

Analysis of the experience and prospects of the implementation of the Moodle platform for the organization of distance learning in Ukrainian universities

Vanda Vyshkivska
*Faculty of Pedagogy
Dragomanov Ukrainian State
University
Kyiv, Ukraine*
vivanova154@gmail.com

Yuliia Sylenko
*Faculty of Pedagogy
Dragomanov Ukrainian State
University
Kyiv, Ukraine*
silenko1yulia@gmail.com

Oksana Golikova
*Institute of Social and Humanitarian
Technologies NTU KhPI
National Technical University
“Kharkiv Polytechnic Institute”
Kharkiv, Ukraine*
golikovantu@gmail.com

Tetiana Tsehelnik
*Faculty of Pedagogy and Psychology
Volodymyr Hnatyuk Ternopil
National Pedagogical University
Khmelnitskyi, Ukraine*
sveettana@ukr.net

Oksana Patlaichuk
*Educational and scientific
humanitarian institute
Admiral Makarov National
University of Shipbuilding
Mykolaiv, Ukraine*
oksana.patlaichuk@nuos.edu.ua

Abstract. The educational process has been rapidly transformed in the last couple of years due to the global changes of the twenties of the 21st century, which significantly affect the ways of organizing the educational process both in face-to-face and online form. Learning conditions provide for a constant increase in the amount of educational information and the need to improve the quality of its use with minimal time expenditure and in non-standard conditions complicated by various factors. Accordingly, the focus of attention of teachers and students is the tools of distance learning, in particular the educational digital platform Moodle, which allows to ensure a high technological level of organization of the educational process, regardless of external circumstances, in conditions of the impossibility of visiting an educational institution.

The purpose of the article is to analyze the experience of implementing the Moodle platform in the system of higher education of Ukraine as a tool of mixed learning; determining the level of respondents' ownership of Moodle resources; development of a universal model of distance learning organization on the Moodle platform.

Through a comparative analysis of educational content management systems, it has been proven that the Moodle platform is the best adapted to the environment of higher education in Ukraine, where since 2020, due to the COVID-

19 pandemic, the format of educational institutions of various training levels has been changed from face-to-face to distance learning. The introduction of martial law in 2022 has even more actualized the problem of the development of distance learning tools, the need for teachers and students to master them.

The article analyzes the experience of introducing Moodle (LMS) as a single online platform in higher education institutions of Ukraine (the sample included 4 universities) with the aim of improving the educational process in the conditions of distance learning. In a comparative aspect, the results of the transformation study of the readiness of subjects of the educational process to use the opportunities and resources of the Moodle platform are presented. The study, organized in two stages, made it possible to analyze the work of teachers (filling electronic educational complexes, uploading test tasks) and students of education (use of the materials presented, educational activities) on the Moodle platform in 2020/2021 (Stage I) and to follow the transformation of the acquired experience during 2022/2023 (Phase II) in connection with the introduction of distance learning as the main form of obtaining higher education in the vast majority of regions of Ukraine.

A universal model for organizing the educational activities of master's students on the Moodle platform in distance

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learning conditions was developed and theoretically substantiated (using the example of studying the disciplines of the cycle of general professional training - "Psychological and pedagogical technologies", "Information systems and technologies", "Didactic systems and educational technologies in higher school").

Keywords: a universal model of the organization of educational activities, distance learning, students of higher education, the Moodle platform (LMS).

I. INTRODUCTION

As of today an active transformation of the educational process in higher educational establishments through creation of the managed information learning environment is currently on both in Ukraine and worldwide. Moodle is the most widespread among the platforms specialized in organizing online learning (ATutor, Claroline, LAMS, Dokeos, Sakai, Open) as it enables designing, creation and further management of resources of dynamic information learning environment. Provision of varied educational services, enhancement of student activity for mastering materials, optimization of asynchronous individual work, intensification of encouragement to self-knowledge and self-organization, activation of interactive convergence are ensured in the aforesaid environment, thereby resulting in formation of the individual position of students.

