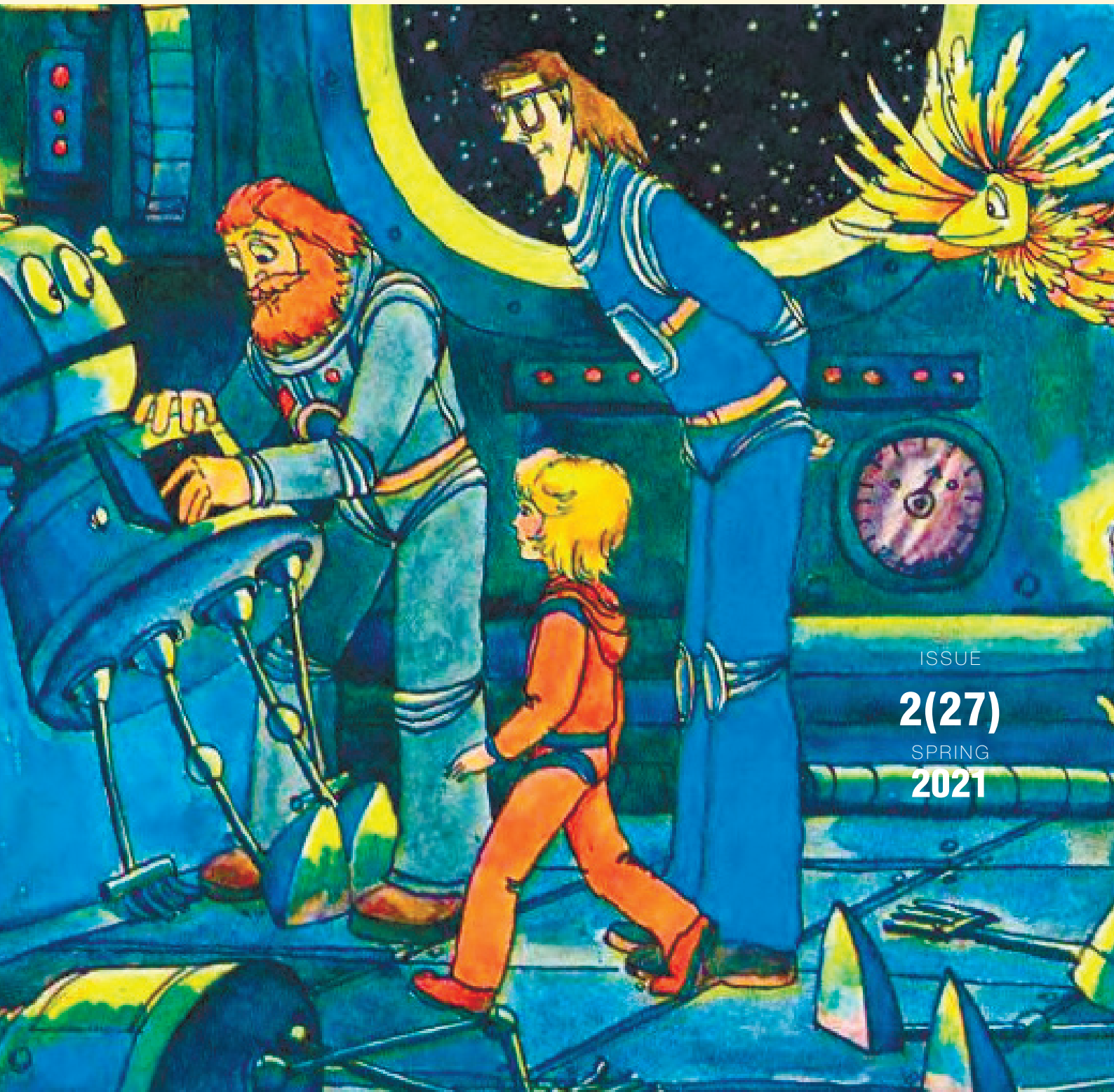
HERB

Higher Education in Russia and Beyond

Digitalization in Higher Education:
Opportunities, Challenges, Perspectives



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Cover: still from the Soviet cartoon
“The mystery of the Third Planet”

Dear colleagues,

This issue of Higher Education in Russia and Beyond is devoted to online education at universities. With the pandemic, digitalization in higher education turned to emergency mode, testing the limits of sustainable innovation. What are the outcomes of the sudden shift away from institution-based, face-to-face teaching? Has online education withstood the challenge? What lessons have been learned and what should be done to improve the quality of online education? What are the prospects for the further digital evolution of higher education? The contributors from universities in Finland, Estonia, Poland, Hungary, Uzbekistan, Kazakhstan and Russia share their research, surveys, reviews and expert opinions regarding these issues. The articles describe university lecturers' experiences in digital education during the pandemic and suggest that a comprehensive expert audit of the higher education system is a pressing challenge. The authors shed light on reengineering higher education practices, the development of digital and hybrid learning environments, building online learning ecosystems, and the training and horizontal peer support of university teachers for teaching excellence. The studies also evaluate the impact of e-learning on study performance, tackle student mental health issues and tell us about an international initiative for the development of a platform for students with special needs.

Guest editor Julia Bril

National Research University Higher School of Economics

National Research University Higher School of Economics is the largest center of socio-economic studies and one of the top-ranked higher education institutions in Eastern Europe. The University efficiently carries out fundamental and applied research projects in such fields as computer science, management, sociology, political science, philosophy, international relations, mathematics, Oriental studies, and journalism, which all come together on grounds of basic principles of modern economics. HSE professors and researchers contribute to the elaboration of social and economic reforms in Russia as experts. The University transmits up-to-date economic knowledge to the government, business community and civil society through system analysis and complex interdisciplinary research. Higher School of Economics incorporates 97 research centers and 32 international laboratories, which are involved in fundamental and applied research. Higher education studies are one of the University's key priorities. According to recent QS World University Ranking, HSE is now among the top 150 universities in the subject of "Education". This research field consolidates intellectual efforts of several research groups, whose work fully complies highest world standards. Experts in economics, sociology, psychology and management from Russia and other countries work together on comparative projects. The main research spheres include: analysis of global and Russian higher education system development, transformation of the academic profession, effective contract in higher education, developing educational standards and HEI evaluation models.

Center for Institutional Studies

The Center for Institutional Studies (CInSt) is one of HSE University's research centers. It focuses on fundamental and applied interdisciplinary research in the field of institutional analysis of the economics and sociology of science and higher education. CInSt is integrated into international higher education research networks and cooperates with foreign experts through joint comparative projects that cover the issues of higher education development and education policy. As part of our long-term cooperation with the Boston College Center for International Higher Education, CInSt has taken up the publication of the Russian version of the "International Higher Education" newsletter.

One of the main research areas of CInSt is the study of applicant and student strategies related to higher education and the link between education and the labour market. Our studies analyze the issues that applicants face during the admission process, the factors of student success during their studies at universities, the issue of student employment and combining of study and work. We also study the expected and actual returns to education and labour market outcomes of university graduates depending on educational factors and strategies of school-to-work transition with particular attention to gender issues. Research on university graduates is conducted in collaboration with other research centers, including The Laboratory for Labour Market Studies at HSE University, Center for Research in Higher Education Policies of the University of Porto, and Ghent University.

The results of the research are published in leading educational journals, such as Higher Education, Higher Education Quarterly, Urban Education, International Journal of Educational Development, European Journal of Education, Journal of Education and Work, Journal of Higher and Further Education, Tertiary Education and Management and other outlets.

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Teachers' Perceptions of Distance Learning amid the COVID-19 Pandemic in Russia

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The perception of distance learning by university teachers during the COVID-19 pandemic

Distance education has been developing in Russia for several decades, primarily through the introduction of digital tools – always additional – accompanying the traditional face-to-face format. Significant changes in educational practice, caused by the COVID-19 pandemic, the associated risks and measures to prevent them, took place in 2020 and will continue in 2021. The transition of all Russian universities to online education, accompanied by a sharp reduction in social contacts, the merging of personal and work spaces, allows us to talk about the problem of distance education and the issues of organizational preparedness, equipment, educational programs and the personal and professional preferences of participants in the educational process.

Survey organization and data collection

In the spring (April 10–15) and summer (June 29–July 7) 2020, the Russian Academy of National Economy and Public Administration (RANEPA) conducted two waves of an all-Russia large-scale administrative survey of university teachers using a non-random combined river sample. The main subsample was the administrative one, organized by official letters and maintained by the administrative staff of higher education institutions. An auxiliary subsample, which controls for the effect of administratively approved responses, was organized on the social networks Facebook and Vkontakte, through targeted information campaigns. For the six days of the first wave, 58,612 people took part, the total number of complete questionnaires was 33,987. The successful implementation of the second wave confirmed the feasibility and effectiveness of large-scale administrative surveys. For nine calendar days, 42,382 people took part; in total, 27,484 complete questionnaires were collected. Samples of the first and second waves, with insignificant bias, represent the general population in terms of gender, age and educational characteristics.

The study was on the attitude of teachers to distance education in response to the sharp change in their professional activities and personal lives.

Attitudes to the pandemic situation and the perception of anti-pandemic measures

Among the university teachers surveyed in the first wave of the study, regardless of gender, age, place of residence or field of study, there was a significant assessment of the pandemic situation. 77% of the respondents assessed the situation as serious or rather serious. Teachers also support the measures taken nationwide, and almost all support the measures taken by their universities: 91% of the respondents agree that measures to prevent coronavirus in their educational institution are sufficient.

The main measure to combat the spread of coronavirus infection – the transition to distance learning – was fully implemented: 98% of teachers described the complete transition to a distance learning format. 25% believe that the university should take additional measures to facilitate the organization of distance education, such as (1) reducing the burden associated with reporting and administration, (2) technical support and consultation, (3) helping to organize a workplace at home, (4) reorganizing library services, (5) continuing education and information.

"The administration should help, not interfere with additional reporting requirements" (PhD, Southern Federal University, Rostov-on-Don);

"To organize workplaces at home, to provide normal working conditions" (Doctor of Science, St. Petersburg State University of Industrial Technologies and Design, St. Petersburg);

"More opportunities for communication among teachers" (PhD, Krasnoyarsk State Medical University, Krasnoyarsk);

"Allow the use of mixed types of education without changing the curriculum" (PhD, Voronezh State Pedagogical University, Voronezh).

And although university teachers represent the most prepared professional group included in online communities (83% of respondents are almost constantly online), for 55% of respondents, with the development of new technologies for remote communication, distance teaching is a completely new experience in which there are a number of methodological and technical problems, the psychological burden associated with changes in their daily routine, and the need to work from home.

The adaptation of teachers to the distance format

The results of the second wave of the survey revealed a large proportion of respondents who were skeptical about

distance learning. This position is especially manifest in the answers of teachers from universities in the North Caucasus (61%), South (55%) and Siberian federal districts (50%), but the level of support and approval had grown significantly by the end of the academic year. In the sample, the largest share of those who are positive or neutral towards distance education is observed in the Central Federal District (53%).

The direction of teaching is one of the reasons for the acceptance to the distance education format, or to its rejection. The latter is typical for teachers of art and culture (64%), mathematics (57%), agriculture (52%), natural sciences (52%) and engineering and technological disciplines (51%). Greater support for the distance format is observed among teachers of computer science (29%), pedagogical sciences (25%), health care (21%), and defense and military sciences (22%).

A large proportion of teachers (74%) were forced to completely or partially change their educational programs, adjusting them to the online format. Full changes in the programs of their courses were noted by the teachers of the universities of the Ural (11%), Far Eastern (10%) and Northwestern (9%) federal districts. Universities of the Central Federal District demonstrate the greatest readiness for the transition to distance learning (7%). Changes in the curriculum, according to the respondents, have serious consequences, and for most respondents, who said it reduced the level and value of education.

