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Key directions for global higher education in the post-Covid era

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Abstract The COVID-19 pandemic necessitated the adaptation of the educational process to the changing conditions. Efforts to stop the spread of the disease, including social distancing and self-isolation, led to the need to implement a new education model and develop effective communications in higher education, with the online educational process from March to April 2020. Platforms such as Discord, Google Meet, Zoom, Skype, and others were used for distance learning. Training for future doctors working in hospitals repurposed to treat COVID-19 patients was organised, including remotely. This rapid transition to distance learning significantly transformed modern higher education. This article explores the features and necessity of internationalising the higher education system as an integral component of the innovative development strategy of higher education institutions in post-COVID conditions. The transition of education to a qualitatively new level – the international online space – requires implementing new strategies and forms of learning. One such form is Collaborative Online International Learning (COIL) programmes. The COIL model aims to integrate educational standards, structures, teaching styles, and academic calendars of different countries into the higher education system, thereby contributing to developing intercultural professional competencies. Collaborative international online learning programmes are designed to develop relationships between educational institutions and their partners within a comprehensive global engagement strategy. From the globalisation of the curriculum to building funding capacity and creating new projects in research, education, and experiential learning, these programmes engage students and faculty in international activities. The COIL model brings teachers and students worldwide to collaborate within academic disciplines and in an interdisciplinary field as part of a joint virtual project. To demonstrate the timeliness and adequacy of the higher education system's response in the post-COVID-19 pandemic, the article presents global experiences using the distance learning principle for teaching.

Keywords: COVID-19 pandemic, virtual project, social distancing, experiential learning, online classes

1. Introduction

Acute respiratory coronavirus infection (COVID-19) was declared a pandemic by the World Health Organization (Pericàs et al., 2020). As of August 2024, more than 700 million people worldwide have contracted COVID-19, resulting in over 7 million deaths (Shi et al., 2020). The etiological factor of the disease is the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which belongs to the genus β-coronaviruses (Wang et al., 2022). The main symptoms of COVID-19 include elevated body temperature and respiratory system manifestations (Napodano et al., 2021). As a result of the quarantine measures caused by the spread of the COVID-19 pandemic, there was a need for a fundamental change in the forms and methods of learning, methods of interpersonal communication, and the system of organizing the educational process. The educational community accumulated its efforts to ensure the functioning of the higher education system in the conditions of the pandemic. To this end, in a short period of time, various educational organizations have conducted studies that allow us to analyze the impact of the COVID-19 pandemic on higher education.

According to the World Bank, by the end of March 2020, nearly 85% of the world's student population (over 1.6 billion schoolchildren and students) were not attending schools and universities, with face-to-face classes suspended in 161 countries (World Health Organization, 2020). Beginning on 16 March 2020, to protect the health of students and employees of educational and scientific organisations, Ukrainian higher education institutions were recommended "to organise student learning outside the location of universities, including ensuring that they acquire educational programmes using distance technologies". The COVID-19 pandemic and the quarantine measures implemented to combat it have affected all spheres of

social life (Guan et al., 2021). The education system in almost all world countries has undergone significant changes. Analysing the consequences, summarising the experience of managing these changes, and identifying directions, mechanisms, and tools to overcome new challenges is a relevant task (UNESCO, 2020a).

However, it is meaningful to note that long before the pandemic there was alreadya great interest in distance learning and online degree programs (Alqurashi, 2019). Along with thisinterest, the educational value of distance learning was being debated and it seems thattwo main schools of thought emerged as now described. On the one hand, much liketraditional forms of knowledge delivery and assessment, online learning could be informedand shaped by integrating pedagogical principles. If such principles are integratedproperly, online learning could become a pedagogical innovation that engages learners asmuch as in-person education does. Other indisputable benefits involve the informationaccessibility and the notable flexibility with which learners are able to undertake the workwhile being able to decide when and what to learn (Xie et al., 2020). Since online learning assumesa self-paced and student-centered approach, it could instigate profound learning. In this regard, learners who have basic technical skills as well as self-discipline, commitment,dedication, and the ability to manage their time can be successful in online education (Teräs et al., 2020).

