Article

Survey on Online Learning at Universities of Slovakia, Czech Republic and Kazakhstan during the COVID-19 Pandemic

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Abstract: The article points out some of the challenges faced by students at the University of Ostrava, Comenius University in Bratislava and Al-Farabi Kazakh National University, who had almost no previous practice in online teaching during the COVID-19 pandemic situation. The students from the mentioned universities were interviewed to share their experiences with online teaching and learning during the COVID-19 lockdown. In this paper, qualitative pedagogical research in the local conditions of the three mentioned universities is used, with the processing of answers of selected students who were interviewed as an available sample. The students were also asked to describe their impressions of this situation from their social and personal points of view. The focus is on the positive and negative aspects, boundaries, and problems of online university teaching during the pandemic situation, as well as changes in the personal life of the students. The aim of this introductory small-scale study is to provide a basis for future research on the impact that the COVID-19 situation has had on the educational process at the above-mentioned universities, as well as to assist educational providers in foreseeing and eliminating the possible problems of lecturers when establishing an online educational environment. Some conclusions are drawn from the interviews that offer potential for further research in educational science, because many difficulties from the students' point of view are related to their social status, lack of social contact, technical problems with Internet connections, the carrying out of lectures and the exams of students. The students' answers are categorized, and each category is described.

Keywords: COVID-19 lockdown; education in the pandemic situation; online teaching; attitudes of students

1. Introduction–Different Types of Universities

The COVID-19 pandemic emerged and caused university closures in most countries (mainly, this happened in March and April 2020); see [1–3]. The universities' leadership and bodies, trying to conform to the restrictive measures acknowledged by national governments and ministries of education, with full responsibility for providing continuous education of their students, in a very short time (1–2 weeks) decided that the academic year would continue exclusively through online classes. For universities that had not previously introduced any online course, this was an alarming situation. The transition from face-to-face to online teaching in the pandemic situation is described in the studies [4–6].

One example is the School of Management (Vysoká škola manažmentu, or VSM) in Bratislava, Slovakia, which was founded by an act of the National Council of the Slovak Republic on 1 December 1999 as the first private school in Slovakia. It is accredited by the Ministry of Education of the Slovak Republic at the undergraduate, graduate and doctorate (PhD) levels for programs in business administration. On top of the Slovak accredited programs, the VSM with the City University of Seattle offers a Bachelor of Science in

Business Administration (BSBA) and Master of Business Administration (MBA) programs, and its diplomas are accredited in the USA by Northwest Commission on Colleges and Universities (NWCCU) (see [7]).

This university has a long tradition in online teaching. For this reason, it was better prepared for the pandemic situation. It had already created many educational online platforms, including online examinations.

University teachers at different state universities had many open questions during their self-preparation (see [8,9]): Do I have all the needed technology support? Should I teach in synchronous or asynchronous form? Will I have good cooperation with the collaborator in the course (another teacher, teaching assistant, technical assistant, or technician)? Will students have the appropriate home equipment for following a synchronous online lecture? Can I ask them to turn their camera/microphone on without disrupting their privacy? Will I have enough time for lecture preparation? How will I examine, and which learning management system is suitable for this process? GDPR questions: What can be recorded? What is allowed to be seen? For example, the question of examination and using technologies is analyzed in the studies [10,11].

2. Online Platforms Used during the Online Teaching

This section introduces "emergency remote teaching" (ERT), although all teachers and students were trained on MS Teams or Zoom at the beginning of the pandemic. However, this only ensured the "technical" mastery of education. There was no focus on planning online teaching in the early days of the pandemic, perhaps not until academic year 2020/2021, when we were forced into online learning. This is why we use the umbrella term "online teaching". Several studies on ERT during the pandemic period explain its role (see [12–14]).

In the spring of 2020, all schools in the Czech Republic were closed and had to switch to online teaching. Similarly, education moved to computer screens around the world. In the first few months of school, materials were sent out and worksheets created; during the last few months, until the end of the school year, distance learning was mostly used, and different resources for direct online learning were tested. Higher education had an advantage, as it has a wealth of experience in conducting distance and online learning. Therefore, it could respond to the situation more flexibly than other educational institutions. By the autumn of 2020, schools were mostly ready and had already started direct online teaching. One of the most popular platforms was the Zoom platform, and MS Teams was used in Kazakhstan. For example, the Al-Farabi Kazakh National University actively used these two platforms and the local Univer system. The leadership began to organize training courses for teachers and faculty to teach on new platforms, such as Zoom and MS Teams. They successfully began to use distance learning courses, which have become popular on the Internet. The use of Internet resources has grown much more than before the pandemic. For students who live far from urban areas, there were problems with the Internet, however. There were areas in Kazakhstan that were not ready for such a rapid transition to online learning and the large flow of users of Internet resources, though they later recovered very quickly and established a connection to the Internet.

Microsoft Teams is a business platform that enables text communication (e.g., chat and forum), video calls (one-on-one or group), and file storage and the integration of other applications into this environment. The service is integrated into an Office 365 subscription. The platform also allows the user to integrate other companies' products [15].

Google Classroom is a free service for schools, non-profit organizations, and anyone with a personal Google account. Classroom makes it easy for students and teachers to connect with each other, inside and outside of schools [16].

Zoom was created primarily for meetings, so it is not traditional webinar software. It is a software, or an application, primarily used for online meetings, i.e., for situations where we need to connect several people by video, audio, and chat. It is a frequent and

popular choice of large and small corporations, which in itself is a good reference. In the world of online education, it is a very popular and highly recommended platform [17].

3. Situation at Universities during the Pandemic—The Usage of Online Platforms Used during the Online Teaching

This section describes the situation at Comenius University in Bratislava, University of Ostrava, and Al-Farabi Kazakh National University. The situation at the Faculty of Education of the Comenius University in Bratislava (Slovakia) before the pandemic situation was that students were taught in face-to-face form. The learning management system (LMS) Moodle was used not so much before the pandemic time. Some active teachers already used platforms MS Teams and Moodle for security reasons. These platforms were more widespread during the pandemic period and many teachers learned to use them. (see [18,19]). Zoom was forbidden at all faculties of the Comenius University in Bratislava. The examinations were mostly in Moodle and MS Forms. Some teachers used other platforms, which were used in the previous time.

At the Faculty of Science of the University of Ostrava (Czech Republic), studies are usually performed in three forms: full-time (face-to-face), combined (part of the study is full-time and other larger part is distance) and distance. Thanks to these three forms of study, our students commonly used LMS Moodle as a tool for distance learning, but also as a supplement to face-to-face teaching. During the pandemic situation in the world, we had to replace face-to-face teaching with online teaching. It was a daunting task at first, and suddenly everyone had to use online tools. Some teachers used Microsoft Teams, some used Zoom, and some used Google Meet (Duo); we also used the BigBlueBottom add-on to the LMS Moodle as part of the University of the Third Age. After a few months, we all started to use Microsoft Teams in unison and, in exceptional situations, Zoom.

Before the quarantine, the students in Almaty (Kazakhstan) studied at the Al-Farabi Kazakh National University (KazNU) in the traditional format of education. All students came to the university building and studied in classrooms and laboratories. With the onset of the quarantine in 2020 around the world, it reached our republic. Day by day, more and more people were talking about the pandemic and its consequences. All institutions have switched to an online learning format and started using online platforms for distance learning.

During the pandemic, the training format completely changed the lives of students and teachers. In some disciplines, such as programming, machine learning, and everything related to computer science, with the transition to an online format, learning has become easier to demonstrate and explain to students. By using the online platform, the results can be shown in the program and shared with students, which makes it easier to study the material. For other disciplines that require the physical intervention of a person in laboratories and obtaining the result of an experiment, online learning is difficult.