Adapting to the new working conditions demanded significant efforts from the teachers, taking more time than well-functioning face-to-face teaching. 85% of teachers say that with the transition to distance education, free time has not increased; although they do not need to spend time traveling to work, the time it takes to prepare for classes has increased. Many are also worried that the change in the workload is not taken into account by the management of the university and teachers are not compensated for the additional efforts to organize distance education.

A critical attitude to the distance education format is characteristic of the respondents of both the first and second waves of the survey. This format, in addition to specified obstacles for teachers, has shortcomings and barriers for students and could cause undesirable consequences for higher education in the near future. The threat to the quality of learning is acutely felt by teachers of the most "unfriendly" distance format areas, namely culture and art (72%), agriculture (71%), natural sciences (71%), healthcare and medical sciences (70%) and mathematics (69%).

Difficulties during the adaptation period, insufficient support from universities, and an uncomfortable home environment for teaching contribute to the formation of a skeptical view of distance learning. 70% of respondents believe that the quality of learning online is lower than in face-to-face classes. Younger (up to 35 years old) teachers are a little more optimistic about this, but 64% of them share this point of view.

The traditional system for assessment and final exams in the absence of personal contact is not entirely effective, leading to an increase in academic deception and general academic failure, and is assessed by most of the survey participants as inconvenient, requiring further revision (87% of the participants in the second wave of the survey held all exams remotely in summer, 67% assess the new exam format and the student progress monitoring as inconvenient (31%) or rather inconvenient (36%). Teachers of universities in the North Caucasus (62%) and Southern (57%) federal districts are most worried about academic dishonesty.

However, the number of teachers who rate the distance format as comfortable and convenient is growing. Constructive criticism, a thoughtful approach, and reflecting on experience create the basis for productive distance learning in higher education.

Visions for the future of education

Despite the fact that the quality of learning in the distance format was questioned, a significant proportion of respondents are optimistic about the measures that universities will be ready to take in case of a recurrence of such a critical situation (49%).

Given the difficulties, teachers are skeptical about the impact of the current crisis on the quality of higher education – about half of the respondents expect that the current situation will lead to a deterioration in the quality of higher education in a year. The share of those who neither agreed nor disagreed is also high, which signals the uncertainty in the current situation and the impossibility of planning for and imagining the future.

Teachers are in a difficult situation requiring them to mobilize not only professional, but also psychological skills. The dramatic transformation of teaching generated protest and resistance to change. In the first months, most of the protest activity was latent dissatisfaction with what was happening. Since the main source of resistance to change is subjective distress, discomfort and the unusualness of the situation, the main approaches to overcoming resistance should lie in psychological and social support, greater freedom in organizing lessons and minimizing the administrative and technical barriers that prevent the successful adoption of the online format.

"A Journey of a Thousand Miles Begins with a Single Step": the Experiences of Online Distance Education at Óbuda University

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The paper explores university lecturers' experiences in digital education during the first wave of COVID-19 in Hungary, and the opportunities for reengineering higher education practices for the future.

Introduction

The COVID-19 pandemic turned the conventional practices of higher educational institutions upside down. It has disrupted education and, in the case of higher education, has required university academic staff to shift to emergency remote education. Similarly to other universities in Europe, Óbuda University in Budapest, closed its doors after the lockdown starting on March 13, 2020. All of its lectures, seminars and labs were shifted to digital platforms. The sudden digital shift shocked both the lecturers and students but opened a different world of virtual classrooms and brought out the positive and negative effects of contactless digital education.

Qualitative research was conducted to explore the experiences and reactions of academic staff to digital education during the first wave of COVID-19. Semi-structured interviews were held with lecturers from different age groups and with different prior experience in e-learning. The research found that lecturers who had some experience in e-learning could adapt better to the short notice remote teaching compared to the lecturers with almost no prior experience. Both groups, however, made efforts to make digital education motivational and as vivid as their face-to-face lectures and seminars.

Óbuda University was one of the first universities in Hungary to introduce blended learning into its curricula over the last five years and introduced either full e-learning courses within the framework of KMOOC (Carpathian basin Online Education Centre) – a unique center for MOOCs in Central and Eastern Europe – or blended learning courses. Consequently, lecturers who had participated in developing e-learning courses already had experience in designing courses, developing video material, tasks, games, tests etc, however, giving live online courses was new. After the lockdown in Hungary, lecturers at Óbuda University had one week to redesign their lectures and seminars as well as prepare modified assessment criteria for online courses. This short notice created stress and anxiety for some of the lecturers, but the one-week rector's break helped them, even the ones with hardly any digital teaching experience, to take a deep breath and rethink and reengineer their teaching. The qualitative research proved that the necessary time for preparation, the workload and the level of stress increased, but as lecturers became more experienced and skilled during the semester, they shared best practices and found ways to raise the quality of teaching and adopt higher education to the requirements of generation Z.

Methodology and data collection

In order to explore academic staff experiences in the first phase of emergency remote teaching qualitative research was conducted employing semi-structured interviews using a thematic framework. The interviews were conducted in August and early September 2020 and lecturers from different faculties at Óbuda University were invited via email to take part in the interviews. The interviewees teach different subjects ranging from technical engineering through informatics to business and management. Their background knowledge and experience in e-learning were different, as were their digital competencies. The participants were assured about anonymity, demographic questions about age group and gender were collected in order to balance the sample for age range and gender. Interviewees were informed about the themes, but the flow of the interviews depended on the interviewees. Semi-structured interviews allow a more open and discursive conversation. The interviewer followed prescribed guidelines, but was able to pick up on points made and digress when he or she felt it appropriate. The semi-structured interviews focused on the lecturers' prior skills, their first reactions to emergency remote teaching, their views on time spent, stress and workload, the pitfalls, the positive and negative effects and the opportunities for the future of higher education at Óbuda University.

Experiences, challenges, and opportunities

The 10 interviewees came equally from the different age groups ranging from 30 to over 60 and half were male and half were female. Five of the lecturers had prior e-learning experience and three of them have degree in computer science. Neither the lecturers nor the university itself were prepared for full contactless education so the one-week contingency timeout after March 13, 2020 enabled both the university and the lecturers to find platforms, rethink their teaching methodologies and replan the course assessments in order to be able to continue teaching. Óbuda University prepared general guidelines on how to conduct lessons during the lockdown and instructed lecturers to use MS Teams for online lessons. Óbuda University redirected all its course contents to its existing Moodle LMS. Student communication was also shifted to these platforms.

Lecturers' first reactions to emergency online teaching varied from "being shocked" and "lost" to "thinking of it as a task to be solved". One lecturer said he "had no idea how to do it" another one found it most difficult "to plan everything precisely in advance" for the rest of the semester. At first "the charm of novelty" was appealing but "a lot of work" followed.

Half of the interviewed lecturers decided to have synchronous online classes while the other half recorded their classes and used the asynchronous mode. Lecturers with prior e-learning experience had no difficulties in preparing for the online classes but the ones with less prior experience found difficulties in learning the technology and preparing material for the classes. As one interviewee said: "An online presence does not bother me, this is totally perfect. It is a bit difficult with the technology and takes quite a lot of time".

What lecturers also found difficult was to transfer their in-class methodology to online classes, they did not feel prepared for online methodology, "how to organize classes, how to motivate students" since "each platform needs different methodology and it is completely different if you go in a classroom with a whiteboard or you do it online". "I think I started from zero" said one of the lecturers, but most of them felt they learnt the skills, tricks and methods to make their online classes interactive, lively and motivating.

Regarding the time-stress-workload triangle, most of the lecturers agreed that time and workload was on average four times more than for face-to-face teaching. On the other hand, most of the lecturers did not find emergency remote teaching stressful, the stress factor was the most scattered (Figures 1 and 2); the standard deviation of stress was the highest (STDEV=1.29).

Figure 1. Interviewees' assessment of time, stress and workload factors

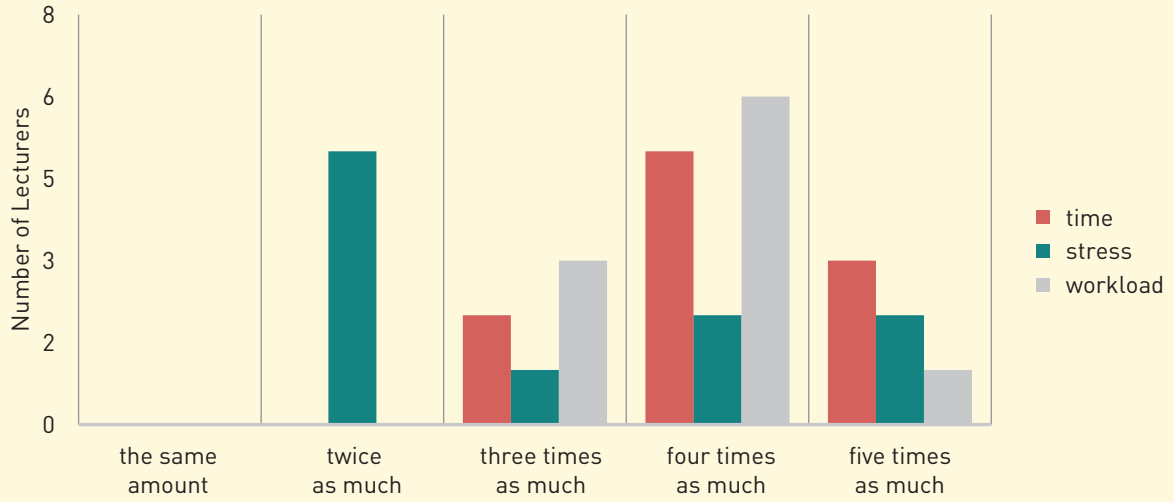

Figure 2. Interviewees' individual perception of time, stress and workload factors on a scale of 1–5 (The axis depicts the 1–5 scale while the numbers are the index for the interviewed lecturers.)

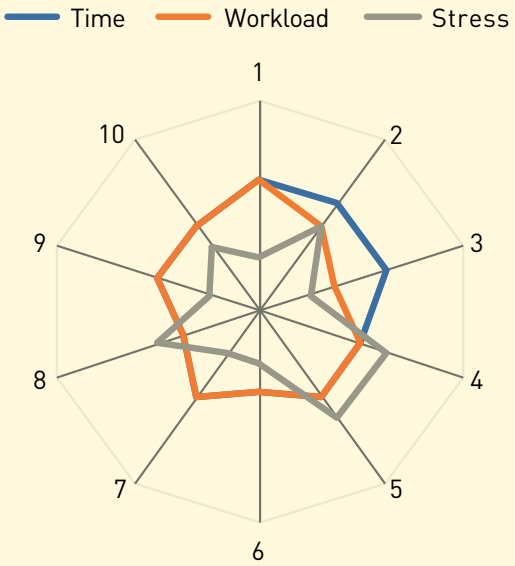

Figure 2 displays the individual answers and shows that initial workload was high for the lecturers but as one of them said: "It is a very big job to prepare the learning material at once, but less work to maintain it in the future". The figure shows the stress rate, time intensity and workload caused by the emergency remote teaching measured on a scale of 1–5. The three factors are depicted in different colors. As an example, the responses from interviewee 1 are: time intensity is five times higher, stress is two times higher and workload is five times higher than in case of personal in-class teaching; for interviewee 3 the time intensity is five times higher, stress is twice as high, and workload is three times higher compared to in-class contact lessons.

The responses assume that there is a relationship between these factors; a higher workload needs more time and causes more stress. Someone less stressed can prepare for the online lessons more quickly; less time and less workload result in less stress. A negative relationship was found between stress and time (Pearson's r=-0.129, Spearman's rho=-0.145); a positive relationship was found between workload and time (Pearson's r=0.524, Spearman's rho=0.489), and workload and stress (Pearson's r=0.027,

Spearman's rho=0.071). However, none of them proved to be significant (p>0.1). These results call for a further, preferably quantitative, survey.