2. Materials and Methods

To solve the tasks set, a combination of theoretical and empirical methods is and will be used, including theoretical methods such as analysis, synthesis, theoretical modelling, and generalisation of materials presented in scientific literature and relevant archives on the studied issue; empirical methods such interpretative (analysis, synthesis, systematisation of obtained data). The search engines analyzed in this study represent common resources in frequently cited systematic reviews and meta-analyses in recent years. Articles were searched in 16 databases and search engines: CINAHL, ClinicalTrials.gov, Cochrane Library, EbscoHost, Embase, ERIC, Google Scholar, LILACS, ProQuest, PsycINFO, PubMed, ScienceDirect, Scopus, SportDiscus, TRID and Web of Science. Although most of the mentioned search systems contain closed databases, the emphasis was therefore on open access publications available for analysis.

3. Literature Review

The scientific name Coronavirus was adopted as the name of the genus by the International Committee on Virus Nomenclature (later renamed the International Committee on Taxonomy of Viruses) in 1971 (Fix et al., 2020). Until 2002, coronaviruses were considered pathogens of mild to moderate upper respiratory tract diseases (with infrequent fatal outcomes). During the 2002 epidemic, approximately 8,000 cases were registered worldwide across 37 countries, with more than 770 of them resulting in death. In 2012, a new coronavirus (MERS-CoV) was identified in Saudi Arabia, which causes severe lung damage and was named “Middle East Respiratory Syndrome”. MERS-CoV belongs to the Betacoronavirus genus; its primary natural reservoir is dromedary camels. From 2012 to 2020, about 2,500 cases of coronavirus infection caused by the MERS-CoV virus were registered, with over 800 resulting in death (Xu et al., 2020). All cases were geographically registered on the Arabian Peninsula (82% were registered in Saudi Arabia) (Zhao et al., 2020).

Scientists from all continents have identified several (primarily similar) problems for students, teachers, and higher education institutions' administration after the forced transition to online learning (Zhu & Liu, 2020; Shcherbak et al., 2023). In many countries, there are issues with digital literacy in education among teachers, students, and parents, and there is a lack of structured content despite the vast amount of Internet resources. Mohalik and Sahoo (2020) argued about teachers' mental, financial, social, and even technical readiness and transforming teaching and learning into an online format during the COVID-19 pandemic. Research (Sangwan et al., 2021) revealed three expected trends in future transformations: increased educational innovation, encouragement of public-private educational partnerships, and the digital divide. The study (Zywiolek et al., 2021; Khan et al., 2024) and colleagues described the benefits of online learning during the pandemic outbreak. As noted by (Deng et al., 2023) in their review, the COVID-19 pandemic has led to mental health problems such as depression, anxiety, stress, anger, emotional disturbances, and post-traumatic stress disorder. Stress reflects factors associated with mental health problems, such as age, gender, place of residence, and coping strategies.

The consequences of the transition to online learning revealed several issues, such as the lack of computers or laptops among students and the unaffordable cost of internet access for poor regions (McKenzie, 2021). An interesting case is China, where, during the pandemic, two assistants were assigned to each online class, ensuring that every student could participate in online lessons. Scientists emphasise (Rosak-Szyrocka et al., 2021) that further steps should focus on the continued development of open educational platforms and quantitative and qualitative research to assess modern online teaching and learning models. The article (Song et al., 2023), provides an understanding of how the psychological stress associated with the COVID-19 pandemic affects various aspects of academic problems and student adaptation to better meet the diverse academic needs of students.

Analysis of the use and justification for the development of higher education globally in the post-COVID period. Research and optimisation of student health protection as a factor in the fight against Coronavirus, using the experience of various countries. On the basis of studies of educational organizations of different countries, to analyze the impact of the threat and

potential opportunities of destabilizing circumstances of a natural nature and society on the development of educational systems, in particular the link of higher education, on the global, European and national dimensions.

The WHO estimates the mortality rate from this disease at 3.4% (Hui & Madani, 2020). Efforts to stop the spread of the disease, including social distancing and self-isolation, have led to the widespread closure of primary and secondary schools, colleges and universities in 61 countries worldwide (Mishra et al., 2020). These preventive measures necessitated the implementation of a new education model and the development of effective communications in higher education, with the online educational process from March to April 2020 (Tam & El-Azar, 2020). The United Nations Educational, Scientific and Cultural Organization (UNESCO) established a Global Education Coalition for COVID-19 to support countries in implementing distance learning systems to minimise disruptions in the educational process and maintain social contact with students. Additionally, it emphasised that beyond meeting immediate needs, these efforts provide an opportunity to rethink the concept of education (see Figure 1). To ensure continuity of learning, UNESCO published a list of available apps and platforms for online learning on its website, which teachers and students can use.