When conducting taught disciplines, additional resources such as Kaggle, Kahoot, and Google forms, and for programming, Python, PyCharm, Jupyter notebook, and others can be used. These programs are used for creating more interactive and exciting environment for students. They actively participated in the classes, then studied the discipline faster and memorized a lot of information. The effort during each lesson was oriented to make it more interesting so that the students obtained good knowledge.

4. Methodology of the Research

The basic premise of our research was the perception of several changes and their impact on the quality of higher education during and shortly after the pandemic period. Particularly, we are referring to the reduction in social contact of both students and teachers; the closure of supporting institutions, especially libraries, and thus the reduced availability of professional printed resources; and the challenges of implementing online education at the beginning of the pandemic period. Both teachers and students had to master several technological aspects of this education. They had to learn and adapt to the online

environments used in education (MS Teams, LMS Moodle, Zoom, etc.). Another problem was the enormous increase of time spent in the online environment and work time with the computer. These problems and changes led us to find out how this period was perceived by university students and how students felt in hindsight about education during the pandemic.

According to Strauss and Corbin (see [20]), qualitative research involves asking participants (in our case university students) about their experiences with events that happen in their lives.

To reach a larger sample of participants in qualitative research, it is also possible to use a questionnaire with the option of open-ended questions/answers, where participants can write longer and more specific answers, if necessary (see [21]). Based on this literature, our team of authors also used a questionnaire to reach currently enrolled students in the summer semester 2022 at the respective universities in each country. All participant responses were included in the research and are archived with the individual authors of the paper.

As a research sample, 136 students of bachelor and master study programs participated in our international interview research. Of these, 17 students were in teacher training in mathematics from the Czech Republic (University of Ostrava, Faculty of Science), 34 students were in teacher training (pre-primary and special education)) from the Slovak Republic (Comenius University in Bratislava, Faculty of Education) and 85 students were in informatics from Kazakhstan (Institute of Mathematics and Mathematical Modeling; Al-Farabi Kazakh National University).

As part of the research, students obtained the interview composed of seven questions concerning their subjective perceptions of higher education during the COVID-19 pandemic:

1. What problems did you encounter in the transition from full-time to online learning at the beginning of a pandemic?
2. Would you be able to describe your mutual communication with the university during the pandemic period (with the teacher, tutor, head of the department, etc.)?
3. How has the period of the pandemic changed you as a student/person (or your personal life)?
4. How do you think higher education changed during the pandemic period? In the use of digital technology, was the progress of the university noticeable?
5. Would you be able to compare the time required for your self-study during full-time teaching and during online teaching in a pandemic period?
6. In your opinion, what are/were the benefits of higher education in the pandemic period?
7. What are/were the negatives/problems and/or limitations in higher education during the pandemic period?

Students were allowed to write answers at their discretion; there was no limit to the length of their responses.

The technique of coding the participants' accounts of qualitative educational research was used to process the students' responses. Specifically, this was an in vivo coding method. Kostrub in [22] states that in vivo text coding involves finding units of meaning in the text (which can be a word, a phrase, a sentence, or a whole paragraph) that are related to the issue under study. The researcher then selects and names or labels each of the resulting units using the chosen coding method.

Thus, the identified units of meaning, i.e., codes, were further linked by the authors, put into contexts, and meaning categories were formed. The starting point for the creation of categories was the integration of individual codes not only based on their frequency of occurrence, but also based on their semantics, internal similarity, or interrelationship. The categories were then subjected to retrospective analysis and subsequent synthesis by the authors to arrive at the results for the evaluation of the research. According to [21–23], context coding is characterized by the operations through which data are analyzed and conceptualized, and then composed again in a new way, which is considered the primary way of creating a new theory or result.

All written responses collected from participants were primarily summarized and analyzed in detail. According to the coding described above, eight categories were created, and authentic examples of student statements were retrospectively included in the evaluation.

The categories are illustrated with concrete participants' (students') responses, which identify the country. Participants with the label SKP are from Slovak Republic (Comenius University in Bratislava), with CZP are from Czech Republic (University of Ostrava) and with KZP are from Republic of Kazakhstan (Al-Farabi Kazakh National University).

5. Interview Research with Students

This chapter is devoted to a comparison of the research results of online university education of the above defined research sample of students in the Czech Republic, Slovakia, and Kazakhstan. It uses the answers of selected students of special education teacher training at Comenius University in Bratislava, teacher training of mathematics or informatics at the University of Ostrava, and informatics study program at Al-Farabi Kazakh National University. There were arrived at through a sequential and multi-layered analysis of the participants' interview responses to the following eight categories:

Category 1: Problems during the transition from face-to-face to online teaching and learning

Comenius University in Bratislava, Slovak Republic: According to the students' statements, the biggest problems were technical in nature, and participants had concerns about technical issues (SKP16: *"At the beginning I was worried whether I would be able to join the meeting. But everything went fine"*). Both students and teachers had not only problems in the beginning, but also problems with using the relevant communication interface (MS Teams, Zoom, Moodle, etc.), creating invitations and in later sending links for connection to students. There were also problems in the field of sufficient/insufficient internet connection (SKP8: *"The problem was mainly with connecting to lectures, signal failure, I could not hear the lecturers well"*). Students were also forced to buy a new, more powerful laptop and internet connection. In addition to technical problems, they experienced personal health problems and subsequent problems in preparing for classes and completing assignments for individual subjects (SKP11: *"At the beginning it was mainly technical and organizational problems, when I was trying to get used to everything. Later, there were problems, especially in maintaining attention, and later I also noticed headaches. I got tired very quickly, I didn't have the energy after lectures to work on assignments and term seminar works, which I had to do on the PC. So, I was putting everything off and doing it at the last minute just to avoid sitting at the PC, my back and neck were also hurting."* SKP29: *"I was experiencing more frequent headaches. As there were some days when I spent 10–12 h behind the laptop"*). Students were also critical of the occasional uninterestingness in online lectures compared to face-to-face classes, but immediately added that this could be due to, among other things, the lower activity level of students, as well as the fact that classmates did not know each other personally. The cancellation of practice was also a negative according to the students (SKP21: *"At the beginning of the pandemic they cancelled our practice, which was moved to the next semester. Subsequently, however, due to the persistence of the pandemic, the practice was conducted online-through interviews"*). Writing tests in an online environment, e.g., via the MS Forms platform, was also a new phenomenon for the students (SKP34: *"Writing tests online was something new for me, so I had to get used to it. Also, the Teams application was new for me, but I didn't have problems with anything, I guess, everything was easy to get used to"*).

Students also saw some problems in the level of teaching. Because they went into quarantine mode too quickly, universities were not prepared for this kind of teaching, and there was limited access to books and other print resources. For students studying at foreign universities under the Erasmus+ program, it was a difficult decision as to whether to stay abroad, where also in the early days teaching had moved online, or to return home quickly.