II. RESEARCH METHODOLOGY

Higher education students (master graduates) and teachers of 4 universities: Drahomanov Ukrainian State University represented by 107 persons, National Technical University "Kharkiv Polytechnic Institute" represented by 99 persons, Volodymyr Hnatyuk Ternopil National Pedagogical University represented by 101 persons, Admiral Makarov National University of Shipbuilding represented by 104 persons were the survey respondents. The total number of respondents was 411.

The following methods are applied in our research: theoretical (analysis; identification of literary sources in order to specify theoretical aspects of the research problem), empirical (survey of university scholars and master degree students so as to determine whether they have experience in using the Moodle platform in the educational process), methods of mathematical processing of findings (ranking method).

III. RESULTS AND DISCUSSION

Our research commenced in 2017 when a pilot experiment on organizing blended learning for full-time students through the Moodle system was launched at the Andriy Malysko Faculty of Ukrainian Philology and Literary Art and at the Faculty of Foreign Philology of the National Drahomanov Pedagogical University. The experiment was launched following acquisition of the recommendation to implement the results of the blended learning project (2016-2017) from the Prometheus platform developers in such Ukrainian higher educational establishments as the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Ivan Franko National University of Lviv, Lviv Polytechnic National University, Ukrainian Catholic University.

At that time, deployment of the Moodle platform was focused on uploading training courses (lecture materials and assignments for workshop classes) by teachers and providing students with the opportunity to process them whenever and however it seemed convenient to them. That way of using the Moodle platform complemented the knowledge mastery organizational forms which were common for teachers and students: full time studies, consultations.

However, since 2020, in connection with the spread of the acute respiratory disease COVID-19 in Ukraine, the format of activities of educational institutions of various levels of training is radically changing: distance learning using information and communication technologies is being introduced. The Moodle platform is becoming especially popular as such, as evidenced by a comparative analysis of educational content management systems, which is the best adapted to the educational environment of educational institutions of Ukraine.

TABLE 1 COMPARISON OF EDUCATIONAL CONTENT MANAGEMENT SYSTEMS

opportunities	systems				
	ATutor	LAMS	MOODLE	Open ACS	Dokeos
Multi-language interface (languages)	(>30) +	(19) +	(54) +	-	(34) +
SCORM Support	-	-	+	-	+
IMS Support	-	-	+	-	+
Testing system	+	+	+	+	+
External testing systems support	-	-	+	-	-
Accounting system	+ -	+ -	+	+ -	+ -
Ukrainian Language support	+	+ -	+	-	-

While analyzing the peculiarities of organization of training through the Moodle platform, we have assumed that the remote course is a special form, which is based on the network technology, to present content of the educational subject and means to implement the educational network forms and methods.

The analysis of the informational component of the educational platform (training courses for teachers) confirmed the presence of all the necessary materials (lectures, seminar and practical tasks, criteria for evaluating educational achievements). At the same time, unsystematic updating of posted information by teachers, insufficient use of the functionality of the Moodle platform, which enables the organization of continuous interactive interaction between teachers and students through announcements, forums, feedback, chats, comments on tasks, etc., was noted.

The Moodle information environment has two types of basic elements for placing educational information: course resources (Web page, text page, note, Web link to a site or file, folder, etc.) and interactive course elements (glossary, book, lessons, task, workbook, seminar, Wiki, forum, chat, database, etc.).

Determining the level of their possession and use in organizing training on the Moodle platform was the first task of the ascertainment stage of the research and was carried out by us through the logic of determining the levels of information literacy. For this purpose, the following criteria with corresponding indicators have been developed: motivational (interest and need in mastering the Moodle resources); informative (familiarity with the Moodle resources; understanding of their essence and role in the educational process); activity (ability to independently create informational content and systematically apply the Moodle resources in educational activities).

