Current state and prospects of distance learning development in Ukraine

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Abstract

The article presents a thorough literature review and highlights the main stages in the development of distance learning in Ukraine. Moreover, the paper suggests the periodization of distance learning. Research data on distance learning peculiarities in Ukraine during and before the pandemic make it possible to outline the main problems faced by higher education institutions' (HEIs) teachers and students. Therefore, the study emphasizes common problems, namely hardware/software issues, poor Internet connectivity, lack of students' self-discipline and self-organization, absence of live communication, insufficient digital literacy skills etc. The paper analyzes the benefits of MOOCs that aim at digital competence development. It presents the results of students' survey on qualitative changes in distance learning organization in 2020–2021 academic year compared to 2019–2020 academic year. The results prove that in current academic year, distance learning is better organized due to a sufficient structure of distance learning courses, the use of one platform for the whole educational institution, higher teachers' digital competence, the use of various resources etc.

Keywords

distance learning, MOOC, problems, digital competence

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1. Introduction

One of the major goals of sustainable development is to "ensure quality education and promote opportunities for all to learn throughout life" [1]. Taking into consideration the quarantine restrictions and the epidemiological situation, this goal is now possible only with the use of distance learning information technologies.

In March 2020, all educational institutions jointly implemented distance learning (distance learning). Initially, distance learning organization was quite disorganized. However, secondary education institutions quickly agreed on the platform for the whole institution, whereas in HEIs, even despite the availability of the platform to support distance learning, the choice of what technologies to use was first and foremost granted to teachers. Therefore, the variety of platforms used led to students' frustration and negatively contributed to quality distance learning. Moreover, it also provoked teachers' disorientation in distance learning organization and led to both technological as well as psychological problems. Consequently, solving these problems requires comprehensive distance learning study.

2. Theoretical background

Scopus database review for the query (KEY (e-learning) OR KEY (distance AND learning) OR KEY (blended AND learning)) (figure 1) shows a steady increase in the interest of distance learning among outstanding foreign and Ukrainian scholars (figure 2). Thus, Lviv Polytechnic National University, Kharkiv National University of Radio Electronics, Kherson State University, Borys Hrinchenko Kyiv University, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", National Academy of Pedagogical Sciences of Ukraine, and Kryvyi Rih State Pedagogical University take the lead in this direction (figure 3).

The spring of 2020 has become decisive for distance learning. Therefore, the results of distance learning study after this period deserves special attention. Thus, in [2] distance learning is viewed as a three-dimensional learning model based on the principles of acquiring knowledge "anywhere", "anytime" and "at any speed". Moreover, the study presents the results of students' survey on distance learning peculiarities which was conducted by the Department of Foreign Languages at the Prydniprovska State Academy of Civil Engineering and Architecture (PSACEA) and at Alfred Nobel University (Dnipro) in March-May, 2020. A similar issue is analyzed in [3]. Thus the research suggests the results of teachers and students' survey on the peculiarities of distance learning organization performed at Ternopil Volodymyr Hnatiuk National Pedagogical University and Dragomanov National Pedagogical University. Some studies propose [4] the analysis of distance learning problems. It is interesting to compare these results with teachers' survey, which was conducted just before the introduction of the quarantine in Kryvyi Rih State Pedagogical University [5, 6]. The researchers have also addressed the problems of design and implementation of distance course "Cloud technologies in the educational process in quarantine" [7], MOOC advantages, classification, popularity and promotion [8] and others.

Some studies are dedicated to the peculiarities of distance learning information technologies use on the basis of Google Classroom [9] or Moodle LMS [10].

