Using Moodle in an Information Educational Environment of HEIs under Distance Learning

Iryna SUBASHKEVYCH[1],
Vira KORNIAT[2],
Viktoriya LOBODA[3],
Ihor SIHETII[4],
Magdalyna OPACHKO[5],
Nelya SIRANT[6]

[1] Ivan Franko National University of Lviv, Ukraine, irasub@ukr.net
[2] Ivan Franko National University of Lviv, Ukraine, hodzinska@ukr.net
[3] Ivan Franko National University of Lviv, Ukraine, vita.loboda@gmail.com
[4] Zakarpattia Institute of Postgraduate Pedagogical Education, Ukraine, sig.igor@gmail.com
[5] State University «Uzhhorod National University», Ukraine, magdaopachko@gmail.com
[6] Ivan Franko National University of Lviv, Ukraine, nelya.sirant@lnu.edu.ua

Abstract: *The article dwells upon the problem of distance learning using the Moodle Learning Management System (LMS). Importantly, the article analyzes the use of LMS or virtual learning environments (VLE) at universities, designed to store learning materials, conduct automatic testing of students' knowledge, support remote communication, generate information on progress and reports on working with distance learning courses. The most well-known paid systems (according to Google Trends service) include Blackboard Learning System, Edmodo, Glow, Ning, SharePoint LMS. At the same time, the most popular free LMS is Moodle, as evidenced by both the results of Google Trends statistics and the data obtained from the ListEdTech resource. The article determines the features of using this system in the professional training of pedagogy students. It describes the challenges (problems) faced by students when taking distance learning courses, the time frame of students' work on this learning platform and students' assessment of the quality of distance learning courses developed in the Moodle system. It shows that the use of this system saves time spent on training, freeing it up for personal life, self-education, hobbies and entertainment. Students with higher academic performance spend more time working in the Moodle system. Indeed, they intend to acquire knowledge, obtain a diploma of higher education and further pursue their professional careers. More than half of the respondents rate distance learning courses positively. In their opinion, such courses are creative, valuable, exciting, effective, clear, innovative, meeting expectations, unconventional, innovative, easy to learn and enjoyable.*

Keywords: *distance learning, pedagogical degree programmes, Moodle, students, professional training.*

Introduction

The educational process in higher education institutions (HEIs) is enabled by the latest information technologies that improve the quality of higher education. The present poses new challenges for both teachers and students, especially during the lockdown period caused by the COVID-19 pandemic. Therefore, distance learning has become a necessary condition for the continuous learning of students.

As part of distance education, distance learning is special pedagogical technology in the organization of educational space characterised by the use of specific strategies and tactics of students' interaction with new carriers and sources of knowledge. This involves the creation of an information educational environment covering computer-based information sources, digital libraries, video and audio materials, teaching aids and tutorials. Such an educational environment enables students to gain knowledge both independently and under the guidance of a teacher (tutor) and to carry out two-way communication with an unlimited number of users whose activities are monitored and controlled (Pysanko & Martynenko, 2020).

Many Ukrainian and international scholars focus on practical aspects of applying information, communication and web-based technologies in education. Specifically, the facilities provided by the Moodle are analyzed by Bakhmat et al. (2019), Bodnenko (2015), Buhaichuk (2013), Chourishi et al. (2011), Garbin et al. (2012), Gerasymova et al. (2019), Komogorova et al. (2021), Kulynych (2015), Palamarchuk et al. (2020), Pysanko & Martynenko (2020), Sheremet et al. (2019), Spirin & Kolos (2020), Syara et al. (2020), Trius et al. (2017). Given the existing practical experience in the use of distance learning technologies in education, there is a lack of comprehensive studies reviewing the role of the Moodle LMS, in particular, in the professional training of pedagogy students.

An analysis of relevant scientific sources shows that despite the introduction of innovative technologies in the educational process, the role of Moodle in enhancing the learning process of future teachers has sufficiently justified yet.

The article aims to determine the features of using Moodle in professional training of pedagogy students.

