COVID-19 Pandemic: Development of Digital Technologies that Provide Connection, Collaboration and Lifelong Learning

Inna H. Otamas[1], Viktoriia O. Anishchenko[2], Liudmyla A. Ovsiankina[3], Inna A. Afanasyeva[4] and Andrii Bieliatynskyi[5]

[1]*University of Educational Management, Ukraine*

[2]*Academy of the State Penitentiary Service, Ukraine*

[3]*Borys Grinchenko Kyiv University, Ukraine*

[4]*Bogomolets National Medical University, Ukraine*

[5]*North Minzu University, China*

Abstract: The topicality of the problem under research in this study concerns the changes in educational systems (from elementary to higher education) in Ukraine and throughout the world caused by COVID-19. This article aims to reveal the essence of initiatives of international organisations in educational institutions in Ukraine and around the world during the COVID-19 period, and to examine the perception of teachers and students of the process of online learning and learning during the COVID-19 pandemic. The study's aim also involves highlighting and analysing the quality of education to ensure continuous updating of its content based on the latest technological advances, including innovative methods in the educational process, during COVID-19. The main sets of methods were as follows: 1) analysis, synthesis, comparison, and generalisation while studying the scientific literature, as well as legislative and regulatory documents; and 2) historical and pedagogical analysis to determine the features of open education development. The data obtained show the following: the regional affiliation and profiles of educational institutions; the experience of the teaching staff in using distance learning technologies in the education process; assessment of the prospects for distance learning implementation in the Ukrainian educational system; and readiness to master distance learning technologies. The significance of the article is to provide a holistic view of online teaching and learning activities under lockdown, to eliminate academic disorders and ensure the resumption of educational activities.

Keywords: educational system in the conditions of COVID-19, innovative technologies in the educational process, digital communication, distance education, online learning platforms.

Introduction

The relevance of the research problem is due to changes in the educational system (from primary to the highest level) caused by COVID-19, not in Ukraine only but all around the world. The development and influence of digital technologies on society throughout the past decades were highlighted in different types of documents. However, the development of digital technologies that provide connection, collaboration, and lifelong learning during COVID-19 has not yet been fully considered.

The world is becoming more interconnected, various risks are growing, and the COVID-19 pandemic does not stop at national borders. It has affected people, regardless of nationality, level of education, gender or wealth. The pandemic had a particularly significant impact on the most vulnerable segments of the population, in particular, socially disadvantaged families and students. Privileged students, as well as those willing to study, who are supported by their parents, could receive alternative education during the pandemic when educational institutions were closed. The crisis has exposed many challenges in education systems, from access to broadband and computers required for online learning to the mismatch between resources and needs (Schleicher, 2020).

Young people face the inability to obtain education and employment, as well as high unemployment due to the COVID-19 pandemic. However, investing in youth can provide a reliable way to recover from COVID-19. Job creation programmes and training for young people should respond to the consequences and systemic challenges faced by young people (Borysenko et al., 2020). The COVID-19 pandemic has contributed to some injustice in our global economic and social systems. This has made it clear that the crisis has affected not only some of the most vulnerable and undervalued professions in our society but also those we have relied on the most.

In addition to the COVID-19 pandemic, we face one of the greatest challenges of the 21st century: the mismatch between the qualifications of recent domestic graduates and the level of qualifications for the world economy. Verification of competencies and capacities will be important, as we see the constant rapid development of all sectors of the world economy. According to the latest report of the World Economic Forum (2020) "Tasks of Tomorrow", the demand for digital and human factors will grow. It is important to provide youth and society with lifelong learning, especially during challenges such as the pandemic.

For its part, the International Partnership of Distance and Online Learning for COVID-19 (UNESCO Institute for Information Technologies in Education, 2020) noted that the unprecedented events caused by COVID-19 have led to the closure of educational institutions around the world. UNESCO estimated that more than 90% of the world's student population could not attend classes and had to stay at home. Students studying in countries that do not have access to appropriate devices and internet connections are particularly vulnerable (Anishchenko et al., 2010; Yaroshenko et al., 2018).

The rapid spread of 'digital' technologies makes digital skills (competencies) key among other skills. Thus, "digitalisation" and cross-platform performance are now the main trends in the general labour market. Thus, the ability to work with "digital" technologies is gradually becoming permanent and necessary for most specialisations, namely, end-to-end or cross-platform. Digital competencies are unique since they allow citizens to acquire competencies in many other areas more effectively (for example, learning languages, subjects, professions, etc.) (Al-Samarrai et al., 2020; Kozlovskyi et al., 2019).

Therefore, this article aims to reveal the essence of initiatives of international organisations to support educational institutions in Ukraine and around the world during the COVID-19 period, and to examine the perception of teachers and students of the process of online learning and learning during the COVID-19 pandemic. A questionnaire was adapted for the purpose of ensuring statistical accuracy and relevance of the obtained data from Google Forms. The link was shared only with pedagogical workers and academics who had passed the advanced training programme "University of

Educational Management" (CIPE) remotely at the Central Institute of Postgraduate Education of the State Institution of Higher Education. This brought an opportunity to provide the required number of respondents and answers to obtain the results of the survey. The obtained data showed regional affiliation and profiles of educational institutions; experience of teaching staff of educational institutions in the use of distance learning technologies in the educational process; assessment of prospects for the introduction of distance learning in the Ukrainian education system; and readiness to improve the process of mastering distance learning technologies.

Methodological Framework

Even half a century ago, computers were highly rated as a tool for improving the effectiveness of teaching and learning processes. Supporters of the 'computerisation of education' were confident that the implementation of digital technologies would facilitate teachers' work, improve the quality of mass education, and reduce the required costs.