University of Ostrava, Czech Republic: The most difficult thing for the students was to find their way around the new situation and to start working more or less independently (CZP01: *"It was lucky that the subjects I was enrolled in at that time could be managed online in*

some way. The situation would have been much worse, in my opinion, if this change of teaching had occurred when I was in my first year-because at that time I needed to adapt to the new place, the material, the teachers, and it was not the easiest thing to do. For that reason, I couldn't imagine it. In maths, it is important to understand the material, which was sometimes challenging in the case of online learning, and more self-study time was needed than usual"). They also cited inconsistency in the materials sent as a primary problem, as some of the teachers sent materials via email, some uploaded via MS Teams or used prepared courses in LMS Moodle. Another problem was self-discrepancy, as the student was not under the supervision of the tutor, so during the lectures, there were more temptations for distraction (CZP04: *"In case the lectures were delivered online, it was very easy to engage in other activities at the same time that are not related to the study at all (reading, chatting, etc.)"*, CZP13: *"Also the home environment (and especially all those available series and games on the second monitor of the PC) was much more distracting").*

In addition to the stated benefits from online learning, it was also a shock to the students (CZP04: *"Especially because independent work and continuous study are not my strong points. Often the teachers did not implement the lessons and only sent materials, which were eventually supplemented by the offer of consultation").* From a technical perspective, students described occasional problems with connectivity.

Overall, they saw a problem in terms of organization (change of metering term) and in terms of implemented teaching, where the dynamics of the direct online teaching did not correspond to the real teaching in the lecture hall or laboratory, as the lecturer did not have follow-up questions and did not see the students' reactions. Often, there was a lack of feedback to check that students had understood everything correctly. Despite the efforts of some lecturers to activate the students by, for example, asking 'good' questions, there was a lack of response from the students. Lessons were delivered at different times, so they changed the weekly schedule completely, or selected teachers switched to complete distance learning with the possibility of consultations.

Although there were major problems at the beginning of the pandemic, these were managed and eliminated as the semesters progressed.

Al-Farabi Kazakh National University, Republic of Kazakhstan: In taking the interview, students shared challenges in making the transition from offline to online learning. It is known that many businesses, including higher education institutions, were not ready for the urgent transition, as noted in the answers of students (KZP9: *"Nothing was ready for online learning, and it takes some time to transit to it").* This shows that students understand the problems. Mostly there were problems with the connection to the Internet and problems with the light, which is explained by the high load due to the large flow of users. In the answers, many students wrote about this (KZP18: *"Weak internet, problems with communication and light. The first classes on the online platform all turned on the cameras, then the system hung heavily, and sometimes displayed an error and shut down. If several students turn on the screen demonstration at the same time, the button would disappear, but then it would appear. During the lesson, when the whole stream comes in, then the entrance is limited and after a few attempts could connect to the lecture".* KZP12: *"There were times when I did not have access to the Internet during online classes").* This type of problem occurred not only among students but also among teachers, which can be seen from the response of students (KZP2: *"In the beginning of online education, I had problems with lagging Zoom/Teams. Sometimes my internet is disconnected. But teachers sometimes had the same troubles").* Also noted were problems with the network and connection to the Internet in remote regions and villages, which contributed to the urgent coverage of the Internet for education. In addition to this problem, students from far regions and foreigners were invited to stay in dormitories with isolated rooms (KZP18: *"There were no problems. I lived in the dormitory of KazNU during the pandemic and connected on time").* Problems were noted with the conduct of laboratory classes, which were carried out with devices in the university's offices before the pandemic (KZP20: *"There were difficulties with the lessons, which included laboratory classes. Because the labs have Raspberry Pi microcontrollers, Arduino IDE, and a lot of sensors with which you can create a smart home device").* There were problems with the lesson schedule, due to which students had to wait

for the next lesson (KZP23: *"There were problems with the class schedule. Because one lesson could be in the morning, and the other in the afternoon. If we were offline, then usually all the lessons are put after each other, sometimes there is an hour break, but not like online"*).

Category 2: Level of digital literacy among students before the pandemic and in present time

Comenius University in Bratislava, Slovak Republic: In general, students expressed that their digital competences were at a fairly good level, even before the pandemic (SKP2: *"I knew everything."* SKP4: *"I work with different devices and applications all the time, even in my working life. So, this transition and software literacy was not something new for me"*).

For some students, the level increased (SKP16: *"My digital literacy level is higher after the pandemic. I have learnt how to work better with PCs and use relevant software, which I consider as a benefit."* SKP20: *"We mostly use MS Teams, Moodle . . . before the pandemic I never came across them. I had no problem learning how to use them, it was just reading comprehension."* SKP21: *"Before the pandemic my digital literacy was at a lower level, my first introduction to software like MS Teams, MS Forms was during the pandemic."* SKP26: *"I had no problem operating PC, NTB even before the pandemic. The biggest problem for me was to learn how to work in MS Teams, where all our lessons were held. I think we all worked well with the software, the biggest problem for some of us was learning to have the microphone turned off, which also created a lot of funny stories. Personally, the worst part for me was making sure I had a good connection, as we were all working from home, and it was often a situation for me to get disconnected from calls. It was also challenging to type quickly on the keyboard during the very time-constrained examinations"*).

For some students, digital competence/digital literacy remained at the same level (SKP3: *"It's at the same level, it's just that digital literacy has been added to the programs that I didn't know about before. But nothing major that would affect life. But it has brought positives in using these programs and in understanding that they can be used in other activities"*).

University of Ostrava, Czech Republic: For students studying technically oriented programs, digital literacy was at the same level before and during the pandemic. For other disciplines, there was a slight improvement, especially in the use of digital technologies (CZP11), Microsoft Teams online tools (CZP13). The biggest gains were in students' use of the cloud to support learning and use of Discord for more complex assignments and exercises (CZP14).

Al-Farabi Kazakh National University, Republic of Kazakhstan: Many of the students who answered the interview stated that they were experienced digital users and had a good command of the basic necessary skills, such as fast typing, video calls and file uploads (KZP23: *"I managed to login to Zoom and MS Teams without problems. Uploaded files to the Univer system. Attending online classes was convenient to combine with work. It was necessary to hand over the specified deadlines, which is very convenient to look at in the system"*), (KZP18: *"It was no problem. I knew all programs before pandemic"*). Some talked about the efforts of teachers to make the lesson interesting and informative (KZP25: *"During the pandemic, many teachers used additional resources like Kahoot, Kaggle,* etc. *to be interesting to the student. I learned a lot of programs and applications for work"*). Since our faculty teaches information technology, students from the first year learn new technologies and master programming languages, which they noted in the answers (KZP63: *"Digital literacy has not improved much since the pandemic, because before the pandemic, the lessons were related to programming and using PCs"*). However, there are students who entered the university during the pandemic and mastered technology during their studies (KZP24: *"Before the pandemic, I studied at school and I didn't use online platforms like Zoom and MS Teams. Now I own it well and use it to discuss the task of lessons among students"*). As a result, we can safely say that almost all students have mastered digital technologies, and senior students have improved their skills.

Category 3: Changing the student as a person and his/her personal life during a pandemic

Comenius University in Bratislava, Slovak Republic: Many situations arise in a person's life that affect them more or less in several areas of functioning and existence. Many changes will directly or indirectly cause the person and their behavior and actions

to change. The pandemic, especially its long two-year duration, has affected not only the education of students, but also the students themselves. While the students' responses are similar in many aspects, many of the responses are ambivalent.

If we understand the pandemic as a negative determinant, then it is possible to say, for example, regarding psychological burden, the following: limiting social contacts with friends, limiting socializing with family, changes in the logistics of studying, working and raising children, being cut off from society, losing comfort in the company of people, the stress of the transition to online learning, people's negative attitude to life, people's hostility, and people's unwillingness to help. It relates to other components, such as helplessness, closed-mindedness, sadness, indifference, demotivation, and fear. Students also commented that returning home from dormitory was difficult (SKP23: *"Coming home was difficult, I interrupted my part-time job, I had to get used to spending longer periods of time at home in the children's room again. Unfortunately, since we were at home my physical health deteriorated, I gained weight, I got lazy."*). Another participant concluded the whole thing in a very straightforward way (SKP27: *"I lacked socialization. Unfortunately, we lost an important part of our student life"*).

