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PAPER

Use of Massive Open Online Courses (MOOC) by Teachers of Ukrainian Universities: Survey Results

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ABSTRACT

The research analyzes the results of a survey of university teachers on the use of massive open online courses (MOOC) in the educational process and for personal self-development. 2,824 respondents from 155 universities located throughout Ukraine took part in the survey. The authors' questionnaire was created with Google Forms. The analysis of responses has revealed that 88.8% of respondents use MOOC. The most famous Ukrainian online platform among teachers is Prometheus (54.7% of respondents). The most famous foreign platform is Coursera (31.2% of teachers). In addition to quantitative analysis of simple responses, we used a hierarchical clustering method to analyze extended responses, and we made a list of 82 standardized responses (SR). It was found that the use of MOOC had increased the amount of teachers' knowledge and their practical experience. The most important advantages of using MOOC in the educational process are additional learning material, experience in non-formal education, etc. As for weaknesses, these are low-quality connection, low quality of some online courses, lack of motivation among teachers. The obtained results expanded the list of advantages and disadvantages of MOOC, and the formed list of SR can become the basis for further research where we plan to study the ways of increasing teacher motivation to use MOOC in the educational process.

KEYWORDS

online learning, massive open online courses (MOOC), online course, higher education, teachers

1 INTRODUCTION

Characteristic features of the information society are the use of information as the main strategic resource and wide implementation of information and communication technologies (ICT) in economy, production, and other spheres of human activity. ICT has changed people's way of life, their educational [1], scientific [2], and professional activities, commerce, recreation, etc. One of the important directions that characterizes the functioning of the information society is education informatization,

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which is considered a natural step in improving the quality of education in modern conditions [3]. It significantly influenced methods of teaching and obtaining educational information [4], forms, and means of communication between the participants of the educational process.

Recent events related to the COVID-19 pandemic have forced educators to become even more active in using ICT to organize the educational process in distance and blended formats [5]. The emergence of various electronic resources has made it possible to satisfy the users' demand for educational information, which is available on the Internet almost without restrictions.

One of the promising types of electronic resources that supports the educational process is massive open online courses (MOOC). Their main advantages are as follows: provision of massiveness; they are completely or partially free of charge; a significant number of online courses on various topics. Due to their advantages, they are used as a supplement to the formal training of students [6] and other users who want to develop their own competencies. P. Duan [7] draws attention to the fact that MOOC provide an opportunity to develop a sense of social presence among students and teachers in the conditions of distance learning. The possibility of professional development with the help of MOOC was studied in the works by [8] (Natural Science teachers), [9], [10] (primary and secondary school teachers), [11] (Physical Education teachers) and others.

At the same time, MOOC have characteristic features that must be taken into account during their implementation in the educational process. In his work, C. Braun [12] studies the possibility of combining an online course with lectures in the classroom. The study by Wahyudi M. N. A. et al. [13] deals with the use of the gamification method in MOOC. Teacher motivation for using online courses in the educational process was studied in the works by P. Lowenthal et al. [14]. The influence of teachers on the process of mastering online courses by students was researched in the works by R. S. Jansen [15], W. Goh [16], and others. M. León-Urrutia [17] analyzed teachers' opinions of MOOC influence on the organization of the educational process at university. The future teachers' opinions on the usefulness of online courses for further professional activity were analyzed in the work by S. Donitsa-Schmidt [18]. S. Li et al. [19] studied the differences between individual and group teacher training with the help of MOOC. The problems that arose while using MOOC were researched in the works by M. Usher and A. Hershkovitz [20], N. Rubaai and H. Hashim [21], and others.

In Ukraine, a lot of attention is paid to the use of MOOC at the state level, as well as within higher education institutions. To a greater extent, online courses are used for non-formal education [22], for providing distance learning [23], and for lifelong learning. For this, users can use both foreign MOOC platforms [24] and Ukrainian online platforms [25]. Communication with teachers and our practical experience have shown that teachers' attitudes towards MOOC and their use in the educational process are ambiguous; each of the teachers has a different experience of using online courses for personal self-development and ensuring the educational process at universities. As for students' attitude to the use of MOOC at some educational institutions, it was studied in the work by I. Mintii [26]. However, there is no thorough survey of teachers of Ukrainian HEIs on the use of MOOC.

The purpose of our study is a survey of university teachers on the use of MOOC in the educational process and for personal self-development. The analysis of the obtained results will demonstrate the current state of MOOC implementation in the educational process of universities; it will reveal teachers' attitudes to MOOC, opportunities, and potential risks of their use in the educational process. Based on

the obtained results, the administration of HEIs will be able to identify problematic points of MOOC implementation in the educational process and form directions for further popularization of MOOC among students and teachers.