PLATO, a computer-based education system known in the 1970s, provided schoolchildren and teaching staff with remote access to high-quality curricula in mathematics, physics, chemistry and other subjects (Dear, 2017; Ivashchenko et al., 2018). Despite heavy investments, this system and other developments did not spread widely or influence the education system. Over the past half a century, digital technologies have changed dramatically. Nowadays, every smartphone owner has access to computing resources that scientists of the last century could not even dream of. Technologies have moved beyond laboratories and turned into daily tools available to mainstream schools, and their potential for improving the educational process has grown significantly. Technology progress has aroused new expectations among computer learning enthusiasts again and again, thus: "... Let's imagine what kind of automated tutor can be created using modern technology. Firstly, imagine that this digital tutor can accumulate data on you over a long period of time. Like a good teacher, it knows what you already understand and what you are ready to learn. It also knows what explanation methods are the most appropriate for you. It knows your learning style: whether you prefer pictures or texts, clear examples or abstractions. Imagine that this tutor has access to a database containing all the knowledge accumulated in the world. Here, the knowledge is organized in compliance with notions and ways of absorbing them. The database contains specific knowledge about how these notions relate, who believes them and why, and what they are useful for. It can be called the knowledge web to distinguish it from the World Wide Web, a database of linked documents" (Hillis, 2004; Levchenko et al., 2021).

Different classifications predetermine points of view on the development of information technologies using computers. Common to all approaches is the recognition that the advent of the personal computer has marked a new stage in the development of information technology.

In methodological literature devoted to the issues of computerisation of education, there are often such synonymous expressions as "new information technologies in education," "modern information learning technologies," "computer learning technologies," "computer teaching technologies," "electronic communication learning systems, tools, and technologies," etc. This indicates that the terminology in this field of research and its concepts have not been established yet. Information technology for learning is a set of methods and technical means for collecting, organising, storing, processing, transmitting, and presenting information that develops people's knowledge and

management skills in technical and social processes. Mashbitz (1986) and Talyzina (1985) consider information technology for learning as a set of various training programmes, including the simplest ones that provide knowledge control and training systems based on artificial intelligence. Based on its content, Sholokhovych (1998) proposes to define information technology for learning as a branch of didactics that studies teaching and learning processes, systematically and consciously organising and comprising the means of computerisation of education.

During 2020, articles and reports of the International Association of Universities (2020b) were published with a global survey to inform the public about the impact of COVID-19 on educational institutions (EI). Joint documents of the International Association of Universities (2020a) set out the essence of their research on the impact of COVID-19 on educational institutions. The brochures, published under the responsibility of the Secretary-General of the Organization for Economic Co-operation and Development (OECD), A. Schleicher, on the global spread of COVID-19 and its impact on higher education, highlight indicators from "Education at a Glance" (Organisation for Economic Co-operation and Development, 2020a), and their analysis allows us to understand the reaction of countries and the potential impact of the pandemic on education.

Distance learning is a measure that helps to transfer the traditional teaching process in the classroom to online. The latest technological developments and expanded access to mobile applications open up new opportunities but they need to be adapted to specific conditions. Therefore, the Commonwealth of Learning (COL) issued "Recommendations on Distance Education during COVID-19", which contain practical advice on the use of methods, tools for distance learning and related technologies. The publication was issued as a supporting measure by COL for the COVID-19 crisis, to help those interested in making effective use of distance learning (Commonwealth of Learning, 2020a).

Schleicher (in OECD, 2020c) made a significant contribution to the study of the use of open education technologies, noting that distance learning offers a certain integrity in learning when it comes to both academic training and vocational education (VE). Compared to general programmes, however, VE programmes suffer more severely from distancing and business closures. However, this sector plays an important role in ensuring coordination between education and work, and the successful transition of students to the labour market. Many professions that form the backbone of economic and social life during a pandemic depend on access to professional qualifications. Therefore, action is needed to ensure these learning flows do not become the first victims of education. The Organisation for Economic Cooperation and Development (2020c) argues for measures to support and prolong greater use of online and virtual platforms in VE institutions to ensure continuity of learning.

The authors used the following methods and approaches in the article:

1) analysis and synthesis, which allowed studying the theoretical aspects of digital technologies in the educational system;

2) comparison and generalisation, which provided an overview of the scientific literature, and legislative and regulatory documents, which could be used as the theoretical basis for further empirical research;

3) historical and pedagogical analysis was used to determine the features of open education development; and

4) one of the research methods was the adaptation of the questionnaire to ensure the statistical accuracy and relevance of the data obtained from the Google Forms web service with limited access (only by link).

Also, for the study of this topic, the researchers used graphical indicators: both charts and tables. This made it possible to clearly show the current state of the technological base for training. Thus, the table "The list of educational programs, platforms and resources (UNESCO)" in general shows what programmes and platforms are used today in most cases, and "Popular platforms for teachers and research and educational workers" shows what platforms are the most popular for certain areas.

Results

Findings from the Literature Review

Like many other industries, the education sector has been severely affected by the COVID-19 pandemic. Fortunately, there are many free (or inexpensive) easy-to-use digital means of communication that provide ample opportunities to address distance learning. Teachers, students and families are still struggling with the immediate task of conducting online classes and distance learning in their homes. International organisations pay considerable attention to distance learning and the use of modern innovative technologies in education, work and life.

Today distance learning is one of the important components in the socio-economic protection of the population. UNESCO offers a comprehensive list of distance learning solutions, including educational programmes, platforms and resources designed to help parents, teachers, schools and school administrators facilitate student learning and provide social assistance and interaction during school closures. Most curatorial decisions are free and many cater to different language groups. Although these decisions do not have explicit UNESCO approval, they tend to have broad coverage, a strong user base and evidence of impact. They are classified according to distance learning needs but most of them offer functionality for different categories (Table 1) (Distance Learning Solutions, 2020).