Figure 1 Fundamental problems of higher education in the post-Covid period. *Source:* UNESCO (2020b).

This led to the need for changes in the development of higher education, particularly the inclusion of Ukraine in the integration processes in the international environment. It has been proposed to implement the university's development strategy based on the following conceptual principles:

- The principle of lifelong learning (lifelong learning);
- The principle of continuous innovation;
- The principle of diversification (simultaneous implementation of several unrelated scientific and educational products);
- The principle of synergy (as the influence of various types of educational and scientific activities on each other);
- Bringing educational services closer to consumers (distance learning, university branches, and representative offices);
- Quality management;
- Formation of a portfolio of scientific and educational products based on strategic analysis.

Although the optimal combination of education and market relations is the foundation of higher education institutions' development strategies, educational tasks and goals should still take priority over economic ones. However, it is impossible to solve educational tasks without focusing on the consumer, the actions of competitors, and the new realities related to the pandemic; therefore, the university's development strategy must be innovative.

For many years, universities worldwide have been working on creating online courses as both primary and supplementary educational tools. Since 2020, due to the COVID-19 pandemic, most educational institutions worldwide have been forced to master a new work format—distance learning. The pandemic conditions and restrictions presented new challenges to university leadership, faculty, students, and staff: providing technical means for online learning, developing new learning models, moving existing courses to electronic platforms, and more. Currently, and most likely in the future,

international online learning programmes (COIL – Collaborative Online International Learning) are coming into play (Nava-Aguirre et al., 2020; Kit et al., 2023). It was developed with the limitations of traditional online approaches in mind.

A characteristic feature of online courses is that, although they allow students from all over the world to participate, they are structured to disseminate knowledge in only one direction and are rarely designed to facilitate intercultural learning or exchange between students of different cultural or national backgrounds. Unlike distance online courses provided by a single higher education institution to students from institutions in other countries, COIL is based on the development of a learning environment by a team in which instructors from two cultures work together to create a shared curriculum, with an emphasis on experiential and collaborative student learning (Robson, 2017). These courses provide new contextual meaning to the ideas and materials they explore, offering students new opportunities to develop their intercultural awareness. Classes can be fully online or, more commonly, offered in combination with traditional face-to-face classes held at both institutions, while the collaborative work of students takes place online.

COIL has truly become a networked model of higher education. It requires integration and dialogue between institutions in different countries with different educational standards and education system structures, different academic calendars, and teaching styles that span a wide range of time zones. Collaborative international online learning (COIL) programmes aim to:

1. Develop relationships between educational institutions and their partners within the framework of a comprehensive global engagement strategy—from the globalisation of the curriculum to building funding capacity—and create new projects in the fields of research, education, and experiential learning;

2. Engage students and faculty currently not involved in international activities. The desired outcome is to create multiple entry points for faculty, staff, and students to increase their participation in global activities.

The significant advantages of COIL programmes include minimal costs since classes are connected via the internet, eliminating the need for travel expenses for students, and there is no need to alter curricula as the assignments are part of an existing course. Such programmes provide participants with unique opportunities to focus their joint projects on sustainable development in line with the UN 2030 Sustainable Development Goals, the strategies and priorities of many leading universities worldwide, and issues that affect the communities in which we live and work at the local level. All of this helps to benefit from a shared international perspective. As shown by the results in Figure 2, most instructors prefer to use Google Classroom for online learning.

