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CHANGES IN THE USE OF THE MOODLE PLATFORM BY STUDENTS AT DIFFERENT LEVELS OF TRAINING DEPENDING ON THE PERIOD OF RESTRICTIONS DUE TO COVID-19

CAMBIOS EN EL USO DE LA PLATAFORMA MOODLE POR PARTE DE LOS ESTUDIANTES DE DISTINTOS NIVELES DE FORMACIÓN EN FUNCIÓN DEL PERÍODO DE RESTRICCIONES POR EL COVID-19

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ABSTRACT

The use of modern innovative information technology in education is a promising direction in pedagogical science as it enables the provision of educational services through a specialized information educational environment – a complex of information resources and technical instruments and channels of communication that provides for the exchange of educational information over long distances. In today's conditions, despite the alleviation of restrictive measures, the problem of organizing distance learning continues to be relevant. The purpose of the study is to identify and compare the views of undergraduate and graduate students on the use of the Moodle system in university education depending on the period of restrictions caused by COVID-19. Based on a survey of university students engaged in distance learning during the period of quarantine restrictions using the Moodle platform, the authors analyze the specific features of student registration on this e-learning platform and determine the peculiarities of the use of Moodle by students depending on the period of restrictions introduced due to COVID-19. It is concluded that the Moodle platform is highly popular in the sphere of higher education and acts as an effective instrument for organizing distance learning under quarantine restrictions.

Keywords:

Distance learning, Moodle platform, registration, academic discipline, quarantine restrictions.

RESUMEN

El uso de tecnología de la información moderna e innovadora en la educación es una dirección prometedora en la ciencia pedagógica, ya que permite la prestación de servicios educativos a través de un entorno educativo de información especializada: un complejo de recursos de información e instrumentos técnicos y canales de comunicación que proporciona el intercambio de información educativa. información a larga distancia. En las condiciones actuales, a pesar del alivio de las medidas restrictivas, el problema de la organización de la educación a distancia sigue siendo relevante. El estudio tiene como objetivo identificar y comparar las opiniones de estudiantes de grado y posgrado sobre el uso del sistema Moodle en la educación universitaria en función del período de restricciones ocasionado por el COVID-19. Con base en una encuesta a estudiantes universitarios que realizan aprendizaje a distancia durante el período de restricciones de cuarentena utilizando la plataforma Moodle, los autores analizan las características específicas del registro de estudiantes en esta plataforma de aprendizaje electrónico y determinan las peculiaridades del uso de Moodle por parte de los estudiantes según el período de restricciones introducido debido a COVID-19. Se concluye que la plataforma Moodle es muy popular en el ámbito de la educación superior y actúa como un instrumento eficaz para organizar la educación a distancia bajo restricciones de cuarentena.

Palabras clave:

Educación a distancia, plataforma Moodle, registro, disciplina académica, restricciones de cuarentena.

INTRODUCTION

The global pandemic of COVID-19 has revitalized the search for new methods and means of teaching (Artemova et al., 2022). Information and communication technologies (ICT) are gaining a wide spread (Rakhinsky et al., 2021). Among ICT tools, particular popularity is enjoyed by the Moodle platform – a learning content management system belonging to the class of freely distributed software that provides support for distance learning and allows creating electronic learning courses and conducting both classroom (full-time) training and distance (extramural) learning (Oproiu, 2015). In this context, blended learning as integration of traditional and distance learning is becoming widely used (Kumar Basak et al., 2018; Korotaeva & Kapustina, 2021). In turn, the use of the Moodle platform, in our view, is an important factor in this integration.

On the Moodle platform, the teacher creates a common training course using multimedia teaching resources, customizes it to the needs and abilities of each learner, and supports the activities of students. The student studies the material recommended to them, organizes their work, and performs exercises. The learner can see the evolution of their activities, perform tasks for self-assessment, and submit completed tasks for review by the teacher. Teachers and students communicate individually or in groups, suggest topics for discussion, and collaborate on research or in creating shared documents. The administrator manages and maintains the system, controls the access and rights of faculty and students, and creates links to external information systems (administrative documents, directories, pedagogical resources, etc.).