Subject to the developed criteria, 3 levels of proficiency in the Moodle resources have been featured: the initial, technological and creative ones. Level I (initial): users have an idea of the Moodle resources, their use in the educational process; partially simulate the learning process through use of the Moodle resources to fulfill trivial assignments. Level II (technological): they know how to use various Moodle resources to a sufficient degree in order to efficiently organize the educational activities; Level III (creative): users create an innovative educational environment based on the Moodle resources, using the up-to-date information and communication tools; evaluate their own activity, efficiently implementing the information and communication tools into the subject area.

Thus, in 2020, we made a survey in order to identify the acute experience (level) of using the Moodle platform services as an auxiliary resource in arrangement of the educational process, to clarify attitudes towards the forms, technologies, resources and prospects for their use in remote learning. The survey included three blocks of questions: motivational, informational and activity ones, each consisting of 5 questions.

The first question of the motivational block "Are you interested in using the Moodle platform?" was answered affirmatively by 67% of respondents, 30% said that their interest was "partial", and 3% were not interested in using it. In response to the question "Can you say that mastering the Moodle resources is a necessary component of information technology competence", 63% of respondents answered "yes", 23.1% chose the "partial" answer, 13.9% did not answer the question. When asked whether it was convenient to navigate in the personal account of the Moodle platform, 72.5% ticked "yes", 13.5% - "partially", 14% specified that navigation was not convenient. When asked about the potentials of Moodle to implement the educational process, 13% said that they appreciated the platform, which made it possible to build an educational path in mastering the course. Meanwhile, 67% noted that they were partially interested in delivery of potentials, and

20% were not motivated by its potentials in educational activities at all. The question "Do you have a desire to continue educational activities on the Moodle platform" was answered by 64.5% of respondents affirmatively, 33.2% were "partially" interested, and 2.3% did not show any desire to use it any longer.

Diagnosis according to the information criterion included answers to the following questions: "Do you think that the Moodle platform has all the necessary resources to transfer in-person learning to a remote format?" (38% of respondents answered affirmatively, 12.3% chose "partially"; 49.7% said "no"); "Please substantiate why the Moodle platform is communicative in a dynamic educational environment" (8.78% set forth a detailed proper answer, 67% of respondents managed to give a partially proper answer, 24.22% failed to answer the question); "Do you know about an option to exchange ideas on the platform by discussing challenging issues" (68% answered "no", 20% - "partially", 12% answered affirmatively); "Do you know the social constructivism provisions underlying the Moodle platform (92% of respondents were not aware of such provisions, 6% of respondents said they were partially aware, only 2% had an expertise knowledge of such information). Accordingly, we can claim that the respondents lack understanding of the conceptual features of Moodle, particularly, creation of a personalized educational environment where the students themselves participate in structuring knowledge as a dynamic, multimodal structure. This contributes to acquisition of experience of self-replenishment of professional knowledge, development of personal responsibility for this process.

Responding to the questions of the third block, respondents noted that 11.23% were able to use the interactive elements of the course on the Moodle platform, 50.57% were partially able, 38.2% were not able at all; with regard to development of presentation materials, 26.78% noted that they had perfectly mastered the elements of development, 64.72% had partially mastered them, and 8.5% failed to master them at all. 5.03% of respondents took advantage of filling in and filling out the glossary on the Moodle platform, 28.2% had incomplete experience, and 66.77% had never used it at all. When asked about development of chats and forums for communication, 7.93% of respondents informed that they used them constantly, 14.68% had incomplete experience, and 77.39% had never used this service at all. Wiki or database resources, according to the survey, were completely ignored by 98%, and only 2% had partial experience.

Thus, the research findings show that the respondents do not sufficiently use the wide range of the Moodle multimedia resources in the educational process, which resources make it possible to create an innovative educational environment and interactive teamwork between participants. Correlation of the criteria and proficiency levels in the Moodle resources by respondents is shown in Fig. 1.

