The COVID-19 Pandemic: Unique Opportunity to Develop Online Learning

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Abstract – **The COVID-19 pandemic has posed a new requirement to the school systems of most countries of the world, including Slovakia, to ensure the teaching process in demanding hitherto unknown conditions. It was necessary to find digital solutions for the teaching process to ensure the protection of students and teachers against coronavirus. Traditional full-time teaching at schools has been replaced by online learning. In this paper we specify selected pedagogical and psychological issues of online learning, identify the potential of online learning, and present the results of research focused on the perception of online learning by students at selected secondary schools in the pandemic. In conclusion, we analyze positive and negative aspects of online learning during the pandemic.**

Keywords – **COVID-19, online learning, perception of online learning, secondary school students.**

1. Introduction

The COVID-19 pandemic has brought many new stimuli and open questions to the field of educational research. One of the current topics is online learning, which we can examine in a broader context of the impact of digital technologies on the education system.

When assessing this impact, we encounter different views in professional discussions. On the one hand there is a requirement of intensive implementation of digital technologies into education and support of online teaching in the context of increasing information literacy and development of digital competencies of the population. According to Selwyn "there is widespread acceptance that digital technologies have to play an integral role in the provision of all aspects of lifelong learning – from the integration of computers in school, college and university classrooms, to the virtual delivery of online courses and training. Digitals technologies and media are also recognized as implicit elements of the informal modes of learning that are stimulated by general interests, pursuits and hobbies outside the formal curriculum" [1]. On the other hand, there are the opinions of Orlando [2], Zhou – Brouwer – Nocente – Martin [3], Hennessy – London [4] etc., who warn of the massive and precedence use of digital technologies in education and recommend their use in education with certain limitations and with an amount of caution, taking into account the social aspects of online education. They draw attention to the pressure of society to use digital technologies in education at the expense of teachers' pedagogical skills and experience. According to some authors, for instance [5] current teachers are able to use digital technologies to support teaching, but at the same time they refuse to replace pedagogical solutions with them, giving emphasize to insufficient empirical evidence of the positive impact of technology on the teaching process. The authors Räihä – Tossavainen – Enkenberg – Turunen [6] point out the alternatives in education with the help of technology (referring to the results of an OECD study), according to which pupils use computers mainly for writing messages and browsing websites, while the use of educational software has a declining trend.

2. Selected Theoretical Aspects of Online Learning

It is indisputable that progress in digital technologies supports the development of the knowledge society and brings significant changes to

countries' education systems. "However, the knowledge society is not about the level at which a particular user can control various technological elements, but rather about how he/she can adapt in different conditions to changes in the environment or another type of application" [7].

Current information and communication technologies have a huge potential. Thanks to two--way communication each participant of learning process can actively work, engage and collaborate. Generation Y is considered technologically proficient and open to acceptance of new digital technologies in learning. The target group of our research – secondary school students, accept technical innovations and have experience with various digital tools supporting communication and cooperation (chat, discussion forums on social networks, e-learning portals in schools, online courses, audio and video podcasts, webinars, wikis, etc.). "The key attributes to remember about this group are that they maintain many of characteristics that apply to learners of all ages. On the one hand, they are interested in learning and seem to become easily excited by new concepts. They want to understand the relationship of the topic to their real-world experience, and they wish to be viewed as intelligent, independent learners. On the other hand, they can become easily discouraged when things do not go well" [8]. Students can be members of different communities in which knowledge is also disseminated. Here students can communicate, ask questions, learn, cooperate in solving assignments and tasks, present and defend their opinions, procedures, and solutions. The knowledge gained from such contemporary learning in the online environment can play an important role in online learning.

The starting point for our research of online learning is the understanding of learning as an individual transformative process, in which there is a quantitative and qualitative transformation of students' input knowledge, skills, habits and attitudes into a new transformed form. The act of transformation creates new knowledge, which is primarily the result of the activity of the learner. Learning here is not a mechanical process that allows knowledge and skills to be acquired only by transferring content from source to student [9]. It is also not true that the use of the latest digital technologies will automatically lead to quality learning [10].

