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TRANSFORMATION OF EDUCATIONAL PROCESS IN COVID-19 PANDEMIC: A CASE OF IGOR SIKORSKY KYIV POLYTECHNIC INSTITUTE

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The rapid spread of the SARS-CoV-2 coronavirus has led to the global COVID-19 pandemic and a lockdown was introduced in Ukraine in March 2020. This forced universities to urgently transform the traditional system of organisation of the educational process and transfer to distance learning. This study aims to evaluate the distance learning system organised by a technical university in COVID-19 lockdowns from the perspective of the students as the main stakeholders of education. The method of the survey as the most widely used research method of sociological research was used to collect and analyse the data obtained. In this context, a number of surveys involving from 2,721 to 9,000 students of technical and humanitarian specialities were conducted to evaluate the level of their satisfaction with the distance learning system. The results of the study showed that the transformations introduced in the organisation and realisation of the learning process were on the whole positively estimated by students, which means that the elements of distance learning should remain after the end of the lockdown restrictions. However, more research is needed to evaluate the diagnostic tools for preventing academic dishonesty.

Keywords: higher education; educational process; learning outcomes; distance learning; diagnostic tools; education technologies.

Introduction

In the last decade, there has been an active penetration of information technology in all spheres of public life and the field of education is no exception (Daanen & Facer, 2007; Kop & Hill, 2008; Zhu, 2020). The current state of development of the education system is characterised by the growing role of information and communication technologies in education. The development of information technology has allowed education to go beyond classrooms and provide assistance for lifelong learning (Bonfield et al., 2020) in a new format (Ellahi et al., 2019; Owusu-Fordjour, Koomson & Hanson, 2020). New education is a response to the needs of Industry 4.0, where man and technology combine to open up new opportunities (Hussin, 2018). Despite the fact that the system of blended learning has been widely used in the higher education system of Ukraine, gradually displacing traditional forms of education (Mizyuk, 2019, Shandra, Yuzyk & Zlenko, 2021), the global COVID-19 pandemic has become a powerful catalyst in transforming the educational process and moving it to the distance mode (Watermeyer et al., 2021).

Many higher education institutions have taken advantage of online education opportunities and created a virtual educational environment within universities (Elumalai et al., 2020; Bao, 2020; Toquero, 2020; Smith et al, 2016), which has changed the system of interaction between the participants of the educational process (teachers and students), making it flexible and accessible. For example, the largest technical university of Ukraine Igor Sikorsky Kyiv Polytechnic Institute has introduced a virtual learning environment – "Sikorsky" Distance Learning Platform. It provides administrators, teachers and students with ample opportunities to apply modern distance learning technologies, develop web resources for academic disciplines, organise interaction between teachers and students, as well as manage the distance learning process. The availability of information and communication technologies and the ability to use them for educational purposes are key aspects in the proper organisation of the educational process in conditions of strict quarantine restrictions associated with the coronavirus pandemic.

Today, there is a wide variety of learning management system (LMS) platforms in the world. For example, the most common ones in the United States and Canada, according to IBL News (Phil Hill, 2020), are Instructure Canvas, Blackboard Learn, D2L Brightspace and Moodle. Among the existing platforms, open-source platforms are in high demand. These are Moodle, Open edX, Canvas, Sakai, Litmos, BrainCert

and others. Ukrainian universities most often use LMS – Moodle, due to the high level of functionality, wide communication capabilities, support for all possible formats, easy integration with other services, the availability of mobile versions. At the same time, in Ukraine, universities have begun to make extensive use of the Google Workspace cloud service (formerly GSuite for Education) and online services for teamwork – Microsoft Teams. They are simpler in use, but functionally more limited than Moodle. Coursera, Prometheus, VUMonline, EdEra e-learning platforms have become an important tool for expanding learning opportunities (Nenko, Kybalna & Snisarenko, 2020; Stukalo & Simakhova, 2020).