Table 1: The List of Educational Programmes, Platforms and Resources (UNESCO)

No.	The list of educational programmes, platforms and resources (UNESCO)
1	Resources to provide psychosocial support

InterAgency Standing Committee guidelines	WHO mental health and psychosocial guidance during the COVID-19 outbreak	UNICEF guidance on how parents and caregivers can talk children about COVID-19	UNICEF guidance on how teachers should talk to children about COVID-19

No.	
2	Digital learning management systems

Century Tech	Class Dojo	Edmodo	Edraak	EkStep	Google Class-room	Moodle	Nafham	Paper Air-planes	Schoo-logy	Seesaw	Skooler

No.	
3	Systems built for use on basic mobile phones

Cell-Ed	Eneza Education	Funzi	KaiOS	Ubongo	Ustad Mobile

Systems with strong offline functionality		
Kolibri	Rumie	Ustad Mobile

No.	
4	Massive Open Online Course (MOOC) Platforms

Alison	Canvas	Coursera	Euro-pean School-net Academy	EdX	iCourse	Future Learn	Icourses	TED-Ed Earth School	Udemy	Xuetang X

No.	
5	Self-directed learning content

ABRA	British Council	Byju's	Code It	Code.org	Code Week	Discovery Education	Quizlet	Duolingo
YouTube	Edraak	Facebook Get Digital	Siyavula	Feed the Monster	History of Africa	Khan Academy	SDG Academy Library	KitKit School
Lab-Xchange	Madrasa	Mindspark	Mosoteach	Music Crab	OneCourse	Profuturo	Smart History	Polyup

The Commonwealth of Learning (COL) is the only intergovernmental organisation in the world that has been exclusively involved in the introduction and development of distance education since 1987. This organisation was created to promote the development and exchange of knowledge, resources and technologies of open learning and distance education. In their research they have noted the benefits of distance education. Thus, it increases access to education, improves quality, reduces costs, and can expand access to education for a large number of students. Commonwealth universities alone serve more than 4.4 million students, while the National Institute of Open Schooling (India) reports a total enrollment of 2.71 million. Because of its flexibility, it is beneficial to students who have family or social responsibilities.

Distance education provides an opportunity for people with disabilities to learn. Mixed approaches are introduced in technical and vocational education for training. Research shows that there is no 'significant difference' between distance and traditional learning in the classroom in terms of learning outcomes, if everything is designed well. Moreover, distance learning is based on student-centered education, promoting lifelong skills such as self-directed learning, discipline and critical thinking. Recent research from Australia suggests that blended learning, combining face-to-face and distance learning, may be as effective as classroom learning for many students (Commonwealth of Learning, 2020a).

During a pandemic, Open and Distance Learning (ODL) can support learning in both the non-formal and formal education sectors. The following is a curatorial list of resources for politicians, school administrators, colleges, teachers, parents, and students posted on the COL website to help students whose educational institutions were closed. In Figure 1 educational resources are specified in percent: A. School level; B. TVET Institute / College / University; C. COL Resources (Commonwealth of Learning, 2020b).
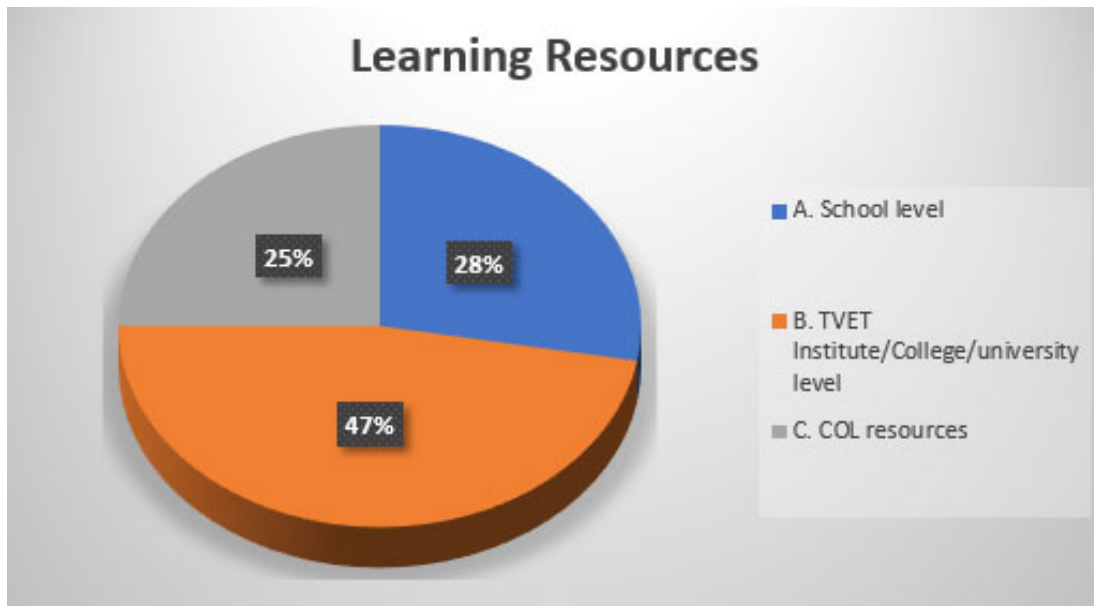

Figure 1: Learning resources (COL)