The immediate transition to online learning during the COVID-19 pandemic confirmed the fact that while online learning requires greater demands on computer skills from teachers and learners, it also offers an alternative solution to the learning situation. A significant impetus is the change in the tool palette that is available in the educational environment. Video applications, real-time collaboration tools, or advanced search engines allow learners to be more active. Learning through an interactive multimedia combination of text, image, sound, and video requires learners to engage their specific cognitive processes. From the amount of information presented, it is necessary to select the essential and meaningful ones, which can be organized into visual and verbal mental models with appropriate association links. It is important to create such conditions in online teaching so that students do not stay in a fragmented empire. It is required timely transition from working with visual material to abstraction, generalization, and critical evaluation. Extremes, based on the one-sided overrating of specific educational material, iconic cognition focused on images, negatively affect the quality of students' knowledge, and prevent the development of their abstract thinking. It is important that the learning process in the digital world becomes problem oriented.

The teachers play an essential role in online education. They have a key role in the selection of technological means, the organization and management of teaching and learning, in communication with learners [11]. The more the teacher in online teaching focuses on the participants and their learning, the more it allows students to be active compared to traditional teaching. There are many problems associated with his role. The teacher finds himself in a process that he cannot completely control because he is led by other specialists (application developers).

Online learning environment is influenced by social, emotional, and cognitive factors. Social factors are associated with the theory of connectivism [12]. Emotional factors relate to reflection and self-responsibility for education, as well as the area of motivation. Cognitive factors draw our attention to the relationship between cognitive psychology and learning [13]. Online learning supports the development of argumentation and discussion skills. As in e-learning, there are two important aspects of social learning: communication and cooperation. Communication in online learning refers to the content of education and information sharing, asking and answering questions, division of tasks, their control and evaluation, but also to the area of social support of participants (providing advice, emotional support, etc.) [14]. Online learning requires an open environment that responds flexibly to students' behaviour.

Communication is researched in online learning research as a precondition for successful education [15].

The influence of users' personality characteristics and skills on effective communication in online learning is the subject of research as well [16].

Based on research in the field of motivation in online education [17], it is possible to guide the student primarily through his own activity, discovery, and creativity. We consider the self-reflection and students' own responsibility for participating in online learning to be important. It can be developed in such a way that the teacher provides students not only with an autonomous learning space, but also with support for it.

3. Perception of Online Learning by Secondary School Students - Selected Research Results

The main aim of the research was to find out how the secondary school students perceive the online learning during the pandemic. We set the following research questions: What was the attitude of students to the online learning? What was the time intensity of the online learning for students during the pandemic? What advantages of the online learning did the students see? What disadvantages of the online learning did the students see? How did the students perceive the teachers and their activities during the pandemic?

As the research method we used an anonymous questionnaire, which was electronically distributed to the respondents. The research file consisted of 2824 respondents (students of business and hotel academies, secondary schools of economics, pedagogy and technology field of study, grammar schools). More age categories were represented, 25,5% were respondents of the first year of study, 28,0% were respondents of the second year of study, 28,8% were respondents of the third year of study and 17,6% were respondents of the fourth year of study (i.e. in the age of 16 – 19 years).

As the research starting point, we made the survey of the respondents' experience with the online learning before the pandemic. According to our findings most of the respondents (79,8%) did not have enough experience with the online learning (41,1% answered less experience and 38,8 % none experience). Only 17,7% respondents thought about their experience as average and 2,4% as rich. The achieved result does not correspond with the aims of the "Conception of Informatization and Digitization in Department of Education" in the Slovak Republic, which determined the active usage of information and communication technologies in the education process as the key factor of the following education development in the Slovak Republic.

We were interested in what kinds of medias did the respondents use in the online learning before and during the pandemic. Based on the comparison, we can state that the respondents used more smartphones (74,8%) than computers (62,9%) before the pandemic. However, during the pandemic, the situation changed, and they used computers (91,1%) more than smartphones (83,3%). We assume that the preferential use of computers was not only a consequence of a more appropriate choice of media with regard to the solved tasks, but also a consequence of students staying at home due to government measures against the spread of coronavirus. The positive finding was that 92,4% of respondents had a smartphone with Internet and 98% a computer with Internet at home. What was less positive, was the fact that 42,5% of the respondents shared one computer together with the other family members, that could cause the problems with completing the school tasks (smartphones 6,9%).

Following the preferred media, we also investigated the usage of applications in the online learning during the pandemic. The most frequented was the school application Edupage (92,5%) that was used by most of the schools as the complex information system. Applications, such as ZOOM Cloud Meeting was used (51,9%), Google Apps (24,5 %), and applications as Kahoot (8%), MS Teams (4,8%), The Planet of Knowledge (2,2%) which were not used very often.