Assuring High Quality of the Educational Process

Today, most HEIs use Learning Management Systems (LMS) or Virtual Learning Environments (VLEs) to assure the high quality of the educational process. They are designed to store learning materials, conduct

automatic testing of students' knowledge, support remote communication and generate information and reports on students' progress in distance learning courses, i.e., the number of accesses, time invested in the different activities (Syara et al., 2020). The most well-known paid systems (according to Google Trends) include Blackboard Learning System, Edmodo, Glow, Ning, SharePoint LMS. At the same time, the most popular free LMS (under open-source licensing) is Moodle (Modular Object-Oriented Dynamic Learning Environment), as evidenced by the results of Google Trends statistics and the data obtained from the ListEdTech resource (Syara et al., 2020). Quite often, when a HEI chooses Moodle for constructing its VLE, it is usually motivated based on the simplicity of this distance learning platform, its adaptability and open-source configuration under General Public License (GPL) (Garbin et al., 2012).

Due to the Moodle LMS facilities, it is possible to fully implement the electronic component of teacher training by providing interactive and stimulating learning experiences (Chourishi et al., 2011). This can be done through the Moodle LMS since:

- it has a modular design, including "social constructionist" principles;
- it includes the user authorization mechanism;
- it has powerful tools for planning the educational process;
- it allows one to integrate various types of educational content (text, photos, videos, audio);
- it has tools for organizing group work and collaboration of participants in distance learning course, as well as for measuring levels of knowledge, skills and abilities;
- it saves the history of students' work in a distance learning course;
- it supports the learning management function (Trius et al., 2017).

The key opportunities provided by Moodle to its users are the following: all resources and activities are gathered in a single space; all participants tackle common training tasks/problems, although they can choose individual learning trajectories; the quality of learning is constantly under the control of the tutor; it is also possible for users (students) to group by roles for carrying out specific activities (Spirin & Kolos, 2020). In Moodle, one can perform all possible learning management tasks. If there is no ready-made solution yet, or if it is imperfect, the functionality of the system can be easily expanded (Buhaichuk, 2013).

Verifying MOODLE Effectiveness in the Educational Process

A survey was conducted among students of the Faculty of Pedagogical Education at Ivan Franko National University of Lviv (IFNUL) to check the effectiveness of using Moodle in the educational process. The respondents were asked to fill out a questionnaire, which consists of 23 questions on the features of their work and attitude to this system. The questions of the questionnaire are conditionally divided into two blocks. The first block is aimed at determining the motivational component of student's learning. The second block focuses on the student's work in the Moodle system. Due to statistical reporting of the distance learning system, it is possible to observe the work of students and tutors in the distance learning course.

Analyzing the responses of students to the question/statement "Moodle simplifies learning for students", it can be argued that the use of the system saves time spent on learning, freeing it up for personal life, self-education, hobbies and entertainment (see Fig. 1 and 2).
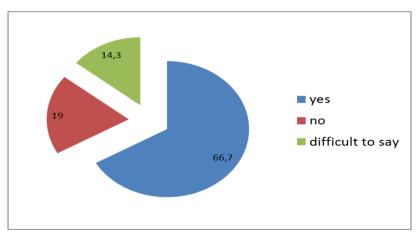

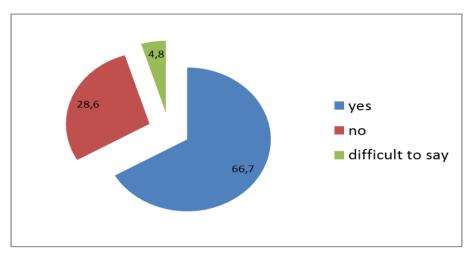**Fig. 1.** *Moodle simplifies learning for students (in %)*

Fig. 2. *Studying online in Moodle stimulates self-education (in %)*

According to the majority of students (52.4%), working in Moodle does not provide more opportunities for engaging in communication between the student and the tutor (see Fig. 3). Students have more opportunities for communication during face-to-face work in a classroom. When questions arise during distance learning, students usually avoid asking and solving them, which in turn can lead to lower academic performance.
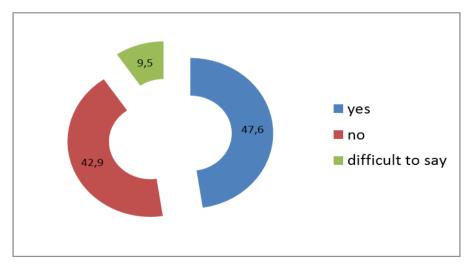

Fig. 3. *Studying online in Moodle encourages communication between the student and the tutor (in %)*

