International Journal of Instruction *October 2023 ● Vol.16, No.4*
e-ISSN: 1308-1470 ● www.e-iji.net *p-ISSN: 1694-609X*
pp. 297-312

Article submission code: 20221026200043
Received: 26/10/2022 Revision: 26/03/2023
Accepted: 19/04/2023 OnlineFirst: 10/07/2023

The Impact of Moodle Learning Analytics on Students' Performance and Motivation

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The central objective of this investigation was to study the issue of objectivity in assessing student performance using Moodle Learning Analytics system. It was decided to interview 532 students and 193 teachers concerning their attitude towards this grading system. This allowed analyzing the satisfaction of students and teachers with Moodle Learning Analytics, the objectivity of the grades given, the levels of students' motivation, students' readiness for self-education, the degree of mastery of theoretical and practical skills in an e-learning mode, as well as general satisfaction with distance learning in Moodle. The findings suggest the necessity to devote more attention to the matter under consideration to elaborate more straightforward assessment criteria, harmonize them among students and teachers, and develop new methods for improving students' abilities related to independent learning.

Keywords: assessment, assessment objectivity, e-exam, exam, moodle learning analytics, students

INTRODUCTION

Academic performance assessment has always been regarded as an important component of the educational process, indirectly reflecting its quality. Nevertheless, the assessment criteria and objectivity continue to be a topic for discussion and research among many scholars aiming to achieve maximum impartiality in judging educational

Citation: Suad, A., Tapalova, O., Berestova, A., & Vlasova, S. (2023). The impact of Moodle learning analytics on students' performance and motivation. *International Journal of Instruction*, *16*(4), 297-312. https://doi.org/10.29333/iji.2023.16418a

achievements (Sae-thung & Boonsuk, 2022). If the assessment is based on a student's hard work and a teacher's pedagogical excellence and proficiency, then, in the end, the learner will surely master the knowledge and corresponding competencies. However, given that educators were faced with the problem of assessing students even in traditional classroom lessons, the new educational paradigm with the predominant use of distance learning strategies raises even more new questions to this process. As such, e-learning is often carried out by means of the Moodle e-learning system, which is quite convenient to use for both students and teachers. Moodle provides for many nuances of the educational process, including the ability to analyze students' responses to determine the grade to give (Brackett et al., 2019). Notwithstanding this, the question arises of how realistically this assessment reflects the mastery of the necessary competencies and whether the grades received during e-learning correspond to those obtained in the class. The Covid-19 pandemic has led to a rapid transition to e-learning mode even in those fields where it has practically never been used before. As a consequence, distance education has acquired both active supporters and conservative opponents, which exacerbated the problem of assessing the quality of knowledge received by students to be able to compare the effectiveness of various training modes (Ramadhani et al., 2019).

However, research indicates that, more often than not, students' prior knowledge and technical skills, particularly their level, significantly impact the effectiveness and ultimate performance in the context of a digital course of study (Yildirim & Gülbahar, 2022). That is, one course of interactive learning is not enough to reorganize the motivational process of a student. After reading the article by Karaoglan Yilmaz and Yilmaz (2021), it was found that the use of Moodle in the context of improving the professional qualities of future professionals is an essential criterion for influencing the motivation to learn.

On the other hand, the use of online media to improve the learning system, although it is an increasing process, is directly dependent on the specifics of the university, the specialty and the methods of application of this tool (Dos Santos, 2023). At the same time, its effectiveness is questioned as opposed to new but expensive programs. This point determined the relevance of this study, the ultimate goal of which was to investigate the issue of objectivity in assessing student success using Moodle Learning Analytics. The study's object was defined as assessing students' performance, and the subject was assessment in Moodle through Learning Analytics tools.

The study objectives were to:

1. analyze the scientific basis for the topic of the study,

2. develop a questionnaire on the impact of Moodle (through learning analytics tools) on the effectiveness of students' academic assessment,

3. conduct online surveys of students and teachers to ensure the objectivity of knowledge assessment during Moodle learning with the help of learning analytics.

The study hypothesis was the assumption that Moodle learning analytics allows for an objective assessment of student performance.