The important question was the survey of the time intensity of the online learning for students during the pandemic. We studied how many hours per day (in average) the students participated in the online learning. Our findings are shown in the Figure 1.
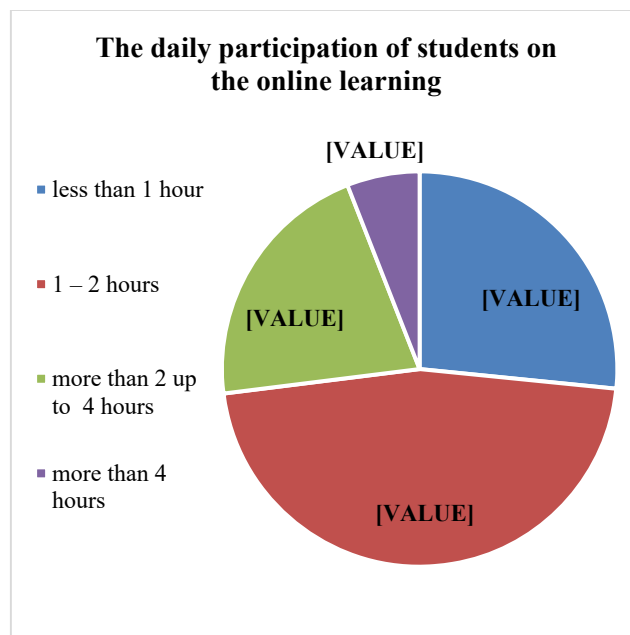

Figure 1. Daily participation of students in the online learning

The majority of the respondents (46,4%) participated in the online learning 1 – 2 hours per day, 26,6% less than 1 hour per day, 21% more than

2 hours to 4 hours, and only 5,9% more than 4 hours a day. We can say that the length of the online learning was far shorter in comparison with the full-time education, which lasted 6 hours a day in average at secondary schools. According to our opinion the results are the consequences of a volunteer's principle in the online learning that was practised at most of the schools. The results were influenced by the frequency of the online lessons during the pandemic as well. The respondents stated that only 8% of all teachers had the online lessons regularly each day, 33% of the teachers had the online lessons more than three times a week, 41% of the respondents mentioned the answer "not regularly", 18% of the respondents stated that the teachers did not use online lessons at all, they only supplied their students with learning resources materials.

An integral part of the online learning was homework sent by the teachers during the pandemic. The results are shown in the Figure 2.
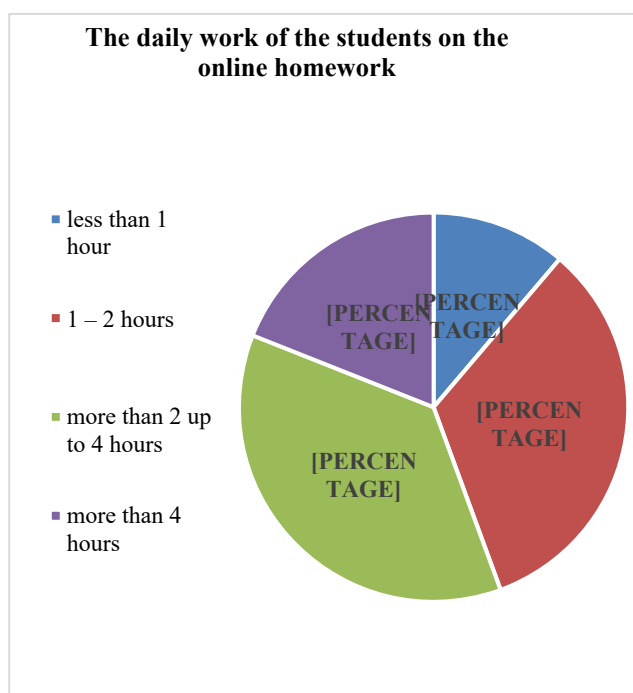

Figure 2. Daily work of students on online homework

The results of the research confirmed the work on the online homework was a larger part of respondents' work than the online lessons itself. The online lessons were shorter, so more emphasis was put on the individual work of the students. The most of the students (36,6%) completed their homework from 2 to 4 hours a day; less of them (33,2%) needed from 1 to 2 hours a day; 19% of the respondents needed more than 4 hours a day, and only 11,2% of them mentioned that doing homework lasted less than 1 hour a day. The research file did not include the respondents who ignored given homework.