Literature review. At present, there is increasing research attention to e-learning, which is the most common form of distance learning (Hernández García de Velazco et al., 2021). E-learning is a promising model of education that relies on the use of new multimedia technologies and the Internet to improve the quality of education by making it easier to access resources and services, as well as exchange them and work in collaboration over distance (Krivova et al., 2021).

According to Benta et al. (2014), 99% of higher education institutions use learning management systems and among the key advantages of e-learning, note its usefulness, convenience, and practical usability. A study by Judrups (2015), demonstrates the effectiveness of teaching with the use of Moodle. In particular, a survey of students reveals higher motivation and productivity and better preparation for exams among learners.

Overall, the review of scientific literature shows that the use of Moodle in the educational process provides the participants in this process with the following opportunities and advantages:

- for the teacher: organization of educational and methodical materials for the discipline in a structured form; a convenient instrument for keeping record of and controlling students' learning activities; an opportunity to set up deadlines for certain tasks for students (Sabir et al., 2014); software that meets the requirements of the educational process; an opportunity to use text, graphics, audio, and video materials in the organization of the educational process (Park, 2014); an opportunity to quickly and easily change, expand, supplement, and correct educational and methodical materials for the discipline; organization of computer-based testing to monitor students' knowledge using different types of questions (Belchenko, 2021); an automated rating system for evaluating students' independent work (Guri-Rosenblit, 2016); an opportunity to engage students in the formation of educational and methodical materials for the course; software protected from unauthorized access, modification, and damage (destruction);

- for the student: access to logically structured and compiled educational and methodological material, which improves the conditions for independent study of the content of disciplines (Moreno et al., 2017); tools for self-assessment and the completion and assessment of tasks without the intervention of the human factor (the teacher); an opportunity to truly take part in the scientific and methodological work of the departments; broader access to Internet resources; the opportunity to learn the educational material remotely and pass the credit and exam session ahead of time (Joksimović et al., 2015).

However, the introduction and use of the e-learning system also cause some problems, among which researchers mention little support from the heads of educational institutions and low motivation and information literacy on the part of teachers (Pechenkina, 2017). Substantial barriers to the use of Moodle also appear on the part of students: lack of experience using the platform (Barannikov et al., 2020) and poor time management (Kör et al., 2016).

Consequently, the use of Moodle can be considered in the context of the previously unresolved part of the overall problem of integration of traditional and distance learning in order to improve the educational process in higher education.

In view of the above, the purpose of this article is to identify and compare the opinions of undergraduate and graduate students regarding the use of Moodle in a university setting, depending on the period of restrictions caused by COVID-19.

Research objectives:

1. to conduct a survey of students regarding their registration in the Moodle e-learning system;

2. to conduct a survey of students regarding the use of Moodle depending on the period of restrictions caused by COVID-19;

3. to perform statistical processing of the results of the study and draw conclusions.

The statistical hypotheses assumed for the statistical processing of the obtained data are as follows:

H0: the samples are about the same according to the studied groups of indicators of the registration and use of the Moodle system;

H1: the samples differ in the studied groups of indicators of the registration and use of the Moodle system.

MATERIALS AND METHODS

To achieve the established research goal, we compiled a set of theoretical and empirical research methods: theoretical methods (analysis, synthesis, comparison, generalization) employed to study scientific literature on the use of Moodle in the study of academic disciplines; empirical methods (survey) used to analyze the state of the use of Moodle in the study of academic disciplines by undergraduate and graduate in different years of study depending on the period of restrictions caused by COVID-19.

The empirical study was conducted on the basis of three Russian universities – the Peoples' Friendship University of Russia (RUDN), the Moscow Aviation Institute, and the Russian State University of Tourism and Services Studies – using an anonymous online survey in Google Forms administered at the beginning of the second semester of 2021.

The characteristics of the sample are presented in Table 1.

Table 1. Sample characteristics.

	Years of training and educational and professional levels						Form of education	
	1B	2B	3B	4B	1M	2M	full-time	extramural
Number of students	250	167	142	241	150	120	962	108
Total	800			270			1,070	

Note: B – bachelor's degree, respectively 1B – first year of bachelor's degree; M – master's degree, respectively 1M – first year of master's degree

Before starting to use the e-learning system, all students had to register on the Moodle website. Given that students get their first impressions from the e-learning system already at the stage of registration, we were concerned whether they had any difficulties at this initial step, which was assessed by the corresponding survey question: "How did your registration on the e-learning website go?".