Taking future delivery methods in higher education into account, all of the lecturers agreed that digitalization was inevitable, and it creates opportunities in higher education such as introducing more blended or purely e-learning courses and implementing more digital tools in conducting lessons either offline or online. Most of the interviewed lecturers would keep online consultations in the future and would introduce more online classes for part-time students since students on these courses usually have full time work and "they really appreciated that they did not have to travel to the university". On the other hand, all of them noticed that contactless lessons make students less motivated, and lecturers need to put more effort into helping students to overcome the difficulties since even the students missed face-to-face lessons. "The magic of personal lectures is in personal physical attendance", one of the lecturers said.

Conclusion

The research conducted allowed lecturers to reflect on their teaching practices and they said offline teaching might be replaced by fully digital education because it is cost-saving and makes education more economically efficient, but cannot be replaced because the essence of the university disappears. The transition of higher education to a fully digital mode has required flexibility, agile resilience, patience, skills and competences as well as enthusiasm from the academic staff.

"Higher education in Hungary has long been undergoing a major reform in terms of methodology. This virus has forced" Hungarian universities to jump immediately into online education and "forces this (digital online) direction in the future".

This paper raises the question whether a purely e-learning form of education could serve higher education best in the future or a blended or even a hybrid type of education should remain. Blended and hybrid learning are two terms but usually refer to one concept [1]. Both instruction methods combine traditional in-person teaching and online teaching (e.g. video conferencing, online courses etc.) [2]. Both utilize a mixture of offline and online instruction methods, the difference is in the space, time and groups. The same group, at different times and in different spaces define blended learning, in the course of which the same students complete some activities online and some offline. On the other hand, different groups, the same time and different space characterize hybrid learning, in the course of which some students participate in-person while others participate online, for instance.

Based on the qualitative research results, lecturers at Óbuda University stand by blended education where online consultations could serve as an active and efficient supplement to their educational practices and most lectures are face-to-face combined with online activities and online consultations.

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E-Learning in Poland: Challenges, Opportunities and Prospects for Remote Learning during the COVID-19 Pandemic

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Introduction

For over two decades, a debate has been taking place in Poland on the role new media should play in learning and teaching. The importance of ICT is evidenced by the fact that computer classes and information technology are an obligatory subject from the first stage of education. Elements of ICT implemented at various educational levels and among various groups have been a permanent component of the Polish educational system for many years. Since activities in the area of digitalization have been carried out for over two decades, the rapid transformation of the analogue environment into digital equivalents should not generate many serious problems. This hypothesis was subjected to a thorough assessment in 2020.

Emergency e-remote teaching and learning

Since March 2020, Polish formal education and the non-formal sector have experienced a state of accelerated digital transition. In describing the transformation related to the implementation of e-learning solutions, two stages can be distinguished:

- the first, from March to June 2020, was characterized by the dominance of crisis distance learning;
- the second, from October 2020 until the lifting of restrictions, was characterized by a full or similar methodology to professionally delivered e-learning.

In the first period, the majority of classes were conducted in the Emergency Remote Teaching mode. This meant that teachers sought to transform the didactic process using the resources available. This did not differ significantly from what happened in other countries. The scale of the phenomenon and the challenges of the crisis situation resulted in the emergence of many problems in the organization of classes at all educational stages. The COVID-19 crisis forced classes to be taught using ICT without debate or consultation. Those teachers who found themselves without methodical support tried on their own, with the use of the available tools for education and synchronous communication (Skype, Zoom, Google Meet, Cisco Webex, Moodle, etc.), to design an educational environment which would allow them to continue the classes they had started offline. This was not an easy task due to the lack of previous experience in this area among Polish teaching staff. The first stage was a time of crisis in distance learning, because teachers (including academic teachers) had only intuitive knowledge of the methodology of distance learning, they did not receive adequate technical support, and in most cases they had to gain e-learning skills through self-education. Many such activities were carried out with the use of tutorials available on the Internet, peer support, or the implementation of e-learning with a constant concern about the quality of education. In schools and universities with a high level of computerization, where the development of the digital competences of the teaching staff had previously been attended to, the transformation was much faster and more effective.

Higher education institutions and universities in Poland during the pandemic

Higher education entered the pandemic period more prepared for e-learning than education at lower levels. Universities in Poland have been conducting selected classes using blended e-learning for a long time. E-learning has been treated as an educational instrument, something that is perceived as a modern solution but which is an attractive addition rather than a basic tool. None of the leading Polish universities decided to take the bold step of fully digitalized education until the beginning of 2020. Many of the courses were delivered in an asynchronous or a mixed mode.

For several years, the free Moodle solution has been extremely popular in Polish higher education. Before the pandemic, this platform was the most frequently used web application for academic e-learning. A great advantage of the software is its advanced configurability and the minimal costs incurred to launch a virtual educational environment. However, many of the academic lecturers noted that Moodle mainly became a repository for files (presentations, text materials, e-books, scientific articles, tasks) rather than a real learning environment. In the initial period of the pandemic, however, Moodle fulfilled its objectives by becoming one of the main or complementary channels for transmitting knowledge. Has it become a real learning environment that provides intuitive operation and interaction between students and lecturers? The answer is not obvious.

The first period of crisis e-learning was a difficult time for many university lecturers in Poland. Currently, there is no representative quantitative data available showing the cross-section of academic e-learning during the COVID pandemic. Based on scarce reports, in the majority of universities the most popular solutions supporting learning and teaching are the following platforms and communicators: Teams, Zoom, Meet, Skype, Messenger, Moodle [1]. In the period from October 2020, solutions based on online direct contact between academic staff and students (live streaming) have been preferred. According to the results of the research collected at the Pedagogical University of Krakow, about 18% of teachers rated their own digital competence in e-learning as poor or very poor. Most difficulties were reported in relation to more complex platforms such as Moodle. About one third of the respondents declared that their skills related to the use of this free platform were low [2]. From the data collected among researchers from Krakow, almost 2/3 had no online teaching experience before the pandemic. Only a few percent had conducted e-learning classes very frequently before March 2020 [3]. The pandemic became a time of forced updating of digital knowledge and skills among Polish academic teachers.

Taking into account the reported needs of teachers and students, universities offered fast and effective courses for the complete transformation of education. The Pedagogical University of Krakow provided several courses on using the Moodle and Teams direct communication software. Both solutions became official teaching tools within a short time. Academic teachers who had a lack of practical knowledge received information on how to conduct exercises and lectures with the use of these applications. Several hundred academic staff took advantage of the offer of the European Centre for Lifelong Learning and Multimedia Education (ECKUM), an internal university unit focused on digital didactic research and training. Operating until March 2020, ECKUM proved to be one of the most practical internal teaching and research units during the pandemic. Similar centers operate in most Polish universities, offering technical support in the use of e-learning platforms and the development of the digital competences of academic teachers.

The mission of universities in Poland is not only to carry out research and teaching but also to cooperate with local communities. Therefore, since the beginning of the pandemic, the Pedagogical University of Krakow has been offering continuous in-service training courses for primary and secondary school teachers. The courses cover basic issues related to creating educational content and operating the Moodle and Teams platforms (creating teams and channels, inviting students to remote meetings, enhancing student involvement in remote activities, forming attendance lists, making presentations, desktops, and whiteboards available, using chat, class booklet, tests,

tasks, placing student materials as read-only or also for editing). The courses also included the advanced options of the Moodle platform (Quizzes, BigBlueButton videoconferencing system, Glossary of Terms, Division of students into groups, Quiz Hot Potatoes, Voting, MindMap, Questionnaire service, Gradebook, Obtaining feedback). So far several hundred teachers have completed the courses.

It is also worth highlighting the implementation of innovations in academic e-learning. One of the non-standard solutions used so far is the SELI platform – Smart Ecosystem for Learning and Inclusion – which was developed between 2018 and 2020 by specialists from Latin America (Bolivia, Brazil, Ecuador, Uruguay), the Caribbean (Dominican Republic) and Europe (Finland, Turkey, Poland). It is a multilingual platform used in these countries as a tool supporting academic e-learning. The use of the SELI platform provides special support for people with special educational needs (visual, hearing, or cognitive deficits). The platform was built for users who do not have extensive digital competences or the time resources to create modern digital educational environments. The pandemic period coincided with the intensive testing of the SELI platform in schools and universities from the above mentioned countries, including the Pedagogical University [4].

Conclusions

From October 2020, school classes are again being carried out using ICT. Even though the situation is still difficult, the present model of e-learning has slightly different characteristics from the emergency e-remote teaching and learning phase described earlier. The digital exclusion rate (lack of equipment, low quality internet connections) has been reduced in many cases. Teachers (and academics) were compelled by the authorities to avoid asynchronous forms of remote learning in favor of synchronous communication. It is increasingly rare that lecturers or teachers send their students self-study files without "live" contact. Educational institutions as "learning organizations" have recently undergone breakthrough transformations forced by external circumstances. The rapid digital transformation of Polish education is the largest unplanned pedagogical experiment in recent history. Conclusions from this experience are becoming increasingly clear. New technologies have become fully-fledged channels connecting learners and teachers, but they are not able to replace the traditional offline model which allows relationships to be built, and thus going beyond the transmission of information. This experiment, driven by ICT, has also highlighted a number of challenges. Teachers can now see, to a greater extent, the potential of new technologies, and they are more aware of the limitations of using ICT with certain groups (pre-school children, people with certain disabilities and learning difficulties). The voices of techno-optimists, who might otherwise seek to prove that analogue teaching methods are all outdated and unnecessary in the information age, are heard less frequently [5] [3]. It is also noticeable that institutions, regions, and countries that have invested in the development of ICT infrastructure and the lifelong learning of their teaching staff have been much better prepared in all respects for full e-learning than universities that (re)acted under adverse circumstances [4].

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The Challenges of Distance Learning to Student Mental Health

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Spring 2020 was a turning point for higher education systems around the world. The COVID-19 pandemic initialized a natural experiment of fully digitalized higher education. In March 2020, all Russian universities had to move classes online as part of the coronavirus pandemic lockdown measures. Although the Russian government had encouraged a digital environment at universities with the launch of the project "A modern digital educational environment in the Russian Federation" in 2016, only 60% of Russian universities had managed to provide distance learning without major interruptions by spring 2020 [1].

While the main goal of digitalizing higher education is the enhancement of students' experience and the improvement of learning outcomes, it is important to make sure that such positive intentions do not have unintended consequences. Within a few weeks, distance learning became the new normal. As the move to a fully online environment was unexpected, neither students nor instructors had enough time to prepare themselves physically or mentally, and this may have had a negative impact on students' mental health. We investigate the link between the shift to distance learning and students' mental health, using the data from an online survey 'SERU COVID-19' of HSE University students in June 2020.

Mental health matters

Supporting students' well-being is a strategic priority for universities in many countries. Researchers found that mild depression and stress could lead to higher risks of emotional disorders or nervous breakdowns [2]. Students who cannot balance their well-being and do not receive prompt support when they are struggling at university are more likely to drop out of university or express deviant behavior [3].

During the lockdown period, when all students had to study from home, the issue of students' mental health became a more serious concern. Distance learning may disrupt sleep cycles, causing headaches, lack of attention and demotivation [4]. As many international students are now in different time zones, they have had to adjust their sleeping habits in order to attend online classes, which may lead to these health issues.

The increased use of electronic devices by students may contribute to their sleeping problems, give rise to tiredness, procrastination and poor time management. Even increased screen time for non-educational activities is connected with depression, anxiety and stress [4]. As technology becomes all-consuming, it causes feelings of loneliness and isolation due to the lack of face-to-face commutation [5]. This is related to one of the most stressful aspects of distance learning, because student face-to-face access to instructors and peers is limited and they may not get answers to all their questions immediately. Compared to traditional learning, distance learning requires students to have better time management skills, find a proper study place, etc.