The paradox is that the pandemic has also brought a lot of positive things to the students' lives. They were able to spend more time with their loved ones, themselves, their interests and hobbies, and their health (SKP27: *"On the contrary, over time I learned to be more with myself, more with my family, and to value my health"*). Many students reported improved family relationships, stabilization of daily routines, more time for learning and for extracurricular activities, and awareness of the importance of social connections. The testimony of SKP10 shows a lot in this way: *"At the same time, the big positive of this whole thing for me was that one came to know what is most important in our lives, and that is one's health and the health of loved ones. Further, appreciating the little things. Just being in close contact with loved ones, seeing their smile on their face, hearing their voice . . . but also to do various activities that fulfil us-sports, a walk-in nature, a trip . . . "*. In addition to the above-mentioned positives of the pandemic, it was noted a satisfaction among participants with having more time for their own interests and activities (SKP14: *" . . . I have time for other things, and especially I don't have to travel to Bratislava"*). One participant (SKP18) even started to do more housework, another (SKP3) perceived that the biggest benefit of the pandemic was that she managed to lose weight thanks to her regular eating regime, and one even found a partner thanks to the pandemic and the move online (SKP25). Improving one's own time management (SKP32), realizing that it is not bad at home (SKP31), realizing how fragile our health is and how important time spent with loved ones is (SKP34) also resonated in the responses.

University of Ostrava, Czech Republic: Since no one was prepared for this situation and did not have enough information, the students reacted in different ways. Students who are more antisocial in everyday life had the opportunity to huddle in their homes, which also impaired their subsequent networking and interaction skills in real life (CZP02" *I worked more for school, felt better in class when I was in my environment and "hid" behind the computer. "* Based on the negative impact of the pandemic on their personal lives, they lost the ability to function among people (CZP11) and became introverted and lazy. CZP06:" *The willingness to leave the comfort of their own home has decreased rapidly. Demands for freer and more flexible schedules have increased").* All students mainly describe problems with psychological stress, impossibility of personal social contact, and impossibility of realizing favorite sport activities. On the other hand, the students tried to improve the quality of their life by all possible means (deepening social contact within the family, eating healthy and regularly, and personal development) and to give it a daily routine, or to start being active in the home environment. The students also appreciated the absence of long commutes to the university, which was reflected in the overall time savings (CZP07: *" . . . as one did not have to commute to Ostrava, catching transfers from faculty to faculty and individual exercises or lectures"* and CZP08: *"less time on the road = more time for personal development").*

Overall, students in the later phase of online learning lost motivation, were unfocused and less productive. The pandemic helped students improve not only time management

skills, but also in their awareness of priorities in life (CZP16: *"Related to this, the pandemic period made me think more about my health, for example"*).

Al-Farabi Kazakh National University, Republic of Kazakhstan: The pandemic has become an impetus for the development of innovative technologies around the world. Humanity has long had the resources to actively introduce technology into the process of work and learning. In my opinion, for all the harm that COVID-19 has brought, one of the positive consequences is the active spread of remote work and distance learning. Many see this as a threat, saying that telecommuting will never replace face-to-face interaction. Man is a social being; without society, he cannot develop and be himself. Correspondence in social networks does not allow replacing live meetings and conversations. It seems to me that the pandemic has allowed people to look differently at everyday things. Indeed, there are professions in which you can neither work nor study remotely. Many have learned to better manage their time; it was required to independently organize their work and rest regimen (KZP27: *"Learned how to use my time effectively. I am glad that I spent more time with family and friends"*). I can even say that I am happy to note that during the pandemic, many people realized that most of the bureaucracy does not make sense; there is no point in printing educational materials, accepting any documents in printed form (KZP41: *"Learn to take time for yourself to exercise. When we studied offline, we spent more time on the road and got very tired in the evening. Become more responsible and mindset has changed"*, KZP29: *"As long as it's not a back problem, then everything is fine. Even had a positive impact on personal development"*, KZP37: *"The pandemic has changed me a lot. I began to respect my family, friends from Shymkent. It was a very comfortable time"*).

Category 4: The change of university education during the pandemic period

Comenius University in Bratislava, Slovak Republic: One of the significant changes brought by the pandemic was the shift of education from the real university environment to the online space. Many universities, educators and students were not prepared for this situation. It took a considerable amount of time for all involved to first set up an effective online space and select the platforms through which education could take place. Subsequently, both students and teachers needed to be trained. Many of the subjects that are part of the training content are practical in nature, and it was these subjects that were problematic to bring 'on the screen'. Teachers were forced to change not only their conception of their teaching, but also their conception of their preparation for teaching, as well as their conception of their own thinking. For the students, apart from the change, it mainly brought a new experience (e.g., SKP4: *"It has moved forward, we have started to use technologies that we had not used before"*). A very nice response was recorded from participant SKP17, who summarized it as follows: *"I think online learning has raised important questions about the suitability of the form of learning for a selected group of students. I was already considering at the time whether part of the study could be moved completely online, but on the other hand this would have to be balanced by e.g., face-to-face events that would emphasize networking, discussions, and the social aspect of getting together rather than static lectures. Lecturers would be incentivized to ensure that their presentations include these elements. On the other hand, I see quite a lot of passivity on the side of the students, which was probably there before, but the online form probably encouraged it a bit more"*.

University of Ostrava, Czech Republic: The most significant change was the complete shift of teaching to an online environment. For disciplines that have a distance learning format, the move was seamless. However, for other majors, it was very challenging, as they had to change their teaching style and methods. Most of the teachers tried to deliver the material to the students effectively, creating and sharing many new course materials (CZP06:" *Video conferencing, chat rooms and individual video calls* via *webcam have become widely used. The use of the Internet also started to increase, as it was not in the power of the teachers to translate everything they had prepared for face-to-face teaching into digital form-the mutual inspiration of the teachers became tangible at every step. "* and CZP01: *"* . . . *some subjects could be mastered "more easily" thanks to online teaching than if they had been taught face-to-face, as some requirements were modified"*). Students were mostly positive about the teachers during

the epidemic, understanding that the transition was very challenging for them (CZP02: *"Teachers were more helpful, understanding, communicative"*). Additional online tools and learning environments were used that are not normally used in face-to-face teaching, which student teachers valued as being beneficial for their future practice.

Al-Farabi Kazakh National University, Republic of Kazakhstan: In general, speaking about the changes that have taken place at the university, we note the mobility of all structural divisions, the increase in digital and computer literacy of teachers, staff and students, the decrease in the number of meetings, and the increased workload on teachers and students. Distance education has also significantly expanded the opportunities for teaching staff, staff and students to take additional distance learning courses and improve their skills in various areas (KZP31: *"Many teachers have started using LMS Moodle. On this platform, all video lectures and practical tasks are written, we had to study and complete tasks before the deadline. The use of such systems has improved the understanding of the subject, because if it is not clear from the first viewing, then you can review the video lecture several times, which makes life easier"*).

Teachers recommended additional online courses, such as Cisco and Stepik to expand students' knowledge (KZP39) (KZP35. *"Welp. On the one hand I have to admit that computer and internet technology grew up because of the pandemic. But some teachers did not adapt and gave us a lot of homework. But some of them adapted and it was the coolest time of education"*). Most students think there has been progress in higher education, especially in IT. As for digital technologies, I think it is still underdeveloped. However, the remote format itself is very convenient, even when you are free. That is, there is a maximum of a week to reflect on the task. The format itself would not say that it was beneficial, because basically only courses were held (KZP35). Many respondents noted that education at the university has improved for the better (KZP46: *"Yes, our university quickly accepted the epidemiological situation and immediately switched to distance learning"*, KZP37: *"Yes, there has been progress in the use of modern technology. learning has become convenient"*). It has improved for the better. At a minimum, we have adopted many Internet programs that are likely to help us make life easier while working.