The results of the research show that most teachers sent materials to students for self-study (61%) regularly and 26,0% sent materials for self-study often. Tests to check the curriculum were sent by 69% of the teachers and problem tasks by 42%. The longer time spent on homework we cannot only attribute to the type of tasks assigned by the teachers. It is also related to the problem of understanding without explanation that had most of the respondents (68%). The next reason of more time spent on homework in comparison with online lessons, could be the compensation of the low presence on the online lessons by respondents. Most respondents (74,0%), despite lower participation in online lessons, felt more responsible for doing homework and 53% of the respondents considered completing homework to be time consuming.

In the context of the main aim of the research, we analysed the whole attitude of the respondents to the online learning in the comparison with the traditional (full-time) education. The results are shown in the Figure 3. We researched which form of education respondents prefer. As we can see from the Figure 3, most of the respondents (53,4%) do not agree with the statement that the online learning should be preferred more than traditional education; 36,3% of the respondents agree with this statement.

By a deeper insight through additional questions in the research questionnaire we concluded that the respondents who preferred the traditional way of teaching:

- appreciated the personal explanation of the curriculum to students in the classroom (68%)
- found it time consuming to do the homework (53%)
- were discouraged by problems associated with the usage of digital technologies: lack of experience with applications (58%), technical problems (69%), fears of communication failure (71%), etc.
- missed the personal contact with the classmates (74%) and the school climate (59%).

Those respondents, who preferred the online teaching appreciated that they could:

- learn at their own pace (88%)
- relieve stress during school examination (75%)
- improve their school results (68%)
- be more independent in learning (84%),
- improve the ability to solve problem tasks (66%).

They also mentioned other advantages that are not direct connected with the online learning:

- the possibility to study in home comfort (97%)
- saving time and travel expenses (89%)
- better time management (76%)
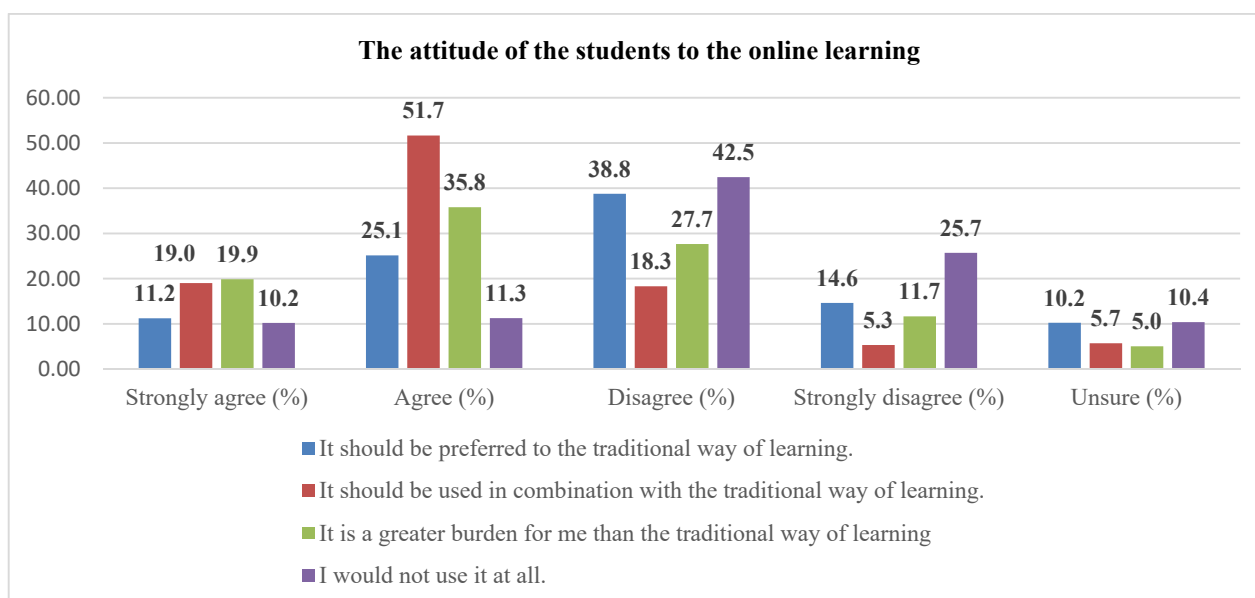- gaining time for other activities (77%).

