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ADOPTION OF LMS MOODLE TOOLS IN STUDENT LEARNING – IN LINE WITH TEACHING PRACTICES

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Abstract. The education of students in an online-based environment in the conditions of a pandemic leads to an intensification of the use of Learning Management Systems (LMS) by higher education institutions (HEIs). In the study, a survey of the higher schools in Bulgaria, educating students mainly in the field of social, economic, and legal sciences, was made. Based on a survey of a sample of 14 universities that educate more than 1000 students in the specified field, it was found that over 92% of them use the Moodle e-platform. The results of a survey of the opinion of distance learning lecturers at University of Economics – Varna (UE – Varna) for the last three academic years allows for a detailed analysis of the use of Moodle tools and the identification of certain trends caused by the COVID-19 pandemic: coincidence in the five most used by teachers instruments for the three years of the period; some tools have been removed due to low usage, while others have seen an increase in usability (uploading multimedia presentations, URL module and electronic tests), some gamification-related tools have been added that are considered to have good potential for increasing students' motivation and engagement in learning.

Keywords: LMS; Moodle tools; gamification; interactive content; COVID-19 pandemic

Introduction

Effective student learning in higher education institutions in recent years has been inextricably linked to the use of Learning Management Systems. Their application contributes to the expansion of the digitization of teaching and learning in the higher education institutes. The propensity of the students themselves, in accordance with their age and preferences, to actively apply information technologies in all activities, leads to a clearly expressed positive attitude towards the digitization of educational activities.

The global impact of COVID-19 on learning at all levels of education, incl. higher education, led to changes in traditional teaching methods. As a result of the

pandemic, the intensity of use of LMS has increased significantly in the last two years. The specified features outline new trends and give reason to conduct a study on the use of LMS in HEIs in Bulgaria, highlighting the changes that occur in the digitization of education in the context of the impact of the pandemic and outlining the main tools that are applied by perspective of teachers.

These are also the motives that determine ***the main objective of the research***: to study the use of LMS in HEIs in Bulgaria, educating students in the field of social, economic, and legal sciences, as well as to examine the tools applied in the e-learning platform used in University of Economics – Varna (UE – Varna) from the teachers' point of view. Similarly included in the scope of the study is the objective to track the change in tools use that is conditioned by the transition to fully electronic-based learning in an online environment caused by the pandemic situation.

The first section of the paper presents the results of a comprehensive study on what LMSs are used in HEIs in Bulgaria, which have an orientation towards educating students in the field of social, economic, and legal sciences. The second section presents the study design, and the third section is dedicated to the study of the main tools of the e-learning platform, which are applied by the teachers, using as a basis the practices of UE–Varna in distance learning. Specifics are highlighted in the tools applied before and during the pandemic, when the training is implemented in an electronic environment. The fourth section outlines guidelines that could be considered for educators to achieve greater engagement in their students. The conclusion summarizes the results achieved in the study and gives directions for future research.

Application of LMSs in education in HEIs in Bulgaria

The impact of information technologies on the learning process is particularly tangible. When studying their influence, researchers express the opinion that in the conditions of an open and increasingly globalized society, in which the dynamics of distribution and access to information are increasing, it is difficult to use it in the traditional way (Remali, Ghazali, Kamaruddin and Kee 2013; Indreica 2014). On this basis, the importance of e-learning platforms in higher education has grown significantly in recent years. By creating web-based adaptive collaborative learning environments they support face to face teaching and learning activities (Bentaa et al. 2015). They fully support the activities and learning of the students in the learning process - through the electronic platforms, the students access the digital educational content, take tests for self-preparation as well as for evaluation, upload distinct types of assignments, get access to video lectures and multimedia presentations, links to external sources, etc. Researchers emphasize the fact that e-learning platforms represent a tool for self-learning and thus achieve an important change in the use of resources, as well as enhance learning efficiency (Virtié 2012).

Some authors highlight the benefits of using LMS in various areas – through them, learners and trainers can access the learning content anytime and anywhere. The e-platform centralizes all learning resources and activities, tools are available for tracking and reporting the success rate of students, an increase in the effectiveness of student activity is achieved, communication between learners and trainers is intensified and tools for learning analytics are available (Ghilay 2019). Other authors specifically emphasize that LMSs lead to a meaningful change in the learning experience for both students and faculty (Alexe et al. 2021), including in context of mobile learning (Todoranova and Penchev 2021).