Literature Review

The versatility and multitasking of ensuring the objectivity and uniformity of student assessment have been multiply emphasized by modern researchers. Today these issues are regarded as especially important because of the introduction of a competency-based approach and therefore require more innovative forms of control (Sae-thung & Boonsuk, 2022). The assessment of student performance as a means of measuring knowledge and competencies has significant drawbacks. Among them, first of all, is the inconsistency of the current system of assessment of a set of competencies, for most of which there is still neither clear measurement nor generalization tools. The second significant shortcoming stems from the dependence of the assessment on the personality of the teacher. Hence, an insufficiently responsible, poorly trained educator is likely to over- or undergrade students. The indicator of student performance not only reflects the process of mastering knowledge but is also considered a criterion describing the effectiveness of the educational institution's activities, especially in modern conditions of tough education market competition (Farhan, 2016). Moreover, it is interpreted differently at various levels: at the level of a student - as a form of personality self-realization; at the level of the department, dean's office, and the university as a whole - as a tool for attestation of a student at all study stages and before graduation; at the employer's level - as a measure of mastered knowledge by a university graduate; and at the ministry level - as a form of monitoring of the work of the educational institution and a means of deciding on the effectiveness of its activities (Brackett et al., 2019). Among the central factors affecting student performance, researchers name basic assessment of freshmen knowledge, attendance accounting, academic performance accounting, availability of interactive forms of learning, provision with educational and methodological literature, availability of personal tuition sessions, exactingness and highly developed lecturing skills of the faculty, and rendering scientific research into academic studies. In addition, scholars note the importance of conducting regular sociological surveys, which would allow determining the degree of coincidence of the official goals of the educational institution and personal goals of a student, student's ability to learn, moral and psychological climate in the study group, factors stimulating knowledge assimilation, aspects hindering the learning process, and the overall student motivation in academic and scientific work. As can be seen, most of the above factors are applicable, first of all, to traditional education modes, and they can be used in relation to e-learning only after significant adjustments. In the meantime, the format of a sociological survey may well be applied in the context of e-learning and cause a favorable effect on the educational process organization (Krishan & Al-rsa'i, 2023).

The modern learning environment is often characterized as intelligent, mobile, and sensor-based technology equipped (Kanagarajan & Ramakrishnan, 2018). The awareness of the learning context and related issues contributes to the expansion of resources and opportunities for e-education (Morland et al., 2019). At the same time, the progress of students may be affected by multiple elements of varying nature, which makes this topic one of the most popular and, simultaneously, challenging to address. Modeling and predicting student performance in an e-learning environment has become an important task for modern educators (Khan & Ghosh, 2021). Today, digital

technologies in the educational process are successfully used to support and promote ipsative assessment and provide feedback that encourages students to think about the links between grades and real achievements (Labovitz & Hubbard, 2020). In this respect, researchers often view digital assessment histories within the framework of the student analytics, setting the core emphasis on the assessment justness and monitoring (Järvelä et al., 2021). The shared advantage of all e-learning systems is their increased interactivity and engagement. Moodle, in turn, additionally affords the ability to predict student academic performance (Bravo-Agapito et al., 2021), analyze the characteristics of a student's educational activities, determine the level of development of his/her convergent and divergent thinking as important skills for the formation of critical thinking, and finding the best ways to solve training-related problems. Being an advanced learning management system (LMS), Moodle is able to monitor and record the events generated by students, thereby allowing teachers to optimize the educational process and adjust current teaching methods to students' needs and interests (Shettar et al., 2020). The capabilities of Moodle as a standard LMS have made it possible to create numerous plugins capable, for instance, of analyzing forums in which students participate and providing educators with useful information. Thus, thanks to the Moodle-based analysis of social networks, teachers can improve the educational process and then yield better learning outcomes (Gamage et al., 2022). Encouraging students to take more online lessons, including quizzes, has been proved to raise learning achievements and lead to higher grades. Researchers report on a clear link between course learning objectives and student learning performance established by using a unique text analytics procedure (Tseng et al., 2019). Besides, there is also a shred of evidence that a thorough analysis of online student activity and key learning factors allows forecasting academic performance and identifying predictors of higher grades.

As such, Moodle provides learners with the possibility of using various plugins, which, among many other things, enable self-assessment of knowledge level dynamics. This fact undoubtedly characterizes it as a flexible, scalable, and user-friendly tool able to offer students individual training paths (Zabolotskikh et al., 2021). Moodle enables the creation, distribution, tracking, and management of various types of learning materials. The major technological enhancements transformed this LMS into powerful software for both delivering content-rich curricula and educational results assessment (Mershad et al., 2019). Moodle Learning Analytics represent an emerging field using sophisticated analytic instruments to improve learning and education that is closely tied to a series of other areas of study like business intelligence, educational data mining, as well as web, academic, and action analytics (Bharara et al., 2018). Learning Analytics demonstrates the capability to achieve learning outcomes as it analyzes a variety of virtual learning tools allowing students to display creativity and innovation as efficiently as during in-class training (Saleeb, 2021).