Figure 3. Attitude of the students to the online learning

We can say that in a difficult situation caused by COVID-19 pandemic the teacher stayed the leader of the online learning. We found out how the students perceived the teachers who led the online learning and their activities. Our findings are shown in the Figure 4.

We assumed that the teacher was the one who helped the students to overcome the stressful situations caused by the new exceptional conditions of learning. Most of the respondents (81,8%) perceived positively the willingness of the teachers to communicate with them beyond the lessons. Only a small number of the respondents (7,9%) were not satisfied with the willingness of the teachers to communicate with the students. For 49,5% of the respondents the teachers were friendlier than at school and 25,3% of the respondents did not perceive them like that. This new situation in learning caused various problems for the learners (technical, family, etc.). The teachers´ attitude to the problems of students was perceived positively by 67,7% of the respondents, negatively by 16% of the respondents. According to the respondents, 52,2% of them felt motivated to work and perform well by the teachers.

We expected, due to the exceptional conditions during the pandemic, the teachers' demands on the students would be lower. The respondents considered the teachers' demands to be appropriate or higher than during the lessons at school. The most of them (62,6%) disagreed with the statement that teachers were less demanding than before the pandemic.
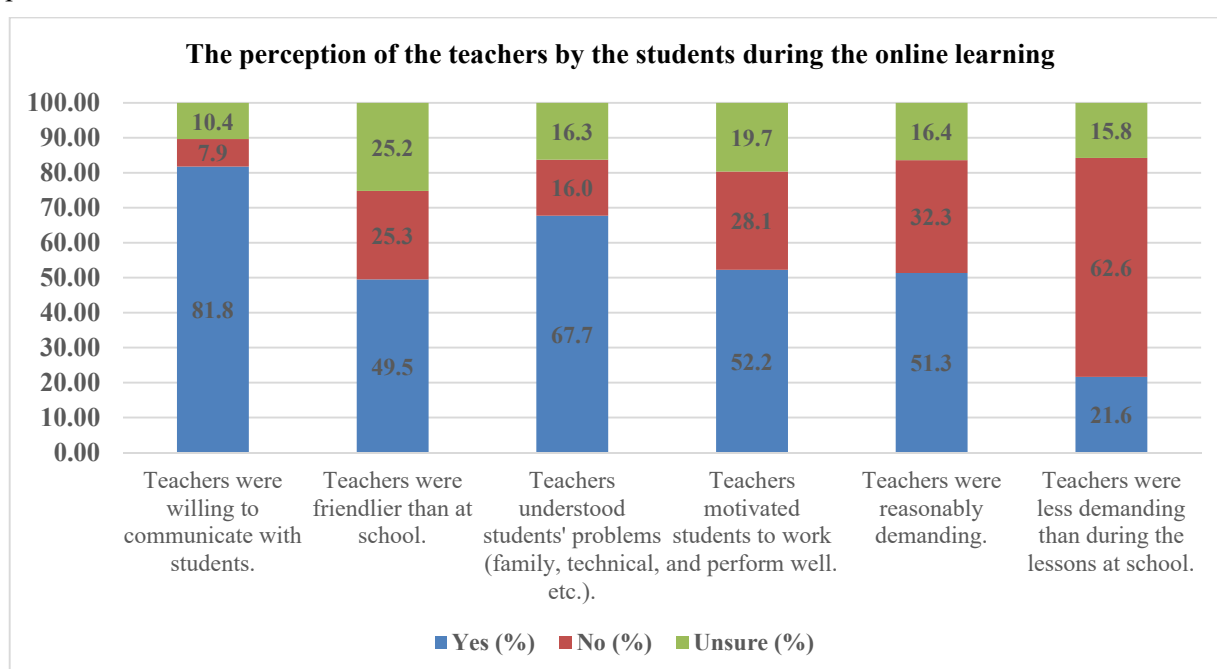

Figure 4. Perception of the teachers by the students during the online learning

4. Conclusion

According to the predictions of several kinds of research, its future is positive. While before the COVID-19 pandemic, online learning was used as one of the rare organizational forms of education, it became an essential part of the school systems of most countries in the world, due to the schools closure during the pandemic.