Thus, nowadays, identifying distance learning problems and finding the ways to solve them

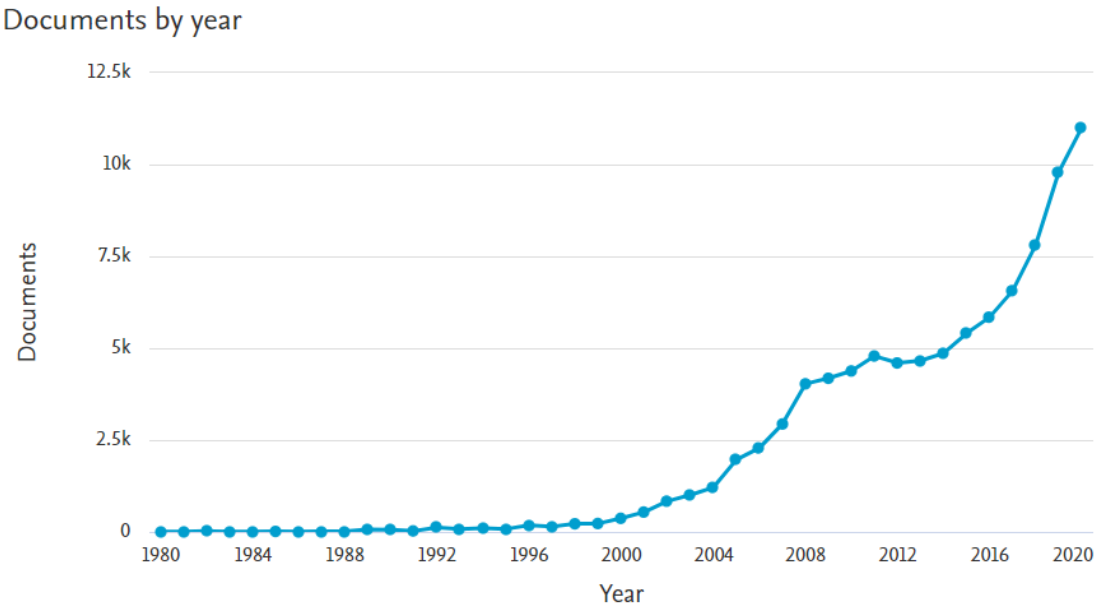

Figure 1: Number of papers included in Scopus by their publication year.

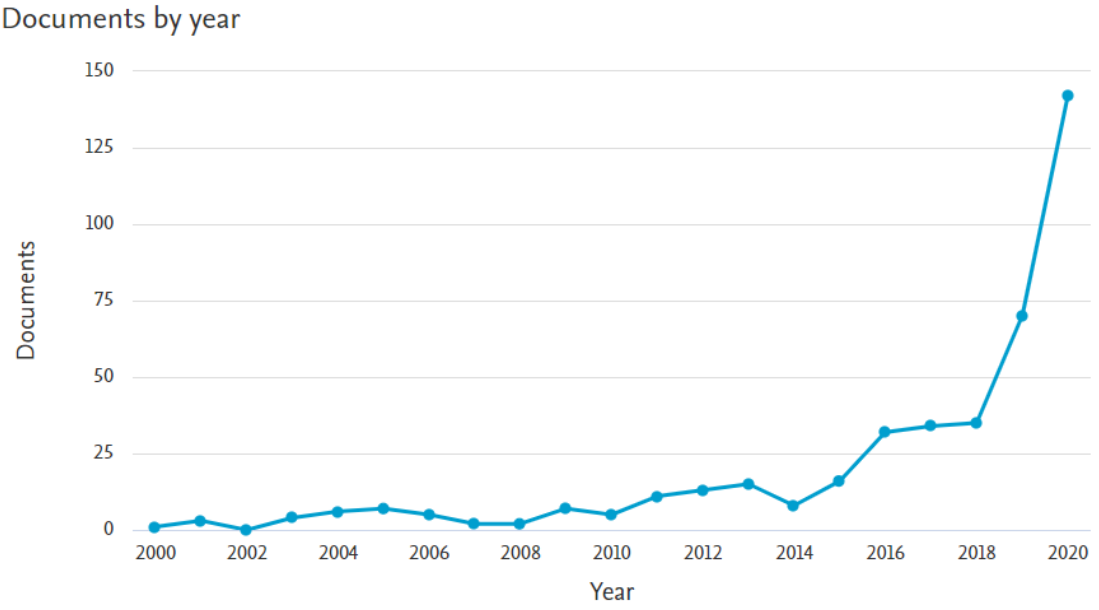

Figure 2: Number of papers included in Scopus by their publication year, AFFILCOUNTRY (Ukraine).