Category 5: Time consumption of self-study

Comenius University in Bratislava, Slovak Republic: Self-study forms an integral part of university education. It is a part of study that involves not only the students' duty, but also their motivation, activity, and desire for knowledge and learning. Students approach it differently, influenced by several factors, such as sufficient/lack of time, work commitments, other study obligations, personal qualities, family background, study conditions, etc. The research focus was oriented to the fact that how the time commitment of students' self-study changed in online learning compared to traditional face-to-face learning. Several students expressed that the time demands for their self-study remained about the same (SKP4: *"As far as studying is concerned, I do not observe any changes. The online lectures were as full as if they were delivered in a face-to-face format. Even the study materials from the lecturers were more accessible and immediately available by uploading to MS Teams."* SKP9: *"Same. Some documents were even more accessible during the online study"*). Because students did not have to travel to school, which is a non-negligible amount of time, they had more time to complete assignments (SKP7; SKP31: *"I had much more time to learn. I didn't have to travel too often to school, which took up a lot of my time. I had more time to create deliverables for my subject during the distance learning."*). However, ambivalent responses also emerged in this category. For some students, self-study during online learning was much easier and less time consuming (SKP18: *"Time-consuming is much more difficult in face-to-face teaching and learning"*. SKP21: *"During face-to-face teaching, the time commitment for self-study was at least in my case several times higher."*), while for others, it was exactly the opposite, and they felt that self-study during online learning was difficult for them (SKP8: *"I definitely had to study more during the pandemic, especially it was a problem to get the necessary study material."* SKP19: *"It was very difficult, I spent more than 15 h on the computer, my eyesight got worse."* SKP25: *"The time-consuming self-study during online learning increased many times. It was a big*

problem to find freely available literature as libraries were also closed. It was much more acceptable for me to self-study during a face-to-face class").

University of Ostrava, Czech Republic: Self-study before the pandemic was perceived as part of exam preparation, with students completing various assignments in between classes (CZP02: *"Before the pandemic-studying only for exams/tests. During the pandemi -preparing for lessons, counting examples, preparation. "*). During the pandemic, the situation reversed, and students had to intensify self-study, look up information on the subject matter, re-watch videos of the class, and complete a large number of projects, exercises, and term assignments that were not part of the direct instruction before the pandemic (CZP01: *"During the pandemic we had to work on various homework assignments, projects, and independent work. I think the preparation and self-study during the semester took a lot more time than before the pandemic."*). Some students also expressed the view of a distorted perception of the time demands of activities from the perspective of the instructor. It is true that attention and focus decreased during the direct online instruction, which was one reason for the subsequent higher engagement in the self-study.

Interestingly, there was a group of students who did not experience any increased or decreased self-study demands (CZP08:" *I did not notice any significant changes."*). On the other hand, some students could not objectively assess the time demands of self-study due to other subjects before and during the pandemic (CZP17).

Al-Farabi Kazakh National University, Republic of Kazakhstan: Most respondents noted an increase in workload. In general, this is not surprising, since the transition to a remote format required from all participants in this process the ability to quickly adapt, explore new ways and approaches in teaching and learning, work on time management and increased responsibility for their results. On the other hand, students indicated that load remained unchanged. Students, in turn, noted the development of independence and responsibility for the results of their learning, increased free time and access to the online library. Students also noted physical discomfort from being in front of a computer for a long time, and the lack of live contact with teachers, the difficulty of participating in general discussions and involving all students in the educational process as a disadvantage.

Some students emphasized the difficulties in self-expression during distance learning, the lack of creative activity. More time was left for self-study than being wasted on the road. With the development of digitalization, the necessary books and materials can be found on the Internet or in the electronic library of the university (KZP48: *"More time is left for self-study. Started developing my skills and hobbies"*). There is a lot of free time in online learning (KZP51: *"You can also develop yourself, go in for sports,* etc. *And in an offline format, you don't even have time to sleep. Transport, road, traffic jams take longer. In online learning there is more time for self-study, and full-time learning takes a lot of time"*). According to the interview, students understand that all things depend on themselves (KZP53: *"In the online format, there is no need to do everything at a certain time, you can think at least day and night. And in person it's the other way around. I can do it whenever I want, if I will do it with pleasure it will be better"*). Most of the students indicate the big difference is the waste time and money on travel and food instead of self-learning.

Category 6: Communication of students with their university during the pandemic period

Comenius University in Bratislava, Slovak Republic: Before the pandemic situation at Comenius University in Bratislava, the LMS Moodle was used, and MS Teams within a small range of users. This situation changed during pandemic situation because many teachers were forced to use these environments, even though they did not use them before. Although there were rare online meetings via chat, Skype, WhatsApp, etc., direct contact with students was preferred. Social communication is an interactive process between two or more people. Although communication can take many forms, talking face to face with another person has other associated benefits, such as the ability to perceive facial expressions, gesticulation, the context of the communication, emotions, etc. These are all at the same time concomitant features of face-to-face teaching, where there exists interaction between the lecturer and the students. The shift of students' university education training

to the online environment has broken the immediate social and communication links between lecturer and student, and communication has been conducted exclusively at a distance through electronic devices and media, mainly by email, MS Teams, Zoom, Skype, SMS, or phone calls. As participants indicated in their accounts, communication with the school, and especially with educators, was almost seamless (SKP28: *"Communication* via *the internet was seamless during the pandemic, it was done* via *email. The speed of feedback to teachers varied."* SKP29: *"Unless there were any unforeseen technical problems, communication* via *email was functional."* SKP34: *"If it happened that I needed to communicate with a lecturer/teacher, the response came quickly within two days at most"*).

University of Ostrava, Czech Republic: At the University of Ostrava, the LMS Moodle, Google Classroom and MS Teams were used before the pandemic situation. Communication with the lecturer was almost seamless (CZP01), the most used tools for communication were MS Teams, LMS Moodle, e-mail (effective and fast communication CZP06), and in exceptional cases via Google tools (CZP07). A major positive was that teachers responded quickly (CZP07) and even in the evening (CZP01) after discussion with the teacher (CZP12). CZP16 stated the following: *"Communication even improved in some ways during the pandemic (at least school-student communication). Thanks to the fact that everyone started using MS Teams, which was only marginally used before the pandemic, it has been possible to communicate faster with teachers since the pandemic . . . "*

Al-Farabi Kazakh National University, Republic of Kazakhstan: Online learning systems, such as UNIVER, LMS Moodle, and MOOCs, were used by Al-Farabi Kazakh National University before the pandemic situation. Rapid adaptation to distance education of students directly depends on the ability and readiness of the university to provide the necessary support. The greatest support was provided in the organization of training courses. Most students also noted the satisfaction, which is also very important for obtaining up-to-date information and feedback on the innovations introduced and the measures taken. The university provides online consulting and support hotlines. Despite the difficulties that the pandemic has presented in the field of education, it is important to emphasize the possibilities of distance learning.