2 MATERIAL AND METHODS

2.1 General background of research

The concept of MOOC can be viewed from different angles, depending on the context: a) It is an online platform that provides an opportunity for everyone to gain knowledge and develop their own skills through distance education [27]. b) A type of distance learning that allows learning without being physically present in the classroom and contributes to the democratization of learning [6], [10]. Being asked a question, "What is MOOC?" ChatGPT answered that it is an online educational program designed to be accessible to a large number of participants from anywhere in the world. The authors understand MOOC as a type of online course that is located on special online platforms.

Depending on the teaching method, MOOC can be divided into several types. cMOOC (Connectivist MOOC) are more student-oriented, they involve the active work of students who collaborate with the teacher and other students, have a certain autonomy in searching for information to design and expand the course, and use online tools for communication. xMOOC (Extended MOOC) are more teacher-oriented; they are based on the traditional delivery of learning material through lectures, videos, tests, and practical exercises. Such courses already have the educational content necessary to master [10], [14].

The most significant advantages of MOOC are reflected in the abbreviation: they allow a large number of users to learn for free (or conditionally free) in a distance format, thus ensuring the principle of open education. According to the study by O. Zawacki-Richter [28], the majority of research works devoted to MOOC indicate open access to courses in a global format.

Sometimes MOOC are seen as the next step in the development of distance courses. They have a lot in common, but there are some differences. MOOC fully realizes the concept of openness and massiveness. As for distance courses, they are limited to the educational institution where students master a certain specialty. The possibilities of MOOC are more like those of social networks; they are not just an electronic resource for storing educational information and monitoring student knowledge [27]. The content of the distance course usually consists of lectures (theoretical material), tasks for practical/laboratory work, tests and tasks for independent work. By contrast, the main content elements of MOOC include videos, tests for each topic, discussion forms, and other means of feedback [6]. Students have a stable external motivation to master the educational material within the academic discipline (getting a grade on the topic, preparing for the exam, etc.). On the contrary, studying MOOC requires internal motivation [29], which significantly affects the successful completion of the online course to the end [30].

Today, there is a large number of MOOC platforms that offer courses on various topics. Therefore, the user should choose a platform and use the course search on the desired topic. For example, to master programming skills, you can use such platforms as Udemy, Alison, Edx, Coursera, Udacity, and Codecademy. The largest number of courses on learning programming languages is presented on the Udemy platform [24]. At the same time, since 2013, well-known Ukrainian universities have

also been developing their own online courses to brand the educational institution and provide distance education [26]. There are several Ukrainian MOOC, which have been offering a limited number of free online courses since 2013. For example, the Open University of Maidan (OUM) ensures the formation of civic culture; the EdEra online platform is more focused on teachers and students; the Prometheus platform provides courses on various topics [25]. The comparison of certain possibilities of online platforms is shown in Table 1.

Table 1. Functional possibilities of famous MOOC

Possibility	Udemy	Coursera	EdEra	Prometheus
Number of online courses	250 000+	8000+	150+	450+
Cost	+/–	+/–	+/–	+/–
Interface	multilingual	multilingual	UA|EN	UA
Search	+		+	+
Filters	+		–	+
Thematic areas	+		+	+
Courses in Ukrainian	55	4844	Most part	Most part

The use of MOOC in the educational process is useful for students, school teachers, and university lecturers. For example, according to the results of a teachers' survey given in the work by M. Yamba-Yugsi et al. [6], 93% of respondents have a positive attitude toward distance learning and are ready to use MOOC in the educational process based on the flipped classroom method. The study [30] draws attention to the use of an online MOOC platform to ensure communication during offline learning. According to university teachers, MOOC can be used in teaching various subjects, including English as a second language [21]. At the same time, the work with online courses does not cause great difficulties, since each teacher has a certain level of digital competence. The educational material, which is presented on online platforms, can be used as part of a lecture within a certain discipline. The researchers called this methodological approach "Pre-MOOC-concept." In this case, part of the lecture will be available to all users (an online MOOC), and the other part will be available only to students studying this discipline [12]. According to M. Usher and A. Hershkovitz [20], MOOC can be used to get an access to student learning achievements and other data that can be received while taking an online course.

Online courses proved to be quite useful during the advanced training and professional development of teachers. The value of such events lies not only in mastering useful theoretical material and methods of online learning organization. The results of the survey highlighted in the study by A. Jimoyiannis et al. [9] confirmed the positive dynamics in the teachers' attitude towards MOOC. The increase in motivation while taking a group online course was emphasized in the study by S. Li et al. [19]. According to the study by E. Kennedy et al. [31], collective mastery of an online course enables teachers to get positive emotions from participating in social learning and to share their practical experience. During group creation of online courses, teachers developed communication skills, improved problem-solving and decision-making competencies [10].

Any technology, including pedagogical one, has its features and weaknesses. These include a low percentage of completing online courses [32], technological difficulties [29], lack of quality feedback from course developers [33], and low levels of digital competence among university lecturers and school teachers [26]. The works by [17], [21] draw attention to the increase in the teacher workload when they start using online courses while teaching an academic discipline.