Under the impact of the COVID-19 pandemic, the normal functioning of universities has been hindered and a transition to working in a fully online environment has been reached. Several authors maintain the opinion that, under these conditions, effective learning in a remote, electronically based environment becomes a key issue in the student learning process (Alturki and Aldraiweesh 2021; Sarnou and Sarnou 2021; Bakhmat, Babakina and Belmaz 2021; Polhun et al. 2021). On this basis, the increased application of two main tools in learning - on the one hand, e-learning and LMS platforms, and on the other hand, various video conferencing and online collaboration tools, such as Zoom and Microsoft Teams – became particularly important. Educational organizations all over the world, including in Bulgaria, have switched to actively using LMS in student training. Although this is a practice adopted by them long before the worsening of the epidemic situation related to COVID-19, the pandemic significantly contributed to the great intensification of the processes of digitalization of learning in higher schools.

The practical research in the present paper is based on the practices in the distance learning of students at the University of Economics - Varna. The university educates students in four professional areas: 3.7 Administration and Management; 3.8 Economics; 3.9 Tourism and 4.6 Computer Science. The first three directions refer to area of higher education 3. Social, Business and Legal Sciences, and the fourth belongs to area 4. Natural sciences, mathematics and informatics (Earth sciences, Mathematics and Informatics).

According to data from the official Register on the number of students in higher education institutions in Bulgaria, maintained by the Ministry of Education and Science (MES)[1] as of May 2022, 75% of all public and private universities in the country educate students and doctoral students in area 3. Social, economic, and legal sciences. UE–Varna falls into this group, and the students from area 3. form 92.40% of all students, and for the distance form of education, the share is 100%. *This fact gives us reason to direct our attention to the study of LMS usage practices in Bulgarian higher education institutions that educate students specifically in the field of social, economic, and legal sciences, as well as to base our conclusions and recommendations on the practices implemented in the distance form of education at UE–Varna.*

There are three main research questions that are the subject of research in the publication:

RQ1: What are the LMSs that are mainly applied in the practice of universities educating students in area 3. Social, economic, and legal sciences?

RQ2: What are the main tools of the e-learning platform that are used by lecturers in the process of teaching students at the University of Economics - Varna?

RQ3: Is there a change in platform tools used during the pandemic compared to the pre-pandemic period?

Research Design

As we indicated, in this research we have set ourselves the goal of studying the application of LMS in a representative part of the higher schools in Bulgaria, teaching students mainly in the field of Social, Business and Legal Sciences. In order to identify these universities, a comprehensive study of all 52 accredited higher education institutions in the Republic of Bulgaria was carried out. The study is based on the Register of HEIs in Republic of Bulgaria[2], maintained by the MES, and as of May 2022, it includes information on both state and private higher education institutions in the country. The studies show that in thirty-nine universities, students (including doctoral students) are educated in area 3. and ***they represent 31.55% of all students in the country***. Table 1 presents summary information about the indicated higher schools, and their arrangement is based on the number of students from area 3. The data is current for the summer semester of the academic year 2021/2022.

Table 1. HEIs in Bulgaria teaching in the field 3. Social, Business and Legal Sciences

№	Name of the HEI	Number of students 2021/2022	Number of students in area 3.	Share of students in area 3.	Funding / Resources
1	University of National and World Economy	17 702	17 702	100.00%	State
2	Sofia University "St. Kliment Ohridski"	21 359	7 465	35.00%	State
3	University of Economics – Varna	6 231	5 757	92.40%	State
4	Plovdiv university "Paisii Hilendarski"	17 707	4 935	27.90%	State
5	Varna Free University	8 590	4 486	52.22%	Private
6	New Bulgarian University	9488	4 046	42.64%	Private
7	D. A. Tsenov Academy of Economics	3 815	3 815	100.00%	State
8	Univerisy of Agrobusiness and Rural Development	3 655	3 655	100.00%	Private
9	St. Cyril and St. Methodius University of Veliko Turnovo	10 184	3 405	33.43%	State
10	South-West University "Neofit Rilski"	8 756	3 280	37.50%	State
11	VUZF University	1 583	1 583	100.00%	Private