However, not all aspects of distance learning may cause stress. Some researchers state that distance education may help students feel calm during classes and more stimulated to study the educational materials in safe, comfortable places, which is especially relevant for first-year students, as they need more time to adjust to a new educational environment [5]. Online instruction may also relieve students' anxieties connected with face-to-face discussions and help them practice self-discipline through self-paced learning.

As these studies show mixed results, we need more evidence to understand how hard online distance learning can hit students' mental health in order to provide timely support. In this paper, we rely on the results of the Student Experience in the Research University (SERU) Consortium survey conducted by the Centre for Institutional Research at HSE University. The survey drew responses from 2,717 students in June 2020. To screen student depression, we used the Patient Health Questionnaire-4 (PHQ-4) and relied on students' responses about their positive and negative experiences of distance learning.

Signs of stress among students

The survey results present convincing evidence that the majority of students (from 72% to 89% for different PHQ-4 items) indicated that they experienced stress during June 2020. The most common symptom was feeling nervous, anxious, or on edge. 41% had little interest in doing things for several days and 36% were feeling down, depressed, or hopeless. 22% were not able to stop worrying nearly every day.

Distance learning is hard to manage

90% of students mentioned obstacles associated with the new learning environment. The most common obstacles were related to a lack of communication with other students (62%), a lack of motivation for online learning (48%), and a lack of access to instructors (41%). Students' scores on the PHQ-4 correlate with these obstacles. Students, who scored higher on symptoms of stress, indicated more obstacles during distance learning ($r = .42$, $p < .001$). Highly stressed students reported obstacles more often, including a lack of motivation for online learning, difficulties in finding an appropriate study space, attending classes at scheduled meeting times and feeling distracted by the home environment.

Surprising benefits of distance learning

Despite these obstacles, 74% of surveyed students had positive experiences associated with distance learning. 43% had more time for studying, 32% enjoyed learning in the new distance format and 30% mentioned that they were able to attend online classes more regularly than offline classes. Students who scored lower for stress, mentioned more benefits of distance learning ($r = -.24$, $p < .001$). They enjoyed learning in a distance format more, they also devoted more time to study, which resulted in more productivity in completing coursework.

Improving the learning experience of distance students

This study provides important results demonstrating that HSE University students were stressed during distance learning even though the majority of them have had experience of taking massive open online courses (MOOCs) long before all universities switched to remote instruction. For instance, during the 2018–2019 academic year, nearly 17,000 HSE University students completed 443 MOOCs. HSE University has launched 99 online courses in English and Russian that makes HSE University one of the top 5 universities in terms of the number of MOOCs launched on Coursera. However, despite all the endeavors of HSE University to promote online learning, the full transition to distance instruction was mentally challenging for students. Similar results were found in US universities: the anxiety rates were above 60% among students who did not transition well to the distance learning mode [6].

As one of the main obstacles was a lack of communication with other students, universities could organize online student study groups and introduce some online mentoring programs in order to provide more interaction opportunities for students. Students should also have the chance to communicate with their peers in informal social settings, so universities may organize online events, especially for first year students who have not had the opportunity to form social connections with peers yet.

Distance learning also requires a significant commitment from faculty members in order to be more accessible for students, which may ease their anxiety about course content, assignments and assessment procedures. Mental health screenings are important to trace students' ability to adapt and function productively in a distance learning environment.

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An Online Learning Ecosystem: The Experience of St. Petersburg State Electrotechnical University (LETI)

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Introduction

With the onset of the COVID-19 pandemic in the spring of 2020, an accelerated adoption of online learning began in Russia. The rapid and partly forced transition to online technology became a real challenge for educational institutions, teachers and students. In this article, we consider the practice of online learning at St. Petersburg State Electrotechnical University (LETI), which has gone from initiatives for the introduction of distance-learning technologies by individual teachers to the creation of a whole ecosystem of online learning, to winning the EdCrunch Award 2020 "The best online course according to consumers". We also describe the creation of individual elements of the system and note the successes and mistakes that can serve as lessons from the LETI experience for the academic community.

The formation of a communication channel

According to research conducted at LETI [1], about half of all students believe that offline learning is better than online learning, which confirms the theory of innovation diffusion put forward by Everett Rogers in 1962 [2]. By the beginning of 2020, most universities in Russia and elsewhere had successfully passed the initial implementation of distance

learning systems, but they were invariably viewed as secondary elements complementing the "normal" face-to-face interaction between teachers and students. In other words, the innovation had not established itself in the social practices of the academic environment; there was a low frequency of adoption. The appeal of students for online courses and rare interventions by professors did not contribute to the internalization of technology and related practices.

Two semesters under the quarantine restrictions changed the situation: online education got rid of its ersatz status. Increasingly, in public and professional discussions, the voices of those who see no reason to return to the old formats after the elimination of the pandemic threats are being heard. There is a demand for innovation, since the simple transfer of educational material into a digital format is no longer perceived as something revolutionary. We predict that from 2023–24 the gradual decline of the MOOC format will begin, being replaced by other more interactive and dynamic ideas of pedagogical design. In this prediction, we rely on the fact that there is an active communication channel in which streaming platforms, the game development industry and other media projects are now promoting their services. First, we are talking about using the potential of social networks, where the exponential growth in the number of horizontal connections between participants and the speed of content delivery is accompanied by the ability to deviate from the principle of broadcasting information in favor of deployment on demand.

The case of LETI

In December 2017, the Strategy for the Development of E-Learning and Distance Learning Technologies at LETI for 2018–2020 was adopted, in which e-learning was recognized as one of the main elements in the modernization of the global education systems, contributing to high standards of education and a convenient environment for learning in accordance with the challenges of the time [3].

In the subsequent period, a regulatory framework was developed and experience was accumulated in the use of online courses. The last sociological studies conducted in the pre-coronavirus period among students showed that [1]:

- the majority of students have a positive attitude to the use of online courses at LETI;
- students (depending on the discipline) rate their level of preparation based on their online courses as intermediate (50–68%), above average (13–33%) or advanced (up to 10%);
- according to students, face-to-face study gives more solid knowledge. In the survey in autumn 2019, compared to a similar survey in spring 2019, the share of students who rated knowledge acquired online as stronger and clearer increased by 6%.
- Throughout LETI, in the spring semester of the 2019/20 academic year, teachers used a variety of technologies, among which the most popular were:
- email;
- the social network VKontakte;
- e-learning on Moodle (texts and tests);
- webinars (Zoom, Discord, BigBlueButton, etc.);
- university media library of lecture notes (https://media.etu.ru);
- studying online courses on various platforms (LETIteach, Open Education, Stepik, Coursera).

According to estimates, before the start of the spring semester, about 1,500 students of LETI were supposed to start learning using online courses, but by April almost every university student studied certain disciplines using online courses developed by teachers from our or other universities. Among the successful practices of online learning LETI in the spring semester of 2020, here we consider the discipline "Ecology".

The first version of the online course "Ecology" was developed by teachers of the Department of Environmental Engineering (DEE) in 2016, and at the beginning of 2020 a completely revised version of the course was released, which is also available (as a simplified version without collaboration on the forum) on the Open Education platform.

For the last two academic years, the course "Ecology" has been used at LETI for teaching the discipline online without face-to-face classes. Students have only one orientation lesson (for the entire stream), in which they are told about the teaching technology, and at the end of the semester, to complete the course, students take a final test with offline or online proctoring. During the semester, students had been able to attend consultations at the department or at the Center for New Educational Technologies and Distance Learning (CNET). In the spring of 2020, all consultations were conducted remotely.

The educational material for "Ecology" includes studio video lectures with animated presentations of educational material, on-site filming in environmental organizations and presentations by practitioners, detailed lecture notes, a glossary and links to additional resources. The online course assessment methodology provides for a variety of activities:

- test questions that are embedded in video lectures;
- tests by sections;
- practical work (with automatic or manual assessment by the teacher);
- coursework on the forum (creative tasks);
- final proctored testing.

The specificities of the course "Ecology" include the use of in-video-quizzes, when during the viewing of a video lecture, simple comprehension questions appear. Another striking feature of the course are the creative assignments on the forums, which are completed individually, but can be brainstormed in their academic group. Another feature is that students perform practical work for "manual" assessment in a PDF template, which makes it easier to check a large number of reports.

As a result, in the spring semester of the 2019/20 academic year, more than 1,500 students of technical faculties of LETI were trained on the course "Ecology" on the university platform LETIteach, and there were almost 2,000 students on the open version of the course on the platform "Open Education".

In cases where fully online courses were not available, students could use the resources of the university's lecture recording media library. The media library is an interactive archive of lectures (authorized users can download, make comments, etc.), work on which began long before the coronavirus restrictions. In 2020, this became a significant help for older teachers who were the first to be required to self-quarantine. The media library was especially in demand among students from remote regions of the country, where the speed of the Internet does not allow high-quality video streaming.

According to the teachers' feedback, working on webinars required a different approach; it was more difficult to maintain attention and motivate students to participate in discussions. As a result, for disciplines that are not supported by full online courses or lecture notes in the media library, achieving high-quality distance learning is more difficult for teachers than offline learning. In this context, the role of ecosystem approaches is increasing, allowing the integrity of the educational process to be maintained when going online. In the final part of the article, we address this issue.

Conclusion

To support the main educational process, LETI has deployed its own ecosystem of support for online education, LETIteach, based on the open edX program code (https://open.etu.ru). The platform is integrated with the Russian national platform "the modern digital educational environment" (http://neorusedu.ru/) and the University of National Technology Initiative 20.35 (https://2035.university/), which allows students of our and other universities to study and transfer their digital portfolio using the xAPI protocol. The digital record can be used for data management technology, in particular, to form a digital profile of a student's competencies and develop recommendations for building his or her individual development trajectory within the main educational direction and additional educational profiles.

In addition to the online learning platform itself, the ecosystem includes an online proctoring system based on ITMOproctor software, an offline proctoring system based on MIT software, and a university lecture library https://media.etu.ru (its own development).

This list can be viewed in the context of the successes and difficulties that have accompanied the university on the way to the implementation of online learning. The online proctoring system was initially an auxiliary tool, therefore, both for remote and offline control, open source products from leading IT universities were used: ITMO University and MIT. This saved resources in order to focus on the development of a truly unique university media library.

The integration of the LETIteach platform with the federal project "The Modern Digital Educational Environment" and the University 20.35 removes the problem of isolation that often accompanies the implementation of university digital ecosystems: our students receive clear confirmation that the progress they have made can be included in such databases as an electronic portfolio or a passport of competencies.

The prospects for the next 3–5 years include promoting new media in the channel. In the near future, we plan to expand the functionality of the LETIteach platform, in particular, to implement an adaptive learning system based on machine learning algorithms, gamification, group interaction and learning services.

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Horizontal Peer Support for Teaching Excellence in the Digital Age

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The impact of digitalization on higher education, strategies for using online tools in teaching and methods of effective communication in an electronic environment are topics that have been studied for at least two decades [1]. Interest in them arose long before the COVID-19 pandemic and the forced total transition to distance learning. During this period, the methodological arsenal of researchers and teachers has accumulated many materials on how to effectively teach students in digital environments. But only

in the spring of 2020, did digital education become a reality for all teachers. It was during this period that a radical change took place in understanding the role of digital technologies in learning and the approaches to working with them. This provided the most ambitious practical test of the techniques and theories that had been developed. As a result, some of them have proven their viability and effectiveness, and others have not and should be discarded. The principle of "learning by doing" has never been so relevant. However, this is where an important question arises: who can be a mentor and reliable guide for university teachers in the digital world?

