a Time of Uncertainty and Crisis* (Bozkurt, 2020), the American study *Suddenly Online: A National Survey of Undergraduates During the COVID-19 Pandemic* (Means, 2020), and the Australian study *Psychological Wellbeing and Academic Experience of University Students in Australia during COVID-19* (Dodd, 2021).

2 Analysis of the survey *Distance Learning*

2.1 General analysis

The consequences of the poorly adjusted school process were also felt by the students. To analyse the impact coronavirus had on education, a survey, titled Distance Learning, was conducted among 95 participants. Three-quarters of them were female, mostly aged between 20 and 24. They came from all statistical regions of the Republic of Slovenia. Most of them studied in Slovenia and some of them studied abroad. Since the respondents had different backgrounds and each of them experienced the pandemic in their ways, some answers differed greatly.

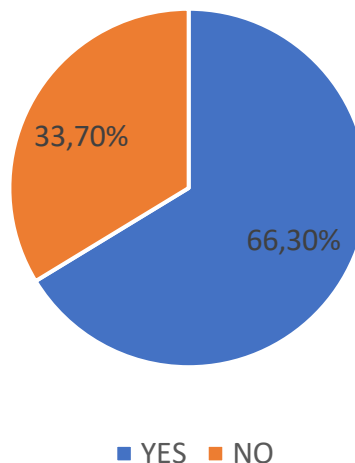
The first problem covered by survey questions where answers differed was the internet connection. The majority of respondents had a relatively stable connection, but the minority with a bad connection should not be ignored. One participant expressed dissatisfaction with the

fact that lectures were more difficult to follow because of the connection disruptions. Most of the participants had a suitable workspace, while others with no such space were facing significant problems. They pointed out that they experienced a drop in concentration and had difficulties with following the learning process. As one of the biggest advantages, the respondents listed they saved money and time that would otherwise be spent on commuting. Distance learning was more comfortable, according to respondents, as all necessities were at hand. As a disadvantage, they indicated the deterioration of mental and physical health, which is the result of prolonged sitting in front of screens and reduced amount of movement. More time and effort had to be invested in the study process, while less knowledge was gained. Participants also mentioned problems with technology and less socialization. Distance learning, as shown in Figure 1, was more demanding than live study in the opinion of two-thirds of participants.

Throughout the analysis, 3 concepts were constantly repeated: concentration, motivation, and communication.

Figure 1: Evaluation of difficulty of distance education compared to in-person education.

Do you find distance learning more difficult than in-person learning? Do you find distance learning more difficult than in-person learning?