It should be noted that the possibilities and benefits of using MOOC in the educational process depend on many factors. In particular, these are the quality and design of online courses [34], hardware capabilities, language barriers, government policy regarding the use of MOOC, etc.

2.2 Preconditions and current state of using MOOC by Ukrainian teachers

Today, online courses on MOOC platforms for Ukrainian students and teachers remain quite popular. This can be explained by several factors. In the context of personal development, MOOC provide an opportunity to improve existing competencies or develop new ones at a convenient time. Online courses on the Ukrainian online platform Prometheus can serve as an example, since they help teachers develop skills of critical thinking, media literacy, and learning and memorizing skills [35]. Completion of an online course can be considered teacher professional development in case the certificate is verified by the relevant structural division of the university. The majority of Ukrainian HEIs have developed regulations on professional development. One of the forms of professional development is the completion of an online course (or courses) in a specialty to form general or professional competencies. In some cases, a certificate of successful completion of an online course is a mandatory condition for employment. The example is an online course for primary school teachers, which is located on the EdEra online platform. According to Order No. 34 of the Ministry of Education and Science of Ukraine as of January 15, 2018, its completion is a mandatory element of professional development for teachers working with first-grade students.

Online courses provide non-formal education and independent work for modern specialist training. Today, in the conditions of active hostilities on the territory of Ukraine, some educational institutions work in distance and blended formats [36]. The analysis of the results of the questionnaire, which was conducted among 331 students from 13 Ukrainian HEIs, showed that video lessons, LMS, online conferences, and MOOC are used during distance learning. Ukrainian students use such platforms as Coursera, EdX, and Udacity most often. As for the given recommendations, they included more active use of non-formal education, in particular online courses on MOOC platforms [23].

Non-formal education allows ensuring lifelong education and sustainable development. Some international and state normative documents emphasize the importance of non-formal education and its results. According to the document "Standards and Guidelines for Quality Assurance in the European Higher Education Area" (Paragraph 1.4), non-formal education is one of the ways to ensure students' educational progress, the results of which should be accepted along with the results of formal (traditional) education. It is noted that non-formal education contributes to the academic mobility of students. The Law of Ukraine "On Education" defines non-formal education (Article 8) and emphasizes the possibility of acquiring professional and other competencies through non-formal education (Article 34). The clear procedures for recognizing the results of non-formal education, including

certificates of MOOC completion, are indicated in the "Criteria for evaluating the quality of the educational program" (Sub-criterion 3.4), which is used during the accreditation of educational programs for student training. This procedure is carried out by the National Agency for Higher Education Quality Assurance. The purpose of the procedure is external assurance of the quality of higher education at Ukrainian universities according to the standards of the European Higher Education Area. In this context, the work by [37] indicates the positive practice of including elements of non-formal education related to sustainable development goals in educational programs.

The implementation of non-formal education is well aligned with the educational process of organized institutions. In this context, the work by [38] highlights individual models demonstrating the introduction of non-formal education in various social institutions of Ukraine, in particular schools, HEIs, research institutions, educational institutions, etc. The work by [22] carried out a comparative analysis of more than twenty MOOC platforms for providing non-formal education in Ukraine. The author used such comparison criteria as the average number of visitors per month, time of visit, and number of viewed pages in a session. According to the research results, in the Ukrainian-speaking region the most popular platforms are Coursera and Udemy.

Taking into account the need to adequately respond to modern challenges such as the provision of distance learning, a comfortable existence in the digital educational space [39], as well as the beginning of war hostilities on the territory of the country, the Ministry of Education and Science of Ukraine (MES) and foreign partners have taken comprehensive measures to provide free educational support and scientific activities for institutions of professional pre-higher and higher education under martial law. Thus, the letter of the Ministry of Education and Science of Ukraine "On the use of free digital resources for distance and blended learning" (dated October 18, 2022) informs educators about the free use of online resources for obtaining non-formal education.

From March 2022, within the framework of domestic education support, leading foreign platforms like Coursera, Udemy, and edX offer Ukrainian students and teachers free access to their online courses, which allowed them to join non-formal education or use online courses in their professional activities.

2.3 Methodology

In order to determine the impact of MOOC on the professional and personal development of Ukrainian teachers, as well as the specifics of using online courses in higher education institutions, we used several methods and software tools.

The survey was carried out at the end of the academic year, when the teachers had no academic load. However, they had recent memories of the educational process. The data collection was organized by the State Scientific Institution "Institute of Education Content Modernization" (IMZO) of the Ministry of Education and Science of Ukraine. IMZO wrote a corresponding letter about conducting a survey among teachers of Ukrainian universities and sent it to all higher education institutions of Ukraine. The survey was undertaken on a voluntary basis. Two months were given for completing the questionnaire.