Experience of the "Teach for HSE" project

In this short article, we address this question based on the experience of the "Teach for HSE" project, which was created at HSE University in 2017 to improve the quality of teaching. For many years the university has a developed system of support for teachers: Department of Degree programmes, methodological support for HSE staff; eLearning Development Centre, which assists in online educational projects; the Center for Continuing Education, through which colleagues participate in internships and learning about the experience of Russian and foreign universities, the Academic Writing Center, which organizes consultations and training programmes to develop employees' skills in creating publications in English; HSE Academic Fund programme, which focuses on research. But "Teach for HSE" has made its own niche in this structure. The conceptual basis is the horizontal interaction and mutual support of teachers, including helping to avoid professional burnout. This makes the project fundamentally different from other divisions and initiatives. Mutual support means different formats communication, from informal conversations about pedagogical challenges and innovative practices used in teaching students, to certified continuing education courses organized for all university teachers. Many course topics were suggested or formulated by the teachers themselves, which enhances the appeal of the approach.

Teacher as an Instructor vs Teacher as a Student

As a rule, it is not invited specialists and coaches, but the teachers themselves who lead discussions, master classes and refresher courses in "Teach for HSE". This approach is challenging for teachers, because teaching to your colleagues requires special preparation. Moving out of your comfort zone stimulates the development of cognitive and professional skills [2]. It is also a great way to hone and develop your soft skills. This is a new level of responsibility for the teacher, and for his or her students (colleagues) giving a feeling of mutual support. More broadly, in this way, professional burnout can be avoided, common academic teaching guidelines and standards are formed, an awareness of the competencies of their colleagues is raised, and areas for further growth within the professional community are identified.

When teachers find themselves in the same classroom, the feeling of mutual support becomes especially strong. The exchange of best practices, ideas, and pedagogical "life hacks" is a natural and fruitful process. The very opportunity to look at a colleague from a student's perspective is a situation inaccessible in the traditional academic hierarchy. Thus, the spread of the best practices occurs not only from above, but also horizontally and naturally according to the principle "If my colleague could, then I can."

Peer support in action

What did this approach give us when the entire educational process was transferred to a digital environment? Even with the university's high level of technology and the lightning-fast reactions of the administration, which provided staff with a range of methods for interacting with students remotely, it was support from experienced colleagues who already had extensive experience with digital tools and platforms that was most in demand. All the activities of "Teach for HSE" have been transferred online and the range of topics has been changed, focusing exclusively on aspects that allow teachers to make online teaching more comfortable and productive. In addition, the online format gives the opportunity to significantly expand the audience, for example, the number of participants in traditional discussion platforms increased almost tenfold, and colleagues from all HSE campuses were finally able to join. Interdisciplinary and inter-campus exchange has become even more intense. During these discussions, teachers talk about their experience of using online technology to assess written or oral exams, to monitor the progress of students, to organize seminars, team and group work online, and much more.

Peer-review as an essential element of engagement

The capabilities of digital platforms made it possible to introduce an important component in the horizontal teaching support system: peer observation. The goal is not to rate or criticize colleagues, but to support each other, and exchange ideas and best practices. It is very useful for teachers to look at their teaching objectively, to see themselves from the outside through the eyes of a colleague. In our opinion, this is an indispensable way to improve. This interaction was introduced in the "Teach for HSE" course - 7 Key Principles of Teaching Excellence, which is implemented every year and is addressed primarily to teachers who have recently come to work at the university. Disciplinary boundaries were deliberately avoided to ensure wider interdisciplinary exchange. The transition to online facilitated its implementation, and made it simpler, from a technical point of view, for the distributed HSE campuses. Previously, mutual attendance at classes was often logistically difficult. As part of this course, teachers were asked to focus on providing feedback. First, the teacher and observer agree on the time and the lesson being observed. Then, during the observation observers filled out a standardized form to describe specific parameters: the learning out-

come(s) of the lesson, how the time is organized, the share of student participation, and much more. Third, observers formulated impressions and recommendations for possible improvements to the course (this could be any element of teaching: from the time allotted for checking homework to the rubrics and criteria for evaluating essays).

Peer observation serves as a powerful stimulus for development, motivates teachers to meet high professional standards and, from a psychological point of view, develops empathy and instills a culture of providing and receiving feedback. In the future, this practice should become systemic and routine (in the positive sense), because only then will it be possible to make the most of interaction between teachers and to productively exchange teaching practices.

A view to the future

Summarizing the experience gained during the project, the idea of building horizontal connections within the teaching community of the university has been fully justified. However, there is still a lot to do to improve and scale up the most effective practices. It is important for teachers to share their experience with colleagues by participating in conferences and round tables to support teaching at the institutional level. At the all-Russian conference was a section "University staff policies: Engagement management practices", where speakers from leading Russian universities focused on the topic of teaching support during the forced transfer to online learning. University administrators presented different models for transforming centralized processes, and teachers spoke of how they adapted their practices to new formats and the results [3].

While maintaining objectivity, it is important to ask what has been lost with the transition to online. It cannot be denied that the challenges faced by universities in spring 2020 have also transformed our view of teacher support in general. There are areas which are almost impossible to compensate for, including, physical fatigue from continuous screen time, the blurring of the personal and professional when working from home, and the loss of face-to-face communication with students. There is also the need for teachers to master new digital skills (in particular, developing effective feedback mechanisms for students, introducing tracking systems and other developments into the educational process) [4].

The most important step has already been taken: the realization that the experience of traditional formats of interaction with students in the classroom cannot be simply transferred to an online environment. The digital space requires different ways of presenting material and different methods of communication. The role of visual content is more significant, a diversification of activities is required, micro-learning, modular courses, interactive learning and new formats for organizing teamwork in a virtual environment are also becoming increasingly important. These changes apply equally to the interaction patterns among teachers. A new culture and new ethic of working in the digital environment is now emerging, and this is a complex and non-linear process. Centralized, administrative levers of control over this process are more effective at this stage, but it is important to select and configure them correctly. The need for methodological and competence-based changes to maintain levels of teaching and learning is obvious, and this is what all the resources of "Teach for HSE" are currently focused on. One of the promising areas here is attracting those with an academic background, but working in business as coaches and trainers, another is original forms of inter-institutional interaction, such as the use of theatrical techniques to develop interactive learning skills, effective communication with students, creative and motivating educational strategies.

Researchers have yet to analyze all the changes that are taking place in education. For this big data will be involved, on the basis of which conclusions and expert assessments will be made. At present, we can rely solely on our personal experience and subjective reflection, which in the future will complement the development of the higher education system.

Notes

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The Learning Experience in a Blended Elective Course on Soft Skills for Master's Students

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In an Experience Society, conceptualized by Gerhard Schulze [1], personal experience plays a key role. This change in public consciousness has given rise to the Experience Economy, which is based on the personalization of goods and the study of consumer experience. This concept of Experience has also penetrated learning and teaching. A purposeful learner journey has emerged and become the center of the learning process. It is important for the Learning Experience to consider the environment in which the student gains knowledge of the subject under study and to design the learning experience so that achieving the goal becomes part of the learner's journey. This is especially important at ITMO University – a non-classical university with a strong engineering expertise which must be supported by a foundation of soft skills.

Today, university education is usually mixed and takes place in two environments: traditional and digital, offline and online. This is especially important in university-wide development courses for all categories of students. First, large groups of learners require more formalization and preparation of universal trajectories for the rapid delivery of knowledge and assessment. Secondly, there is a risk of the loss of personalization, so the presence of a digital platform allows an enriched choice of material. Thirdly, today soft skills must ensure good communication between an individual and the world, offline or online. In terms of experience, the ITMO soft skills Master's course is both learning and communication itself, which supports all possible formats. Good teaching is good communication. And vice versa. Besides, online and offline learning experiences are created in different environments, and therefore it is important to combine these formats in the most harmonic way.

Our case describes the experience of students in the "Effective Team Management" course for first-year graduate students at ITMO. As part of the course, students learn what teams are, how to create them, how to motivate participants and effectively interact with them in accordance with team roles. A significant part of the course is devoted to practicing the skills to understand one's own and others' emotions, and how to behave in conflict situations. Students learn to be team leaders, make decisions at all stages of the team's life cycle, taking into account the features of the group and its individual members. The topic of the course dictates the formation of streams: students from areas of study are grouped together and the groups are balanced by gender (approximately 50/50). This provides the necessary diversity that is essential for successful teamwork.

Mainly active business instructors with experience in team building events teach the course. There is no lecture format as such, these hours are used for a series of workshops and trainings organized according to the rules of classic business trainings: the ratio of practice and theory 70:30, the reliance on the principles of andragogy and Kolb's learning cycle [2].

The course is a continuous module that takes place daily in the evening for 2 and a half weeks (excluding weekends). This creates the maximum immersion of the participants in the course. The blended learning combines hands-on agile skill development with theory and assessment on the Moodle platform. Participants use their own devices for online surveys and quizzes in Mentimeter, Kahoot and Quizziz. An electronic portfolio transfers the course into an educational track format, which the student covers for each topic, answering the question: "Who am I as a team player?" The portfolio is compiled in the form of a presentation on GoogleDrive.

For teachers, there is a knowledge base stored in the cloud work folder. This is the library of materials, including workshop plans, presentations, exercises, and additional literature. Learning practices are created and refined through Zoom meetings and a WhatsApp teacher chat. The official part of the course is on a single platform—ISU ITMO. Credits are entered into an electronic statement, which posts the results of coursework into electronic grade books. Informal support for student groups is carried out in chats with the teacher. Such chats are used to exchange information and materials, reflections and emotional reinforcement. The chat is also a back-up channel for online class interaction. Tracking progress on the course is carried out through read-only access to the instructor's grade sheet on GoogleDrive. Checking written work is also carried out on GoogleDrive, where students upload their work, and the teacher makes comments.

On completion of the course, undergraduates provide feedback on their impressions in a survey created using GoogleForms. The answers are analyzed, summarized and used to further adjust the course. This flexibility is possible due to the fact that the course program is a generalized plan with goals, competencies and topics. The main training tasks are formed for each specific program for the topic of each training session.

An important feature of the course is that the vast majority of students are current and future members of distributed IT teams. Therefore, they already have experience developing their soft skills in different environments while upgrading in their usual mixed environment. From this point of view, online learning should be an additional opportunity for team interaction using certain tools. As an example, collaborative design on Miro online whiteboards is a valuable experience for students. Miro was created specifically for distributed teams that brainstorm, develop projects and business models for startups.

Survey data from the two courses in September and November 2020 show that the greatest interest from students was in team exercises, and in business and role-playing games (more than 60% of students noted this type of work). "Launching a rocket" is a team game according to the method of Belbin, an expert on team building, which was very well received. Only one in ten was dissatisfied with the course schedule (late evening, everyday classes), 14% would prefer to adjust the volume, depth and content of the course materials - 3% of which were on the platform. The mixed format of the course for undergraduates was in most cases convenient, a third of the students sometimes had problems with the Moodle platform.

During the second wave of the COVID-19 pandemic, as part of the second course, distance groups with classes in Zoom were created for those students who could not continue their studies offline. For these sessions, the course was changed to include more intensive activities: working in teams with different numbers of participants, teamwork on Miro, electronic voting and quizzes. When all the universities in Moscow and St. Petersburg were transferred to distance learning – and this happened right in the middle of the course – all classes were successfully implemented online without loss of quality. Satisfaction with the second run was even 9% higher, and interest in the course did not change, 75% of students consider it very useful.