In Figure 2 COL resources specifically for online learning are specified: A. Brief notes and guides for politicians; B. Basic tutorials on online learning, blended learning, open textbooks; C. OER and MOOC; D. Quality assurance; E. Technologies and tools; Links and resources from other organisations (Commonwealth of Learning, 2020b).
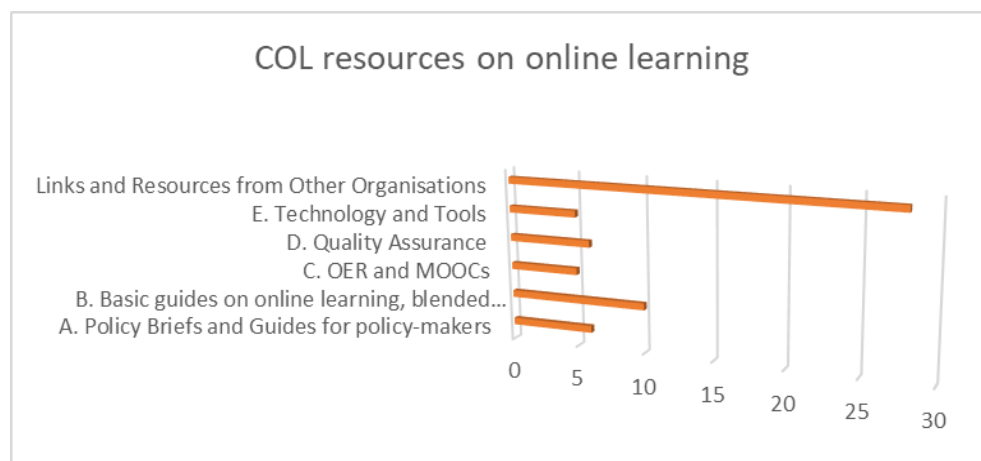

Figure 2: COL Resources on online learning

The Organisation for Economic Cooperation and Development (OECD) is an international organisation working to create better policies for a better life. Most contingency plans include: training during a pandemic (e.g., FRA, ITA); training of teachers and school principals for distance work (e.g., CHN, GBR), and creation of online classes (e.g., CHN).

Like many other industries, the education sector has been severely affected by the COVID-19 pandemic. During a pandemic, there are free (or inexpensive) easy-to-use digital communications tools that provide a wide range of distance learning solutions. At present, teachers, students and families are still struggling with the immediate task of conducting online classes and distance learning in the company of their relatives.

UNESCO offers a comprehensive list of distance learning solutions, including educational programmes, platforms and resources, to help parents, teachers, schools and school administrators facilitate student learning and provide social assistance and interaction during school closures (ITU News, 2020). To address digital learning on the UNESCO website, there is a list of national Learning Platforms and Tools (2021). For example, in Algeria, the National Bureau of Distance Education and Training Office (national d'éducation et de forma à distance) in the Ministry of Education, provides online learning platforms on various subjects for all academic levels. For example, the Spanish Educlan is an internet channel supported by the Ministry of Education that provides educational resources for use when classes are suspended. The Lebanese Ministry of Education provides an application in Arabic, English and French, which can be used by up to six family members. In France, Ma classe à la maison (my lesson at home) is designed so that students can continue their education at home and keep in touch with their teachers. The joint website of the Swiss Eduport State Secretariat for Education, Research and Innovation and the Swiss Conference of Cantonal Ministers of Education contains information, links and resources to support distance learning.

Ministries of Education are expanding measures to ensure lifelong learning. For all countries, avoiding disruptions to children's learning as much as possible is a priority, and they are introducing or expanding existing distance learning methods based on different combinations of technologies. For example, Costa Rica uses social media to communicate daily reading plans to students and parents and encourages students to develop campaigns to curb the spread of the pandemic. The Italian Education Minister, Lucia Azzolina, said: "We use social networking tools to maintain the relationship between teachers and students and keep them motivated." The Estonian Ministry of Education and Research shared all its digital education tools to support other countries' education systems during the COVID-19 crisis. The United Arab Emirates announced a two-week distance learning initiative on March 22, 2020 that included all of its students (Fig. 3) (National Learning Platforms and Tools, 2021; Krupskyi et al., 2019).
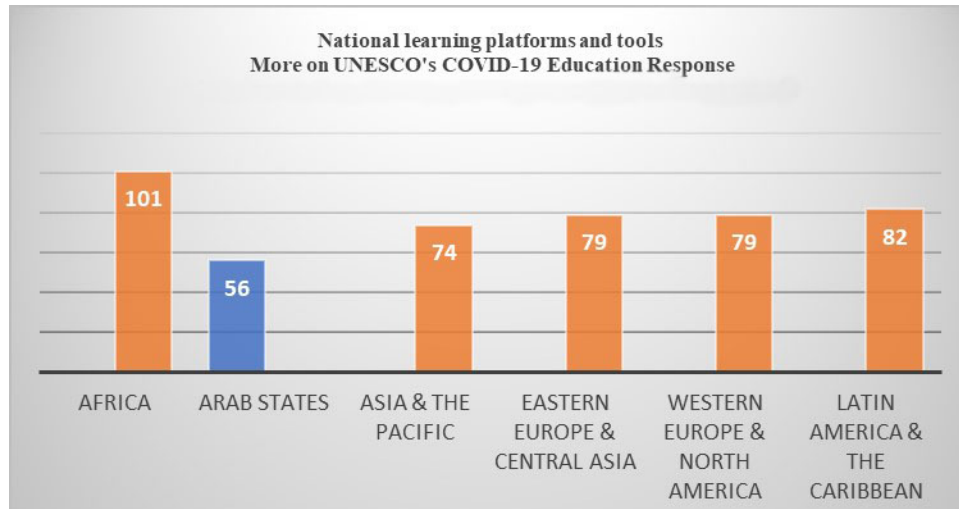
Figure 3: National learning platforms and tools

In almost all countries, teachers and school administrators are encouraged to use applications to support communication with students and parents, as well as to conduct real-time lessons or record Mass Open Online Courses (MOOC). Learning content is also broadcast on television and other media.