The respondents were asked to answer on a five-point scale: 0 (no registration) 1 (very difficult); 2 (rather difficult); 3 (it depends); 4 (rather simple); 5 (very simple).

The main research question was formulated as follows:

"Indicate the dynamics of your use of the e-learning website (Moodle system) for your academic disciplines in higher education: before the restrictions caused by COVID-19; during the restrictions caused by COVID-19; how comfortable you would be in continuing to use Moodle after the restrictions caused by COVID-19 are alleviated".

The response was to be given on a five-point scale: 1 (no or very few disciplines), 2 (the lesser part); 3 (almost half); 4 (most); 5 (vast majority/all disciplines).

The SPSS Statistics software program was used for mathematical processing of the results (to calculate Pearson's $\chi 2$ criterion)

RESULTS AND DISCUSSION

The results on student registration on the e-learning website are shown in Tables 2 and 3.

Table 2. Results of student registration on the e-learning platform Moodle: the year of study within the bachelor's and master's degree.

Response	N/%	Years of training and educational and professional levels						Total
		1B	2B	3B	4B	1M	2M	
No registration	N	6	7	3	7	2	3	28
	%	2.4%	4.2%	2.1%	2.9%	1.3%	2.5%	2.6%
Very difficult	N	14	8	7	5	4	5	43
	%	5.6%	4.8%	4.9%	2.1%	2.6%	4.2%	4.0%
Rather difficult	N	18	18	14	20	10	10	90
	%	7.2%	10.8%	9.9%	8.3%	6.6%	8.3%	8.4%
It depends	N	36	32	26	38	18	24	174
	%	14.4%	19.2%	18.3%	15.8%	11.9%	20.0%	16.2%
Rather simple	N	87	38	44	79	45	36	328
	%	34.8%	22.8%	31.0%	32.8%	29.8%	30.0%	30.7%
Very simple	N	89	64	48	92	71	42	407
	%	35.6%	38.3%	33.8%	38.2%	47.7%	35.0%	38.0%
Total	N	250	167	142	241	150	120	1070
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: N – number of respondents; % – percentage of the course/year of study

Table 3. Results of student registration on the e-learning platform Moodle: distribution by educational and professional levels, forms of training.

Response	N/%	Form of education		Full-time		Extramural		All students	
		Full-time	Extramural	1-4B	1-2M	1-4B	1-2M	1-4B	1-2M
No registration	N	23	5	19	4	4	1	23	5
	%	2.4%	4.6%	2.6%	1.8%	6.6%	2.1%	2.9%	1.8%
Very difficult	N	39	4	31	8	3	1	34	9
	%	4.1%	3.7%	4.2%	3.6%	4.9%	2.1%	4.3%	3.3%
Rather difficult	N	78	12	63	15	7	5	70	20
	%	8.1%	11.0%	8.5%	6.7%	11.5%	10.4%	8.8%	7.4%
It depends	N	156	18	122	34	10	8	132	42
	%	16.2%	16.5%	16.5%	15.2%	16.4%	16.7%	16.5%	15.5%
Rather simple	N	293	36	224	69	24	12	248	81
	%	30.5%	33.0%	30.3%	30.1%	41.0%	25%	31%	29.9%
Very simple	N	373	34	280	93	13	21	293	113
	%	38.8%	31.2%	37.9%	41.7%	31.3%	43.8%	36.6%	40.6%
Total	N	962	109	739	223	61	48	800	270
	%	100%	100%	100%	100%	100%	100%	100%	100%
χ2-criterion		2.70		1.66		6.54		2.63	

Our intention was to determine the factor affecting these challenges the most – the year of study or some other factors. Pearson's χ2 criterion was used to compare registration rates among undergraduate and graduate students. At 95% confidence level ($p < 0.05$), the critical value of Pearson's criterion for four degrees of freedom is 9.488.

For the compared groups I-4B /I-2M, the results of calculations are $\chi 2_{emp}(2.63) < \chi 2_{0.05}(9.488)$. Thus, the null hypothesis is accepted, the reliability of the convergence of characteristics (registration rate) between the compared samples (students of different educational and professional levels of training) according to the statistical criterion x2 is 95%, that is, there are no statistically significant differences in registration.