Recent higher education reforms have forced numerous universities to enter the global market, which has actualized the matter of competitiveness and quality of educational services provided (Farhan, 2016). However, there is an opinion that the current bases for perceiving the education quality, such as addressing learners' expectations and needs, meeting established standards, and education cost estimation, are in disagreement with

the principal aims and measures of quality in higher education. Even if objective, education quality assessment reveals only the quality of training. Students' experience cannot be measured by student evaluation alone because it is felt much later in life. Therefore, among the central tasks of modern universities in the context of ensuring the quality of the educational process should be the promotion of lifelong learning and building long-term relationships with alumni and employers (Calma & Dickson-Deane, 2020). Against this background, the need for competition is becoming a normal practice in academic institutions (Farhan, 2016).

The e-learning principles promoted by the Covid-19 pandemic have now become one of the foundational pillars of the education process, allowing students to acquire sound knowledge. As such, e-learning has taken the role of a facilitator of developing new (adapted) training methods, the most prominent of which is the online-based examination (or e-examination) – a novel approach designed to solve traditional examination issues using specially developed software (Ahmed et al., 2021). On the other hand, despite all its presumptive benefits, the introduction of e-exams also faces several challenges, such as authentication of the examinee and submitted works. In view of this, the necessity of evaluating students' knowledge by means of intensive and continuous assessment, including e-examination supported by authentication methods, acquires particular significance as it is expected to help detect, reduce, or even prevent student violations. From this standpoint, the tools of the Moodle LMS seem the most preferred to be introduced (Ahmed et al., 2021).

Intrinsically, distance forms of education have been widely applied for studying languages or preparing professionals in a number of technical or managerial specialties. As concerns medical students, although the development of online technologies was carried out earlier, their implementation became widespread only after the Covid-19 outbreak, thereby rising a rather trying problem of practical training in a remote format (Barteit et al., 2020). Traditionally, medical students acquired professional competencies and experience in direct contact with the patient, and the main diagnostic method was a clinical examination. Whether it is possible to acquire these skills remotely and examine a patient online is now a question for both the educational process and the online technologies. The advantage of distance learning lies in the ability to study anytime, anywhere, and at the pace selected by students themselves. However, here, the problem of providing the level of knowledge and competencies corresponding to traditional learning becomes especially acute (Milićević et al., 2021). In this context, there was revolutionary destruction of the prevailing stereotypes as the world academic community presented reasoned evidence of the effectiveness of Moodle for both theoretical and practical training of medical students. Thus, the examination of the impact of an e-learning course conducted on the Moodle platform on the accuracy and effectiveness of treatment of lesions of the oral mucosa showed its exceptional usefulness (Braun et al., 2020). Apart from this, Moodle was defined as a suitable means for distance medical learning as its online courses for practical preparation of nurses, physiotherapists, and radiologists were proved to improve the available curriculum (Degorio, 2022). In a similar vein, improvement of distance learning courses was confirmed to result in better medical professionalism, skills, and the quality of care

provided to patients in the public health system, including but not limited to pediatric practice (Bavaresco et al., 2019). On the other hand, even though most medical students who completed online training prior to the pandemic were satisfied with their online experience, the inability to have clinical access was defined as a major obstacle when using such e-learning methods. Therefore, a blended learning format with the creation of a well-established infrastructure for e-education was determined as the most advantageous (Sindiani et al., 2020). In any case, positive student feedback encourages to continue the development of e-education from the perspective of preparing experts in medicine and psychology (teaching clinical and special psychology) as an attractive educational option (Sindiani et al., 2020). In this regard, it can be said that an LMS focused on blended learning can effectively support e-learning environments in universities (Mohd Nasir et al., 2021). In addition, the use of virtual simulators can be a decisive argument in favor of online technologies for teaching medical specialties and developing not only theoretical knowledge but also practical skills (Dammerer et al., 2018).