Figure 4 shows data on what are the biggest challenges (problems) that students face when taking distance learning courses) in Moodle One of such challenges is primarily the lack of time for training (19%) since many students work starting from the 3-4th year of study. Lack of time can be one of the reasons that prevent students from fully understanding how the website on which the distance learning course is hosted works (19%). Also, the same percentage of students (14.3%) deal with the problems in studying and understanding the course material, performing tasks (tests/quizzes, practical assignments, workshops), especially meeting the deadlines. Interestingly, 10% of students do not have constant and reliable access to a computer or the Internet, which greatly complicates the timely completion of tasks. Some students tend to encounter difficulties in posting their completed tasks in the Moodle system.
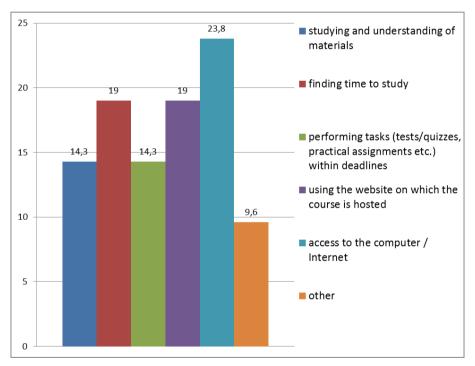

Fig. 4. *Challenges (problems) faced by students while taking distance learning courses in Moodle (in %)*

Given the problem of lack of time to study, it is relevant to consider in detail how much time students spend on work in the Moodle system (see Fig. 5).
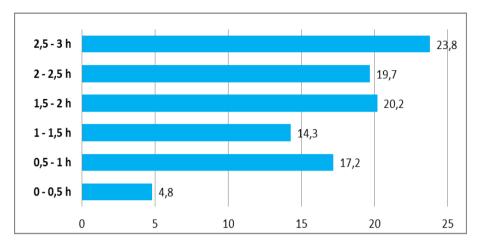
Fig. 5. *Time spent by students for studying online in Moodle (in %)*

More than 60% of the surveyed students work in the Moodle system for at least an hour and a half each time they enter the course. The quantitative data analysis allows one to clarify the relationship between the timespan of studying in the Moodle system and other parameters using the linear correlation according to Pearson (the obtained results were processed using the STATISTICA package (version 11.0)). The following direct correlations ($p \leq 0.01$) were recorded between the "timespan of studying in the Moodle system" – "realization that it is difficult to achieve anything in life without a diploma of higher education" ($r = 0.57$), "desire to gain knowledge, learn new things" ($r = 0.65$), "good progress in studies, academic performance" ($r = 0.79$). Therefore, high-achieving students spend more time studying in the Moodle system. They intend to acquire knowledge, obtain a diploma of higher education and further pursue their professional career.

Also, the students were offered to choose between pairs of opposite definitions used to describe distance learning courses. The numbers between the paired definitions indicate the ranking between them (1 – excellent, 2 – good, 3 – satisfactory, 4 – unsatisfactory). The data for these parameters are shown in Table 1.

Table 1. *Students assessing the quality of courses in the Moodle system (based on the ranking from 1 to 4)*

Definitions used to describe the course	Impressions of the e-course				Definitions used to describe the course
	excellent	*good*	*satisfactory*	*un-satisfactory*	
Positive	**1**	**2**	**3**	**4**	**Negative**
enjoyable	46.5%	44.8%	5.3%	3.4%	*annoying*
understandable	68.9%	26.3%	4.8%	0%	*not understandable*
creative	37.3%	12.9%	43%	6.8%	*dull*
easy to learn	49.4%	28.2%	18.1%	4.3%	*difficult to learn*
valuable	37.8%	43.2%	12.4%	6.6%	*inferior*
exciting	41.1%	26.8%	27.2%	4.9%	*boring*
inventive	39.2%	24.8%	13.6%	22.4%	*conventional*
meets expectations	43.9%	36.5%	11.4%	8.2%	*not meeting expectations*
efficient	39.6%	42.1%	9.3%	9%	*inefficient*
clear	51.3%	38.4%	9.1%	2.2%	*confusing*
innovative	61.7%	33.1%	5.2%	0%	*conservative*

The analysis of averages, based on students' impressions of the effectiveness of courses in the Moodle system, indicates that more than three-fourths of respondents (79.5%) rated the online courses positively. Of these, 47% consider such courses as excellent and 32.5% as good. In their opinion, distance learning courses are understandable, creative, valuable, exciting, efficient, clear, innovative, meeting expectations, inventive, easy to learn and enjoyable. Only 14.4% of the respondents consider them satisfactory, while 6.1% of them give a negative assessment (consider them unsatisfactory) (see Fig. 5).