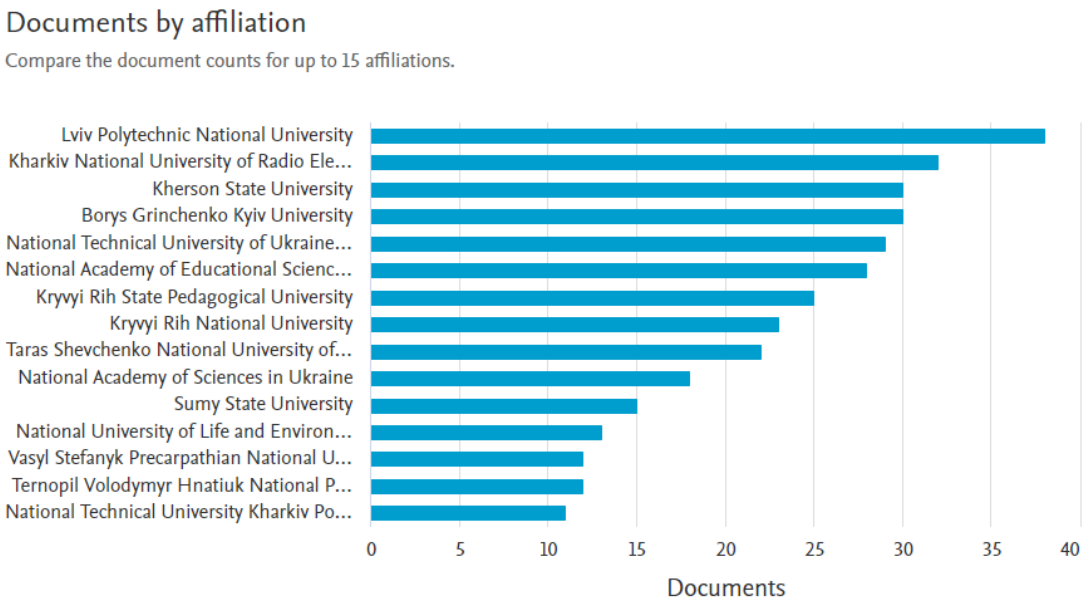

Figure 3: Number of papers included in Scopus by their publication year by affiliation.

are among the most widely discussed and investigated issues worldwide.

3. Methodology

The aim of the study is to analyze the current state of distance learning in Ukraine, identify its main problems and specify the ways to solve them. Therefore, the paper presents the analysis of the main stages of distance learning development in Ukraine and determines its periodization. Moreover, it summarizes the main problems associated with the organization of distance learning in HEIs in Ukraine on the basis of current research results [2, 3, 4, 5, 6].

As one of the problems of distance learning implementation, mentioned by HEIs teachers, is a low level of digital competence, the experience of MOOC courses should be taken into consideration for its further development.

Therefore, the paper considers the history of MOOC courses development in Ukraine and analyzes MOOC courses aimed at digital competence development. In addition, the study presents the results of HEIs students' survey on distance learning peculiarities.

The aim of the survey was to find out whether there were any qualitative changes in distance learning organization in 2020–2021 academic year compared to 2019–2020 academic year. What is more, it was necessary to identify the factors which contributed to quality changes. The survey was conducted at Kryvyi Rih State Pedagogical University among the 2nd-4th year Bachelor degree students and the 1st year Master degree students of the Faculty of Physics and Mathematics.

4. Results

4.1. History of distance learning in Ukraine

The history of distance learning in Ukraine could be roughly divided into the following stages:

Stage I: Introduction

- distance learning introduction at the National Technical University "Kharkiv Polytechnic Institute", Kharkiv National University of Radio Electronics and Lviv Institute of Management (1997) [11];

Stage II: Popularization

- foundation of the Ukrainian Distance Education Center on the basis of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" (2000) [12];
- approval of the Regulation "Concept of distance education development in Ukraine" (2000) [13];
- fostering the introduction and use of distance learning technologies, establishing centers of distance learning systems on the basis of educational institutions of different types (after 2000) in particular;
- approval of the "Regulations on distance learning" (2004) [14];
- approval of the new "Regulations on distance learning" (2013) [15];

Stage III: Widespread implementation

- widespread distance learning introduction in educational institutions of all levels due to quarantine restrictions related to COVID-19 (spring 2020);
- approval of the order "On distance learning organisation" (2020) [16].