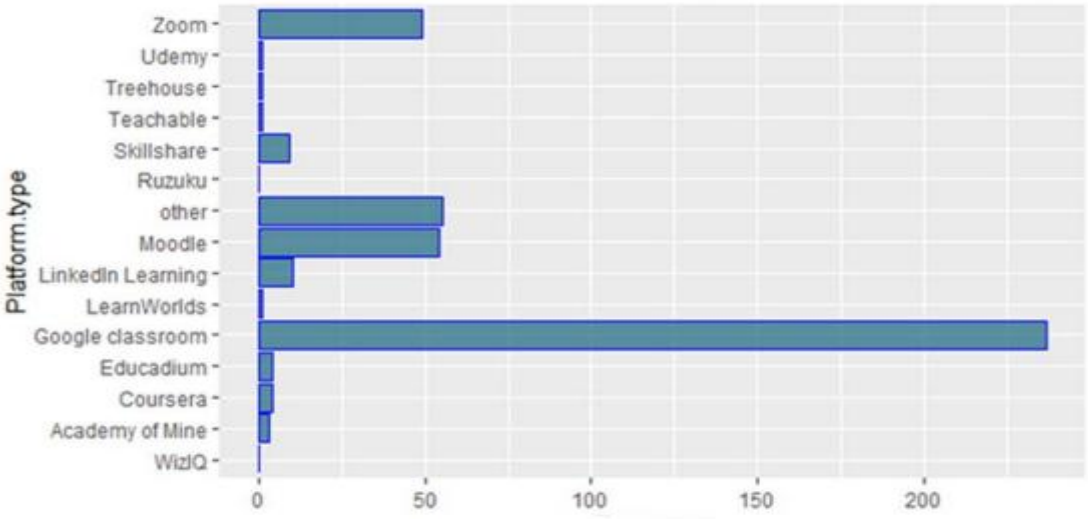

Figure 2 E-learning platforms used worldwide.

The use of non-simulation active methods in teaching, which began to be actively conducted online after COVID-19, has become a real panacea for higher education.

After the COVID-19 crisis, online education has come to embody the transition from traditional to modern methods of learning in education (Chen et al., 2021). If, before the crisis, online learning, distance education, and correspondence courses were considered part of non-formal education, now, according to scholars, online education is gradually replacing the existing formal education system. The accelerated development of distance education in the coming years could displace a significant portion of traditional educational institutions in many countries from the education market. The leading global trends in education development in the post-COVID period are presented in Table 1.

Therefore, the forced transition to online education in conditions of the pandemic in educational institutions of all levels led to the rapid development of innovations, the market of online education no; identified the need to overcome the digital divide, diversification of forms and means of training, Soft Skills; strengthened the role of the state in regulating the field of education services. Educational policy should be aimed at ensuring digital resources of educational institutions and to reduce

digital inequality among students and teachers, to ensure the preservation of a single educational space, guarantee high quality of education, promote the development of academic mobility and responsible you are world standards.

Table 1 Global trends in education development.

Strengthening the role of the state in regulating the education sector	Promoting online learning at all levels of education
	Promoting public-private educational partnerships
Increasing educational innovation	Development of new educational platforms
	Creation of new, higher-quality databases
	Development and implementation of new methodological approaches
	Course curation
Bridging the digital skills gap	Increasing the number of digital literacy courses
	Charitable funds for students
Increased need for soft skills	Creativity
	Communication in teamwork
	Adaptability to change
	Emotional intelligence
Growing individual needs in education	Educational resources and tools
	Remote support and feedback
	Additional opportunities for older people
Diversification of forms and means of education	Increased use of mobile devices
	Gamification
	Microlearning
Rapid development of the global online learning market	Growing demand for online learning software
	Growing demand for online learning trainers

The development of the post-COVID education system is most sensitive to innovation, as it shapes future specialists in various subject areas. Throughout life, individuals are often required to master new professions and specialities and acquire new knowledge. In the learning process, a priority task is developing students' ability to independently set learning goals and objectives, design ways to achieve them, evaluate their achievements, self-assess, and formulate their opinions. Attention to academic mobility for teachers and students is essential to ensuring their contribution to building scientific potential in the post-COVID period. Currently, a conceptual shift in the development of academic mobility is observed compared to the 1970s–1980s when academic mobility was considered less prestigious and focused on the exchange of small, elite scientific personnel, predominantly aimed at poaching scientific talent.

We agree with the opinion of foreign researchers that teachers as a result of the forced transition to distance education can be divided into four groups (Deng et al., 2023). The first group is teachers of disciplines that require a significant amount of practical, laboratory work In most cases, such teachers did not have any serious replacement of teaching methods. On average, these are about 5% of the total number. This group of teachers is categorically against the use of distance education and new technologies in the future. The second group is teachers who actively used digital technologies (including online courses and resources) before the pandemic. They were able to quickly expand the use of the usual means of communication and the creation of digital resources, learning management systems - their share was about 25% (up to 40% in leading universities). This group as a whole supports the expansion of the use of the distance form and believes that the quality of education in the online format can be equated with the quality of education in the offline format. The next group is teachers who are knowledgeable about digital technologies (including outside of professional activity), who search for information on the Internet , with communication by e-mail. Such teachers (up to 50% of leading higher education institutions) quickly mastered new tools, including synchronous learning, but this required considerable effort. Representatives of this group mostly do not support a significant expansion of online education (including the use of online courses of leading open education platforms), but they see in some cases the possibility of using communication technologies, educational process management systems, use of additional digital educational resources.