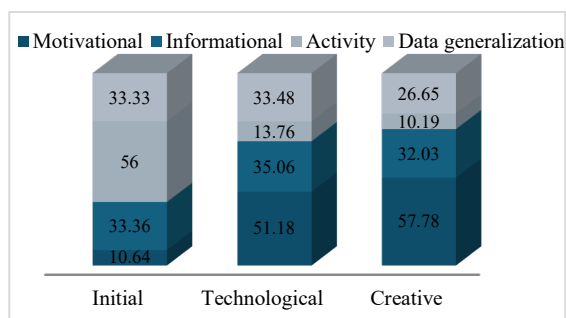


Fig. 1. Moodle resources proficiency levels according to Phase I of the research

As it follows from the research findings, the vast majority of respondents has the initial level in terms of information and activity criteria featured by a sketchy concept about the Moodle resources and primitive use thereof in the educational process, an insufficient ability to create high-quality and complex information content based on the unsystematic nature of its application in the educational process activity. Instead, the motivational criterion at all levels is predominantly characterized by an acute interest, however with an undesigned need to master the Moodle resources owing to complexity of mastering multimedia services.

It should be noted that in settings of the war, arrangement of the learning process through the Moodle platform has become the only opportunity for the teachers, who stay in the temporarily occupied territories or in the front-line territories, to continue the educational process, and for the students from extremely dangerous areas to receive high-quality educational services, since for the reasons of security and due to the technical problems they are unable to attend Zoom online classes. Thus, we have conducted the second phase of our research in the period of 2022-2023, through Google Forms (<https://forms.gle/csmeufpocxEQY4AZA>), which was targeted to establish the acute level of use of the Moodle platform as the major resource of remote learning that was introduced under the conditions of martial law in Ukraine.

The repeated survey has been conducted according to the same blocks of questions as in the first phase of the research: motivational, informational, activity. The answers have been evaluated based on the following scale: "yes" - high level, "partially" - medium, "no" - low.

Generalized analysis of the findings is given below. The affirmative answers to the motivational block questions ("Are you interested in using the Moodle platform?", "Do you think that proficiency in the Moodle resources is the essential component of the informational and technological competence?", "Are you willing to continue learning on the Moodle platform?") have grown up by 20%, 25%, 20% accordingly, which fact implies to a steady interest to use of the Moodle platform. Respondents have also been asked: "What percentage can you assign to your aptitude to use all the Moodle services in the educational process?" and the subjective answers are divided. So, 43.1% are ready for 50%, 41.2% outline their

readiness at the level of 50-75%, and 15.7% indicate that they are 75-100% ready.

Analysis of the informational block answers shows that the respondents' level of awareness of the specifics of the Moodle platform has increased. 50% more positive responses have been obtained to the question: "Do you think that the Moodle platform optimally organizes in-person learning in the distance format?" 12.3% of respondents (i.e. 3.52% more than in Phase I) give the proper answer to the question: "Why is Moodle a communicative platform in the dynamic learning environment?"

Almost the same proportion of answers is given to the question "Do you know the social constructivism provisions underlying the Moodle platform?". 81.5% respondents do not have any idea of such provisions (Phase I: 92%), 7.2% partially know about them (Phase I: 6%). 11.3% respondents have an excellent knowledge of the above information, i.e. 9.3% more than before. Thus, it can be concluded in the comparative analysis that respondents (compared to Phase I) understand, in their vast majority, the conceptual features of Moodle.

The third block of questions provides for analysis of the activity aspect. Thus, the question "Do you develop interactive components of the course on the Moodle platform?" has been answered affirmatively by 27.6% (i.e. 16.36% more than before), "partially" by 61.1% (50.57% in Phase I), 11.3% of respondents do not develop them at all (i.e. 26.9% less than before).

When asked "Do you use Moodle resources or tools to develop your presentations?", 47.3% have noted that they still do not use them; 43.2% use them partially; and 9.5% have mastered a range of services competently (indicatively, respondents have chosen H5P (7.8%), HotPot (3.9%), EJSApp (1%), etc., as such tools).

The question "Do you use the resources or tools to ensure social interaction between participants in the educational process?", 59.1% have provided a completely affirmative answer, 17.2% use them partially, 23.7% of respondents do not use any resources at all (i.e. 24.3 % less than before).