№	Name of the HEI	Number of students 2021/2022	Number of students in area 3.	Share of students in area 3.	Funding / Resources
12	International Business School	1 280	1 280	100.00%	Private
13	Burgas Free University	2 445	1 246	50.96%	Private
14	University of Library Studies and Information Technologies Sofia	3 789	1 156	30.51%	State
15	University of Ruse	6 204	939	15.14%	State
16	University "Prof. Dr. Assen Zlatarov" Burgas	3669	934	25.50%	State
17	MT&M College	764	764	100%	Private
18	Agriculture University Plovdiv	3 256	753	23.21%	State
19	Trakia University	7 539	714	9.47%	State
20	American University in Bulgaria	1 186	528	44.52%	Private
21	University of Security and Economics – Plovdiv	1 794	521	29.04%	Private
22	College of Tourism – Blagoevgrad	493	493	100%	Private
23	Technical University of Gabrovo	3 497	478	13.7%	State
24	Shumen University	6 296	469	7.45%	State
25	University of Food Technologies – Plovdiv	3 914	462	11.80%	State
26	UTP	1885	394	20.9%	State
27	Varna University of Management	429	385	89.74%	Private
28	Todor Kableshkov University of Transport	1 506	241	16.00%	State
29	Technical University of Sofia	10 538	232	2.20%	State
30	Technical University of Varna	5 091	224	4.40%	State
31	"Vasil Levski" National Military University	2 175	198	9.10%	State
32	MOI Academy	1 623	149	9.18%	State
33	University of Forestry	2 851	148	5.19%	State
34	Rakovski National Defence College	1 484	128	8.63%	State
35	Medical University – Varna "Prof. Dr. Paraskev Stoyanov"	6 238	20	0.30%	State
36	University of Chemical Technology and Metallurgy	2 076	17	0.82%	State
37	Medical University - Pleven	3 266	11	0.30%	State
38	Nikola Vaptsarov Naval Academy	3 180	7	0.22%	State
39	University of Mining and Geology "St. Ivan Rilski"	2 917	2	0.07%	State

In order to focus the present research, the following criterion was chosen – the number of students trained in area 3. should be *over 1 000 people.* As a result of the application of the criterion, the investigated universities were reduced to a total of fourteen and are presented in table 2. Of these, eight HEIs are state and six are private. For all the universities included in the sample, a survey was made on their websites which LMS they use. Table 2. lists also the names of the systems and their URLs.

Table 2. HEI in area 3. with over 1 000 students and LMS they use

№	Name of the HEI	Funding / Resources	Name of the used LMS	URL address of the used system
1	University of National and World Economy	State	Moodle	https://m-learning.unwe.bg/ http://moodle.unwe.bg
2	Sofia University "St. Kliment Ohridski"	State	Moodle	http://elearn.uni-sofia.bg
3	University of Economics – Varna	State	Moodle	http://e-learn.ue-varna.bg/
4	Plovdiv university "Paisii Hilendarski"	State	Moodle	https://e-learning.uni-plovdiv.bg/
5	Varna Free University	Private	Moodle	https://do.vfu.bg/
6	New Bulgarian University	Private	Moodle	https://e-edu.nbu.bg/
7	D. A. Tsenov Academy of Economics	State	Moodle	https://dl.uni-svishtov.bg/
8	University of Agrobusiness and Rural Development	Private	Moodle	https://uni.e-uard.bg/ http://www.vuarr-dist.com/index.php/
9	St. Cyril and St. Methodius University of Veliko Turnovo	State	Moodle	https://deo.uni-vt.bg/
10	South-West University "Neofit Rilski"	State	Moodle	http://www.e-learning.swu.bg/
11	VUZF University	Private	Moodle	https://moodle.vuzf.bg/
12	International Business School	Private	Moodle	https://dlc.ibsedu.bg/login/index.php https://students.ibsedu.bg/
13	Burgas Free University	Private	Moodle	https://moodle.bfu.bg/
14	University of Library Studies and Information Technologies Sofia	State	System "Integrated Learning Information Arbeit System" (ILIAS)	https://e-learn.unibit.bg/

The analysis of the data in Table 2. shows the following: ***92.30% of the surveyed universities use the LMS Moodle***. Only one university (with a share of only 7.1%) has focused on using another platform (ILIAS). This high relative share testifies to the leading positions that the Moodle e-learning platform has in Bulgaria among HEIs teaching in area 3. This gives us a serious reason, based on a study of the practice of UE–Varna in the use of Moodle tools, to make summaries that can be taken as a starting point for analyzing the practices of HEI's in Bulgaria.