No statistically significant differences are also found in comparing the studied groups by the following parameters:

- form of undergraduate/master's education – full-time $\chi 2_{emp}(1.66) < \chi 2_{0.05}(9.488)$ and extramural $\chi 2_{emp}(6.54) < \chi 2_{0.05}(9.488)$;

- form of education (all students) – full-time/extramural $\chi 2_{emp}(2.70) < \chi 2_{0.05}(9.488)$.

Thus, none of the above factors reveal statistically significant differences ($p < 0.05$) between students in terms of their registration in Moodle.

The results of the student survey on the use of Moodle depending on the period of restrictions are shown in Table 4.

Table 4. The use of Moodle depending on the period of restrictions caused by COVID-19.

Response	N/%	1B	2B	3B	4B	1M	2M	Total
Before quarantine								
No or very few disciplines	N	125	105	69	129	72	46	546
	%	50.0%	62.9%	48.6%	53.5%	47.7%	38.3%	51.0%
The lesser part of the disciplines	N	48	32	30	62	40	30	242
	%	19.2%	19.2%	21.1%	25.7%	26.5%	25.0%	22.6%
Almost half of the disciplines	N	46	18	24	32	22	24	166
	%	18.4%	10.8%	16.9%	13.3%	14.6%	20.0%	15.5%
Most of the disciplines	N	22	2	8	12	12	13	69
	%	8.8%	1.2%	5.6%	5.0%	7.9%	10.8%	6.4%
Vast majority or all of the disciplines	N	9	10	11	6	5	7	48
	%	3.6%	6.0%	7.7%	2.5%	3.3%	5.8%	4.5%
Total	N	250	167	142	241	151	120	1071
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
During quarantine								
No or very few disciplines	N	12	10	5	9	7	8	51
	%	4.8%	6.0%	3.5%	3.7%	4.6%	6.7%	4.8%
The lesser part of the disciplines	N	31	25	15	20	10	8	109
	%	12.4%	15.0%	10.6%	8.3%	6.6%	6.7%	10.2%
Almost half of the disciplines	N	43	33	30	32	28	21	187
	%	17.2%	19.8%	21.1%	13.3%	18.5%	17.5%	17.5%
Most of the disciplines	N	53	33	34	41	33	26	220
	%	21.2%	19.8%	23.9%	17.0%	21.9%	21.7%	20.5%
Vast majority or all of the disciplines	N	111	66	58	139	73	57	504
	%	44.4%	39.5%	40.8%	57.7%	48.3%	47.5%	47.1%
Total	N	250	167	142	241	151	120	1071
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
After quarantine								
No or very few disciplines	N	29	22	20	30	9	14	124
	%	11.6%	13.2%	14.1%	12.4%	6.0%	11.7%	11.6%

The lesser part of the disciplines	N	34	29	22	32	25	11	153
	%	13.6%	17.4%	15.5%	13.3%	16.6%	9.2%	14.3%
Almost half of the disciplines	N	65	43	41	68	46	43	306
	%	26.0%	25.7%	28.9%	28.2%	30.5%	35.8%	28.6%
Most of the disciplines	N	60	27	26	40	34	27	214
	%	24.0%	16.2%	18.3%	16.6%	22.5%	22.5%	20.0%
Vast majority or all of the disciplines	N	62	46	33	71	37	25	274
	%	24.8%	27.5%	23.2%	29.5%	24.5%	20.8%	25.6%
Total	N	250	167	142	241	151	120	1,071
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

To compare the study of academic disciplines in Moodle by bachelor's and master's students, the $\chi 2$ criterion ($p < 0.05$) was calculated for the following time frames:

- before quarantine restrictions B/M $\chi 2_{emp}(10.49) > \chi 2_{0.05}(9.488)$

- during quarantine restrictions B/M $\chi 2_{emp}(5.32) < \chi 2_{0.05}(9.488)$

- after quarantine restrictions B/M $\chi 2_{emp}(7.67) < \chi 2_{0.05}(9.488)$.

Thus, with respect to the time prior to the restrictions brought about by COVID-19, the compared groups demonstrate a statistically significant difference, whereas in the period during quarantine, there are no differences to be found (reliability 95%). There is also no difference in students' desire to continue using Moodle after the restrictions caused by COVID-19 are over. The reason for that could probably be that Moodle has become the primary and quite effective platform for the distance learning of university students under quarantine restrictions.