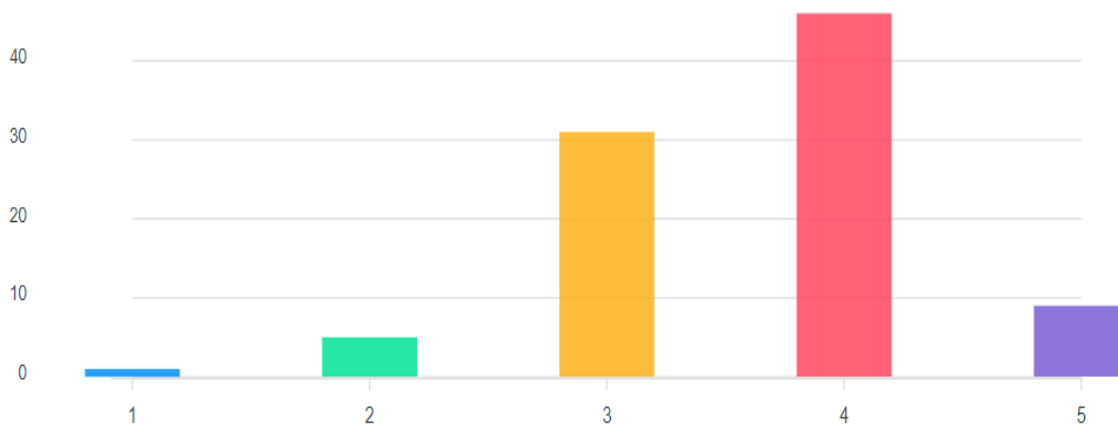
2.2 Concentration

Most participants did not say they were disturbed by common distractors, such as telephone and classmates. Although these were also mentioned, a new type of distractors was predominant, especially distractors that are not found in the school environment, namely pets and family members. Some participants reported they prepared lunch rather than listened to the lecturer. The distractors were linked to the home environment. Everyone was being used to these distractors from everyday life and was therefore not aware of them. One of the reasons for the drop in concentration, according to participants, was also incoherent lectures caused by internet disruptions. Figure 2, which presents how students rated the stability of their internet connection, shows that only a minority of participants had an excellent internet connection, and the rest were facing problems. The biggest issue was following the lectures and taking notes. Distance education requires a lot of self-control. This is particularly evident in the case of

university students, as professors are no longer involved in an individual's learning achievements, and parents no longer assume the role of supervisor, which is very common in primary and secondary school. Students are forced to show greater independence as they are responsible for their education. The pandemic thus presented a step forward in greater independence and self-control of pupils, especially higher-education students, who were responsible for providing themselves with technical devices and a stable connection for regular and uninterrupted attendance at lectures. In the current situation, it was up to them, to an even greater extent, to follow lectures and participate without succumbing to distractions surrounding them.

The advantages of self-control that students have gained during the distance learning process will be felt in the future as well. Later, when they find themselves in the role of employees, they will be more adaptable to the work environment and, above all, they will be more productive, as they have learned to ignore distractions from the environment that would interfere with their work. Greater focus on our actions also brought progress in tolerance, as we began to think about the situations of others and to adapt to them to a greater extent. Self-control, flexibility, and tolerance, which we had to acquire during distance learning, are very important qualities for the development of personal responsibility. In future relationships, we will find it easier to understand the different situations and problems that other people face, and we will be more understanding and tolerant. This is the basis of good relationships in various areas of life and such qualities will help us greatly. They are especially important for workplace relations, where we must learn to be respectful and tolerant of our co-workers, both our superiors, our subordinates, and others we are in contact with, as this is the foundation for successful cooperation. What we learned as a result of distance learning during the pandemic will not only affect work relations, but also the inclusion of the individual in society in general.

Figure 2: Stability of internet connection (as rated by students).



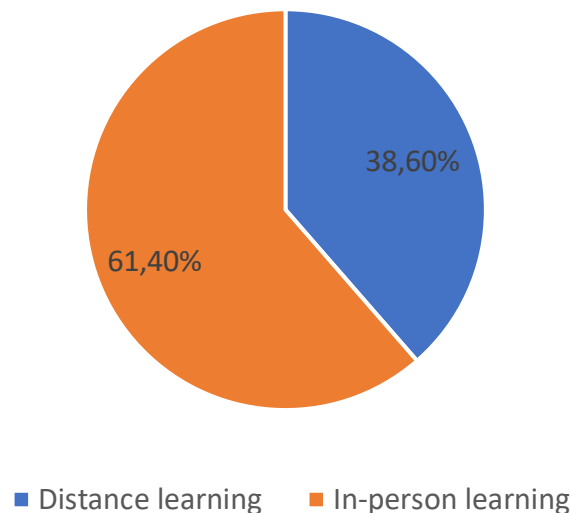
2.3 Motivation

Another concept that often appeared in the responses was a drop in motivation. As Figure 3 shows, almost two-thirds of participants noticed that distance learning offered them less motivation. Many lines have been blurred during the pandemic and the period of distance learning. The most obvious one was the line between leisure and school time. Leaving school and the beginning of free time was previously marked by the physical exit from the school building. Now that everything was done in one place, there was no obvious demarcation. As the space for rest and the workspace became united, there was no end of work time insight, so the work time and leisure overlapped. The line between the semester and the examination period