A diagnostic method (questionnaire) was used to collect data and form a sample. For this, a questionnaire was drawn up with the help of Google Forms. The questionnaire contained a few closed-ended questions (Q1–Q3) with a pre-defined list

of options and open-ended questions (Q4–Q6), which required the respondents' personal responses. We offered the following questions to the respondents:

Q1: Which higher education institution do you represent?
Q2: Do you use MOOC for personal self-development or in the educational process?
Q3: Which MOOC platforms do you use?
Q4: How did the use of MOOC influence your personal experience?
Q5: What are the advantages of using MOOC in the educational process from your personal experience?
Q6: What disadvantages of MOOC did you come across while using them in the educational process?

Since each respondent could take the survey only once, the total number of answers corresponds to the number of respondents. Calculating the number of higher education institutions involved several steps: 1) the answers received to question Q2 were imported into an Excel Table, 2) in each line of the table we corrected spelling mistakes if there were any, removed extra characters, etc., 3) the processed Excel table was imported into Microsoft Access database, where the final number of higher education institutions was obtained using a data grouping query.

The answers to closed-ended question Q3 were automatically processed with the help of Google Forms. The answers to open-ended questions Q4–Q6 were processed according to our own methodology, which included several stages. If the answer was short (consisting of 1–2 words) and unequivocal (for example, "positive," "I don't know," "it was not," etc.), then it was analyzed in its unchanged form. If the respondent's answer was extended, that is, if it included one or more sentences, then it was manually analyzed by the authors and differentiated into one or more standardized responses (SR) depending on the context. Their use made it possible to minimize ambiguity in extended responses and to present the same information in similar situations. Accordingly, the number of SR was greater than the number of extended answers. After that, SR were conditionally grouped into several categories (clusters) with the help of the hierarchical clustering method. This made it possible to delve deeper into the problem and analyze it from different angles. Thus, for each open-ended question, an array of unequivocal answers was formed, as well as an array of SR, which were hierarchically assigned to the corresponding categories.

At the next stage, all the answers (standardized and unequivocal) were imported into the database in the form of relational tables, and their preliminary processing was carried out (removal of extra words, spaces, correction of spelling mistakes, etc.). Thus, each table contained a prepared sample of data for one open-ended question. Then, with the help of SQL queries the data was grouped by categories and quantitative indicators were obtained within a table. We used Enterprise Architect software to graphically display the categories and SR to each open-ended question.

3 RESULT

There were 2,824 teachers from 155 universities geographically located throughout Ukraine who took part in the research. The analysis of the responses to question Q2 showed that 2,508 teachers use MOOC for their self-development, which is 88.8% of the total number of respondents. At the same time, 11.2% of teachers (316 respondents) did not use MOOC either in their activities or for self-development.

Having analyzed the responses to closed-ended question Q3 with the possibility of multiple choices, we managed to find out which online platforms are used by Ukrainian teachers (see Figure 1).

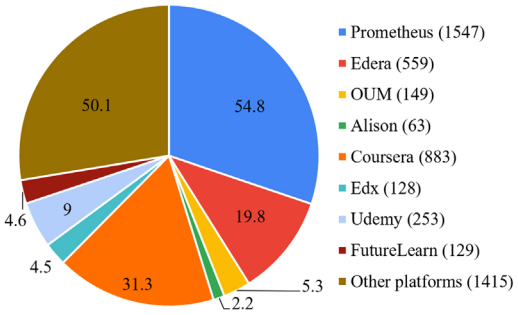

Fig. 1. Online platforms used by Ukrainian teachers

As we can see in Figure 1, online platform Prometheus is in the greatest demand among Ukrainian teachers. It was used by 1,547 respondents, which is 54.8% of the total number of teachers. This indicator fully corresponds to the current situation, since Prometheus online platform contains the largest number of courses among Ukrainian MOOC. The most famous foreign platform among teachers is Coursera platform, which was mentioned by 883 respondents, which is 31.3% of the total number of respondents. Such popularity of Coursera can be explained by the fact that it offered Ukrainian universities a significant number of courses on a free basis.

As for open-ended question Q4, which asked about the influence of MOOC on the teacher's personal experience, we received 1,333 (47.2%) unequivocal answers. We found that 31.7% (895 respondents) positively assessed the impact of MOOC on their pedagogical experience. 72 respondents (2.5%) paid attention to the partial impact of MOOC on their pedagogical experience. 328 teachers (11.6%) were not affected in any way by the use of MOOC. Unfortunately, seven teachers, which is 0.2% of the total number of respondents, mentioned the negative impact of using MOOC.

Most of the teachers (1,491 respondents, 52.8%) provided extended responses, which were processed and reduced to 27 standardized responses. In turn, all of the SR were grouped into seven categories (clusters): Enrichment, Improvement, Increase, Learning process, Motivation, New, Update (see Figure 2).