In this context, the question arises about the pros and cons of such a rapid transformation of education. Since the introduction of quarantine restrictions and the transition of educational institutions to distance learning, educators around the world have been trying to answer these questions and evaluate the effectiveness of distance learning, particularly for higher education (Can Aksu, 2020; Naciri et al., 2020; Pokhrel & Chhetri, 2021; Brammer & Clark, 2020; Eric M. Anderman & Sungjun Won, 2019). In Ukraine, the problems of online learning during quarantine have also been studied quite intensively (Lavrinenko, 2020; Soter, 2020; Mizyuk, 2019; Mukan & Lavrysh, 2020; Lukianenko & Vadaska, 2020; Lytovchenko & Voronina, 2020). Malovany (2020) found that the main problems faced by the participants of educational interactions in distance learning include: lack of quality Internet communication, incomplete provision of participants of the educational process with the necessary technical equipment, lack of previous experience and knowledge of the methodology of distance learning. Also, an important problem of online education is the lack of psychophysiological readiness of participants of the educational process to new conditions of learning, which leads to fatigue and the need for a lengthy period of adaptation. These factors are important for students' ability to learn online (Hew, 2014; Gürler, Uslu & Daştan, 2020).

Analysing the challenges facing education systems around the world, Rashid and Yadav (2020) note that, "The pandemic has exposed the vulnerabilities and shortcomings of current education systems and has also emphasised the need for digital literacy development, particularly in times like these, for both developed and developing countries. …. The current situation has challenged deep-rooted notions about the role of higher education institutions in providing quality education, mode of delivery, accessibility, the importance of lifelong learning, and educator's perceptions about the type of learners. This may provide insight to educators and policymakers for the overall improvement of education systems around the world" (Rashid & Yadav, 2020, p. 341).

Thus, the current transformations taking place in higher education during the COVID-19 pandemic need to solve such problems as: the formation of effective management models in higher education institutions, technical improvement of the organisation and implementation of learning; ensuring the quality of educational programmes; ensuring integrity. In this context, our study aims to evaluate the distance learning system organised by National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" in COVID-19 lockdowns from the perspective of students as the main stakeholders of the educational process.

Methods

To achieve the aim of the study, we used the quantitative research design, particularly an online questionnaire as a quantitative method of sociological research. During November-December 2020, we conducted a survey among the students about their satisfaction with the educational process, i.e. ensuring the quality of education and management in the distance mode, providing technical support for online learning, maintaining academic integrity. The sample size was 2,721 respondents, representing all faculties and institutes of Igor Sikorsky Kyiv Polytechnic Institute. The study involved 40.2% of female respondents and 59.8% of male respondents. The questionnaire included a number of closed and open questions. The results were processed using "OCA NewLine" licenced software.

In addition, another survey was conducted in January 2021 which assessed the digital skills of the teaching staff using a special module of the automated LMS "Electronic Campus". The students were asked to rate the teachers who conducted classes in the previous semester using a 5-point scale where 5 indicated complete compliance with the criterion, and 1 indicated complete non-compliance. The sample of respondents, depending on the year, ranged from 7,000 to 9,000 students, which is quite sufficient to obtain representative data. A teacher's average score, according to the results of the survey was displayed in his/her account.

To provide technical support for the teachers and students during distance education, Igor Sikorsky Kyiv Polytechnic Institute introduced an open "Sikorsky" Distance Learning Platform, which is based on two systems – Moodle and Google Workspace. This approach, on the one hand, simplifies the work of teachers who can choose any system based on their own preferences and needs, and on the other hand – supports the administration of the educational process.

The transformations of higher education have affected a number of aspects of the educational process, which are generally interconnected in such a way that changes in one of them lead to changes in the others. First of all, we mean the changes in teaching methods, i.e, the development of relevant strategies to achieve the learning outcomes. The second aspect concerns the software and hardware support of the educational interactions, as well as technical support of the process of managing educational activities. The third aspect is related to following the ethical imperatives of the behaviour of participants in the educational process. Another integral component of the educational process that has undergone transformations is the system of quality assurance of the educational process.

Results

Technical improvement of the organisation of learning

The main platforms where the teachers of Igor Sikorsky Kyiv Polytechnic Institute can locate their distance learning courses are Moodle and Google Workspace. The first "leap" in the number of distance learning courses (+1366) in the period from March to June 2020 (Fig. 1) was caused by the transition to remote learning mode after the beginning of the lockdown in Ukraine. The second "leap" (+913) from June to September 2020 was caused by two factors: 1) teachers taking professional development causes on the creation of distance learning courses for students which the university provided free of charge on the basis of the Institute of Postgraduate Education; 2) teachers' vacation period, when they were not engaged in the education process and had more time for creating distance learning courses. Such a rapid increase in the number of learning courses has led to an increase in the number of registered users of the system (from 2777 users in March 2020 to 22861 in January 2021).