According to the Regulation on distance learning, "the aim of distance learning is to provide educational services through the use of modern ICT in teaching at certain educational or educational and qualification levels in accordance with state educational standards; according to the programs of citizens' preparation for admission to educational institutions, training of foreigners and advanced training of employees" [15].

4.2. State of distance learning

Moodle LMS is a common platform for distance / blended learning due to its wide range of features and simple interface. The modular structure of Moodle LMS allows to easily modify the design. Moreover, it has more than 40 language packs available to localize the system.

The results of Internet resources analysis (of May 2020) prove that the vast majority (86%) of Ukrainian educational institutions provide training in pedagogical specialties using Moodle LMS [17].

4.3. The analysis of distance learning problems

According to the annual report of the National Agency for Quality Assurance in Higher Education [18], the level of computer support for higher education is highly rated (4.07 with a 5-point scale, where 4 is rather good, 5 is very good).

Countries engagement in the use of information technology is expressed by the Network Readiness Index (NRI).

Thus, this research model focuses on four categories, such as technology, people, management, influence, and covers a wide range of issues from artificial intelligence and the Internet of Things to the role of digital transformation in achieving sustainable development goals (figure 4).

In 2020, in the context of "The Network Readiness Index 2020" survey [19] 134 countries were analyzed on 60 indicators. Ukraine is on the 64 th place with the value of NRI = 49.43 (figure 4). It is among Mexico, Belarus, Azerbaijan, Northern Macedonia, and Georgia. At the same time, Ukraine is among the top 3 countries in terms of NRI with below-average incomes (along with Vietnam and Moldova). The analysis of figure 4 outlines the weaknesses in the readiness to use information technology.

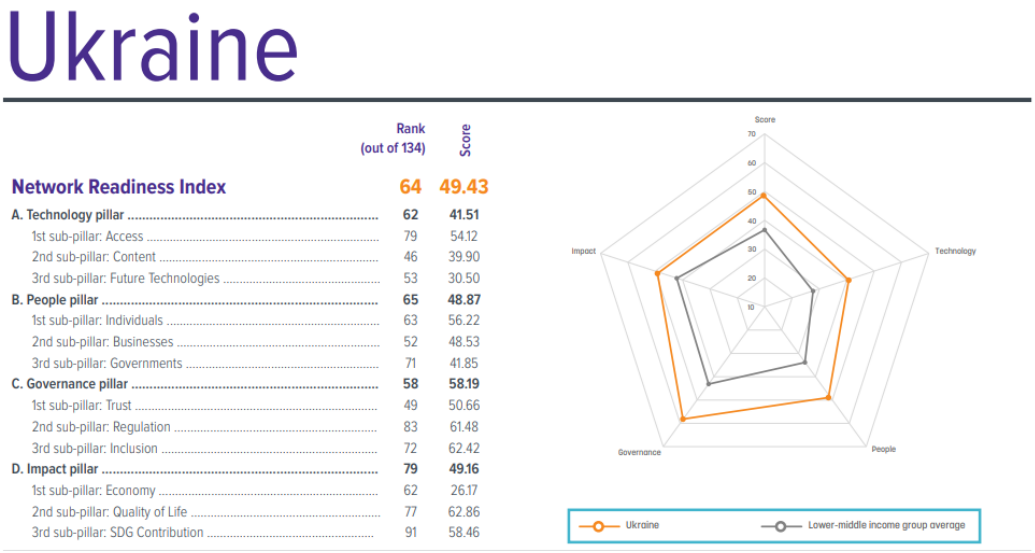

Figure 4: NRI Ukraine Index.