In order to answer the research questions, the results of the annual surveys of lecturers' opinions about the organization of distance learning and improvement of the quality of the offered educational service, conducted jointly by the Center for Electronic and Distance Learning and the Center for Quality of Learning at UE – Varna. A three-year period has been selected, covering the academic years before and during the COVID-19 pandemic: 2018/2019, 2019/2020 and 2020/2021. The surveys were conducted through the UE–Varna online survey system. The invitation to participate has been sent to all lecturers participating in distance education at the university. Table 3. presents the exact periods in which the data were collected, the number of teachers to whom an invitation to participate was sent, and the number of teachers who took part in the survey.

Table 3. Survey data by academic year

Indicator	2018/2019	2019/2020	2020/2021
Conducting period	01.07.2019 – 28.07.2019	07.07.2020 – 02.08.2020	13.07.2021 – 08.08.2021
Number of surveys sent	107	83	118
Number of respondents	52	42	54
Share of respondents	48.60%	50.60%	45.76%

The method of forming the sample is according to those who responded, and the proportion of participants ranges between 46% (2020/2021) and 51% (2019/2020). The survey includes questions divided into 5 sections. A series of questions refer to each teacher's assessment of the degree of use of the e-learning platform tools, with a total of 26 tools described. Over the three academic years, there was some variation in the tools included in the surveys, with their number being 23 per year. For each tool, teachers can indicate to what extent they use it and the possible answers are the following: „I use it in all my disciplines", „I use it in some of my disciplines", „I don't use it, but I might in the future", „I don't use it and I don't intend to", „Not familiar with the tool", „No answer".

A study of the implemented tools in the Moodle platform in the context of distance learning in UE – Varna from the lecturers' perspective

Particularly interesting from a research point of view is the question of which tools in the e-learning platform are used to the greatest extent by lecturers in the process of teaching students. In addition, the changes that have occurred in the scope of the most applied tools of the platform in the conditions of a pandemic situation and an online-based learning process are also of particular interest.

In order to analyze the tools used on the Moodle platform and draw relevant conclusions, Table 4 summarizes the results based on surveys of lecturers' opinions from the three academic years. The table summarizes the data on the tools used

on the electronic platform in education of the distance learning students, with the numbers showing the total share of two of the answers "I use it in all my disciplines" and "I use it in some of my disciplines". The ranking of the tools is based on responses to their use in the first year of the covered period.

In addition, it should be pointed out that during the COVID-19 pandemic situation and teaching in an online-based environment at UE–Varna, for the purposes of synchronous learning of students, the Google Meet video conferencing software is applied. It implements functionality similar to Moodle's open-source web conferencing plugin BigBlueButton (BBB) to support real-time online classrooms.

Table 4. Used Moodle tools by academic year

Tool	2018/2019	2019/2020	2020/2021
Upload Word and PDF files	98.07%	100.00%	100.00%
Assignments	86.54%	92.85%	92.16%
Using chat	84.62%	92.86%	-
Use of electronic tests	78.84%	92.85%	98.04%
URL Module (Hyperlinks)	75.00%	90.47%	96.08%
Upload multimedia presentations	63.47%	78.57%	90.20%
Create a forum	61.54%	76.19%	66.67%
Create a schedule	48.07%	35.71%	21.57%
Ask a general question	44.23%	59.52%	43.14%
Add files in specific formats	38.46%	59.52%	50.98%
Set labels	25.00%	45.24%	31.37%
Create a database	25.00%	30.96%	27.45%
Upload a video lecture / training film	25.00%	38.09%	33.34%
Module "Lesson"	23.08%	35.72%	33.34%
Create a dictionary	23.07%	23.81%	9.80%
Development of surveys	23.07%	33.33%	29.41%
Online blog	21.15%	26.19%	11.76%
Module "Book"	21.15%	21.42%	9.80%
Creating a Wiki	11.54%	4.76%	0.00%
Using an IMS package	11.54%	7.14%	-
Creation of an Internet page	11.54%	19.05%	13.73%
Module "Workshop"	9.62%	9.52%	7.84%
Using a SCORM package	5.77%	4.76%	-
Module Game	-	-	3.92%
H5P interactive content	-	-	1.96%
Gamification QUESTOURnament	-	-	0.00%