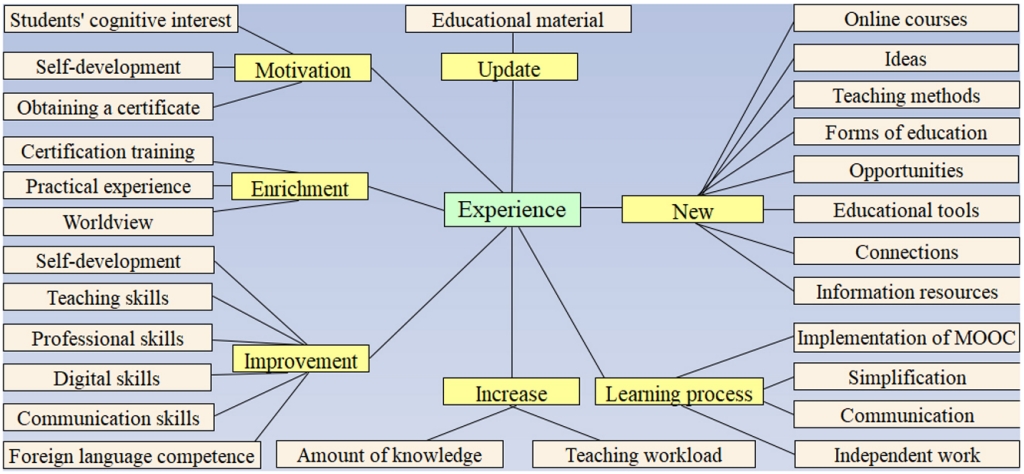

Fig. 2. Categories and standardized responses to question Q4

Since the extended response could contain several SR (usually up to three responses), a total of 1,930 SR were obtained for question Q4 (refer to Table 2).

Table 2. Quantitative indicators of extended responses to question Q4

Category	Terms	Count	Percent
Enrichment	Certification training	120	6.2
	Practical experience	280	14.5
	Worldview	61	3.2
Improvement	Self-development	163	8.4
	Teaching skills	129	6.7
	Professional skills	86	4.5
	Digital skills	47	2.4
	Communication skills	19	1
	Foreign language skills	10	0.5
Increase	Amount of knowledge	349	18.1
	Teaching workload	6	0.3
Learning process	Implementation of MOOC	96	5
	Simplification	36	1.9
	Communication	19	1
	Independent work	13	0.7
Motivation	Self-development	39	2
	Students' cognitive interest	36	1.9
	Obtaining a certificate	8	0.4
New	Teaching methods	94	4.9
	Forms of education	63	3.3
	Opportunities	61	3.2
	Educational tools	52	2.7
	Connections	35	1.8
	Information resources	33	1.7
	Ideas	13	0.7
	Online courses	9	0.5
Update	Educational material	53	2.7
Total		1,930	100

As we can see from Table 2, MOOC had the greatest effect on the increase of teachers' amount of knowledge (349 SR, 18.1%), enrichment of their practical experience (280 SR, 14.5%), teachers' self-development (163 SR, 8.4%), improvement of their pedagogical (129 SR, 6.7) and professional (86 SR, 4.5%) skills. Such indicators can be explained by the special features of learning and using MOOC in a distance

format, as well as by the educational content of online courses that teachers took (or used). In addition, with the help of MOOC, teachers improve their own qualification and receive certificates, as proved by 120 SR (6.2% of the total number of standardized responses).

In order to determine the advantages of using MOOC in the educational process, teachers were asked question Q5. We received 346 (47.2%) unequivocal responses. 254 (9%) teachers pointed out that they had not found any advantages in using MOOC. 92 respondents (3.3%) could not decide on the advantages of MOOC. All other teachers (2,478 respondents, 87.7%) gave extended responses, which were analyzed and reduced to 24 standardized responses. Since the extended response could contain several standardized responses, a total of 3,182 SR were obtained for question Q5 (refer to Table 3).

Table 3. Quantitative indicators of extended responses to question Q5

Terms	Count	Percent
Acquiring new knowledge	488	15.3
Additional learning material	412	12.9
Provision of blended/distance learning	263	8.3
Experience in non-formal education	254	8
Accessibility/mobility	225	7.1
Students' self-development	193	6.1
Individual learning pace	191	6
Increasing cognitive interest	143	4.5
Different approaches to teaching	116	3.6
Diversification of the learning process	109	3.4
Establishing connections between the teacher/students	106	3.3
Obtaining a certificate	105	3.3
Provision of independent work	98	3.1
Time saving	77	2.4
Easing of the teacher's workload	77	2.4
Evaluation of learning outcomes	70	2.2
Orientation towards a wide audience	63	2
Development of digital skills	52	1.6
Development of general competencies	39	1.2
Development of independence	38	1.2
Teacher's brand	28	0.9
Development of critical thinking	17	0.5
Foreign language environment	13	0.4
Formation of interdisciplinary links	5	0.2
Total	3,182	100

As we can see from Table 3, university teachers are well aware of the possibilities provided by MOOC. A significant advantage of MOOC is its influence on personality development: acquiring new knowledge (488 SR, 15.3%), experience in non-formal education (254 SR, 8%), students' self-development (193 SR, 6.1%). Some answers were related to the development of digital skills (52 SR, 1.6%), general competencies (39 SR, 1.2%), independence skills (38 SR, 1.2%), and others.