The study [19] emphasizes that "the world is ready for the Internet". However, it raises the question whether the network is ready for that [19]. Nowadays, when social distancing has become the norm, only 4.5 billion people (59% of the world population) have a network connection. Although these indicators are significant, especially compared to 5–10 years ago, it should be noted that the growth rate of penetration has decreased. Consequently, at such a rate it will take 50 years or more to connect the whole world to the network [19]. Therefore, the authors of [19] see a new architecture for the next stage of development – the digital network Next-Gen Digital Network. It will be built in a fundamentally different way, combining four

specialized technological connections: wired and wireless, software and hardware, connection and computing, and open source.

Bakhmat et al. [4] analyzes the results of a survey of HEIs' teachers on distance learning. Particular attention is given to the following questions:

- Did you receive technical support / recommendations for organizing online teaching of your course (from HEI, technical support, etc.)?
- What problems did you face when organizing and conducting online classes?
- What are the benefits of online learning for you?

The results of the survey show that due to significant differences in the curricula of HEIs, the respondents did not receive clear recommendations from the Ministry of Education and Science on the organization of distance learning during the quarantine. On the other hand, secondary education institutions were given better support, namely regular lessons on TV channels, YouTube channel, approval of "The Regulations on the distance form of getting full secondary education", etc.). Therefore, the management of HEIs had almost unlimited freedom. Consequently, it led to sufficient differences in distance learning organization.

The results of the survey show that the majority (60%) of respondents received technical support / recommendations for organizing their online courses. However, the teachers emphasized the following distance learning organization problems (table 1).

Table 1
The problems of teachers in distance learning (Kharkiv region, Kyiv, Ternopil and Poltava regions

№	Problem	%
1	low quality / lack of network connection	31
2	technical problems	10
3	insufficient student engagement	8
4	lack of eye interaction	6
5	low level of digital competence	4
6	lack of HEIs'	4
7	significant workload and stress	3
8	lack of students' motivation	3

These data correlate with the results of the study [17] on Moodle LMS use problems, namely lack of time, low level of digital competence, inadequate hardware and software.

It is important to emphasize the advantages of online learning, such as the efficiency of time use; quick access to classes; flexible schedule; variety of means; mobility, clear assessment; individualization and inclusiveness; possibility to invite experts to online courses etc.

Tokarieva et al. [2, p. 5] analyzes students' main problems in distance learning (table 2).

The survey results [3] help to identify the problems of both HEIs teachers and students in distance learning (table 3).

According to the survey conducted just before the quarantine in March 2020 at the Kryvyi Rih State Pedagogical University [5, p. 375], [6, p. 301], among the problems of using distance learning information technology (Moodle LMS in particular) the teachers emphasized technical difficulties, namely:

Table 2
The main problems of students in distance learning (I – Prydniprovska State Academy of Civil Engineering and Architecture, II – Alfred Nobel University

№	Problems	I (%)	II (%)
1	Problems with self-organisation, high level of distraction	35	33
2	The excessive number of educational tasks	35	31
3	Dependence on technical means	87	28
4	Poor quality of home Internet	61	28
5	Restrictions on obtaining practical skills	22	27
6	Lack of opportunity to communicate freely with the teacher	0	23
7	Lack of control over the level of knowledge	13	18
8	Insufficient duration of classes (time limit)	0	15
9	The quality of the material taught	17	12
10	Insufficient theoretical materials to perform tests and/or tasks	30	10
11	Lack of opportunity to communicate with other students	57	10
12	The need to learn how to work online	13	5

Table 3
The main problems of both teachers and students in distance learning

№	Students	%	Academic staff	%
1	Self-motivation	75	Positive attitude towards ICT	69
2	Lack of practice	73	English language proficiency	65
3	Time management	61	Media literacy	65
4	Adaptability strugle	61	Instruction strategy	61
5	Lack of attention	61	Learner's capability	54
6	Anxiety & confusion	52	Digital alienation	54
7	English language proficiency	52	Up-to-date meaningful content of e-courses	52

- lack of Internet connection,
- limited software functionality for solving didactic tasks,
- instability of distance learning information technologies, and
- lack or inconsistency of teachers' technical support.

Moreover, the respondents highlighted organizational and methodological difficulties, such as:

- low level of teachers and students digital competence,
- insufficient development of distance learning theoretical and methodological principles,
- the use of information technology in educational process, and
- psychological unwillingness of some teachers to use information technology.