The last group are teachers who were unable to master new tools for organizing learning, collective work, and expanded use of digital resources (Sujarwoto et al., 2023). They actually switched to correspondence education. Their share is from 5% to 30%, depending on the institution. For these teachers, the transition experience was very difficult. They do not believe either in the effectiveness of the distance format, or in their ability to master new learning technologies. Thus, a significant percentage of teachers have one or another negative attitude towards the online format of education. Agreeing with the opinion of the researchers, we note that the development of effective online programs that can fully replace face-to-face training, make them interactive, and not just transfer information into a digital format, actualizes the need for the development of specific knowledge, skills and programming skills.

Therefore, the forced transition to online learning during the pandemic across all levels of educational institutions has led to the rapid development of innovations and the online learning market. In the context of online learning (Khan & Abid, 2021). For example, the teacher creates a problem situation in the form of a clinical case presented as a “case study”. This teaching method is considered an active simulation-based non-game method and has a multifunctional role. Analysing a specific situation can address three didactic tasks: reinforcing new knowledge (acquired during the lecture), and stimulating the exchange of knowledge and experience. Practical lessons contribute to activating students' thinking activities and applying their knowledge in professional practice. It is important to note that the critical factor that helped the university team adapt to the new reality was acting in uncertain conditions and taking responsibility.

Note that no fundamental research was conducted in Ukraine regarding the impact of the COVID-19 pandemic on higher education. Analysis of the problem is complicated by the lack of available objective data. We agree with the opinion of Volodymyr Bakhrushin that the available data have a complex structure and different formats, they are often insufficiently complete and up-to-date and cannot be compared with similar data from other countries. Due to these and other reasons, they are not very suitable for use when making many important decisions (Bakhrushin, 2020; Shkola et al., 2022).

4. Future Perspectives

1. The pandemic has caused such innovations in education as the use of digital technologies. This led to the need to explore the further development of open educational platforms and new hybrid learning models that combine face-to-face and distance learning.

2. Public-private partnership. With increasing technological dependence, collaboration between the public and private sectors will be essential to provide affordable solutions, especially in regions with limited digital infrastructure.

3. The pandemic has forced governments to address inequalities in access to technology and the Internet, especially for students in poorer regions. Initiatives to provide devices and access to the Internet should be a priority in the future.

4. Training and qualification of teachers. It is important to continue to invest in the digital training of teachers, improving their digital literacy and adaptation to new technologies.

5. Health and well-being of students and teachers: The impact of the pandemic on the mental and physical health of teachers and students needs to be investigated, with a focus on developing support policies for future crises.

6. Resilience of the education system: Studying the impact of the pandemic and developing mechanisms to deal with future emergencies are critical. This includes flexible teaching policies and contingency plans.

5. Conclusion

The trends that have deepened in education after higher education institutions transitioned to online learning due to the spread of the COVID-19 pandemic have been analysed and summarised. The leading global trends in the development of online education worldwide have been identified, such as the increasing role of governments in regulating online education, the growth of educational innovations, and so on. The impact of the internationalisation of the higher education system has been identified as an integral component of the global higher education development strategy. Traditionally, internationalisation tasks were addressed through students, faculty, and staff participation in academic mobility programmes. However, in 2020, due to restrictions related to counteracting the spread of COVID-19, exchange programmes were halted. International online educational programmes (COIL) have gained popularity in most countries. Leading universities worldwide are implementing such programmes in various fields of knowledge in theoretical and applied areas.

COIL programmes allow for the involvement of instructors and staff from other countries in creating and assessing course achievements, as well as practitioners from various subject areas; they also enhance student engagement and satisfaction with communication in the international arena. An essential advantage of such programmes is their low cost of implementation, especially as most educational institutions are actively equipping the educational process with the necessary equipment for online learning. It can be confidently assumed that even after removing many COVID-19-related restrictions, the education system, particularly the higher education system, cannot fully return to pre-COVID practices. For the successful development of universities, attention will need to be paid to new approaches and forms, one of which is undoubtedly COIL programmes. Prospects for further research are outlined issues, in our opinion, relate to development professional potential of teachers and solutions possible socio-psychological problems related to them with the future challenges ahead educational systems of different countries.

Ethical Considerations

Not applicable.

Conflict of Interest

The authors declare no conflicts of interest.

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