Considering the organization of the educational process, MOOC is a source of additional learning material (412 SR, 12.9%). Since the majority of online courses are freely available on the Internet (225 SR, 71%), they allow the provision of blended/distance learning (263 SR, 8.3%). Part of the answers (77 SR, 2.4%) mention the easing of the teacher's work, since part of the educational material, which the online course contains, can be used to study certain disciplines in an unchanged form.

The teachers noted that the variety of educational content and topics of online courses make it possible to significantly diversify the educational process (109 SR, 3.9%). They also emphasized the possibility of increasing students' cognitive interest (143 SR, 4.3%). The advantage of MOOC is the provision of individual learning pace (191 SR, 6%), which helps to use them easily during independent work (98 SR, 3.1%). Obtaining a certificate will motivate students to use online courses. That fact was emphasized in 105 SR (3.3%).

The weaknesses of MOOC were pointed out in the answers to question Q6. 1,025 teachers (36.3% of the total number of respondents) did not notice any disadvantages in using online courses. 125 (4.4%) teachers had difficulties answering this question. Other teachers (1,674 respondents, 59.3%) gave extended responses, which were further analyzed and reduced to 31 standardized responses. In turn, the sample answers were grouped into six categories (clusters): Teacher, Content, Certificate, Students, Technical limitations, Duration. Additionally, two SR ("Low digital skills", "Limited feedback") were simultaneously included into two categories: Teacher and Students (see Figure 3).

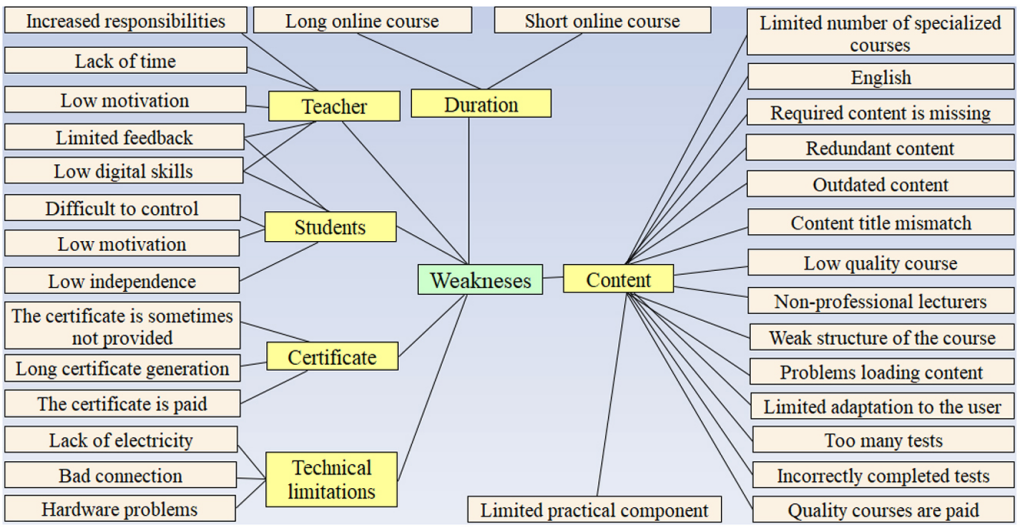

Fig. 3. Categories and standardized responses to question Q6

Since the extended response could contain several standardized responses, a total of 1,899 SR were obtained for question Q6 (refer to Table 4).

Table 4. Quantitative indicators of extended responses to question Q6

Category	Terms	Count	Percent
Teacher	Increased responsibilities	25	1.3
	Lack of time	136	7.2
	Low motivation	117	6.2
Content	Limited number of specialized courses	62	3.3
	English	55	2.9
	Required content is missing	14	0.7
	Redundant content	110	5.8
	Outdated content	61	3.2
	Content title mismatch	43	2.3
	Low quality course	123	6.5
	Non-professional lecturers	38	2
	Weak structure of the course	49	2.6
	Problems loading content	14	0.7
	Limited adaptation to the user	75	3.9
	Too many tests	8	0.4
	Incorrectly completed tests	34	1.8
	Limited practical component	63	3.3
	Quality courses are paid	79	4.2
Teacher, Students	Low digital skills	46	2.4
	Limited feedback	128	6.7
Certificate	Long certificate generation	12	0.6
	The certificate is sometimes not provided	9	0.5
	The certificate is paid	30	1.6
Students	Difficult to control	60	3.2
	Low motivation	66	3.5
	Low independence	11	0.6
Technical limitations	Lack of electricity	25	1.3
	Bad connection	179	9.4
	Hardware problems	118	6.2
Duration	Long online course	101	5.3
	Short online course	8	0.4
Total		1899	100

As we can see from Table 4, when using online courses respondents often mention poor connection (179 SR, 9.4%), insufficient technical support (118 SR, 6.2%) and electricity shortage (25 SR, 1.3%). This can be explained by the military operations in Ukraine which makes living conditions difficult. People often have problems with the electricity supply, which results in the absence of the Internet connection.