In the conducted study, we compared the responses of students regarding the difficulty/ease of registering in Moodle and the number of disciplines studied through Moodle by students at different levels of training depending on the period of restrictions introduced due to COVID-19.

Our findings suggest that registration on the e-learning website (Moodle) is simple for most students (63-78%), although some difficulties are reported by 9-16% in different years of study. The results obtained are consistent with previous research. For instance, is a study by Shen & Huang (2006), the majority of respondents (76%) had no difficulties registering in Moodle, 16% of students had some difficulties, which they easily overcame, and 8% of the respondents failed to register on their own and asked for help from the teacher. In this respect, we suggest that teachers and employees of the e-learning platform conduct appropriate methodological work to consult students before or during their registration in Moodle.

Furthermore, students who had the most difficulties registering note that prior to quarantine restrictions, most of their academic courses were not represented in Moodle. Specifically, 81.4% of the students for whom registration was "very difficult" and 58.9% of those for whom it was "difficult" report having little to no disciplines studied in Moodle before the pandemic. Accordingly, these students had no prior experience working in the system, which, in our view, could be the reason for their difficulties in registering.

Over 70% of all students note that before the pandemic restrictions were introduced, Moodle had been very little used in their studies. Afterward, under the quarantine restrictions, the number of academic disciplines represented on the e-learning platform increased sharply for both bachelor's and master's students, which is consistent with the results of the 2020 Analytical report (Barannikov et al., 2020). While before the COVID-19-induced restrictions, 25% of undergraduate students and about 30% of graduate students reported at least half or more disciplines studied in Moodle, these numbers increased to nearly 84% and 88%, respectively, during the restrictions, or from about 26% to nearly 85% for all responding students.

Meanwhile, the primary scenarios of the use of Moodle are practically identical before and during the pandemic limitations: the most widespread is the use of educational and methodical materials of the discipline by students (lecture courses, textbooks, materials for practical classes, working programs of academic disciplines, and the like); sending the completed current academic tasks; computer testing to perform the tasks of the module and final control (Benta et

al., 2014). The biggest change during quarantine restrictions is driven by an increase in the number of academic disciplines in Moodle (Barannikov et al., 2020).

This fact affected the use of Moodle before and after quarantine measures, which is evidenced by the fact that as of the end of 2020, 97.4% of students and all teachers of the universities covered in our study were registered on the Moodle platform. The number of daily views of educational materials and daily users of the universities' e-learning systems in Moodle also shows a significant increase compared to previous years.

Organization of e-learning also has a positive effect on the formation of students' positive attitudes to Moodle, which goes in line with previous studies – most undergraduate (72%) and graduate students (78%) express a desire to continue taking academic disciplines in Moodle (Table 4).

CONCLUSIONS

The research findings show that the Moodle platform enjoys great popularity in higher education and presents an effective instrument for organizing distance learning. The study reveals some limitations in the use of Moodle for teaching students that had been faced prior to the restrictions brought about by COVID-19, since only 25% of bachelor's students and about 30% of master's students studied most of their academic disciplines on the platform. In the period of restrictions due to the COVID-19 pandemic, in the conditions of distance learning, these shares grew up to 84% and 88%, respectively.

After the alleviation of pandemic restrictions, 72% of undergraduate students and 78% of graduate students show a willingness to study most of their courses on the Moodle platform. Whereas prior to the quarantine restrictions, there was a statistically significant difference between the compared groups in the use of Moodle, during the pandemic restrictions and afterward, no differences are detected.

The majority of university students in all years of study (63-78%) have no difficulties registering in Moodle. Some difficulty in registering is reported by about 9-16% of students in different courses. According to the $\chi 2$ criterion ($p < 0.05$), no statistically significant difference is found in the indicators of student registration by their educational and professional levels, form of education, and gender. It is established that among the students who had a "very difficult" and "difficult" time registering in Moodle, 81.4% and 58.9%, respectively, had no or very few disciplines taught through Moodle prior to the pandemic. The lack of relevant experience in e-learning probably caused students to have further difficulties registering in Moodle.

Prospective further research in this area, we believe, is expedient to be aimed at the further analysis of the various aspects of the influence of distance learning in general and the Moodle platform in particular on both students and teachers at universities.

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