For example, the Spanish Ministry of Education and FP and RTVE launched "Aprendemos en Casa (we study at home)" on March 23, 2020 to teach 6-16-year-olds to suspend traditional classes. Programmes include five hours per day of study. "Only 60% of students have the Internet, so we had to combine distance education with open television to reach everyone," said Mexican Education Minister Esteban Moktesuma Barragan, adding that his country is also exploring strategies to reach children with special needs. Education and technology join forces.

China is an example of a pandemic response merging the Ministry of Education and the Ministry of Technology to ensure the continuing education of Chinese students when classes were interrupted by a coronavirus outbreak. "China's education system's response to the COVID-19 emergency is extraordinary in terms of the depth of availability of distance learning facilities and the scale needed to meet the needs," said Marielza Oliveira, Director of UNESCO's Beijing office. In 2019, the UK Department of Education published a strategy to help education providers and the technology industry. The comprehensive publication includes sections on the development of digital capabilities and skills, promoting digital security (ITU News, 2020). To address digital learning in Eastern Europe and Central Asia, the UNESCO website lists national learning platforms and tools (summarised in Fig. 4).
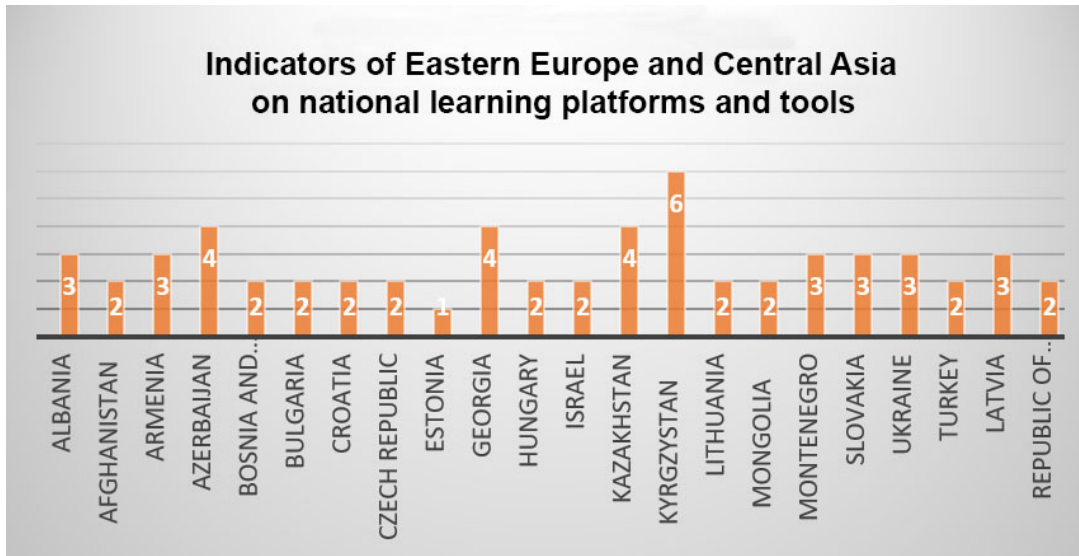
Figure 4: Indicators of Eastern Europe and Central Asia on National Learning Platforms and Tools

Minister of Education, Dan Tehan, said that reforms in education in Australia stimulate students and universities to meet the needs of industry and the requirements for qualification for the new economy, which will appear in response to the pandemic (Australian Government, 2020). During COVID-19, China was the first to suffer from pandemic closures but fortunately it was already quite advanced in providing a large proportion of its students with access to opportunities for online training. A complexity of some existing resources, however, is the fact that their mass use is not always possible at the same time. Some private sector platforms have also already provided their resources and services and free access to some schools to enhance countries' response capabilities (e.g., CHN, JPN) (Organisation for Economic Co-operation and Development, 2020b).

Ledoux and Seniahbeto (IIEP-UNESCO, 2020) also noted, that the crisis will provide lessons which can be used as opportunities. This could turn the provision of educational services in many countries more towards distance learning. Countries which go this route will be better prepared for the future. For example, international education represents a significant economic benefit to Canada, as foreign students contributed 21.6 billion dollars in GDP in Canada and supported almost 170,000 job opportunities in 2018. By using distance education, students can begin their classes while outside of Canada, and complete 50% of the programme by using distance learning before they go to Canada to complete their studies (Immigration, Refugees and Citizenship Canada, 2020).

The Ministry of Education and Science of Ukraine (2020b) and postgraduate education institutions paid considerable attention to the possibilities of distance learning in the period of COVID-19. At the same time, the number of pedagogical and scientific-pedagogical workers is increasing and they are motivated to acquire theoretical and practical skills in mastering cloud services. In Ukraine, at the initiative of the NGO Consortium of Postgraduate Pedagogical Education, the Ukrainian Open University of Postgraduate Education (2021) was established, and the leading role in this was played by UEM University of Educational Management. In order to technically provide distance learning in the system of advanced training for the Ukrainian Open University of Postgraduate Education, an

authentic web platform Learning Management System Adult Learning — LMS AdL was developed, taking into account the peculiarities of adult learning.

In order to regulate the educational process in quarantine, a number of bylaws were also issued by the Ministry of Education and Science of Ukraine. Thus, the order No 406 "About organizational measures to prevent the spread of coronavirus COVID-19" (Ministry of Education and Science of Ukraine, 2020a) provided guidance to heads of institutions and pre-school, general secondary, extra-curricular, professional (vocational) professional pre-higher, higher and postgraduate education for the period of quarantine: "to ensure the implementation of educational programs of education institutions, in particular by organizing the educational process using distance learning, which does not involve visiting educational institutions by its applicants, and in exceptional cases by consolidating the educational process."