Teachers do not always have enough time to implement online courses as additional forms of learning in the educational process (136 SR, 7.2%). Teachers often emphasize the lack of motivation (117 SR, 6.2%). In their answers, they noted that administration of educational institutions does not provide either moral or financial encouragement for additional use of MOOC. At the same time, the teacher's methodological load (refer to Table 2) and the number of duties (25 SR, 1.3%) are increasing, which leads to a further motivation decrease in the implementation of innovations. These indicators are worrying, so more attention should be paid to increase motivation for implementing and using MOOC in the educational process.

Most of the answers were about the content of online courses. The teachers noted that some courses were of low quality (123 SR, 6.5%), so they could not be used in studying the discipline. Some courses had a lot of redundant (110 SR, 5.8%) or outdated (61 SR, 3.2%) material, so teachers spent much more time studying the course. Some teachers indicated the limitation of the practical components when using online courses (63 SR, 3.3%).

Part of the responses (75 SR, 3.9%) concerned the limited adaptation of MOOC to user requests. In our opinion, this shortcoming refers more to the competence of teachers and low popularization of various online platforms among them. Currently, most foreign platforms differentiate online courses by the level of difficulty, length, cost of the course, and other criteria [24]. In our opinion, the "traditional" weakness of MOOC is the limited feedback between the developers of the online course and users, or its absence. According to the survey results, a similar opinion is given in 128 standardized responses, which is 6.7% of the total number of responses to question Q6.

The teachers also mentioned that high-quality online courses (79 SR, 4.2%) and certificates (30 SR, 1.6%) are expensive, which can be explained by relatively low salaries of Ukrainian teachers.

4 DISCUSSIONS

In our opinion, MOOC is a powerful source of information on various topics that can be successfully used at universities to train future specialists. This is confirmed by the results of the teachers' survey, some of whom mention that online courses can be used as additional learning material (refer to Table 3) and to ensure students' independent work (refer to Table 2, category 'Learning process'). These results correlate with the results of the survey of Ukrainian students [26], [40] for whom MOOC help to better understand the educational material and make it more diverse. Having been developed primarily for lifelong education and self-development, MOOC are unlikely to become an alternative to face-to-face learning at universities [14], [41], as they will not be able to provide quality feedback and communication between the participants of the educational process. It is the limited feedback when using MOOC that teachers emphasize in their answers (refer to Table 4, categories 'Teacher,' 'Students'). Currently, in some Ukrainian universities the educational process is organized only in a distance or blended format. According to teachers (refer to Table 3), MOOC can be effectively used during the organization of these forms of education, which is confirmed by the study by S. Semerikov et al. [23]. In this context, the statement of J. Reich and J. Ruipérez-Valiente [42] seems interesting, predicting gradual integration of digital technologies, including MOOC, into the modern education system and their use according to specific needs.

According to our study, the most popular among teachers appeared to be Ukrainian (Prometheus, EdEra) and foreign (Coursera, Udemy) online platforms. These results correlate with previous studies. The work by [25] provides an analysis of Ukrainian MOOC (Prometheus, EdEra, OUM) according to such criteria as the chronology of course creation, the number of online courses by thematic areas, and the total number of courses on each online platform. The research concluded that Prometheus online platform has the highest quantitative indicators among the analyzed MOOC. According to the work by [43], the most useful MOOC for providing non-formal education in various areas among Ukrainian students turned out to be Udemy, Coursera, and Prometheus.

While processing the survey results, we were pleasantly surprised to see a significant number of MOOC advantages. In addition to the traditional features, such as massiveness, accessibility and being partially free of charge, the teachers drew attention to other strengths. In particular, it is an opportunity to gain experience in non-formal education, development of general and special competencies, diversification of the educational process (refer to Table 3), etc.

Unfortunately, the implementation of MOOC in the educational process is still associated with certain weaknesses that should be addressed or taken into account. Let us briefly dwell on some weaknesses of online courses and offer our own ways to solve them. The analysis of the teachers' responses showed that some of them dealt with low-quality online courses, which contained outdated or redundant learning material, including poor quality translations into the Ukrainian language (refer to Table 4, category 'Content'). As a result, they considered inappropriate to use such courses for studying a certain discipline. A similar idea is expressed by S. Donitsa-Schmidt [18], who believes that online courses should meet high expectations as for their content. In our opinion, this problem can be solved by choosing another online course or even another MOOC platform.