Following the research questions posed, it is appropriate to analyze the information in Table 4 in the following aspects:

– Most and least used tools by lecturers during the study period

The five tools most used by teachers in the e-learning platform are the same for all three years of the period, and these are the traditional activities and resources of the platform for student learning, through which materials for (self) preparation are provided and assessment is carried out learners: uploading Word and PDF files, setting assignments, using chat, using e-tests, URL module (hyperlinks). Only one exception should be noted in the last year, when uploading multimedia presentations is included in the group of the most frequently used tools. The reason is objective, since the "Chat" function of the platform was then removed due to the inclusion in the training process of Google meet video conferencing software.

It is noteworthy that the intensity of use of the first five tools in the two last years of the period is different – it significantly increases and reaches over 90% among all respondents, while in the first year only one tool (file upload) is used by over 90% of them. The last year has seen a change in the ranking of the tools compared to the previous two, with the use of e-tests and hyperlinks taking the lead after the File Upload tool. The specified specifics are due to the accumulation of more skills in using the platform's resources and activities because of the continuous work of educators in an online environment caused by the COVID-19 pandemic. Teachers need to be stimulated, including trained, to develop digital educational content and actively apply ICT in the learning process.

The five least used tools in the first two years of the period (although with different ranking) were creating a Wiki, using an IMS standard package, creating a Web page, the Workshop module, using a SCORM package. They are less applicable in teaching students of social sciences, economics, and law. Therefore, a very small proportion of teachers include them in their work. Only the creation of a website has a positive change in the intensity of its use compared to the beginning of the period.

– Dropped and added instruments within the study period

As already stated, although chat is in the top 5 most used tools, in the last year it has been removed as synchronous communication is done through the chat of the video conferencing software. In addition, asynchronous communication takes place through the messaging system of the e-learning platform. The most significant are the changes that occur in the little-used tools. In the third year of the period, two of them were removed (using a package according to the IMS standard and using a SCORM package) and three new ones were added: module Game, H5P interactive content, QUESTOURnament gamification. The new tools are extremely up-to-date and directly related to the new trends in the digitization of the educational process. They are still insufficiently known to teachers, which is why it is necessary to organize trainings for their application.

– Tools that have undergone significant changes in terms of the intensity of their use during the study period

Three categories of tools stand out:

✓ *Tools with a clear trend of increasing their application*. An increasing number of teachers during the analyzed period use uploading of multimedia presentations (42.1% growth compared to the beginning of the period), URL module (28.1% growth), use of electronic tests (24.4% growth), setting assignments (during the last year is 6.5% more compared to the beginning of the period), file uploads (2% growth and reaching 100% usage). The apparently positive trend covers the most frequently used resources and activities for the presentation of digital educational content by educators, which the Moodle platform provides.

✓ *Tools where there are fluctuations in the dynamics of their use, but at the end of the period their application is greater compared to the beginning* (ranking is by growth in use of the tool at the end of the period compared to the beginning): module "Lesson" (up 44.5%), upload a video lecture/tutorial (up 33.4%), add files in specific formats (up 32.6%), develop surveys (up 27.5 %), set label (25% growth), website creation (19% growth), database creation (9.8% growth), forum creation (8.3% growth). The increased interest of teachers in diversifying the forms of digitalization of the learning process and targeting resources and activities that are time-consuming such as preparation and use, but through them the interactivity of the learning process, is striking.

✓ *Tools with a pronounced tendency to decrease in their use*: the application of "Create a schedule" decreased by 55.1% compared to the beginning of the period, there is also a decrease in the module "Workshop" (decrease by 18.5%), and in the tool "Create a Wiki" the decline leads to a lack of application in the last year. The use of other tools such as creating a dictionary (decrease by 57.5% compared to the beginning of the period), module "Book" (decrease by 53.7%), online blog (decrease by 44.4%), setting general question (down 2.5%). It is necessary to track the effectiveness of the use of the indicated tools in the education of students in the field of social, economic, and legal sciences, to direct the attention of educators to them as well or to remove them and replace them with new ones.