also became blurred. The University of Maribor introduced an extended examination period, so the examination period and the following semester were intertwined. The boundary between them became almost invisible, and as the result, a feeling of endlessness developed. Before the pandemic, a new semester began after the end of the exam period, but it was no longer so. This had a strong impact on motivation, as it was impossible to constantly maintain such a high level of concentration to carry out all obligations at once. The feeling of infinity also lowers motivation. Motivation is higher by achieving a goal, while in the current situation, the desired goal was being more and more distant. Motivation also decreased due to the increased amount of schoolwork. In addition to the lectures, the professors assigned more individual tasks to students. There was also an obvious difference between assignments before the pandemic and during distance learning. Students needed to complete more tasks, such as term papers and presentations, which negatively affected motivation, as the schoolwork overload and the apparent unmanageableness of it lowers the motivation to work. Technical problems during lectures also significantly lowered motivation. The following question arose: why would someone even go to the lectures if unable to follow them? Social contact, which increases motivation, also cannot go unmentioned. Personal contact with professors, classmates, assistants, and others, gives more energy and more willingness to work than when they are only present on the screen. The importance of motivation in personal development is especially evident when talking about skills and enthusiasm in the workplace. Namely, if we have a workforce that is not trained sufficiently during the period of education, it will not set high goals and it will not achieve them, so it will be less productive. Society, on the other hand, wants productive and intellectual individuals. To be personally responsible, one must be critical of arguments. This means that they must have enough motivation to critically evaluate something and form an objective opinion about it.

Figure 3: The type of learning that offers more motivation:

Which type of learning offers more motivation?



2.4 Communication

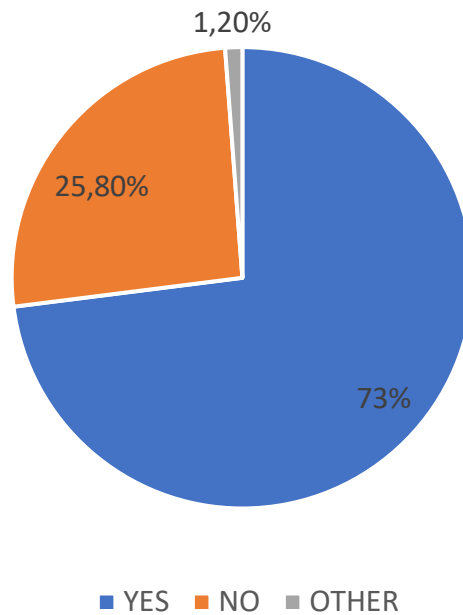
Communication, especially in-person communication suffered greatly during the pandemic. When the learning process was forced to move to online applications such as MS Teams, online classrooms and e-mail, the participants noticed a difference in the responsiveness of professors

at the beginning of the pandemic and later on. When the pandemic started, the inboxes of professors were not yet as full, but they filled up during the pandemic, and so the response time changed. Some participants expressed dissatisfaction because they had to either send several messages before receiving a response or not receiving one at all. Respondents - as shown in Figure 4 - expressed a desire for in-person communication, as they find it much more effective, easier, and more relaxed. A very specific phenomenon must also be mentioned – some of the older professors used telephone calls and messages instead of online communication channels. This could be a sign of their resistance to digitalization, and it could indicate a lack of opportunities for adaptation. This proves that there is still a lot of work needed to digitize school and that a lot of effort should be put into promoting digital literacy among teachers.

The shift of communication to the online environment brought many consequences. Most notably, students were involved in less person-to-person communication, so they did not renew or develop this skill. The lack of communication skills is not apparent only in the context of social interaction, but also in professional communication. Throughout their studies, students start to develop professional communication, which is extremely useful in the workplace. The ability of professional communication – and after all the communication in general – is a fundamental part of any relationship. If a person wants to be personally and socially responsible, they have to know how to establish constructive relationships. In other words, they need to know how to communicate well. Since this ability was affected during the pandemic, the lack of it will be evident in the future. On the other hand, students were now forced to use other means of communication that they would not normally use. They developed and perfected professional communication in the online environment. They also learned about many platforms used for professional communication and for facilitating the implementation of distance school and work. To meet the goal of creating a socially responsible person, the person must know how to communicate well, both in an online environment and in person. However, since the development of society is currently focused on digitalization, the ability to communicate online plays a greater part.