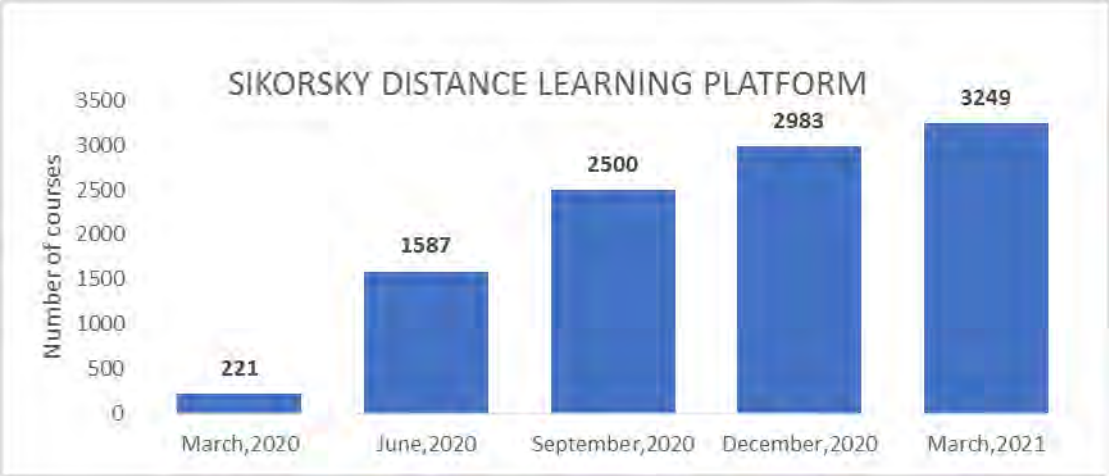

Figure 1. Number of distance learning courses on "Sikorsky" distance learning platform

Another problem faced by our university is the uneven level of readiness of teachers to conduct the educational process online. As can be seen from the students' assessment of teachers' distance learning skills (using a 5-point scale where 5 is the highest and 1 is the lowest point), the level of digital competence of the teaching staff increased in the transition to remote learning mode (Fig. 2). In fact, the lockdown restrictions forced teachers, even those inclined to use traditional forms of interaction with students, to master new electronic tools and implement them in the educational process.

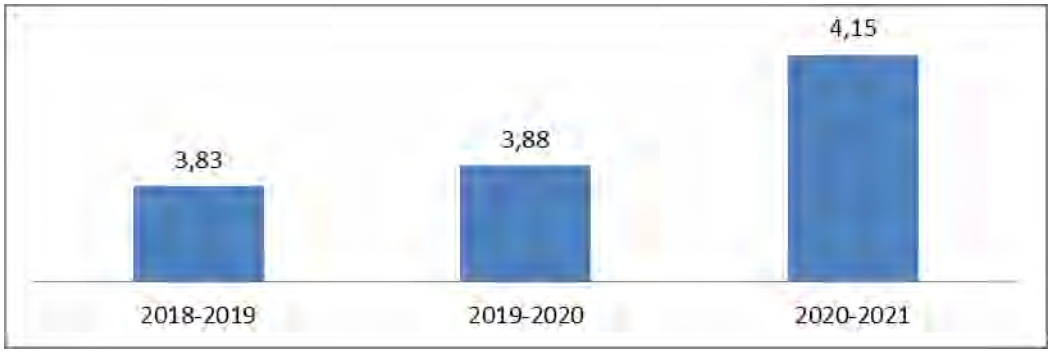

Figure 2. Students' assessment of teachers' digital competence

Improving the management system

The organisation of learning and assessment in the distance mode affects the administrative component of the educational process. In contrast to previous approaches to reforming the education system, transformations during the pandemic period simultaneously affected the entire education system and all levels of its functioning. Thus, the systems of management of the educational process have acquired a new quality.

It is important to control the interaction of participants in the educational process at all stages of its operation. This organisational and control function is performed by administrators of educational departments (heads of departments, deans of faculties, deans' offices). Igor Sikorsky Kyiv Polytechnic Institute uses its own automated information system "Electronic Campus" which ensures interaction between all participants of the educational process and has become an effective tool for student-teacher-administrator interaction in online learning. The Electronic Campus allows teachers to display students' grades, students – to see their grades, heads of departments and faculties – to obtain assessment results for further analysis and managerial decisions.