An analysis of the results of research into the perception of online learning during the COVID-19 pandemic by secondary school students has brought several interesting findings. In the first research question, we examined the attitude of students to online learning during a pandemic. Most respondents perceived online learning during the pandemic positively, but did not agree with its preference over the traditional (full-time) form of learning. They would like to use it equally in combination with the traditional full-time form of learning in the future. In the second research question, we looked at the students´ perception of the time intensity of online learning during the pandemic. Most of the respondents attended the online lessons each day, lasting to 2 hours, which can be considered as a very low time intensity compared to the time spent by learning in pre-pandemic conditions. Despite this fact, more than half of the respondents perceived the time intensity of online learning greater than the traditional form of learning. From the perspective of respondents this result was influenced by the greater time-consuming difficulty of doing online homework. We consider it important that up to a third of teachers put greater emphasize on the students' work out of direct online lessons, which corresponds to the results of examining the frequency of sending materials to students needed for their study.

In the third research question, we analyzed what students see as the benefits of online learning. Most respondents mentioned these advantages of online learning: the possibility to learn at their own pace and stress reduction during the testing in the online environment. The result confirmed our assumption that online learning at the time of the pandemic allowed students, due to its voluntariness, to apply their management of the time taken for study. As well as the confirmation of another assumption – online learning, according to the respondents' perception, brings less stress than traditional (full-time) learning.

In the fourth research question, we examined what disadvantages of online learning were seen by the students. The analysis of the research results allowed us to identify the disadvantages of online learning perceived by respondents in three areas. In the technical field, where most of the respondents mentioned the lack of technical equipment that was needed for online learning and indicated the poorer quality of their internet connection during the online lessons. In the didactic area, most respondents consider as a disadvantage the difficulty of understanding the curriculum without the teacher´s explanation. In the social field, most respondents considered the absence of personal contact with classmates as a disadvantage. The result confirmed our assumption that the students´ technical equipment needed for online learning is a significant factor influencing their perception of online learning.

In the fifth research question, we examined how students perceived the personality and activity of online learning teachers during the pandemic. Most respondents stated that teachers were willing to communicate with them and understood their problems arising from their insufficient technical equipment needed for online learning. Our assumption that students will perceive teachers in online learning during a pandemic as less demanding compared to the conditions of the traditional form of learning has not been confirmed. Most respondents considered the demands of teachers for online learning to be greater than during traditional full-time learning.

We extended the research of perception of online learning by students with guided interviews with secondary school teachers. We focused on their perception of positive and negative online learning during a pandemic. Teachers assessed positively that online learning during the COVID-19 pandemic led to the improvement of students' digital skills and increased their independence and responsibility for the tasks. They positively assessed the free access of some applications for online learning. They noted the benefits of online learning for improving the public status of teachers.

The analysis of guided interviews revealed several disadvantages of online learning presented by teachers. A significant disadvantage of online learning, considered by teachers, was the high time consumption required for the preparation of online learning content, checking of solved homework, and the time-consuming providing feedback to test and homework. The teachers missed immediate contact with the students as well as contact with absentee students, as online learning during the pandemic was voluntary and not attended by all students. The teachers negatively perceived the low students´ activity during online lessons to asking questions and poor feedback of the students. The evaluation of the students was influenced by many factors (some students helped their classmates with given tasks – when they did not know how to complete them alone, copying homework, cheating on tests), what according to the teachers led to biased results on the

online testing. Teachers saw as the negatives of online learning the lack of equipment of students' households with technologies for online learning, lack of experience, and insecurity in working with some educational portals. They negatively perceived the time constraints of some applications. Most teachers mentioned the impact of frequent and long-time use of digital technologies on health.

The COVID-19 pandemic has caught teachers and secondary school learners unprepared for online learning. The results of our study on students' and teachers' perceptions with regard to online learning during a pandemic allow us to confirm the importance of technical infrastructure and readiness of both, students, and teachers, for online learning.

The significant factor that had influenced the results of our research was the strong habit of the teachers, who felt comfortable in the familiar environment of the traditional classroom, as well as limits of the digital technologies that were not able to completely replace the personal contact of the teacher in interaction with students.

Digital technologies promise to provide learners with access to high-quality learning, although most of the education systems have to ensure that the inequalities caused by different approaches to online learning do not increase. These are also evident in the conditions of secondary schools in the Slovak Republic. It is not only a matter of providing access to technologies and learning resources, but it is necessary to maintain effective social relations between teachers, students, and families. It is extremely important for students who are lacking persistence and interest to learn alone.

Digital technologies can be a good tool for the teachers, but they cannot replace them. In online learning, so as in the traditional one, the teachers are the ones who manage the whole educational process. They contribute with their professional, moral, and pedagogical-psychological qualities to the outcome of this process.

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