Figure 4: Proportion of students that miss in-person contact with professors.

Do you miss face-to-face contact with professors?



3 Conclusions of the analysis and comparison to foreign studies

The analysis of the survey results showed that pandemics caused a radical change in society as we know it.

The main changes concerned digitalization, which has already started spreading to all areas of life but has now become more prominent in the field of education, where it was less present before the pandemic. Digitalization, which has been a part of our lives for a long time, has had positive and negative effects, especially for students, who suddenly had to completely change their learning environment. Students, who had already spent too much time in front of the screens before the pandemic started were now forced to do so to an even larger extent, including during school time. Spending more time indoors and in front of a computer damaged their physical and mental health. The lack of personal contact with their peers meant they were involved in less social interaction, therefore the relationships established in the future will be less genuine and of lower quality. Since the people, but especially the students, will feel less connected because of the distance they had to keep, they will have big problems with establishing relationships. Children had to rely on themselves during that period, and they did not even have the option to have the company of others, therefore in the future, they will have more trouble trusting people and building strong emotional connections with others. Hours of sitting and staring at the screen without a break affected their perception of the world around them.

The conclusions of our research are also supported by the results of foreign studies. In each of them, we detected a recurrence of the problems caused by the pandemic. The Australian (Dodd, 2021) study states that deterioration in mental health was much more common in women and students between the ages of 18 and 24. General deterioration in mental health was also evident from the results of our survey, which however was not designed to support or refute the correlation with the results of Australian research. Foreign studies also emphasized the problem

of dissatisfaction with distance learning. A USA-based (Means, 2020) study found that as many as 51% of students were very satisfied with the course of study before the pandemic began, while that number dropped drastically to just 19% during the pandemic. Our research provided comparable results in terms of satisfaction with distance learning compared to in-person learning, but there was an interesting difference - in the American survey, students expressed satisfaction with how professors adapted to distance learning, while the participants in our study were less satisfied with the same aspect. All studies, both foreign and ours, also indicate problems and inequalities related to the internet connection. Everywhere there were those with a better and those with a worse connection, yet the majority of participants pointed out that their study process was disturbed because of the connection disruptions. The results of the international survey (2020) showed that the problem with internet connection was particularly pronounced in some African, Asian, and South American countries, where there are entire areas with no infrastructure that would provide internet connection. This research, just like ours, also highlighted the importance of digital literacy, critical thinking, self-control, independent work and building quality relationships.

All studies, regardless of where they were carried out, generally referred to the same problems, namely a drop in motivation, deterioration of mental health, problems with communication and the desire to communicate in-person, and the blurred line between school and home environment.

4 Conclusions

The pandemic has highlighted the importance of the digitalization of the school system. It would be utopian to think that the school system can go back to the state it was in before the pandemic.

The importance of digital literacy and digitally responsible people has been shown, so educating people to be digitally literate has become one of the new key tasks of the school system. We do not think that distance learning should continue the same way as it was during the pandemic, but we feel digital materials should become a part of the curriculum to raise awareness among children as early as possible of how important digital literacy is. We also support the use of digital teaching aids since they provide additional training for individuals in the field of digital responsibility. In addition to the possible benefits this would bring to students in their personal development, it would also help to develop social responsibility. With the growing presence of digitalization in the workplace, it is essential to educate future workers to be digitally literate and to know how to use technology, as they must keep pace with the development and be adequately trained to carry out work that is constantly changing and adapting due to digitalization. It is therefore extremely important that digital technologies are used critically and correctly so that society's productivity and responsibility will improve.

We do not expect that a utopian scenario, in which all relationships are perfect, and all people respect each other, unfolds. However, we believe that the pandemic will have a positive impact, no matter how small, on interpersonal relations.

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