The optimal use of various technological advances in the transformational movement from traditional learning to innovative e-education determines the enormous potential of Moodle (Kant et al., 2021). E-exams held on this platform using the Respondus Lockdown Browser are already successfully introduced in the daily practice at Al Ain University (UAE) and Abai University (Kazakhstan), thereby ensuring high impartiality and objectivity of assessment. The use of Learning Analytics helps Moodle users improve learning outcomes and predict future success based on past activity. Optimization of the educational process when using Learning Analytics is carried out through the measurement, collection, and analysis of various data, such as statistics of cognitive and social interaction (what content the student viewed, submitted, or edited, in what events participated, etc.). Prediction and analysis can be applied selectively, i.e., not to the entire site but to specific courses, categories, and teachers. Thus, Moodle undoubtedly represents a significant contribution to the educational community as it provides an evolving platform for virtual learning management that became the standard for most universities around the world (Campo et al., 2021).

METHOD

Sample

To study the objectivity of student assessment by means of Moodle Learning Analytics, the study authors compiled a special questionnaire, with the help of which 532 students and 193 teachers selected randomly were interviewed concerning their attitude to this grading system. Among the entire research population, 185 students and 83 teachers enrolled were from I.M. Sechenov First Moscow State Medical University, 197 students and 65 teachers were from Moscow Aviation Institute, and 150 students and 45 faculty members were from Abai University.

Study case

In total, 725 online questionnaires were received. Student and teacher satisfaction with the Learning Analytics system was analyzed according to the following criteria:

- Totally satisfied;
- Mostly satisfied;
- Neutral attitude;
- Unsatisfied;
- Totally unsatisfied.

The analysis of the objectivity of the given assessments was also carried out according to specific criteria. They were as follows:

- Entirely objective;
- Mostly objective;
- Difficult to answer;
- Mostly subjective;
- Entirely biased.

Apart from this, the developed questionnaire also comprised questions about the level of students' motivation (High, Moderate, Low), their readiness for independent work (High, Moderate, Low), as well as the degree of mastery of theoretical knowledge and practical skills in e-learning (High, Sufficient, Moderate, Low).

Research design

1. Determining the research topic and justifying its relevance;
2. Formulating the research object, subject, goal, objectives, and hypothesis;
3. Conducting an analytical review of the literature on the topic;
4. Drawing up a questionnaire and forming a sample of respondents (students and teachers) by means of randomization;
5. Questioning respondents and processing the results;
6. Making inferences, providing practical recommendations, and determining prospects for further investigation.

Ethical issues were addressed by anonymizing the online survey and ensuring that the involvement did not affect the respondents' interpersonal relationships and work/study conditions. The gender, age, and ethnicity of the study participants were not considered.

Research limitations, for the most part, are related to the number of included educational institutions. Although they differ in profile (medicine, foreign languages, clinical and special psychology), this sample cannot reflect the entire spectrum of

specialties for which online training and assessment are carried out these days. Therefore, it seems reasonable to consider this study as a pilot in this direction and assume that it should be continued in other universities and with representatives of other specialties.

Separate notice should be made of the fact that this research was given no support or funding, and no conflicts of interest were observed during the work.

FINDINGS AND DISCUSSION

The development of the global educational space and the active introduction of distance learning highlight the problem of unification and objectification of the process of assessing students' knowledge. In this regard, the experience of many universities worldwide (in particular, Al Ain University (2021), confirmed by a number of scientific studies (Ahmed et al., 2021; Bharara et al., 2018; Mershad et al., 2019) allows talking about the advantage of e-exams, the international standard for assessing which is Moodle Learning Analytics (Campo et al., 2021). The process of introducing an e-assessment system depends not only on the technical component but also on a number of other factors, including universities' educational traditions, national education system's policy, and the subjective perception of users. Thus, investigating the peculiarities of using Learning Analytics is particularly interesting in determining other vectors of this technology development. In addition, the comparative aspect of the experience of various educational institutions and the specifics of using Learning Analytics for specialties in technical and humanitarian areas is also of particular significance. This will be especially useful in the aspect of training in those professions where the practical component of preparation based on direct communication dominates (for example, in medical and psychological faculties). The authors decided to outline preliminary guidelines in the field. The present paper provides the results of a pilot study using a specially designed questionnaire, which attempted to make allowance for the key issues of e-assessment. Table 1 below presents the summary results of this survey.