The components of success

The first is the conditions for organizing distance learning at ITMO University. This is the electronic booking of rooms in Zoom, which the teacher can do with "one click" in the IT system for any of their classes in their electronic timetable. This automatically provides notification with a link to all the students in the group. The second is the well-coordinated work of the team teachers who promptly processed plans for activities from offline to online, changing the mechanics of classes and placing all materials online. The third is the attitude of the students themselves to the course: their motivation and involvement. Fourth, the experience of the teaching staff in conducting online classes and their readiness to be flexible. Difficulties arising during the course (no-shows, lack of access to Moodle etc.) are promptly resolved by the team responsible for organizing the course.

An analysis of the Learning Experience of the course "Effective team management" identified key points of the students' experience: enrollment in groups, registration in Moodle, team exercises, tracking progress, assembling a portfolio, completing a lesson. It is at these points that the main impressions of the learners are created or changed. Our case makes it clear that in blended learning for soft skills, offline formats are the basic environment and online classes enrich this environment and allow the transfer of acquired skills to the "reflected" reality and expand the experience of students. When mapping the blended learning experience as a whole, these moments of transition from online to offline and vice versa must be taken into account – these are the points that can create the best learning experience or, on the contrary, dramatically reduce engagement.

The specificity of online courses on soft skills from the point of view of the Learning Experience is that the presentation of the material should be as emotional as possible. Here the effect of a "stage" is triggered, where it is better to overact than underact. A good online activity is a continuous performance with a quick change of scenery, which provides dynamics and engagement. Online learning is based on digital etiquette, which include turning on the camera, turning off the sound, and the use of stickers to indicate reactions.

Thanks to this approach, student engagement and effectiveness are improving, and the popularity of the course is growing (the number of students increased by 19%) and more popular in terms of choice. In the first stream, 65% of undergraduates attended 90% of the classes, in the second, 77% had almost one hundred percent attendance.

Thanks to the analysis of the students' experiences, the content and format of the classes can be quickly and flexibly adjusted, specific exercises based on the information received can be changed, ultimately increasing the quality of training and the effectiveness of the classes. For example, at the suggestion of foreign students of the first stream, the course was supplemented with an English-Russian glossary of terms to facilitate the understanding and learning of the course terminology.

In general, from the point of view of the Learning Experience, it is clear that the development of soft skills occurs not only in the learning process, but also in communication among the group and the teacher, which must be taken into account in the development of the content and format of such courses. Success is achieved not just by measuring achievements but by continuously monitoring learning experiences.

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A Closer Look: Contextualizing the Impact of E-Learning on Study Performance

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Digitalization has increasingly affected higher education over the past decade. This trend was abruptly and exponentially accelerated on a global scale by the COVID-19 pandemic and its direct and indirect consequences for teaching and learning. E-learning is no longer a choice, but a necessity.

In this short piece, we briefly discuss some of the results of a case study of the teaching activities at the University of Tartu (Estonia) and use several key findings as a stepping stone to a better understand of learning and teaching by comparing the impact of the presence or absence of e-learning components in two similar samples of online and offline students on the same course. The objective of our commentary is not only to contribute to the scholarly and professional debate, but also to provide an original perspective on the possibilities of e-learning in enhancing the study process, which is needed in the ongoing global health emergency and considering the unprecedented related challenges faced by higher education globally.

Our case study is concerned with one of the most innovative courses taught at the Johan Skytte Institute of Political Studies of the University of Tartu (SHRG.02.025. "Measuring the Impact of e-Government: Economic, Political and Social Outcomes"), which was among the first at the university to introduce a two-track system of course attendance. Given the flexible format and attendance mode, the assessment of SHRG.02.025 was particularly relevant during the ongoing health crisis and the related restrictions. The course's innovative nature is not limited to its format, but deals also with its content. SHRG.02.025 is an empirical, problem-based course which requires students' comprehension of the principles of impact evaluation through the completion of assignments related to practical workshops in R, writing a collaborative group project, and actively taking part in class discussions.

Given its format, it provides a unique opportunity to test (and isolate) the impact of e-learning, considering that the online and offline tracks were identical in structure, format, and assessment criteria. The course has also been repeated over several different years (2016–2019) and the online and offline tracks have been attended by numerous and comparable cohorts of students. We have analyzed the data aggregated from the first two runs.

In our approach, we draw upon quantitative data: students' performance attendance sheets and overall performance from the Study Information System of the University of Tartu. To qualitatively estimate the effect on students' attitudes, post-course feedback surveys using Moodle and Google Forms are used. In total, we coded 135 students (our unit of analysis) from the first batch of data collected in 2016 and 2017, where the ratio of online to offline students after two courses is 65 online students to 70 offline students (39/33 in the spring 2017 cohort, and 26/37 in the spring 2016 cohort).

The quantitative data collected from the Student Information System and anonymized have been grouped and coded in a coherent and original dataset in order to allow the highest level of comparability for the descriptive and inferential analysis.

Discussion of results

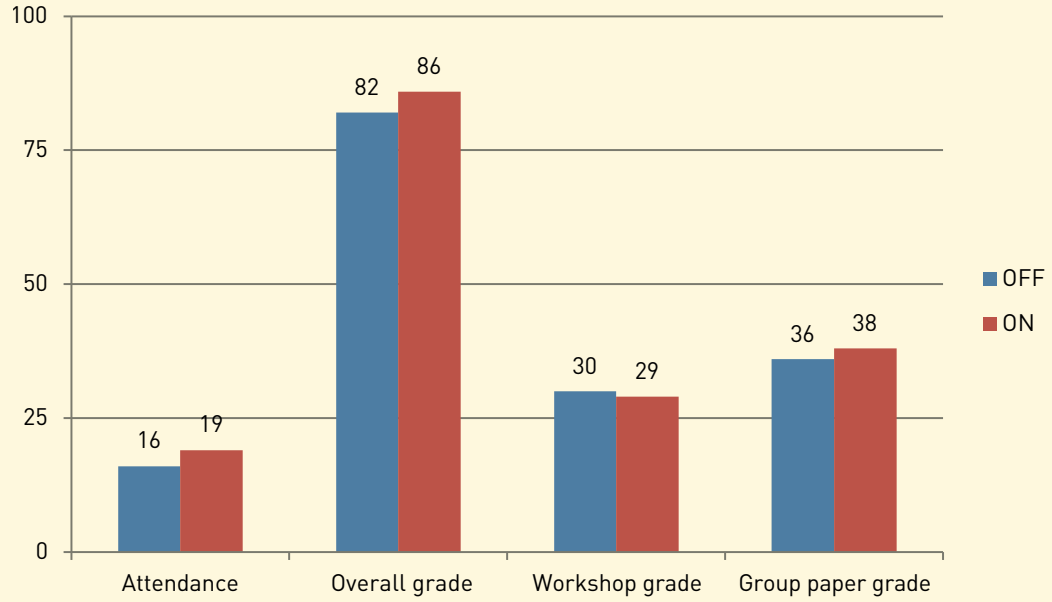
After assessing the data, our results suggest that despite the impact of other competing explanatory factors (such as gender, affiliation, and study level) a distinctive e-learning impact is confirmed. In particular, the most tangible positive effect can be found in student attendance and overall grades. Our data show that there is a direct correlation between attendance and workshop performance.

A similar trend is confirmed by the qualitative feedback which confirms the selective positive impact of e-learning only on certain specific aspects of the students' cognitive mechanisms especially for time-sensitive or task-related components. For example, multiple students included in the study praised the possibility of accessing video lectures outside of class time as a valuable feature of the course, which allowed them to work through the material of the course at any time. Accordingly, one of the students in 2017 pointed out that "the course managers endeavored to make all students enrolled in the course participate in every activity. I, as an online student, did not feel any different from those in the physical class" [1]. Another student from the previous year said that "luckily, as an online student, I could scroll the lecture back and forth as much as needed to grasp the logic behind the graphs, models etc" [2].

Our quantitative analysis also illustrates a moderate, although visible, positive effect of e-learning on students' performance in the coordination of the group project. The results of the qualitative analysis are in line with this finding. Students from the offline group more often bring up issues related to the lack of intra-group coordination, compared to students in the online cohort. In line with that, one of the students from the 2017 offline cohort said that "getting data

for the project was very hectic and in my own case made me postpone starting the project" [1]. Another student from the same offline cohort said that "writing the final report in groups of 5 people is very exhausting and frustrating. Smaller groups would be helpful to be able to write better reports" [1]. These results seem to suggest a potentially counter-intuitive trend: better intra-group coordination among the online cohort of student compared to their offline counterparts.

Figure 1. Comparative performance of online and offline groups



Note: The overall grade is computed according to a scale of 100 points: attendance = 20 points, workshop = 35 points, and group paper = 45 points.

The findings introduced in this commentary represent only a brief snapshot of a much wider analysis of the trends and impact of e-learning on students' performance. While data from the most recent runs of the course are still being evaluated, the preliminary results suggest a trend consistent with the patterns identified in earlier courses. We believe that the inclusion of new and more recent study cohorts could serve as a good testing ground for further assessing the effectiveness of e-learning in the context of students' cognitive mechanisms and engagement in the study process, especially in the context of the global pandemic, which pushed the possibilities of digitalization to the limits and tested its compatibility with traditional learning outcomes. Although our study is still a work in progress, we believe that in the current context, it is more relevant than ever for the scholarly community to engage in such comparative exercises to better understand students' behavioral patterns and to improve the course material and study process. More specifically, comparing and evaluating various components of the course help educators to better match forms and types of study material, thereby maximizing students' learning.

When it comes to the specific field of social sciences, a few lessons can be learned. A number of in-house and global indicators show that social sciences and humanities overall, are generally conservative when it comes to the use of ICT and, more specifically, online teaching. Given these limitations, when it comes to the course under investigation in this study, one of the incentives to adopt a blended-learning format is related to its ICT or digital content. Regrettably, this is not necessarily the case for most of the courses in social sciences. The results of this study, however, clearly show how the advantages of e-learning are not a function of the degree of ICT-friendliness of the specific course, but are dependent on a number of factors disconnected from the nature of the subject. In this respect, our suggestion is to gradually disconnect the topic from presence or absence of ICT-friendly content, while looking closer at students' attitudes, learning objectives, and assessment criteria.

Our study suggests that diversifying not only the content of a course and its assessment, but also the format through which this content is conveyed and assessment is conducted, is an effective way to stimulate students' responsiveness to different educational stimuli and foster their capacity to diversify their self-development and study process. These lessons are even more valuable as higher education is facing the global challenge of a sudden digital transition without undermining the learning process and study content.

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Pandemic Effects on Russian Higher Education: Force Majeure Notes

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The forced transition to distance learning in March 2020 was a stress test for the Russian higher education system. It affected all aspects of university life and demanded a radical restructuring of internal processes and principles. It also affected external communications with the regulator and other participants in the events, some of whom were not directly related to education, but began to play a decisive role in a pandemic (for example, the Russian Ministry of Health). Students, teachers and researchers were forced to adapt to the new conditions and to master new digital technologies and work methods, often experimenting on themselves, their colleagues and students through trial and error. The administration of universities and the Ministry of Science and Higher Education (MoSHE) needed to organize and provide infrastructure for this unprecedented "experiment" extremely quickly. Despite all the difficulties and problems, the Russian higher education system as a whole, passed this stress test [1]. However, the pandemic has exposed a number of systemic challenges and problems that go beyond the current moment and are important for the development of higher education in general. One of these challenges is the ineffectiveness of hierarchical management models with declining institutional and academic autonomy. This text discusses this problem and reflects on solutions for restructuring universities in the post-pandemic period.