Ensuring the quality of educational programmes

One of the key issues in the transformation of education in the pandemic time was the risk of lowering the quality of education. It should be mentioned that the quality of the educational process is determined by a number of determinants, among which are: the quality of teaching staff, the quality of educational content, the quality of technical support, the quality of learners. In our opinion, an indirect indicator of the quality of the educational process can be the students' self-assessment of their knowledge and skills in the pre-lockdown period and the period of distance learning in lockdown (Figure 3). As can be seen, the students' attitudes to the statement "I acquire good knowledge and skills in my educational programme" before the pandemic (2019) and during the pandemic (2020-2021) remained almost the same, which gives us ground to consider that the quality of education was not compromised in distance learning.

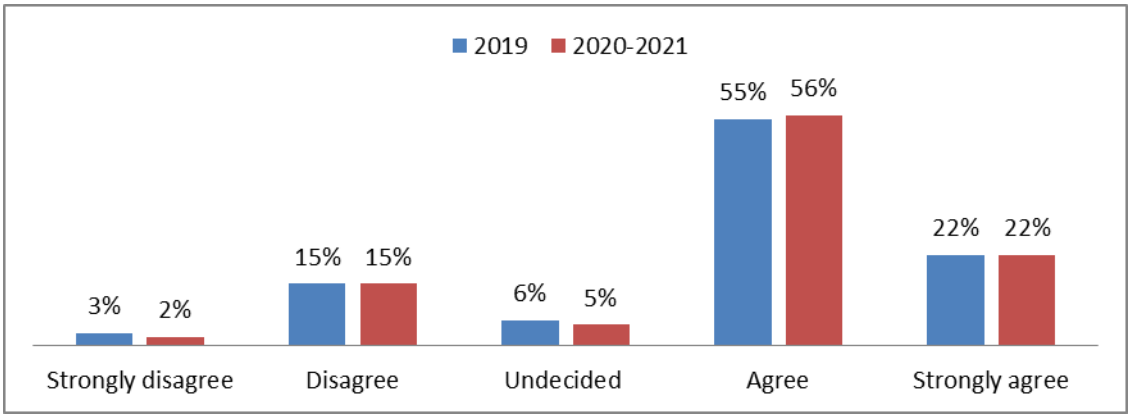

Figure 3. Students' attitudes to the statement "I acquire good knowledge and skills in my educational programme" before the pandemic (2019) and during the pandemic (2020-2021)

The researchers were also interested in how the changes associated with the pandemic affected the students' motivation for learning and found that, according to the respondents' self-assessment of their own learning efforts (Figs. 4, 5) during the pandemic (2020-2021), the vast majority of students were diligent in learning and attended classes regularly.

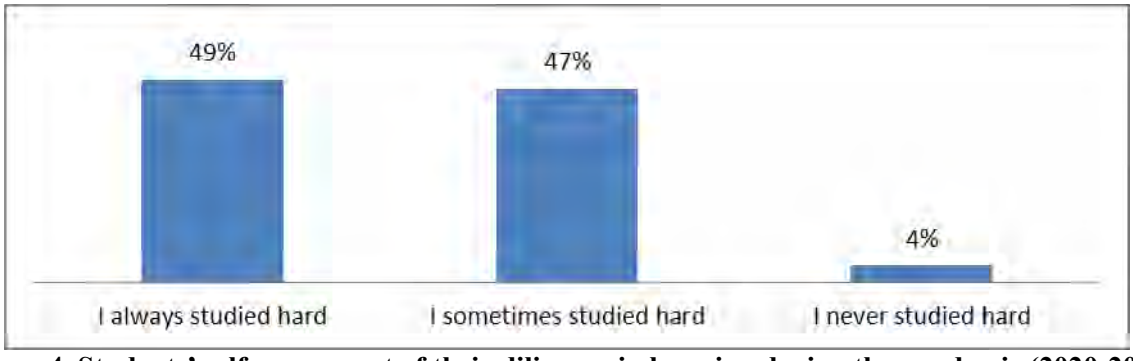

Figure 4. Students' self-assessment of their diligence in learning during the pandemic (2020-2021)