The students in this interview noted that they had more opportunities to keep in touch with their teachers, review lectures and regularly monitor progress in their personal account. They noted that they began to communicate with teachers on social networks. Curators created group chats not only for students, but also for parents (KZP43: *"Communication with teachers was good. If there were questions, we could write or call for example and get answers"*, KZP21: *"During the pandemic, the curator has been our guide. She was constantly in touch, and we wrote all the questions in the chat in the group and even called the number. It was able to communicate with everyone by WhatsApp. But some days I had to track by WhatsApp 24/7"*). Students note that they were satisfied with the work of teachers, and communication with the university, not to mention technical problems (KZP77: *"During the pandemic, there were no problems in this regard. They helped us in online learning as well as offline. Everything was accessible and understandable"*).

Category 7: The negatives of online university education during the pandemic period

Comenius University in Bratislava, Slovak Republic: Participants' responses show that some students did not register any negatives. However, there were also some who noticed several and students were affected by them. It is possible from these kinds of responses to note the following: lessons were less interactive and the material was harder to remember (SKP1); closed libraries (SKP2); lack of social contacts and little or no practice (SKP3; SKP9; SKP10); problems with internet access and getting the necessary study materials (SKP8); constant activity on the computer, impaired eyesight, increased number of assignments (SKP19); minimizing exercise, deteriorating physical and mental health, difficulty concentrating on lectures in the home environment, loss of contact with classmates (SKP23); poorer quality of teaching, higher demands from teachers, lack of information, social isolation (SKP24); inability to teach online in all homes due to lack of necessary technology, frequent problems with internet connection dropouts, distorted feedback during

class, low level of computer skills on both sides (teachers and students), isolation from society, and loss of socially acceptable behaviors and habits such as dining and greeting.

A very long answer was given by participant SKP11: *"I find as negative the lack of practice, practical learning, we had to learn everything only in a theoretical way, which did not help me to decide what I would like to do in the future. The limitation of contacts, I didn't have the opportunity to get to know my classmates better. It became progressively harder to concentrate during the online lectures, we deprived ourselves of a lot of knowledge in this way. I also find it negative the fact that we had to do a lot of work in groups, and it was extremely difficult to agree on the division of work and the meeting itself. Overall, this online class was challenging and the longer it went on, the less quality of learning I got. I don't just blame the school. Obviously, the way I approached everything was influenced by things other than education".*

University of Ostrava, Czech Republic: All respondents agreed on one thing, namely that there was a limitation of direct contact with teachers and classmates during the pandemic. There was an emphasis on self-study in teaching (CZP01) as some teachers resigned from teaching (CZP05). Before the pandemic, the most used tool at our faculty was LMS Moodle, which according to CZP15 students, gave way to MS Teams during the pandemic and now respondents must watch all communication tools: emails, MS Teams and LMS Moodle. They ask for the tools to be reduced or to be unified within courses. In addition to face-to-face teaching, they negatively evaluate the inability to use the department's special equipment for faculty during a pandemic (CZP12).

Al-Farabi Kazakh National University, Republic of Kazakhstan: Students often point out the lack of personal communication and social interaction as a disadvantage of distance education, which is one of the most important competencies in the field of human–human sciences. Educational functions do not work and emotionality disappears, which negatively affects communicative competencies. It was also noted that opportunities for practice-oriented learning and experimental work for science departments have decreased. Technical issues are noted as a separate item: some students are not satisfied with the quality of the Internet and proctoring, and increased time spent at the computer.

In addition, among the answers, psychological discomfort is emphasized from the fact that the audience may not hear the answers to the teacher's questions.

Students also noted physical discomfort from being in front of a computer for a long time and the lack of live contact with teachers, the difficulty of participating in general discussions and involving all students in the educational process as a disadvantage. Some students emphasized the difficulties in self-expression during distance learning, the lack of creative activity. It is important to note that many students expressed their personal statement, that they feel the lack of social life as the main disadvantage of switching to distance learning (KZP46: *"Basically, deterioration in health is also due to the constant sedentary mode near the computer. I was losing sight, increasing stress and constantly checking mail and phone"*, KZP83: *"During the quarantine, I entered the first year. I did not know my classmates and even the audience of the university. It was difficult to find the numbers of fellow students and to connect and learn. Could not meet friends and spend time in nature. Fear of getting sick with this virus"*). There was no direct opportunity to discuss the topic of the lesson extensively with teachers, and often the network did not catch well. Big negatives for students were a lot of homework. Sometimes, they had 3–4 times more homework than usual. Large problems included internet connection and lag from Zoom/Teams.

Some of them had problems with limitations and deadlines: time to download homework (KZP56: *"If teacher gave you homework on Saturday 15:00. You had to download it at 22:59. But at the end of the week you have emotional damage and I have no motivation to do something"*. KZP49: *"To be honest, as a student of the technical direction, there were a lot of laboratory subjects. Because of the pandemic, everything had to be done only through programs. As a result, we don't even understand now how everything should be done in practice. Some subjects required extra components for laboratory tasks that can't be found at home. It was difficult when the lights were turned off during milestones and sessions, when the Internet was not working with us and with some teachers"*).

Category 8: The positives of online university education during the pandemic period

Comenius University in Bratislava, Slovak Republic: Although it may seem that the COVID-19 pandemic has taken a lot away from us and brought negative things into our lives, some positive statements by participants' responses were noted as well. Students are aware of several positive aspects. These include in particular the benefits in increasing students' digital literacy (SKP2; SKP6); the increased digitization and computerization of education (SKP1); the reduced need for external students to take holidays (SKP5); and the savings in time and money associated with travel and accommodation (SKP8; SKP28, SKP32); improvement in technical matters when working with digital technologies and different programs (SKP10); and the convenience of being able to stay at home and at the same time perceive different innovative approaches using online technologies (SKP17). Participant SKP34 perceived positives in that she experienced less stress during the pandemic, had more time to prepare more thoroughly, and the evaluation of online tests was done almost immediately after travel. A more comprehensive view of the positives and benefits of pandemic education was provided by participant SKP3: *"Learning that even in an online environment you can do it if you want to . . . I think it's a good form of education for external students, so they don't have to travel for weekends to the city where the university is located. And if the student cares about it, they can prepare for the classes just as well. It has 'forced' many students to set their own priorities, which is also a positive".*

University of Ostrava, Czech Republic: All respondents ranked the biggest positive of online teaching as: no commute = more time. Furthermore, the possibility to replay the recorded lesson was the most convenient for them, but also more processed and available study materials.

With the huge shift in the integration of digital technologies into teaching (CZP05; CZP06; CZP11, CZP12), this means that many kinds of teaching and learning activities were realized through these technologies (lectures, seminars, examinations, etc.)

Al-Farabi Kazakh National University, Republic of Kazakhstan: Among students, the development of the ability to think and the increase in their independence were highlighted as the advantages of the transition to distance education. In terms of personal and professional development, they noted the training in digital skills and digital literacy, and the opportunity to engage in creativity and self-development by increasing free time. Speaking about the quality and content of education, students note that the quality of the material has become higher, and the use of modern software and hardware makes e-learning more effective. New technologies make it possible to make visual information bright and dynamic to build the education process itself, taking into account the active interaction of the student with the learning system. Students noted the development of independence and responsibility for the results of their learning, increased free time and access to the online library.

Many respondents noted as a positive point the absence of the need to waste time on the road to the university (KZP38: "I am glad that more time was spent with family and friends. I began to value our time and spend it on important goals and plans. Our literacy in the use of new applications and Internet resources has increased. I do not waste time and money on the road. We got more tired while getting to the university with morning traffic jams and back with evening traffic jams and a lot of people on buses and the subway", KZP40: "During quarantine, the city has become much cleaner, and nature has blossomed. Since everyone is at home, there are few cars and public transport in the streets, which has a good effect on nature"). The pandemic period changed the reference representation of education. A lot of students and teachers had to admit that online education can be more effective or the same as that offline. In my opinion, it is great because you can use this knowledge while sitting at home. Digitalization has improved, and there is an opportunity to study and work at the same time, gaining experience. For most students, online learning is very convenient and understandable. If you miss classes for some reason, you can review the video lesson. Additionally, there is no need to go anywhere and dress up, which saves time.