Motivation for change, care for children and their education during the quarantine in the spring of 2020 in Ukraine inspired scientists and practitioners to develop and implement platforms for teachers and scientific educational staff. Their details, specifications and course topics are described in Table 2 (ITU News, 2020; Kyrychenko et al., 2020).

Table 2: Popular Platforms for Teachers and Research and Educational Workers

Platform	Specifications	Course Topics
Higher School of Educational Management - online platform of the MCFR Digital Publishing House for advanced training of specialists of educational institutions https://school.pedrada.com.ua	Training is held in groups and begins on the 1st of each month. The training program is designed for two calendar months	• Documents for the Head of Preschool Institution: State Supervision and Control • Personnel Documents - 2020 for the Head of Educational Institution • Smart Cards in Integrated Learning and Professional Development • Smart Cards in Preschool Institution • Crisis Management and Communications in the Institution
'Prometheus' - Ukrainian public project of mass open online courses https://prometheus.org.ua	Designed courses last several weeks	• Science of Teaching: What Should Every Teacher Know? • Deep Learning Through Transformational Pedagogy • Implementation of Innovations in Schools • Media Literacy for Educators
EdEra - Online Education Studio https://www.ed-era.com/	Provides online courses, textbooks and special projects	• Online Course for Primary School Teachers • Online Course for Teachers and School Leaders on Distance Learning • Pro Power Point • #blend_it: Mastering Blended Learning and others

VUM platform – Interesting facts not only for teachers, but also for schoolchildren and students. https://vumonline.ua		• School for All: Safe School Environment • How to Conduct EdCamp for Your Community.
Lesson Educational Project Webinars, conferences, competitions for educators https://naurok.com.ua/courses		• Stem Office/Laboratory in Primary School as a Prequel to Subject Rooms: Biology, Chemistry and Physics • Media Literacy and Critical Thinking: from Theory to Practice • Project-Based Teaching Methods • Pedagogy of Trust.
Platform 'Be able' - by Ivan Ivanov, author and developer of the platform, the founder of the Center for New Education., certified Microsoft expert teacher, organiser of online competitions for educators. https://umity.in.ua	Courses in innovative pedagogy and ICT	• Teach by Storytelling • Orientation in The Methodology of Training • Develop Interactive Learning Materials • Use Video and Audio in Teaching.

According to a survey of leaders in 2020, 96.9% of General Secondary Education Institutions (GSEI) during the quarantine period, students were taught using distance learning technologies. The majority of leaders (75.9%) noted that the entire teaching staff was involved. However, in almost 20.1% of schools, distance learning was provided only by teachers who are provided with computer equipment and internet access. At the same time, 3.12% of the surveyed IGME leaders stated that their school did not switch to remote work mode for the following reasons: students and teachers do not have computer equipment and Internet access (30 IGME, 0.76% of surveyed principals); most teachers do not have the skills to work remotely (45 IGME, 1.14%); does not allow the speed of internet communication (32 IGME, 0.81%) (State Education Quality Service of Ukraine, 2020).

In response to the potential challenges of the second wave of coronavirus, the Ministry of Education and Science of Ukraine (2020c) developed recommendations for the organisation of blended learning in institutions of higher and professional higher education. Universities and colleges received advice on how to deploy blended learning, what regulations and technology were needed, and how to train staff and plan the learning process. The document contains detailed recommendations for teachers on the creation or adaptation of training courses, planning learning outcomes and effective evaluation of student performance. The recommendations are supplemented by checklists, examples of blended learning models, course planning matrices and other supporting materials that institution leaders and teachers can use in preparation for the new school year.

Findings from the Survey

The organisation of blended learning is impossible without the use of an e-learning platform that contains a Learning Management System (LMS). Therefore, to improve distance learning programmes, an electronic survey was conducted using the Google Forms web service with limited access to the form. The e-study on the conditions of distance education during life involved the

teaching and academic staff who underwent distance learning from the following regions: Kyiv, Khmelnytsky, Kharkiv, Volyn, Cherkasy, Odessa, Zakarpattia and Mykolaiv. The survey was conducted by an associate professor of vocational and higher education at the Central Institute of Postgraduate Education of the State Institution of Higher Education 'University of Educational Management' (UOUPE, 2021).

Respondents were asked the following questions within the questionnaire in Google Forms, "Evaluation of the efficiency of the distance learning during the advanced training":

1. How much time per day do you need for individual training?
2. Do teaching staff, academic staff who live in the city have the opportunity to study remotely?
3. What social networks are practical for the advanced training of adults: Google Site, Facebook, Instagram, Telegram, Tik Tok, Padlet, Skype?
4. Do teaching staff, academic staff who live in the village or region have the opportunity to study remotely?

In Figure 5 the personal data of pedagogical and scientific-pedagogical workers who took part in interrogation about time possibility for individual training are specified. The survey was conducted in the Fall of 2020 during the COVID-19 period: 2% — for life, 2% — 1-2 hours, 2% - want to study with a teacher, 11.8% — depending on the circumstances, 25.5% — 20 minutes, 47.1% — 45 minutes (Otamas & Brin, 2020)
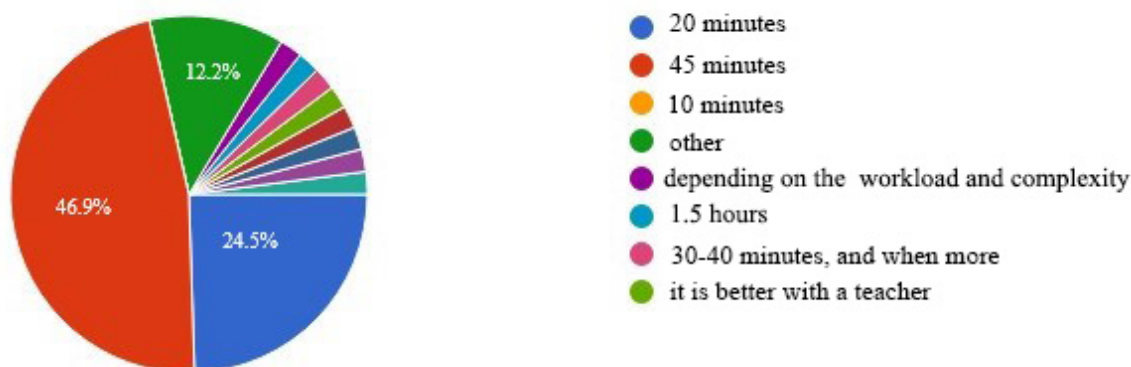