The problematic issues for teachers remain the increase in the academic load (refer to Table 2, category 'Increase') and reduced motivation to use MOOC in the educational process (refer to Table 4). A similar weakness is mentioned in the work by [21]. To avoid the problem of excessive workload, researchers advise that teachers should grow professionally, in particular they should develop planning and time management skills [9]. In order to increase the teacher motivation to use MOOC, the works by [17], [19] suggest introducing different types of incentives for teachers, such as reducing the teachers' workload or a number of other responsibilities, etc. In our opinion, there are several ways to encourage teachers to use MOOC in the educational process. First, it is necessary to standardize the recognition of certificates of online course completion at the level of internal university documents. In this case, teachers will be obliged to use MOOC during independent work of students, to improve their own qualifications [35], etc. Provided that teachers create their own online course on well-known MOOC platforms, it should be reflected in the methodological recommendations for planning different types of teacher work and encouraged with the appropriate number of points.

Partial obstacles to MOOC implementation in the educational process on a permanent basis are technical limitations and the absence of a stable connection (refer to Table 4), which is also indicated in the works by [4], [27]. Besides, Ukrainian education faced an additional challenge – shortage of electricity, which is confirmed by research [22]. In this case, the authors hope for a faster restoration of the energy infrastructure of Ukraine, then this shortcoming will gradually disappear by itself.

In our opinion, the conducted research made it possible to obtain some benefits. First, the results of the survey give a possibility to take a new look at the use of

MOOC in the educational process, to delve into the subject area, and expand the list of advantages and disadvantages of MOOC. With the help of standardized responses, we could learn more about the attitude of Ukrainian teachers to the possibilities of MOOC for the organization of the educational process and personal self-development. Also, based on the obtained results, the Ministry of Digital Policy and the Ministry of Education and Science of Ukraine, which ensure digitalization of education at the state level, could get a better idea of the state of MOOC implementation in the educational process. Thirdly, the formed list of typical responses can become the basis for further research, as well as for the development of new questionnaires on the use of MOOC.

5 LIMITATIONS

It should be noted that the conducted study has several limitations. Despite the big size of the sample for analysis, the number of respondents from different universities varied significantly. Having an autonomy, each higher education institution implemented educational platforms, in particular MOOC, in a different way. Hence, the teachers from different universities could have different attitudes towards this process. In our opinion, it is impossible to create similar conditions for digitization of education in different universities. Since the survey was voluntary, the authors could not influence the number of respondents. As a result, the number of respondents from different educational institutions was not the same, which could affect the generalization of the findings. Another limitation is the procedure of forming the list of standardized responses, as it was done manually by the authors of the paper based on the teachers' extended responses.

6 ETHICAL CONSIDERATIONS

To ensure impartiality, anonymity and confidentiality of respondents, the questionnaire did not include the teacher's name, his/her email address or other information that identifies him/her. To determine the number of universities, one question concerned the name of the educational institution where the teacher works. At the same time, since there are a lot of teachers in an educational institution, it is quite difficult to single out a specific person. In addition, the survey results were not and will not be transferred to third parties for the purpose of identifying the respondents, since the authors value their reputation and consider the data obtained with responsibility.

7 CONCLUSION

Thus, in the conditions of education informatization and military operations on the territory of Ukraine, MOOC are considered a promising electronic resource for organizing distance learning at universities, providing non-formal education and independent work of students. To achieve the purpose of research, we conducted a survey of 2,824 teachers working at 155 universities in different regions of Ukraine.

The analysis of responses to the close-ended question Q2 has showed that 88.8% of respondents use MOOC either for personal self-development or in the educational process. The quantitative analysis of responses to the close-ended question Q2 has

showed that the most famous Ukrainian online platform is Prometheus, which was mentioned by 1,547 (54.7%) respondents. The most famous foreign platform is Coursera, which was mentioned by 883 teachers (31.2%).

For question Q4 we received 1,333 (47.2%) unequivocal and 1,491 (52.8%) extended responses. We found out that 31.7% (895 respondents) had positively assessed the impact of MOOC on their pedagogical experience. The quantitative and qualitative analyses of the extended responses revealed that MOOC had the greatest effect on increasing the amount of teachers' knowledge and their practical experience.

For question Q5 we received 346 (12.3%) unequivocal and 2,478 (87.7%) extended responses. 254 (9%) teachers indicated that they had not seen any advantages in using MOOC. According to the quantitative and qualitative analyses of the extended responses, we have found out that the most important advantages of using MOOC in the educational process are additional learning material, experience in non-formal education, provision of blended/distance learning.

For question Q6, which was about the disadvantages of using MOOC, we received 1,150 (40.7%) unequivocal and 1,674 (59.3%) extended responses. 1,025 (36.3%) teachers did not notice any disadvantages in using online courses. On the basis of the additional analysis of extended responses, we have found out that the weak points are low-quality connection when using online courses, low quality of some online courses, as well as lack of teacher motivation to introduce MOOC in the educational process.

In our opinion, important reasons for the insufficient implementation of MOOC in the educational process of Ukrainian universities are weak motivation of some teachers and the lack of relevant internal regulatory documents. Therefore, in the next research, we plan to explore the ways of increasing teacher motivation to use MOOC in the educational process.

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