6. Discussion and Conclusions

The results of the research are limited, which is caused by the accessible sample of students who were enrolled at the required study programmers in the summer semester of 2022. The sample of students was from Comenius University in Bratislava, University of Ostrava, and Al-Farabi Kazakh National University. The findings presented are not intended to be generalized but to provide an initial perspective of students' perceptions of the pitfalls or benefits of the educational process during the pandemic period at mentioned universities.

The COVID-19 pandemic has affected all countries in the world, but also all sectors, such as the economy, medicine, the social sphere and last, but not least, education. Although selected schools, in particular, universities, were already partly using online learning or asynchronous learning through various applications before the pandemic, the big majority of schools found themselves in a completely new situation that should be solved quickly. In this research, the local conditions at three selected universities in Slovakia, Czech Republic, and Kazakhstan were examined. These kinds of studies were realized in many countries, for example [24–27]. Many of the schools reacted quite flexibly, but some of them needed more time to transfer the learning to the online environment. Specifically in the universities, the transition to online learning required training not only of all students, administrative and support staff in the school, but also of the teachers themselves. Their digital literacy was at varying levels by the start of the pandemic, and if the positives of the pandemic period are assessed, in addition to the negatives, it can be clearly included the increase in digital literacy of university teachers and educators (and in a similar way, the literacy of primary and secondary school teachers and educators).

Despite the enormous efforts of all involved, several problems emerged in the early days of online education, such as inadequate hardware equipment or outdated technology not supporting online platforms (PCs without cameras, audio equipment), insufficient or slow internet connectivity, inadequate load on the internet connection (parents' home office and students' simultaneous education), inability to access the study literature, etc. Other problems were characterized by low student activity, lack of interest in computer-assisted lectures, very low levels of communication and discussion, absence of hands-on learning, etc. These results are in accordance with the study [28,29], which define as one of the problems of pandemic education lack of technology.

In addition to the objective causes from the research results, there were also perceived subjective barriers present on the part of the person themselves, such as undue strain on students' attention, distracting home environment, limited educational space, increased workload for both students and teachers, lack of exercise, psychological burden, psychological stress, limitation of social contacts, deterioration of health, headaches, joint pains, or overcoming COVID-19. Similar problems of students during the pandemic education are described in [30,31].

The cancellation of professional and pedagogical practices and foreign mobility of students and teachers due to the closure of universities was also a serious problem. What was perceived by participants in each country was the problem of communication with educators, especially through virtual environments (email communication continued to work) in the early days of the pandemic. This problem in the relationship between student–teacher during the pandemic period is described also in [32–34]. However, this problem gradually disappeared, and the student–educator pair was gradually strengthened and saturated.

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Despite the enormous efforts of all involved, several problems emerged in the early days of online education, such as inadequate hardware equipment or outdated technology not supporting online platforms (PCs without cameras or audio equipment), insufficient or slow Internet connectivity, inadequate load on the Internet connection (parents' home office and students' simultaneous education), the inability to access the study literature, etc. Other problems were characterized by low student activity, a lack of interest in computer-assisted lectures, very low levels of communication and discussion, the absence of hands-on learning, etc. These results are in accordance with the study [28,29], which define the lack of technology as one of the problems of pandemic education.

In addition to the objective causes from the research results, subjective barriers were also perceived by the persons themselves, such as undue strain on students' attention, a distracting home environment, limited educational space, an increased workload for both students and teachers, a lack of exercise, psychological burden, psychological stress, a limitation on social contacts, deterioration of health, headaches, joint pains, or overcoming COVID-19. Similar problems of students during the pandemic education are described in [30,31].

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After two years of the pandemic, many students, and indeed teachers, are taking stock of the past years. Most agree that the pandemic and its aftermath changed not only their educational habits, but also themselves. Many have become aware of basic values such as health, family and friendship, and have started to devote more time to themselves (personal development), have started to play more sports and go outdoors more, follow a regular eating regime, and use their time more efficiently (KZP41: "*We have become more responsible and have changed our mindset*"). Teachers also positively evaluated the online opportunity to update their qualifications in different areas and the extension of the offer of further education through webinars, online conferences, and professional seminars.

Along with changes on the part of teachers and students, changes were also observed in university education, in its system, in the processes and in the methods, forms and means used. When evaluating the time demands of full-time study and online study, most participants agreed that they were about the same. The main variation was that the time that students previously had to spend travelling to and from school could be spent more on completing assignments or relaxing during the pandemic. Differences were also observed in the assessment of the time commitment of full-time and part-time students. While full-

time students rated the time demands of learning during online learning as much greater in several respects, part-time students were much more comfortable with online learning. They claimed that they did not have to commute long distances to the school building; they saved money on travel and accommodation during the teaching concentrations; they did not have to take a lot of holidays (and could join the learning from work), and last, but not least, they did not have to leave their families, especially young children.

Overall, the pandemic period has brought both negative and positive changes for all involved. The ambivalent attitude towards this difficult period was clearly declared by two participants. SKP27: "*I missed the socialization and unfortunately, we lost an important part of our student life*". A more positive perception of the whole situation was expressed by participant KZP35: " . . . *it was the most amazing period of my education*!"

Future research can be oriented on the development and adaptation of teaching and learning frameworks in the post COVID-19 era. The form of teaching will not fully return to the position in the period before the COVID-19 pandemic period (see also [35–41]).

References

1. korona.gov.sk. Coronavirus (COVID-19) in the Slovak Republic. 2022. Available online: https://korona.gov.sk/en (accessed on 5 April 2022).
2. UNICEF. What Will a Return to School during the COVID-19 Pandemic Look Like? 24 August 2020. Available online: https://www.unicef.org/coronavirus/what-will-return-school-during-covid-19-pandemic-look (accessed on 5 April 2022).
3. United Nations. Policy Brief: Education during COVID-19 and beyond. August 2020. Available online: https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf (accessed on 5 April 2022).
4. Azevedo, J.P.; Hasan, A.; Goldemberg, D.; Iqbal, S.A.; Geven, K. Simulating the Potential Impacts of COVID-19 School Closures on Schooling and Learning Outcomes: A Set of Global Estimates. *World Bank Res. Obs.* **2021**, *36*, 1–40. [CrossRef]
5. Engzell, P.; Frey, A.; Verhagen, M.D. *Learning Inequality during the Covid-19 Pandemic*; SocArXiv ve4z7; Center for Open Science, University of Oxford: Oxford, UK, 2020; Available online: https://ideas.repec.org/p/osf/socarx/ve4z7.html (accessed on 5 April 2022).
6. Klimovský, D.; Nemec, J.; Bouckaert, G. The COVID-19 Pandemic in the Czech Republic and Slovakia. *Sci. Pap. Univ. Pardubic.* **2021**, *29*, 1320. [CrossRef]
7. VSM. The School of Management (Vysoká Škola Manažmentu, or VSM). 2022. Available online: http://www.vsm.sk/us/about-school/introduction/about-us/ (accessed on 5 April 2022).
8. Kenzig, M.J. Lost in Translation: Adapting a Face-to-Face Course into an Online Learning Experience. *Health Promot. Pract.* **2015**, *16*, 625–628. [CrossRef] [PubMed]
9. Kučera, D.; Stuchlíková, I.; Mrhálek, T. Impacts of COVID-19 Pandemic on the Mental Health of Working Adults in the Czech Republic: Analysis of Self-Report Psychological Data in a One Year Perspective. *Eur. J. Investig. Health Psychol. Educ.* **2021**, *11*, 1061–1072. [CrossRef]

10. Haeck, C.; Lefebvre, P. Pandemic school closures may increase inequality in test scores. *Can. Public Policy* **2020**, *46* (Suppl. S1), S82–S87. [CrossRef]

11. Carpenter, P.J.; Rosenberg, J.M.; Dousay, A.T.; Romero-Hall, E.; Trust, T.; Kessler, A.; Phillips, M.; Morrison, A.S.; Fischer, C.; Krutka, D.G. What should teacher educators know about technology? Perspectives and self-assessments. *Teach. Teach. Educ.* **2020**, *95*, 103–124. [CrossRef]

12. Bozkurt, A.; Sharma, R.C. Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian J. Distance Educ.* **2020**, *15*, i–vi.