Thus, our respondents have mentioned Google Meet™ for Moodle (34.3%), feedback (20.6%), chats, forums (18.6%), etc., as the above resources (i.e. 3.92% more than in Phase I of the research).

When asked about study of the research and pedagogical literature and replenishment of the glossary, respondents have mentioned them in the following proportion: 17.8% use them on a permanent basis (5.03% in Phase I), 38.4% use them occasionally (28.2% in Phase I), and 43.8% have never taken advantage of them (i.e. 22.97% more than before).

However, the findings have remained the same with regard to the database creation tools and the use of Wiki resources, since according to the survey 98% do not use them, and only 2% have partial experience.

The research Phase II findings are shown in Fig. 2

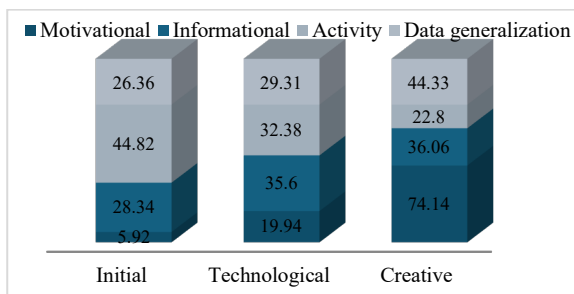


Fig. 2. Moodle resources proficiency levels based on the Phase I of the research

As it follows from the research findings, 44.33% of respondents have a creative and technological level (29.31%) that makes it possible for them to create the informational environment on the basis of creation of the multimedia educational information. However, we still observe 26.36% of respondents who have an initial level of proficiency in the Moodle services, therefore they are disabled to efficiently fulfill the whole range of potentials of the Moodle platform in their subject area.

Ranking of findings on Phases I and II of the research is shown in Fig. 3.

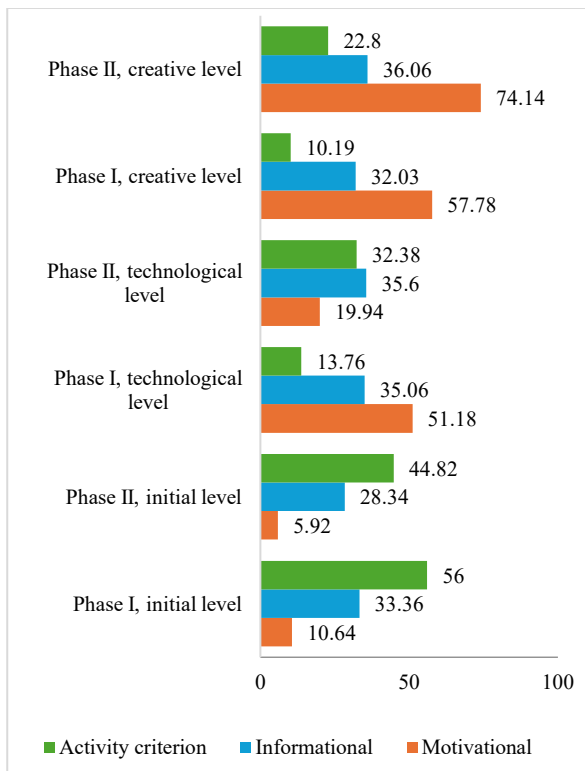


Fig. 3. Moodle resources proficiency levels by Phases I and II of the research (compared)

The obtained findings imply that the two-year experience in using the Moodle platform has made it possible to enhance interest and motivation for using it (the creative level was 57.78% in Phase I of the research, and 74.14% in Phase II); informational awareness of the platform and its potentials has increased slightly (the creative level was 32.03% in Phase I of the research, and

36.06% in Phase II). At the same time, the level of students' proficiency in the operational constituent of the Moodle resources remains insufficient, as the creative level is observed at 10.19% in Phase I of the research, and 22.8% in Phase II. Meanwhile, the low level remains consistently high (56% and 44.82%, respectively).

This conclusion provides for the necessity to develop a universal model to arrange distance learning through use of the Moodle platform in higher education institutions.