Therefore, the analysis of survey results makes it possible to emphasize the need to develop both students and teachers digital competence.

4.4. History of MOOC development in Ukraine

Taking into consideration the importance of social distancing, it is important to consider the experience of using Massive open online courses (MOOC) to develop digital competence. Therefore, the paper outlines the history of MOOC development in Ukraine.

The first MOOC was created at Taras Shevchenko National University of Kyiv "University Online" in 2013. The first MOOC was created on brand management by Ivan Primachenko (9000 participants) [11].

In 2014, platforms for online courses EdEra (developers: Ilia Filipov, Artem Ilchuk, Olga Filipova) and Prometheus (developers: Ivan Prymachenko, Oleksii Molchanovskyi) were created. Currently, 70+ courses are available on EdEra, and 200+ courses are available on Prometheus, which have already been completed by more than 1.5 million people who received 800,000 certificates.

2016 is characterized by the implementation of blended education pilot programs in the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Lviv National University named after Ivan Franko, National University "Lviv Polytechnic" and the Ukrainian Catholic University: introduction of courses from Prometheus to full-time study [20].

However, it should be noted that the first prototypes of MOOC in Ukraine were courses "Fundamentals of Distance Learning" (1999, 50 students), "Practical Distance Learning Course" (2000–2001, 60 students) developed by Volodymyr M. Kukharenko [21].

Currently, there are a lot of Ukrainian-language online courses for teachers, namely: "Technology of distance course development-2021" [12], "The expertise of distance course-2021" [22] at National Technical University "Kharkiv Polytechnic Institute"; "Cloud technologies in distance learning in quarantine" [23] at Zhytomyr Polytechnic State University and others [17].

2020 was a very fruitful year for MOOC development. Thus, EdEra platform [24] has a number of courses on distance learning and the use of distance learning ICT in quarantine. The courses are developed for school teachers, teachers of vocational education institutions, teachers and employees of HEIs' administration:

- online course on distance learning for teachers and school leaders [25] (August 2020);
- online course on distance learning for teachers and the principals of vocational education institutions [26] (August 2020);
- "Take it and do it" Blended and distance learning [27] (November 2020);
- #blend_it: We master blended learning [28] (January 2021).

At the beginning of the quarantine, the Ministry of Education and Science of Ukraine developed a project "Diia. Digital Education" [29]. It introduced a lot of series for teachers, which are also aimed at digital competence development:

- educational series "Quarantine: online services for teachers" [30];
- teachers' digital skills [31];
- interactive learning: tools and technologies for interesting lessons [32];
- training for coaches [33].

However, these courses are mostly for HEIs pedagogical staff. Thus, such courses development is a perspective direction for further research. However, the development of such courses is needed for HEIs managers. Although statistics show that such courses (for heads of departments, deans, etc.) are not popular (table 4) and, as a result, distance learning process in most educational institutions is unmanageable [11]. Therefore, special attention should be given to this issue.

Table 4
Course statistics for heads of departments, deans, etc.

Course	Registered	Studied	Completed
Basics of distance learning	1652	363	65
Distance course development technologies	1368	488	194
Blended learning	396	125	52
Tutors' workshop	210	53	24
Content curator	460	213	85
Distance learning for managers	131	30	14

The experience of the European Union can be used to solve the issue of distance learning implementation, namely: Open University (United Kingdom) [34], National University of Distance Education (Universidad Nacional de Educación a Distancia) (Spain) [35], National Center for Distance Education (Center national d'enseignement à distance (CNED)) (France) [36] etc.

Thus, the aim of CNED lies in the maximum implementation of distance education and presupposes establishing courses for learners from kindergarten to HEIs. Moreover, it provides vocational education, inclusive education, elective courses, summer courses, HEIs admission courses. What is more, it proposes certified training sessions; exams preparation for replacement positions, educational institutions consultation, adaptation of existing courses for a specific customer; training in the fields of culture, art, sports, medicine, etc.

Another way to improve distance learning implementation is to ensure the appropriate level of IT infrastructure.