Guidelines for Improving LMS Applicability in Learning

Learning management systems and specifically the Moodle platform are very suitable for use in the preparation of students in the field of social, economic, and legal sciences, which is the reason for their wide application in HEIs in Bulgaria. The analyzes made and the answers to the posed research questions provide grounds for formulating the following guidelines for improving their use:

1. Increasing the interactivity of learning to motivate students for more active participation. Lecturers use a wide variety of resources and activities on the Moodle platform in the learning process. The engagement of learners is directly related

to the interactivity of the tools used. The implementation of two-way or multi-way communication during the performance of a task for assessment, holding a discussion (forum), as well as in the process of self-training through the modules "Lesson", "Book", "Workshop", etc. it stimulates students' engagement in solving various problems, develops critical thinking on the questions posed, and teachers get the opportunity to guide and evaluate them at the same time. In this way, a harmonious effect is achieved, which is characteristic of interactive action. It should be emphasized that the interaction requires very good preliminary preparation, because it must be adapted both to the available techniques and technologies, and to the available teaching time. The flexibility of the learning process can be improved by more intensive use of video conferencing software in traditional learning as well. Other authors also appreciate the importance of interactivity in learning and the relationship with student motivation (Skibińska and Kwiatkowska 2019; Gopinathan, S. et al. 2022).

2. Gamification of the learning process and creating more opportunities for students to express themselves. One of the ways to increase students' motivation and engagement is using gamification, providing an opportunity to include game elements in the educational process. The inclusion of game principles is possible both in learning platforms and in entertainment systems (Bankov 2020). Through the games teachers can set various incentives (bonuses) to activate students' work in a competitive environment with their colleagues. Several options are available on the e-learning platform to include games in the courses: "Madhouse", "Snakes and Ladders", "Cryptogram", "Crossword", "Hidden Picture", "Get Rich", "Sudoku" and others. We believe that in this way the effectiveness of the training will be increased, and the achieved results will be improved, which gives us reason to recommend the inclusion of interactive games in the training of students from the field of social, economic, and legal sciences.

3. Encouraging educators to create digital educational content. The digitization of education is related to the investment of serious personal efforts by teachers, which should be rewarded. The possibilities for this are different – financial stimulation, change in the load standards for active use of an e-learning platform, creation of conditions for the development and publication of teaching aids with interactive educational content, etc. The initial resistance of learners and trainers to the digitization of the educational process was completely overcome in the pandemic conditions. Currently, support (including through training) and stimulation by the management of higher schools is needed for more and more active application of ICT in education.

Conclusion

The use of LMS in HEIs is increasingly expanding, and in the context of a pandemic situation, this trend is intensifying. As a result of the research in this

paper, it was established that the Bulgarian educational institutions, oriented to training students in the field of social, economic, and legal sciences, mainly use the Moodle e-learning platform in their education. The study shows that 92.30% of the 14 higher education institutions included in the study with more than 1000 students rely on this platform.

The study of the main tools of the e-learning platform Moodle from lecturers' point of view is based on surveys among distance learning trainers at UE–Varna for three academic years, including a period before and during the pandemic. The study found the following results:

1. There is overlap in the five most used e-platform tools by educators, including traditional student learning activities and resources: file uploads, assignments, chat, e-tests, URL module (hyperlinks). Last year uploading multimedia presentations replaces the chat tool, because the video conferencing tool Google meet is included as the fifth leading tool. During the COVID-19 period their use is markedly increasing. The least used tools are creating a Wiki, using an IMS standard package, creating a Web page, the Workshop module, using a SCORM package.

2. Some tools have been identified that have been removed due to their low use (using a package according to the IMS standard and using a SCORM package), as well as particularly relevant tools such as module Game, H5P interactive content, QUESTOURnament gamification have been included.

3. Tools with a clear tendency to increase in their usability are presented (uploading multimedia presentations, URL module and electronic tests); with other tools, there are fluctuations in their use, but at the end of the period they show a serious growth (e.g. "Lesson" module, uploading a video lecture/educational film, adding files in specific formats, etc.). In the case of a third group of tools, a contraction in their use is noticeable (Creating a timetable, the "Workshop" module, "Creating a Wiki", etc.).

Based on the analyzes made and in response to the research questions, some recommendations are formulated to improve the usability of the LMS: it is necessary to expand the interactivity of the training in order to increase the motivation of the students. as well as to actively include gamification in the learning process so that learners are more engaged in learning. It is recommended that lecturers are encouraged to intensively prepare and upload rich digital educational content to the e-platform so that students can be more fully involved in learning. This is a direction for future research by the authors.

NOTES

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