As can be seen from this table, even though the majority of both students (68.4%) and teachers (81.1%) positively assess their experience in Moodle-based learning and using Learning Analytics, their estimates do not match if turning to details. Students tend to judge their level of motivation significantly higher than educators. Thus, only 24.3% of teachers consider the motivation of students in e-learning to be high (the prevailing share of them (61.5%) identified it as moderate), whereas the surveyed learners, on the contrary, declare it to be so in as much as 40.8% of cases. Even though students were more loyal in assessing their readiness for independent work, in general, representatives of both groups of respondents were unanimous that this indicator is insufficient, and only about a quarter of learners demonstrate a high ability to be engaged in self-study. At the same time, while students predominantly rate their ability for self-directed learning as moderate, teachers give preference to a low level. This issue can be deemed an indicator of the mismatch of assessment criteria between students and teachers, and therefore become a topic for further discussion and research to develop clear assessment parameters, harmonize them among students and teachers, and elaborate methods for improving learners' self-study skills.

As concerns online-based theoretical training, it is regarded as sufficient by 44.3% of students and 34.5% of teachers, whereas about a third of respondents (34.0% of students and 29.1% of teachers) note its high level. Practical online preparation is assessed as sufficient by only 17.5% of learners and 11.5% of educators, while about half of the surveyed in both study groups consider mastering practical skills in an online format moderate. While only 2.8% of respondents on the part of students and 4.8% on the part of teachers deem the level of theory assimilation in e-learning to be low, the proportion of those saying that mastering practical skills is insufficient is much larger (18.4% and 29.1% of students and teachers, respectively). Provided the meaningfulness of these results, the point of practical training in an online mode requires more in-depth study.

Table 1
Results of surveying students (A) and teachers (B) on e-learning (Moodle) and e-assessment (Learning Analytics) issues

Question	Response options	A		B		Student's	*p*
		n	%	*N*	%	*t*	
Level of students' motivation in e-learning	High	115	40.8	36	24.3	116.67	<0.05
	Moderate	124	44.0	91	61.5	123.71	<0.05
	Low	43	15.2	21	14.2	7.07	<0.05
Students' readiness for independent work in e-learning	High	72	25.5	32	21.6	27.58	<0.05
	Moderate	145	51.4	54	34.5	119.50	<0.05
	Low	65	23.1	62	41.9	132.94	<0.05
Level of mastery of theoretical knowledge in e-learning	High	96	34.0	43	29.1	34.65	<0.05
	Sufficient	125	44.3	76	51.4	50.20	<0.05
	Moderate	53	18.9	22	14.9	28.28	<0.05
	Low	8	2.8	7	4.7	13.44	<0.05
Level of mastery of practical skills in e-learning	High	16	5.7	8	5.4	2.12	<0.05
	Sufficient	49	17.4	17	11.5	41.72	<0.05
	Moderate	165	58.5	80	54.1	31.11	<0.05
	Low	52	18.4	43	29.1	75.66	<0.05
Attitude towards grading using Moodle Learning Analytics system	Entirely objective	97	34.4	54	36.4	55.86	<0.05
	Mostly objective	110	39.0	86	58.1	135.06	<0.05
	Difficult to answer	68	24.1	8	5.4	132.23	<0.05
	Mostly subjective	5	1.8	0	0	12.73	<0.05
	Entirely biased	2	7.1	0	0	50.20	<0.05
Satisfaction with the Learning Analytics grading system	Totally satisfied	85	30.1	32	21.6	60.10	<0.05
	Mostly satisfied	102	36.2	84	56.8	145.66	<0.05
	Neutral attitude	91	32.3	25	16.9	108.89	<0.05
	Unsatisfied	3	10.6	6	4.1	45.96	<0.05
	Totally unsatisfied	1	0.4	1	0.7	2.12	<0.05
Overall satisfaction with the Moodle platform	Totally satisfied	83	29.4	34	23.0	45.25	<0.05
	Mostly satisfied	110	39.0	86	58.1	135.06	<0.05
	Neutral attitude	89	31.6	21	14.2	123.04	<0.05
	Unsatisfied	2	0.7	5	3.4	19.09	<0.05
	Totally unsatisfied	2	0.7	2	1.4	4.95	<0.05
Total		282	100	148	100		