Figure 5: Monitoring of students of the Central Institute of Postgraduate Education about time opportunities for individual learning

Figure 6 is a representation of monitoring social networks for advanced training of adults during COVID-19 in 2020: 58.8% – Google Site, 62.7% – Facebook, 21.6% – Instagram, 25.5% – Telegram, 3.9% – Tik Tok, 5.9% – Padlet, 49% – Skype, 2% – Moodle.
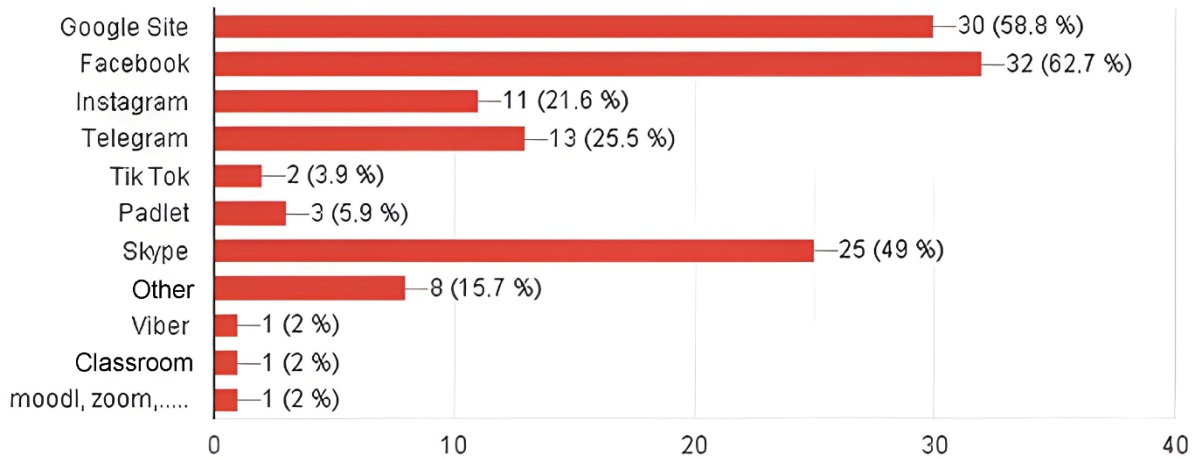
Figure 6: Practical networks for advanced training of adults: Google Site, Facebook, Instagram, Telegram, Tik Tok, Padlet, Skype

Figure 7 indicates the personal data of teaching and academic staff who took part in the survey during COVID-19 in 2020 about the possibility of remote studying given the city, region or village they live: yes — 66.7%, no — 33.3%.
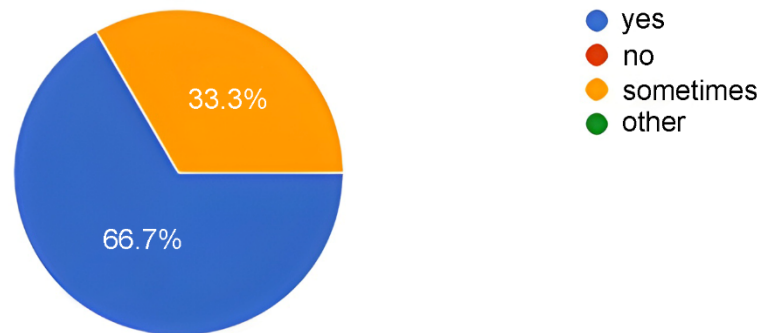

Figure 7: Monitoring the possibility of teaching and academic staff who live in the city, village, or region to study remotely

Analysing the content of the results, especially in terms of the practical difficulties that arise during distance learning for teachers and research and teaching staff, there is a need to solve the problems of educators, which will take into account all the cognitive needs of educators, as well as their time opportunities. It is significant that a third of the teaching staff answered that they do not always have the opportunity to study remotely. So, for these teachers, closure of campuses due to a pandemic or any other reason, means closure of teaching and learning. That is, lifelong learning ceases to be such.

Discussion

This document aimed to examine the perception of teachers and students of the process of online learning and learning during the COVID-19 pandemic. Although a theoretical view underlies the

study, the study provides different perspectives on the practical challenges faced by online learning today. The mixed-use study examined various international organisations that offer a comprehensive list of distance learning solutions, including educational programmes, platforms, and resources designed to help parents, teachers, schools, and school administrators facilitate student learning and provide social assistance and interaction when educational institutions are closed.

A study by Mishra et al. (2020) highlights the need to make efforts to provide students with free access to online educational resources so that they can make the most of their time during the Covid period. Now, for the first time, many teachers in the classroom are trying to understand the intricacies of distance learning and are looking for free online resources for schools that support the perception of our university teachers who also advocated for free access to online learning resources.

The transition to online learning through COVID-19 has been a very difficult task for higher education institutions. This is confirmed in a study by Aguilera-Hermida (2020). The study presents factors, which impact the use and acceptance of students' online learning at the time of the order to stay at home due to COVID-19. One of the strongest categories of qualitative data showed that after the transition to teaching on the internet many students reported that their learning on the internet was an unpleasant experience, and they expressed their negative attitude to this. Not only did they find online learning more difficult, but the lack of support resources (access to a training centre, library, interaction with professors, etc.) was an important issue during the transition to online learning.