The digitalization of higher education: the landscape on the eve of the pandemic

On the eve of the pandemic in Russia, there were lively discussions about the prospects for the digitalization of higher education. MoSHE and the senior management of leading universities supported the accelerated digitalization of teaching, arguing for the need for an innovative shake-up of the higher education system and the implementation of progressive international experience, concentrated in massive open online courses (MOOCs) offered by international and Russian providers, as well as the development of infrastructure for the implementation of online and distance learning (primarily, electronic learning management systems – LMS). The largest universities actively developed their own MOOCs and sought to integrate elements of online education into their educational process. Universities have been implementing electronic document management systems and LMS with varying speed and mixed results. But by the beginning of the COVID-19 pandemic, this process was very uneven and was far from reaching the planned results in terms of the coverage and quality of the digitalization of education management. The results of monitoring the readiness of universities to switch to a remote format show that 15% of universities did not have electronic systems to support online education, and less than half of the universities (45%) fully used them [2].

Around the pace and depth of digitalization in higher education, a rift has emerged between educational management and the university academic community. The fears of the latter were largely associated with the effect of the "uberization" of their work and the precariatization of professional status in the intensive transition to online education. Russian university professors, interviewed before the pandemic and the transition to a remote work format, expressed concerns about their future professional status and saw the risks of digitalization of teaching in revising the terms of labor contracts in the direction of worsening the position of workers [3]. These concerns are about the proletarianization of academic work with the use of digital tools and technologies as an additional way to control professional activities. At the beginning of the pandemic and the force majeure transition to distance learning in March 2020, institutional, sociocultural and organizational tensions already existed in the Russian higher education system between different groups of stakeholders regarding the paths, speed and depth of penetration of digital technologies into the spheres of academic work and university management.

Pandemic reset of higher education governance

Russia is a country with a high degree of administrative centralization in public administration, economics, social policy, and education. Most higher education institutions are state-owned and obey the orders of MoSHE, with a limited amount of institutional autonomy. Therefore, with rare exceptions, the entire system of higher education in Russia quickly switched to remote work and distance learning during the final two weeks of March 2020 by order of MoSHE.

Despite the overall success in transferring to distance learning and remote work of employees, the surveys of teaching staff show that the management of many universities during the transition provided insufficient support, in fact, leaving the operational administration of the educational process up to the teachers themselves [2]. Only 16% of teachers reported that the administrative services of the university were fully prepared for the transition to remote work, 25% were completely satisfied with the actions of the management and administrative services [4]. Under these conditions, the ability for grassroots self-organization of

the academic community played a significant role. The importance of horizontal communication between university employees, the presence of collective solidarity and a strong local professional culture at the level of departments, faculties, master's programs, etc. has significantly increased. The university revived academic autonomy at the grassroots level, corporate solidarity and mutual assistance in solving a common problem. Students were fully involved in this process. They, together with their teachers, solved the problems of organizing online learning.

Such grassroots initiatives often met with resistance from the university administration, which uphold the "rules of the game" laid down in federal state educational standards and other documents regulating the work of universities. In fact, universities were forced to act reactively, awaiting centralized decisions from the regulator. One of the striking examples of such a "wait and see" position was the policy regarding the remote defense of dissertations. In the absence of guidelines in the relevant regulations, the viva process was stopped completely. The only exceptions were a few universities, which received the right to award their own academic degrees and have a relatively high level of autonomy [5]. In addition, the research shows that one of the significant difficulties in the transition to distance learning was the increase in the bureaucratic burden on teachers with the intensification of requests from the administration to fill out various reporting forms [2]. The fundamental problem of modern Russian education – excessive bureaucracy and the overregulation of all processes of educational administration and management – was exposed. In many ways, this problem has become a deterrent to deepening the digitalization processes during the pandemic and has created additional difficulties for all participants in the educational process.

Where to next?

The transition to distance learning and remote work has shown that a number of basic principles of university management associated with the low level of institutional and professional autonomy, and the number of existing administrative procedures do not work for the sustainable development of the academic system. Excessive centralization and administrative overregulation reduce the potential for development, making the higher education system a regime of permanent accountability, where procedures and formal processes gradually erode creativity and innovation in research and teaching. The current situation can be used to audit and transform the principles of higher education governance.

Among the most important operational measures may include: (1) reducing administrative control over the work of universities, including the frequency and forms of inspections by government agencies (the introduction of inspection holidays during 2021-2022); (2) overcoming the imbalance in requirements for university teachers in terms of their teaching and research workload; (3) revising and simplifying the design of academic curricula; (4) an amnesty for KPIs in labor "effective contracts" for university employees (by 25% -50%).

In the long term, a comprehensive and independent audit of the administration of the Russian education system based on international experience is required. Such an audit should reduce the bureaucratic burden on the university community, get rid of outdated and often ineffective rules, optimize the management apparatus and practices at all levels of the system. The implementation of these measures requires the support of all stakeholders. In addition, it can be the basis of a "social contract" between MoSHE, the university management and the community of academic professionals.

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The Education System is a Driver of Societal Transformation in Digital Format

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The digital reality is firmly embedded in our lives. Examples of this phenomenon are ubiquitous mobile devices; social networks, which are the main means of commu-

nication for many people; cloud computing; geolocation sensors – the list goes on. All of this has had an impact on higher education.

L.N. Gumilyov Eurasian National University (ENU) is the leading university in Kazakhstan. According to the results of 2020, ENU is ranked 357 in the QS World University Ranking, and is the only higher educational institution in Central Asia in the world ranking for young universities according to the QS Top 50 Under 50 and Times Higher Education Young University Ranking.

In the current competitive environment and the crisis caused by the COVID-19 pandemic, ENU is committed to improving the educational experience offered, increasing its revenues and reducing costs. Higher education in general, and universities in particular, face serious problems in adapting to the digital society. The culture of universities, their stability and conservatism generate inertia and make it difficult to change their operating models. Higher education is ready for a digital breakthrough, which must be carried out systematically and consistently, preserving the accumulated knowledge and experience.

The state program "Digital Kazakhstan" is aimed at ensuring information security; increasing digital literacy in secondary, technical and vocational, higher education; increasing the digital literacy of the population (training, retraining), and supporting innovative development. To address these issues it is necessary to transform the education system in accordance with the best world practices.

A set of measures is being implemented for the digitalization and development of education and science in Kazakhstan. One of the main measures for this is the state program for the development of education and science in Kazakhstan 2020–2025, which is aimed at increasing the global competitiveness of education and science of Kazakhstan, as well as developing and training individuals on the basis of universal values.

Many universities have developed specific digital strategies in response to the massive shift to new technologies, but they are not effective. As a result, many institutions have invested heavily in ICT which do not provide the expected benefits and results. Higher education institutions are not ready to admit that a digital strategy alone is insufficient. In order to remain in demand in the digital era, each institution needs to take a strategic approach to ICT and all aspects of the university's activities. The lack of digital literacy among students and academic staff emphasizes the need to direct efforts to achieve fundamental changes in all parts of the institution. To choose some particular areas of digitalization is not enough, it is necessary to move on all fronts. The digitalization of management, the digital organization of the educational process, the development of the digital competencies of students and teachers, and defining the digitalization of the economy and society are the main research topics. A whole digital ecosystem needs to be created. Universities that are not able to adapt to the new digital era will be left behind.

The education system is designed to transform traditional society into its digital version. ENU has developed the Concept of a Digital Ecosystem for this purpose.

The digital ecosystem is understood as [1] a system in which the structure of organizations changes, creating a transition to a network economy and a knowledge-based economy. It provides continuous innovation, access to information, global value chains, specific services, the adaptation of new technologies, and the adoption of new business models.

The Concept defines the main directions of the digital development of ENU and helps to find new mechanisms, methods, and algorithms to increase the availability, efficiency and quality of services provided. These effects will ensure the simultaneous growth of capitalization and the implementation of the mission of ENU.

The unified digital management environment of the university will allow analytical research to be conducted in order to make optimal decisions, and increase the efficiency of existing business processes and the quality of education, research and management. It will lead to a reduction in costs due to the reengineering of existing and the development of new information systems (and an increase in wages through minimizing labor and reducing the time for rendering services) a reduction in the costs for consumables, a reduction in corruption risks, an increase in the transparency of decisions and an increase in digital literacy.

The university has a wide range of information systems and services that operate separately from each other and some of the data should be sent to state databases. At the current stage, we are working on the integration of information systems and services with each other and with external databases. This will allow consumers to use online assistants and provide self-contained services.

The unified Knowledge Base is used for academic and scientific activities, international cooperation, social and civil development, finance, economics and accounting, and human resource management.

The digital management of the university using the unified Knowledge Base will allow significant changes to be made. First, ENU can significantly reduce costs for the implementation, development and technical support of information systems. Secondly, it will ensure the collection of standardized data and the validation of data for subsequent analysis using big data and artificial intelligence technologies.

The exchange of data between ENU information systems on the basis of standardized formats and interaction mechanisms will make it possible to combine them and provide transparent, reliable, automated data exchange, eliminating the duplication of information and manual data entry.

The purpose of the Digital Ecosystem is to change the logic of the processes and transition of the ENU to management based on digital technologies and big data analysis. A necessary condition for ensuring the reliability of operational management information is the use of a single data model, which uniquely determines the processes and the relationship between them.

The creation of ENU's Digital Ecosystem enhances the digital development of the university, which means the optimization of, and/or a change in, the logic of the university's processes. The ecosystem consists of several smart components dealing with the areas of management, services, learning process, science, information security and IT infrastructure. The goals and objectives are important for the implementation of intelligent control systems based on digital technologies at ENU.

The digital development of the university is impossible without appropriate staffing. In addition to the continuous development of the ICT infrastructure and ensuring information security, it is necessary to constantly develop the digital skills of the academic staff, students and employees of the university.

Table 1. The main effects from the implementation of the Concept of a Digital Ecosystem

Subject	Effects
Government	Reducing expenses at ENU. Reducing corruption risks. Ensuring the transparency of decisions. Increasing digital literacy of the population (training, retraining).
ENU	The development of MOOCs and an increase in the number of students. Reducing wage costs by reducing the number of employees in structural divisions.
Employees of structural divisions	Reducing labor costs and the time for rendering services due to the optimization of business processes and information systems.
Teaching Staff	Reducing labor costs due to the reengineering of existing and the development of new information systems. Advanced training of teaching staff on new digital technologies.
Learners	Reducing unequal access to educational resources. Increased accessibility to quality digital content. Convenience of receiving educational services.

Conclusion

The implementation of the Concept will have a positive impact on the individual, institutional and the national levels. The implementation of the Concept will entail irreversible and sustainable cultural and behavioral changes for teaching staff, students and managers. This will enhance the use of digital technologies and initiate a sustainable increase in productivity and efficiency. This will enable the university to become a digital education leader as outlined in the University's Strategy 2021–2025. Digital leadership in research, teaching and learning requires the university to focus on data analytics and excellence in research and education delivery. The Concept of the Digital Ecosystem at ENU describes the goals, objectives, principles and opportunities necessary for the university to flourish and adapt to a rapidly changing environment.

- Technology, science and education are now interdependent.
- New technologies create opportunities for transformation.
- Investments in technology deliver measurable results.
- Making management decisions should be based on the analysis of data about the university activities.
- Digital content complements traditional learning, which increases the flexibility of the educational process.

All of these aspects must be taken into account when creating a digital university ecosystem.

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The State of the Digitalization of Higher Education in Uzbekistan: Successes, Problems and Future Tasks

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The measures taken to ensure the continuity of the education during the pandemic

From April 1, 2020, higher education in Uzbekistan turned towards distance learning because of the global COVID-19 pandemic. Uzbekistan, like so many other

countries in the world, was not fully ready for this. However, the rapid digitalization of the education system was carried out, and measures were taken to maintain the quality of education. In particular, the internet speed in higher education institutions, which depends on the number of students, doubled on average. In collaboration with the Ministry for Development of Information Technologies and Communications, in higher education institutions from the 2020–2021 academic year, a preferential tariff was developed to increase the speed of the internet to 1 Gb/s in order to increase the efficiency of distance learning platforms.