To be of high quality, Moodle courses should contain the following information materials (content) used in online courses: a textbook or lecture notes; methodological materials for laboratory and practical work; computer-based and web-based training programmes (e-textbook, control testing systems, training programmes, laboratory work, reference books, encyclopaedias, subject-oriented space); instructional materials. Besides, it is necessary to follow all the structural components that such courses include:

1) introductory information, which sets out the goals and objectives of the course, learning schedule, recommendations;

2) preliminary self-testing, which allows students to assess the level of their preparation and adapt the course to their needs;

3) recommendations for studying the course;

4) theoretical materials usually presented in the form of modules;

5) laboratory and practical work with a preliminary testing system (admission).

6) a list of frequently asked questions and answers to them;

7) a glossary;

8) a list of links to other websites to broaden and deepen knowledge on the subject (Kulynych, 2015).

	excellent	good	satisfactory	unsatisfactory
Serie	47%	32,50%	14,40%	6,10%

Fig. 6. *Students' level of satisfaction with the teaching of Moodle courses (based on average values)*

Thus, the constructivism of the Moodle system assumes that the student is an active subject who independently creates his/her system of knowledge using the available resources. The role of the teacher (tutor) is to motivate and support learners, accompanying their independent work on mastering the educational material. As a result of such work, skills and abilities for self-educational activities are developed, and the knowledge of

students in a particular field is expanded and updated. According to the foundations of social constructivism, constructed knowledge is most effective when one learns in collaboration. This is possible when students work in a group, sharing their experiences and ideas and are open to the experiences and opinions of others.

Conclusions

Today, the efforts of HEIs (universities) are aimed at supporting independent work of students in the context of distance learning, due to the introduction of the lockdown. Distance learning courses in all subjects have been developed on the Moodle platform. The conducted study indicates the effectiveness and features of using Moodle in professional training of pedagogy students. Indeed, the use of this system saves time spent on learning, freeing it up for personal life, self-education, hobbies and entertainment. Students with high academic performance spend more time studying in the Moodle system. They intend to acquire knowledge, obtain a diploma of higher education and further pursue their professional careers. More than half of the respondents evaluate distance learning courses positively. In their opinion, such courses are understandable, creative, valuable, exciting, efficient, clear, innovative, meeting expectations, inventive, easy to learn and enjoyable.

One should pay considerable attention to the selection of educational information so that it is up-to-date, perfect, facilitates its motivated processing in activities and requires communication between the participants in the educational process to enrich the involved information resources and improve the results. Thus, training materials should form a special complex that will provide all the above-mentioned requirements for educational information.

The conducted research does not claim to be the final solution to the problem under study, and the results obtained indicate the advisability of further theoretical and practical research of the outlined problem.

References

Bakhmat, N., Maksymchuk, B., Voloshyna, O., Kuzmenko, V., Matviichuk, T., Kovalchuk, A., Martynets, L., Uchytel, I., Solovyov, V., Manzhos, E., Sheian, M., Alieksieiev, O., Slyusarenko, N., Zhorova, I., & Maksymchuk, I. (2019). Designing cloud-oriented university environment in teacher training of future physical education teachers. *Journal of Physical Education and Sport, 19*(4), 1323-1332. http://efsupit.ro/images/stories/august2019/Art%20192.pdf

Bodnenko, T. (2015). Vykorystannya v LMS moodle u protsesi navchannya dystsyplin z avtomatyzatsiyi vyrobnytstva maybutnikh fakhivtsiv kompyuternykh system [Using MOODLE LMS in the process of teaching subjects on production automation to future specialists in computer systems]. *Naukovi zapysky. Seriya: Problemy metodyky fizyko-matematychnoyi i tekhnolohichnoyi osvity*, *2*(7), 21-26. https://phm.cuspu.edu.ua/ojs/index.php/NZ-PMFMTO/article/viewFile/519/495

Buhaichuk, K. L. (2013). *Napryamy vykorystannya LMS Moodle v systemi profesiynoyi pidhotovky ta pidvyshchennya kvalifikatsiyi naukovo-pedahohichnoho skladu VNZ MVS Ukrayiny* [Areas of using Moodle LMS in the system of professional training advanced training of scientific and pedagogical staff of universities at the Ministry of Internal Affairs of Ukraine]. Retrieved from http://2013.moodlemoot.in.ua/course/view.php?id=5