Petrenko et al. (2020) said that the system of management of educational content (LMS or LCMS) in VET institutions is complex in terms of both software and hardware but it can provide the kind of indirect interaction between remote participants which students missed at the start of the pandemic. Also, it can become a sustainable training process by using automation of some of its components and it is now part of the VET informational and educational the environment of their institution. The most common systems management content used in teaching in the Ukrainian sphere of education include Moodle, eFront, OpenEDX, etc. (Petrenko et al., 2020).

Conclusion

When society is in the recovery phase of COVID-19, it will be a period of critical reflection on the role of education systems and especially vocational education. The global health crisis and the ensuing blockade have led to increased respect for those workers who are currently working tirelessly to save the economy. Education plays an important role in developing the competencies and skills needed for tomorrow's society. Real change often takes place in deep crises, and this moment preserves the possibility that we will not return to the way things were. Although this crisis has had profoundly devastating consequences, including for education, the pandemic is also a call to renew commitment to sustainable development. Providing all young people with the opportunity to succeed in education and develop knowledge, skills, attitudes and values that will enable them to contribute to society is at the heart of the global agenda and the promise of education in our future society.

The results presented above, depicted in tables and charts, provide a picture of the state of development of digital technologies in the field of lifelong learning. They allow us to determine which platforms and methods are used for training, how much time students can devote to learning and, in theory, to determine the prospects for such methods and approaches.

Although it is a well-established assumption that no pedagogical approach can replace formal education through direct face-to-face interaction with teachers, after the COVID-19 crisis, online education has seen the beginning of a pedagogical transition from the traditional method to the modern approach of teaching-learning from class to scale, from personal to virtual and from seminar to webinar. Previously, e-learning, distance education and distance learning courses were considered by many people as part of non-formal education but today these seem likely to gradually replace the formal education system if the current circumstances persist. Internet-based communication could change the direction of the entire education system around the world after COVID-19.

Some key international organisations already recognise the promising and appropriate systemic implementation of distance technology in specific subjects and contexts. At the same time, some common problems in the use of distance vocational training related to diverse technical and material situations, were identified as follows: access to high-quality functional use of electronic platforms; design of distance courses; low level of IT literacy of students and teachers which complicated the introduction of distance learning technologies; and integration of theoretical and practical training in the conditions of distance learning.

A survey of academic staff indicated specific problems with distance learning since opportunities and access to certain resources are not always available. An indicator of 33.3% of respondents who do not always have the opportunity to access various sources for distance learning has acquired a critical value. Thus, the field of education requires implementing new approaches and assistance from the state in promoting the development of such a factor as distance learning for everyone.

On the other hand, the survey showed that adults use many social media platforms and networks for advanced training (from Google Site to Viber and others). It testifies that adults find various ways to improve their professional skills. In the future, it may lead not only to reflection on the experience gained during the COVID-19 pandemic, but also the acquirement of the basic knowledge needed to transform the entire educational system in accordance with the latest technologies and digitalisation.

The results of research and analysis of survey data outline some ways to scientifically solve existing problems, and can be summarised in prepared guidelines for improving the implementation of distance learning in vocational education and training in particular. Undoubtedly, the implementation of theoretical and methodological developments in the development of distance education, training, and technology requires the consolidation of the efforts of the scientific community with all stakeholders involved in the process of distance education system development.

Recommendations

Successful implementation of an Action Plan will require work in close partnership and cooperation with the European Parliament and the member states, with the active participation of the Committee of the Regions and local authorities. For member states, closer cooperation will help to overcome fragmented policies that could undermine effective digital education policies. There is also a need to strengthen and coordinate work between sectors and policy areas. The Commission should therefore support cooperation and networking at the EU level between national structures on digital education. This will help facilitate the exchange of best practices across peer learning and support a more consistent and structured approach to digital education policy.

The Commission could also organise field events, in the form of stakeholder forums, to increase participation — and a sense of ownership — of a wide range of stakeholders. Such events will gather member states, EU institutions and stakeholders in education (including teachers and parent organisations, local authorities, civil society groups and companies — including companies committed to the agenda of the digital education) to share best practices and discuss emerging issues and opportunities.

Digital education can be an important tool for the EU at the international level by exchanging and scaling up best practices and building communities of practice through EU-supported cooperation and projects. A well-functioning education system underpins the European way of life and is essential for the prosperity and stability of the EU, the member states and our partner country. Digital education initiatives have the potential to strengthen relations between partner countries and the EU, as well as to strengthen relations in various non-EU regions. An open and highly efficient digital education ecosystem in the EU can help attract and nurture excellence around the world as global competition for talent and innovation accelerates. This can help increase the innovation performance of the EU and its member states.

Strengthening international cooperation on digital education must be an integral part of the EU as a global partner in education. This will be reflected in the EU's international cooperation programmes at the global, regional and bilateral levels, including the international dimension of Erasmus +. In particular, the EU, in line with Team Europe's approach, will contribute to the global development of cooperation while addressing its strategic objectives in priority regions, especially the Western Balkans, Africa and the Eastern Partnership and the Southern Mediterranean, based on the Digital4Development Hub.

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Authors:

Inna H. Otamas. Email: otamas8057@edu-knu.com

Viktoriia O. Anishchenko. Email: viktoriia.anishchenko@sci-academy.cc

Liudmyla A. Ovsiankina. Email: liudmyla.ovsiankina@edu.cn.ua

Inna A. Afanasyeva. Email: inna.afanasyeva@edu-knu.com

Andrii Bieliatynskyi. andr-bieliatynskyi@neu.com.de