Measures are being taken to provide special preferential traffic enabling free access to distance learning platforms and database systems at higher education institutions and the use of other educational resources by all telecommunication operators working in Uzbekistan. Currently, the mobile operator Mobil.uz has introduced a new preferential tariff plan for students and teachers.

During the pandemic, a considerable number of measures have been taken to introduce distance learning in the higher education system. For instance, in order to ensure the continuity of the educational process, to organize the collective use of educational resources, the distance learning website https://dist.edu.uz was launched. This integrates the e-learning resources of all higher education institutions onto a single platform.

Requirements for e-learning resources, guidelines for creating resources for distance learning, and routers for students to use distance learning courses were prepared and submitted to universities by the Ministry of Higher and Secondary Special Education.

Webinars are held for officials and professors of higher education institutions about these guidelines and requirements for the implementation of distance learning platforms. In preparation for the 2020–2021 academic year, 6,102 e-learning resources were improved, and 1,098 new e-learning resources were created. 88 state higher educational institutions started the 2020–2021 academic year with distance learning for senior courses (402,165 students). Extra-curricular courses have been introduced at http://mk.bimm.uz/ to teach professors and teachers the technology of distance learning.

A website https://tube.edu.uz has been launched on the TAS-IX network to present video lectures, and now there are more than 400 available. A website for special fiction https://audiobook.edu.uz, a part of the TAS-IX network, has also been launched and approximately 100 audiobooks have been posted. The @eduuz_online channel has been launched on the Telegram social network to support distance learning. Webinars have also begun to proliferate. Professors and teachers of higher educational institutions of Uzbekistan have created and shared video lectures through this channel and the students have reaped the fruits of this enterprise. Free access to courses on the open online platform Coursera is provided for university teachers and students.

A number of projects have been carried out to develop and implement information systems:

- an information system for managing higher education as part of a digital university project;
- an online application for admission to master's degree programs, the transfer and reinstatement of students, entrance examinations for secondary education, academic lyceums, vocational schools, colleges and technical schools;
- in 2019/2020, state diploma information for undergraduate and graduate students of higher education institutions was fully digitized through an individual QR-coding system;
- national online science Olympiads among students of higher education institutions have been developed. More than 20,000 students have taken part in the National Online Science Olympiads;
- a database of degrees issued by higher education institutions since 1991 has been formed. More than 1,532,000 degrees were awarded during this period. To date, more than 970,000 degrees have been digitized. This information system was integrated with the information systems of the Ministry of Employment and Labor Relations and the Ministry of Foreign Affairs;
- "Scientific Journals of Uzbekistan" (https://uzjournals.edu.uz) was created to promote the work of Uzbek scientists around the world, to bring scientific journals of higher education institutions in line with international standards, to create opportunities for young people to publish scientific articles internationally, and the scientific journals of 41 higher education institutions were reorganized on the basis of the standards of international scientific and technical databases;
- the site iq.edu.uz was put into operation in order to facilitate the spending of students' free time meaningfully and increase their logical thinking. To date, more than 1,000 students have been certified by solving tests on the platform.

Pressing problems in the digitalization of higher education

Despite the work done and the results achieved, there are a number of problems still to be solved in the digitalization of higher education:

- the monthly salary of specialists is below the average market indicators, therefore, there is a need to create favorable conditions and a competitive environment;
- there is insufficient ICT infrastructure in higher education institutions;
- educational information management systems are not available in higher education institutions;
- there is a lack of studios and media centers that produce audiovisual educational content and multimedia educational products (audiobooks, 3D, VR technologies, etc.);

- the competence of teachers in the organization of distance learning does not fully meet the present requirements;
- web metrics on the websites of higher education institutions are below international standards;
- virtual training laboratories in special subjects are not sufficient.

Given the current state of the digitalization of higher education in Uzbekistan, the following proposals are put forward for the development of the sector:

- the implementation of measures to digitize educational process;
- expand the introduction of distance learning;
- develop the skills of teachers and students to create and use electronic information and educational resources;
- the establishment of a system of training for engineers and technicians for the digital economy;
- the improvement of ICT infrastructure at higher education institutions.
- the introduction of the "Digital University" information system in higher education institutions, the creation of electronic teaching materials. Through this system, we can introduce student grade books; digitize group journals, the deans' activities and student portfolios; and automate the management and monitoring of educational and research activities;
- the establishment of studios for the production of educational audiovisual content and educational multimedia products for distance learning;
- the development of a single "Digital Library" for teachers, researchers and students with the integration of digital catalogs of academic literature.
- the individualization of educational processes based on digital technologies, the development of distance learning services, the widespread introduction of webinars, "blended learning", and "flipped classroom" technologies.

Conclusion

Despite the work done to stabilize education during the pandemic, there is much yet to be done. However, we think that the measures taken by the government of Uzbekistan have laid the foundation for what we plan to accomplish in the coming years. The achievements in the past months reflect the will and the determination of the government to meet international educational standards, but this determination can only be fully realized when it is undertaken cooperatively: that is, it is sponsored and promoted by the government, or the organizations that have the resources, and formulated by those who have the abilities to implement it.

Transforming University Learning Environments: Key Processes of Educational Development

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Introduction

Much attention has recently been paid to the development of different learning environments in university contexts. University campus buildings have been transformed to provide open and flexible spaces for varied, collaborative and interactive teaching and learning. The demand for development has been brought about by the call for digital learning environments, by the ideas of community learning and student-centeredness and by the need to improve students' professional skills. The COVID-19 situation is posing further demands for developing hybrid learning environments.

This paper approaches the development of learning environments by first looking at the general conditions based on previous research. It then looks at some pedagogical models that guide this development, and their practical implementations. Finally, some guidelines for future transformation are outlined.

The development of learning environments and operational culture

According to studies on the development of university education, (e.g. Fraser, Gosling, Sorcinelli, 2010 [1]; Hirsto & Löytönen, 2011 [2]), three different models can be distinguished in the enhancement of university education: those focused on the individual, the institution or the whole university sector. When attention is paid primarily to the individual university teacher, the development is often focused on different ways of planning, implementing and evaluating teaching. University pedagogical training at different universities often supports the advancement of an individual teacher in teaching skills and in guiding students' learning.

When the whole institution is the object of development, the primary focus is on the improvement of structures and organizational change, i.e. the implementation of strategic plans and objectives, often also monitoring the performance of students. In this case, the function of teacher development is to primarily serve strategic leadership. However, according to Fraser, Gosling and Sorcinelli [1], the entire university education sector can also be at the heart

of the enhancement of teaching, in which case the aim is to develop either certain pedagogical issues through the university sector or, for example, teaching in a specific field.

From an international perspective, university-based teaching development supports the improvement of the quality of learning and teaching, as well as the implementation of up-to-date curricula (see, for example, Barnett & Coate, 2005 [3]). Many teaching development units have pursued this primarily through the training and professional development of university teachers, focusing less on another key element of teaching progress—curriculum development [3]. Since Barnett and Coate's (2005) seminal work, a lot of research has been devoted to curriculum development in higher education, but still it seems to need more clear focus in practice. One of the challenges may be that there is not enough continuous research conducted on the success and effectiveness of curricula or study programs. It is mostly, at its best, investigated through administrative reports.

The core processes of educational development

The transformation of learning environments and the preconditions for change in operating cultures can be examined through general core processes of educational development. Hirsto [4], [5] has described three core processes that operate at different levels of the institutional educational context: strategic work, competence development and curriculum work. These processes integrate many of the perspectives present in the educational development literature (e.g. Anakin, Spronken-Smith, Healey & Vajoczki, 2018 [6]; Bens, Kolomitro & Han, 2020 [7]; Shagrir, 2017 [8]).

A key management tool is the strategy that runs through the organization where goals are set at different levels. This is a cyclical process, utilizing research-based feedback and evaluation as a basis for decision-making.

In competence development, university teachers often participate in pedagogical or instructional courses. In developing teachers' expertise, the idea of a scholarship of teaching and learning (SoTL) has been important (e.g. Gibbs, 2013 [9]). SoTL includes the idea that evolving as a university teacher requires a scholarly approach in which teachers are developing their own teaching through educational research, and write scholarly articles based on this, to be assessed by the wider scholarly community. University teachers' need for support in continuous professional development is apparent in the context of, e.g., the rapidly changing technological environment. It has also been suggested that collaboration is an important component of academic and professional progress [8]. It is essential that collaboration is facilitated on various levels, not only between teachers, but also with management and administrative staff.

The third key process affecting the development of learning environments and teaching is curriculum work. A prerequisite for the development of teaching in this respect is that the teacher seeks feedback on his or her teaching, its goals, implementation and evaluation in different ways.

Curriculum work as a core process of development can be viewed from the point of view of drawing up the curricula for a whole educational program, but also from the viewpoint of semester planning or the planning of individual lessons. Feedback can be collected in many ways, and with digital pedagogy, the teacher can also use a wide range of data that can provide perspectives on, e.g., students' time management and the pace of studies.

Underlying the core processes of educational development is the idea that all these processes need to be influenced and invested in, in order to bring about sustainable change in institutional learning environments. First, the leadership must formulate a shared vision and goals for the development of teaching in a dialogue with faculties and students. Secondly, the skills of teachers and their support in the utilization and introduction of technology or new kinds of physical environments must be ensured. Thirdly, there is a need to consider how different physical, social, and digital learning environments can be utilized in different subjects, in different classes, during different phases of studies and for different learners.

Core processes and the digitalization of teaching

In addition to paying attention to the core processes of educational development in changing teaching and learning environments, there is much research on the elements which support teachers' adoption of technology. One of the models is the unified theory of the acceptance and use of technology (UTAUT) (e.g. Venkatesh, Morris, Davis & Davis, 2003 [10]). From the UTAUT viewpoint, it is important to consider in more detail how university teachers perceive the challenges and outcomes of adopting technology in their teaching. The development of the use of ICT can be viewed as a network of different effects. According to the UTAUT model, change in technology use is influenced by how much the individuals expect that they need to invest time and effort in it, and how they expect themselves to cope in a new operating culture. Social support is also important in bringing about change, as it can influence the willingness of teachers and facilitators of learning environments to change. The utilization of ICT in teaching is also influenced by various contextual factors, such as support services and the user-friendliness of equipment.

According to Mumtaz's (2000) review [11], teachers' use of ICT is also affected by the availability of resources, the quality of applications and equipment, and its ease of use. He also highlights broader perspectives behind change, such as incentives for pedagogical change, experiences of support and community in the faculty, as well as national and institution-level regulations. According to Mumtaz [11], the individual's general commitment to continuing professional development and ICT skills brought about by background training are also relevant. These individual perspectives are also related to Venkatesh et al. [10], and

Ifenthaler and Schweinbenz's [12] view of the burden of an individual's own investment: if a teacher sees continuous professional development as important and has some of the skills required for change, he or she is likely to experience less of the required self-investment.

The question is what kind of learning environments there should be in the future and how to create them. It has been suggested that future learning environments will be more variable than today. The learning environment can be viewed and designed from physical, technological, social, didactic, and local perspectives (Manninen et al., 2007 [13]). In addition to, and instead of, traditional formal classroom learning, students will study in a variety of informal and non-formal, virtual (VR) and augmented (AR) learning environments. In developing formal learning environments in different directions, universities and similar institutions are key development environments. Teachers need the skills to utilize these varied learning environments, and support in integrating these new learning environments into their teaching and curricula on a more general level.

The conditions for the successful implementation of a developmental idea (device, software, pedagogical model, etc.) can be examined and influenced by the questions and perspectives presented in this paper. Key questions in educational evolvement should focus on how teachers' competence can be elaborated in terms of instructional or personal advancement in order to digitalize their teaching, how organizational strategical processes can engage faculty in digitalizing their teaching on different levels, and how pedagogical ideas could be facilitated among teachers in order to support collaborative curriculum development to enhance the digitalization of their whole program.

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