Chourishi, D., Buttan, Ch. K., Chaurasia, A., & Soni, A. (2011). Effective distance learning through Moodle. *International Journal of Advance Technology & Engineering Research*, *1*(1), 34-38. https://www.yumpu.com/en/document/read/40261855/effective-e-learning-through-moodle-ijater

Garbin, M. C., Amaral, S. F. do, Mendes, C. O. S., Ogasawara, E., & Soqueria Rocha, J. M. de. (2012). Adaptation of the Moodle for application in distance education course at the state university of Campinas. *Procedia - Social and Behavioral Sciences, 46*, 2514-2518. http://dx.doi.org/10.1016/j.sbspro.2012.05.513

Gerasymova, I., Maksymchuk, B., Bilozerova, M., Chernetska, Yu., Matviichuk, T., Solovyov, V., & Maksymchuk, I. (2019). Forming professional mobility in future agricultural specialists: the sociohistorical context. *Revista Romaneasca pentru Educatie Multidimensionala, 11*(4), 345-361. http://doi.org/10.18662/rrem/195

Komogorova, M., Maksymchuk, B., Bernatska, O., Lukianchuk, S., Gerasymova, I., Popova, O., Matviichuk, T., Solovyov, V., Kalashnik, N., Davydenko, H., Stoliarenko, O., Stoliarenko, O., & Maksymchuk, I. (2021). Pedagogical Consolidation of Pupil-Athletes? Knowledge of Humanities. *Revista Romaneasca Pentru Educatie Multidimensionala*, *13*(1), 168-187. https://doi.org/10.18662/rrem/13.1/367

Kulynych, M. (2015). Zastosuvannya tekhnolohiydystantsiynoho navchannya pid chasvykladannyaoblikovo-analitychnykh dystsyplin [The application of distance learning in teaching of accounting and analytical cycle disciplines]. *Ekonomichnyy chasopys Volynskoho natsionalnoho universytetu imeni Lesi Ukrainky*, *3*(3), 79-85. https://echas.vnu.edu.ua/index.php/echas/article/view/255/210

Palamarchuk, O., Gurevych, R., Maksymchuk, B., Gerasymova, I., Fushtey, O., Logutina, N., Kalashnik, N., Kylivnyk, A., Haba, I., Matviichuk, T., Solovyov, V., & Maksymchuk, I. (2020). Studying Innovation as the Factor in Professional Self-Development of Specialists in Physical Education and Sport. *Revista Romaneasca Pentru Educatie Multidimensionala*, *12*(4), 118-136. https://doi.org/10.18662/rrem/12.4/337

Pysanko, M. L., & Martynenko, O. Y. (2020). MOODLE yak zasib dystantsiynoho navchannya maybutnikh perekladachiv audiyuvannya anhliyskoyumovoyu [MOODLE as a means of teaching prospective interpreters via e-course on listening comprehension in English]. *Informatsiyni tekhnolohiyi i zasoby navchannya*, *75*(1), 237-252. https://journal.iitta.gov.ua/index.php/itlt/article/view/2644

Sheremet, M., Leniv, Z., Loboda, V., & Maksymchuk, B. (2019) The development level of smart information criterion for specialists' readiness for inclusion implementation in education. *Information Technologies and Learning Tools*, *72*(4), 273-285. https://doi.org/10.33407/itlt.v72i4.2561

Spirin, O. M., & Kolos, K. R. (2020). Tekhnolohiya orhanizatsiyi masovoho dystantsiynoho navchannya uchniv v umovakh karantynu na bazi platformy Moodle [Technology for organization of distance learning for students in quarantine conditions on the basis of the MOODLE platform]. *Informatsiyni tekhnolohiyi i zasoby navchannya*, *79*(5), 29-58. https://journal.iitta.gov.ua/index.php/itlt/article/view/4090/1705

Syara, Y., Anggoro, B. S., Handoko, A., Haka, N. B., Kesumawardani, A. D., & Hidayah, N. (2020). The use of moodle-based learning management system (LMS) on MATE (Media Ajar Teori Evolusi). *Journal of Physics Conference Series*, *1467*, 1-11. https://iopscience.iop.org/article/10.1088/1742-6596/1467/1/012016/pdf

Trius, Y. V., Herasymenko, I. V., & V. M. Franchuk. (2017). *Systema elektronnoho navchannya VNZ na bazi MOODLE* [Distance learning system of HEIs on the basis of MOODLE]. ChSTU. https://vfranchuk.fi.npu.edu.ua/images/files/statty/37_SEN_VNZ.pdf.pdf