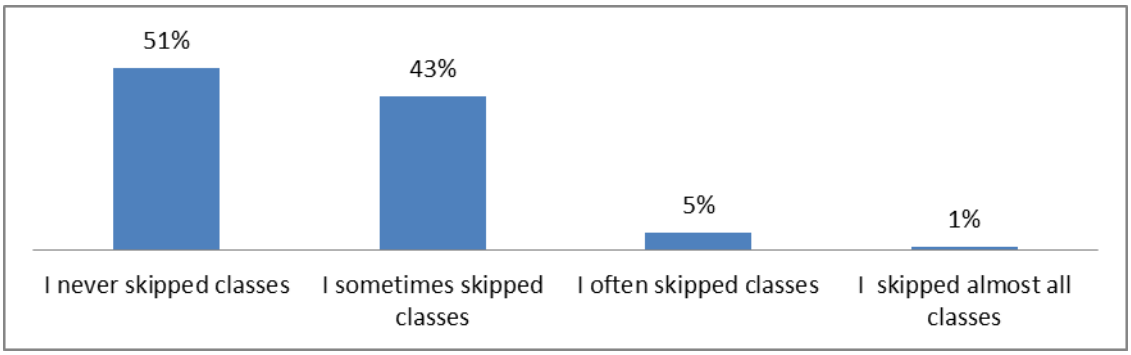

Figure 5. Students' self-reported attendance of classes

Discussion

The results of the evaluation of the distance learning system at Igor Sikorsky Kyiv Polytechnic Institute by students as the main stakeholders in education showed that the transformations introduced in the organisation and realisation of the learning process were on the whole positively estimated by students, which means that the elements of distance learning should remain after the end of the lockdown restrictions.

We agree with the conclusions of Dombrovska (2020) regarding the irreversibility of changes in the higher education system after the pandemic. She points out that COVID-19 has led to the intensification of long-term pedagogical trends, created a natural experiment that provides an opportunity to test and evaluate numerous innovations. The first results indicate that a large number of innovations that were applied during the pandemic will be used by teachers, students and administrators after the crisis.

One of the positive transformations in the education system was the intensive introduction of the system of recognition of learning outcomes obtained within the framework of informal and non-formal education. In particular, our university changed its policy relatively quickly and gave students the opportunity to credit their results in courses on Coursera, Prometheus, VUMonline platforms. Moreover, a number of changes were made in the syllabi of disciplines, including the recommendations for using open courses available on the platforms of the world's leading universities. This can help improve the quality of the content of academic disciplines and develop the internationalisation of education.

Positive changes have also taken place in the pedagogical approaches to teaching and learning in the distance mode, which is in line with Areshonkov (2020) who stated that "pedagogy of higher education began a transformation on the principles of andragogy based on the phenomenon of "self": self-development, self-improvement, self-education. And in these conditions, the competencies of self-study, planning, self-development and others are of primary importance for students.

Another important change associated with the pandemic has been the increase in the transparency of the educational process, the record of the learning outcomes and, as a result, the reduction of the risks of corruption. The use of appropriate platforms for distance learning and administration of the educational process creates the so-called "digital footprints" which contribute to greater transparency of educational and administrative processes.

Recommendations for ensuring academic integrity in distance learning

An important element of distance education is the realisation of different types of control of learning. The organisation of assessment of learning outcomes in such conditions becomes a real challenge both for the teacher and the university as a whole. For example, in the case of a student performing test and / or examination tasks remotely, the examiner should be able to verify the authenticity of the completed task and the student's academic integrity. Technologies which permit teachers' personal access to the testing system, time constraints, checking the works through anti-plagiarism systems, development of creative tasks that make it impossible to obtain quick ready-made solutions based on search queries can be used for this purpose. In online testing, the examiner must not only ensure the reliable identification of the student, but also objectively assess his knowledge, monitoring the student's compliance with the academic integrity rules. Today, in the conditions of distance learning, a university teacher actually has to perform a dual function: on the one hand that of an examiner who checks the correctness of the student's work, on the other hand – that of an administrator who monitors the student's learning process to avoid his academic cheating.

Conclusions

Thus, the spread of the COVID-19 pandemic has stimulated the widespread introduction of distance learning technologies and methods, which in some cases, can serve as a basis for raising the quality and

developing individual approaches to learning. The results of the study conducted at Igor Sikorsky Kyiv Polytechnic Institute showed that on the whole students positively estimated the transformations introduced in the learning process, which means that the elements of distance learning should remain after the lockdown restrictions. We can conclude that the education process has received a new impetus for transformations and in many respects these changes are irreversible. However, further studies are necessary to assess the efficiency of the use of tools for ensuring academic integrity in distance learning.

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