4.5. Determining qualitative changes in distance learning organization

To identify the changes in distance learning organization in 2020–2021 academic year compared to 2019–2020 academic year we conducted a survey among the students of the Faculty of Physics and Mathematics of Kryvyi Rih State Pedagogical University. The survey included the following questions:

1. *How did distance learning organization change in 2020-2021 academic year compared to 2019-2020 academic year?* (the results are presented in the figure 5).

2. *Has teachers' digital competence in 2020-2021 compared to 2019-2020 academic year changed?* (the results are presented in the figure 6).

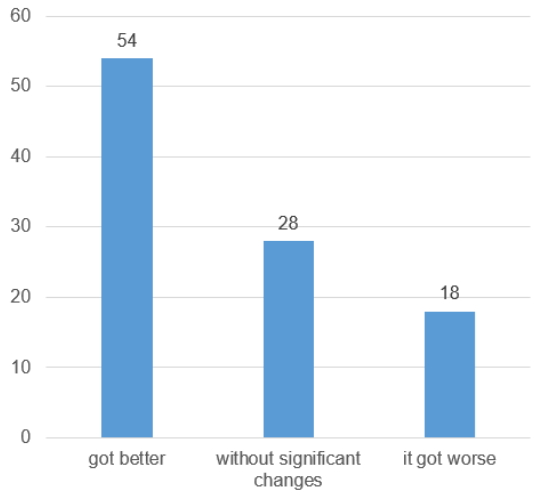

Figure 5: Changing the distance learning organisation.

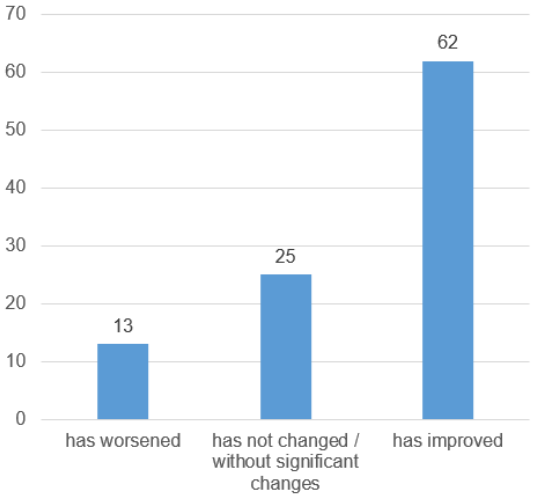

Figure 6: Changing the teachers' digital competence.

3. *Choose the factors which are important to facilitate distance learning process?* (the results are presented in the figure 7).