TABLE 2 MODEL TO ORGANIZE THE WORK OF MASTER DEGREE STUDENTS ON THE MOODLE PLATFORM IN THE DISTANCE LEARNING FORMAT

Block of motivation and purpose	Purpose: to optimize and intensify the organization of work of master degree students on the Moodle platform in the distance learning format			
Block of content and arrangement	Theoretical and methodological fundamentals to implement the model			
	Methodological approaches:	Didactic principles:		
	Competent Structural and systemic Personal and activity	Scientific, systematic, variability, individualization and differentiation		
Block of content and activities	Arrangement of educational process			
	Educational forms	Types of training	Moodle resources	
	Lecture classes	Recital of educational material, presentations:	- EJSApp; - HSP; - HotPot; - SCORM package;	Discussion of material: chats, forums
		Work with research literature:	- database; - Wiki; - glossary;	
	Workshops / Practical classes	Discussion of material, replenishment of knowledge, formation of practical knowledge and skills	- assignment, workshop class	
	Individual work	Completion of the assignments provided by the course program:	- database; - Wiki; - glossary;	
Material proficiency check:		- "Questionnaire"; - "Choice" feedback;		
Consultations	Clarification of problematic issues	- OpenMeetings; - Google Meet™ for Moodle;		
Block of analysis and findings	Monitoring of the Moodle platform skills formed			

As evidenced by our research, the resource potential of Moodle in the universities of Ukraine is quite limited at present. Largely, it goes about creating different categories of courses using the Moodle's own tools, choosing their structure, content [1], arrangement of test evaluation of the students' academic achievements [2], reducing the interactive multimedia as necessary to ensure the proper quality of education interaction to a minimum, in our opinion. At the same time, Avramchuk [3] and Halimon [4] claim that using the MOODLE tools in the educational process fosters responsibility of teachers and students for quality of teaching and learning, develops their independence; alongside, it does not require teachers to have special programming skills. We accept the opinion of the authors, however we consider that the professional competence of teachers requires a significant advancement, in particular in respect of its information and technological component, as well as competence in designing multimedia electronic educational resources in the Moodle system [3].

Similar conclusions are available with foreign researchers. Jalobeanu [5], Naaj [5], Martin-Blas [6], Serrano-Fernandez [6] emphasize that MOODLE contributes to improvement of comprehension of educational information by students, helps to develop motivation for learning, but requires proper training of teachers. Alongside, researchers have noted that the Moodle resources are used by a large number of participants and as a result do not always meet pedagogical needs of the teacher in all types of activities [7]. That is why technologies for implementing a personalized hybrid e-learning system are being developed (Čeponienė [7]).

Hargreaves argues that motivation and ability of students to learn independently are crucial for personalization, as they reduce dependence on the teacher and traditional classroom learning styles [8]. We believe that the training organization through the Moodle tools solves this issue in the best possible way as due to the research it implements the idea of individualization of training and differentiation of educational assignments to the fullest extent.

A number of scientists (Zaiarna [9], Kauts [10]), while examining the options of using administrative, educational and communication tools of LMS Moodle in teaching the English language students, have also determined the prospects of the above tools. Taking into account the opinion of the authors, we have developed a model of the Moodle resources used not just for studying a particular subject, but as a means to arrange the educational process in a distance format, specifying the Moodle resources depending on the training organizational forms (lecture, workshop, independent work, consultations) and types of educational works and assignments.

IV. CONCLUSIONS

Interactive resources and information delivery systems of the Moodle platform are able to ensure the appropriate level to render educational services: presentation of

educational material, impartial assessment of educational achievements, interpersonal communication and advisory support of students. In the conditions of the martial law, distance learning solves a number of security issues as well. At the same time, the operational productivity on the Moodle platform, as the main tool for implementing distance learning in most universities of Ukraine, depends on solving a number of problematic issues, including the major ones: no sufficient aptitude of most teachers to work in the informational educational environment. The developed model, in our opinion, will help increase the aptitude level for introducing a range of the platform services into the educational process with an option to create an informational educational environment with interactive multimedia support in both distance and blended learning conditions.

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