13. Karakose, T. Emergency remote teaching due to COVID-19 pandemic and potential risks for socioeconomically disadvantaged students in higher education. *Educ. Process Int. J.* **2021**, *10*, 53–61. [CrossRef]

14. Hodges, C.; Moore, S.; Lockee, B.; Trust, T.; Bond, A. The Difference between Emergency Remote Teaching and Online Learning. 2022. Available online: https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning (accessed on 5 April 2022).

15. Microsoft Teams. Available online: https://www.microsoft.com/en-ww/microsoft-teams/ (accessed on 5 April 2022).

16. Google Classroom. Available online: https://classroom.google.com/ (accessed on 5 April 2022).

17. Zoom. Available online: https://zoom.us/ (accessed on 5 April 2022).

18. SUPPORT. Support for Long-Distance Education on CU. 2022. Available online: https://uniba.sk/en/elearning/ (accessed on 5 April 2022).

19. Fikar, M. *Moodle 3: Príručka Učiteľa (Moodle 3: Teacher's Guide)*; Slovak Technical University in Bratislava: Bratislava, Slovakia, 2018; Available online: https://www.uiam.sk/~fikar/mdl.pdf (accessed on 5 April 2022).

20. Strauss, A.; Corbin, J.M. *Basics of Qualitative Research*; Techniques and Procedures for Developing Grounded Theory; SAGE Publications Inc.: Thousand Oaks, CA, USA, 2014.

21. Švaříček, R.; Šeďová, K. *Kvalitativní Výzkum v Pedagogických Vědách (Qualitative Research in Educational Sciences)*; Portál: Prague, Czech Republic, 2014.

22. Kostrub, D. *Základy Kvalitatívnej Metodológie: Keď Interpretované Významy Znamenajú Viac ako Vysoké Čísla (The Base of Qualitative Methodology: When Interpreted Meanings Mean More than High Numbers)*; Comenius University in Bratislava Publishing House: Bratislava, UK, 2016.

23. Gavora, P. *Sprievodca Metodológiou Kvalitatívneho Výskumu (Handbook of the Methodology of Qualitative Research)*; Comenius University in Bratislava: Bratislava, Slovakia, 2007.

24. Rajcsányi-Molnár, M.; Bacsa-Bán, A. From the initial steps to the concept of online education—Teacher experiences and development directions based on feedback from online education introduced during the pandemic. *Cent. Eur. J. Educ. Res.* **2021**, *3*, 33–48. [CrossRef]

25. Saldana, J.; Omasta, M. *Qualitative Research: Analysing Life*; SAGE Publications Inc.: Thousand Oaks, CA, USA, 2021.

26. Vančová, A. *Inovácie a Zmeny v Kurikulárnom a Procesuálnom Zabezpečení Edukácie v Praktických Školách (Innovations and Changes in Curricular and Procedural Side of Education in Practical Schools)*; Paedagogica Specialis 34: Zborník Vedeckých Príspevkov Pedagogickej Fakulty Univerzity Komenského v Bratislave; Univerzita Komenského v Bratislave: Bratislava, Slovakia, 2020; pp. 13–33.

27. Wiberg, M.; Lyrén, P.-E.; Lind Pantzare, A. Schools, Universities and Large-Scale Assessment Responses to COVID-19: The Swedish Example. *Educ. Sci.* **2021**, *11*, 175. [CrossRef]

28. Chierichetti, M.; Backer, P. Exploring Faculty Perspectives during Emergency Remote Teaching in Engineering at a Large Public University. *Educ. Sci.* **2021**, *11*, 419. [CrossRef]

29. Sun, L.; Tang, Y.; Zuo, W. Coronavirus pushes education online. *Nat. Mater.* **2020**, *19*, 687. [CrossRef] [PubMed]

30. Czerniewicz, L.; Trotter, H.; Haupt, G. Online teaching in response to student protests and campus shutdowns: Academics' perspectives. *Int. J. Educ. Technol. High. Educ.* **2019**, *16*, 43. [CrossRef]

31. Buda, A.; Czékmán, B. Pandemic and Education. *Cent. Eur. J. Educ. Res.* **2021**, *3*, 1–10. [CrossRef]

32. Hammerstein, S.; König, C.; Dreisoerner, T.; Frey, A. Effects of COVID-19-Related School Closures on Student Achievement—A Systematic Review. *Front. Psychol.* **2021**, *12*, 4020. [CrossRef] [PubMed]

33. Aljedaani, W.; Aljedaani, M.; AlOmar, E.A.; Mkaouer, M.W.; Ludi, S.; Khalaf, Y.B. I Cannot See You—The Perspectives of Deaf Students to Online Learning during COVID-19 Pandemic: Saudi Arabia Case Study. *Educ. Sci.* **2021**, *11*, 712. [CrossRef]

34. Tony, B. *Lessons from Lockdown: The Educational Legacy of COVID-19*; Routledge: London, UK, 2021.

35. Peimani, N.; Kamalipour, H. Online Education in the Post COVID-19 Era: Students' Perception and Learning Experience. *Educ. Sci.* **2021**, *11*, 633. [CrossRef]

36. Zhao, Y.; Watterston, J. The changes we need: Education post COVID-19. *J. Educ. Change* **2021**, *22*, 3–12. [CrossRef]

37. Crawley, F.E.; Fewell, M.D.; Sugar, W.A. Researcher and Researched: The Phenomenology of Change from Face-to-Face to Online Instruction. *Q. Rev. Distance Educ.* **2009**, *10*, 165–176.

38. Bell, T.; Aubele, J.W.; Perruso, C. Digital Divide Issues Affecting Undergraduates at a Hispanic-Serving Institution during the Pandemic: A Mixed-Methods Approach. *Educ. Sci.* **2022**, *12*, 115. [CrossRef]

39. Mynaříková, L.; Novotný, L. Knowledge society failure? barriers in the use of ICTs and further teacher education in the Czech Republic. *Sustainability* **2020**, *12*, 6933. [CrossRef]

40. Pirklová, P.; Bímová, D. GeoGebra book containing worksheets for Monge projection. *AIP Conf. Proc.* **2019**, *2172*, 040002.

41. Iždinská, R.; Scholtzová, I. Príprava budúcich pedagógov pre predprimárny stupeň vzdelávania v Nemecku (Bavorsku) a na Slovensku (Training prospective teachers for pre-primary stage of education in Germany (Bavaria) and Slovakia). In *Osvita i Suspiľstvo (III): Mižnarodnyj Zbirnyk Naukovych Prac*; Berďanskyj Deržavnyj Pedahohičnyj Universyte: Berďansk, Ukraine, 2018; pp. 189–196.