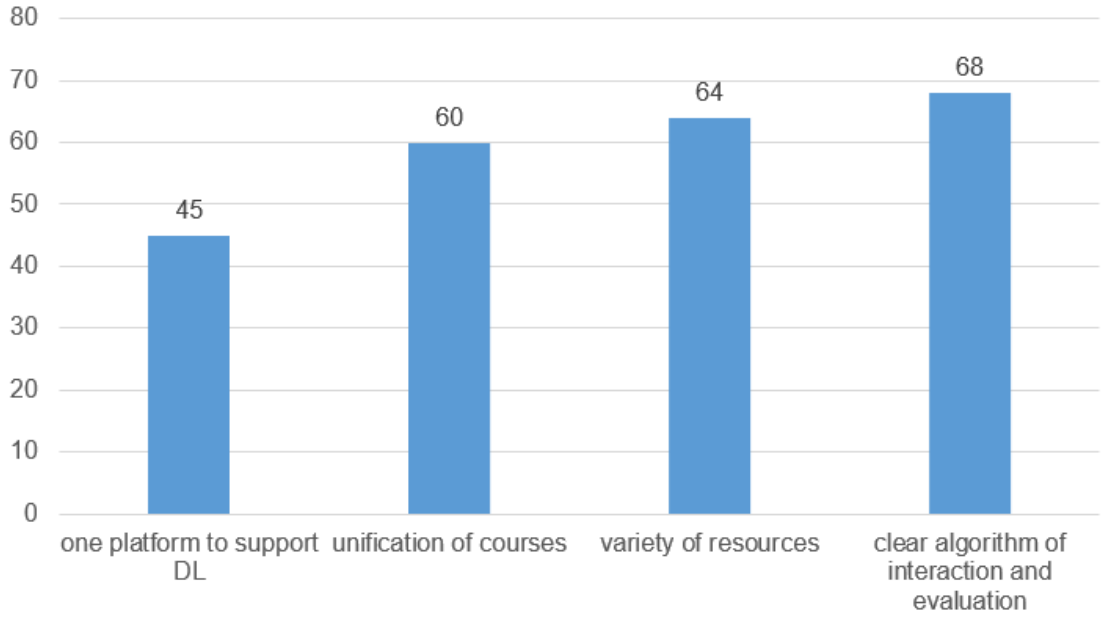

Figure 7: Important factors for facilitating distance learning.

4. *What form of education would you prefer?* (the results are presented in the figure 8).

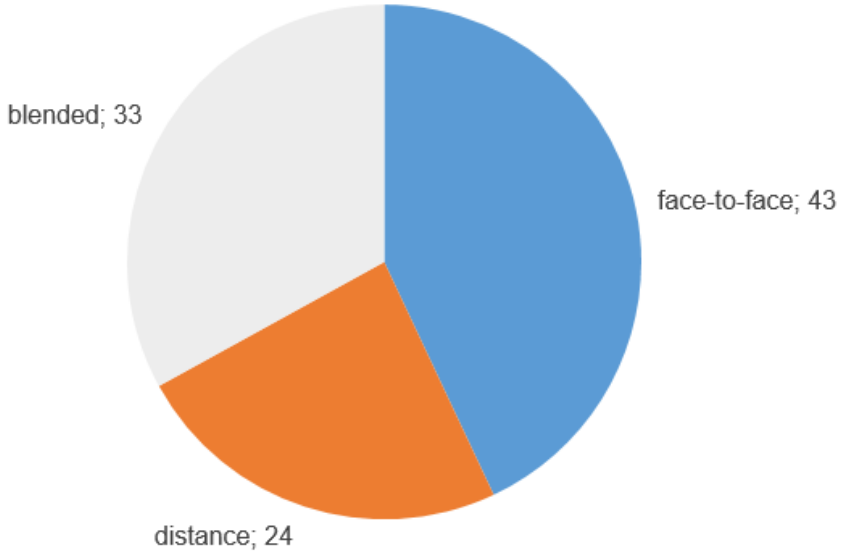

Figure 8: Preferred form of education.

5. *Your comment about distance learning.*

It's interesting to cite the students' answers:

> *It got better, as teachers supported learning through Moodle LMS system throughout the course. They introduced the main tasks to be done and set the deadlines.*
>
> *All teachers use one platform, which allows you to navigate faster.*
>
> *A variety of resources facilitate the understanding of the material. The use of MOOC by teachers helps to master the course at a significantly higher level as you understand that this is a course that is studied all over the world, and your results meet world standards.*

5. Conclusions

The COVID-19 quarantine restrictions have become a catalyst for the use of distance learning technologies in all educational institutions and a litmus test to identify the problems associated with it. Despite HEIs high self-assessment on computer software stated in the reports of the National Agency for Quality Assurance in Higher Education [18], there are a lot of problems related to distance learning. Thus among the main problems teachers and students emphasize hardware / software inconsistencies and technical problems with the Internet.

In addition, they highlight the importance of developing both teachers and students digital competence. It may be facilitated by the MOOC, the significance of which is highly appreciated by both non-governmental organization and the Ministry of Education and Science of Ukraine. Due to their cooperation a number of courses have already been developed both for training and for determining the level of digital literacy.

The other problems, namely problems with self-organization, high level of distraction, restrictions on obtaining practical skills, lack of opportunity to communicate freely with the teacher, lack of control over the level of knowledge, insufficient theoretical materials to perform tests and / or tasks, can be solved through blended learning.

The results of a survey conducted to identify changes in distance learning organization in 2020–2021 academic year compared to 2019–2020 academic year prove a better distance learning organization which became possible thank to by higher level of teachers' digital competence, the use of one platform within the educational institution and the use of a variety of resources, including MOOC.

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