This would help improve practical e-learning curricula and stimulate more close consideration of the issue of blended learning in a number of specialties, primarily medical (Sindiani et al., 2020), especially giving that a certain positive experience has already been gained (Bavaresco et al., 2019). Knowledge assessment using Moodle Learning Analytics is likely to be perceived by students with a far larger portion of skepticism than from teachers. It should be noted that educators are actually unanimous in positive reviews and judge the assessment of knowledge in Learning Analytics to be entirely (36.5%) or mostly (58.1%) objective, with no adverse reactions. On the contrary, students' opinions were rather polarized: 73.4% of them regard the assessment to be entirely or mostly objective, 24.1% find it challenging to make an unambiguous judgment, and 2.5% express deep distrust of this assessment system, believing it to be mostly or entirely biased. What is more, 11.0% of surveyed students express dissatisfaction with the use of Learning Analytics as a knowledge assessment system, which can be explained by their prejudiced attitude associated with a negative experience of receiving bad grades. Overall, 78.4% of educators and 66.3% of learners enrolled are satisfied with Moodle's assessment procedure facilitated by Learning Analytics, while 94.5% of teachers and only 73.4% of students claim it to be objective, 24.1% of students express doubts about this, and 7.1% consider it to be entirely biased. That is, whereas teachers are more inclined to regard the e-assessment system positively, rarely noting its shortcomings, a fairly meaningful number of students voice doubts and dissatisfaction with this e-assessment method. This aspect revealed the problem of introducing Learning Analytics from a somewhat unexpected side since such information was not identified in the reviewed scientific literature. At first, we were prone to explain this dissatisfaction with personal disappointment with the received grades. However, its closer study allowed the assumption that it is due to the psychological and psychophysiological component of the procedure for conducting an e-exam, its time regulation requirements, the prohibition of moving around the room during the exam procedure, and the need for the prolonged focus on the computer screen. Many students find these conditions difficult to fulfill because of the individual characteristics of their nervous systems' responses to such stressful factors, which are likely to become distress provocateurs. On the other hand, Egorov et al. (2021) argued that most of the programs that are now actively used in Europe and Asia to analyze the success of students are more innovative and effective (Atchia & Chinapah, 2023).

The obtained results provide substantial room for discussion on the dialectic nature of the subjective assessment factor because the direct student-teacher contact does not always imply the latter's bias. On the contrary, an experienced and competent teacher always pays due regard to a student's psychological experience of taking exams and can provide moral support, ask a leading question, and give additional time to think about the answer. The electronic system, in turn, fails to grant such opportunities as far as the examination is conducted at an intensive pace with maximal and long-term stress, which may cause the disruption of adaptation processes and lead not only to an unsatisfactory assessment of a student's knowledge but also to the subsequent violation of their physical and psychological health.

The present research did not aim to study the psychological aspects of the procedure for conducting an e-examination. This problem has blown up from the analysis of respondents' answers to the question on the satisfaction with the assessment procedure. Though, it is believed to be highly critical in the current context since the general psychological/psychophysiological component can dramatically affect knowledge demonstration and, consequently, the final grade. Some researchers point out that the program's technology has become obsolete compared to artificial intelligence in education or virtual reality technologies (Quynh & Phuong, 2021). Therefore, it seems logical to continue research on factorial analysis of e-assessment components, including not only the subjectivity/objectivity but also psychophysiological and psychological characteristics of students during the exam. This could be a promising direction for further research due to the possibility of improving the e-assessment system and making the benefits of using Moodle Learning Analytics even more significant.

Tellingly, the academic world unanimously and categorically agrees that the e-exam does allow successful resolving of objectivity-related issues in assessing students' knowledge if specially developed software is provided (Ahmed et al., 2021; Bravo-Agapito et al., 2021; Mershad et al., 2019). By comparing the experience of the practical application of Moodle Learning Analytics in various educational institutions, particularly, Al Ain University (2021), one can become convinced of the rigor and impartiality of this system, which, however, does not hinder its successful application in many universities around the globe due to useful features and capabilities (Ahmed et al., 2021; Campo et al., 2021). The thorough analysis of scientific literature showed that Learning Analytics and other e-assessment systems are considered mainly from the technical side and the perspective of eliminating the subjective component of the knowledge assessment process, while the psychological aspect of e-exams is not taken into account by any of the authors.

CONCLUSIONS

Ensuring objectivity, uniformity, and independence of student assessment is relevant today due to the widespread introduction of the competency-based approach and distance learning. As the most complex and constantly developing analytical tool for these purposes, Moodle Learning Analytics remains highly popular among educational institutions. However, as follows from the results of the conducted examination, despite the overall positive assessment of experience with Moodle and Learning Analytics, in detail, students' and teachers' points of view do not coincide. It was found that learners tend to rate their level of motivation and readiness for independent work significantly higher than educators. Only about a quarter of the surveyed students demonstrate a high ability for self-learning, while teachers insist on a low level of this indicator. This issue can be regarded as a sign of the mismatch of assessment criteria between learners and educators, and therefore become a topic for further examination to make them clearer, harmonize them among students and teachers, and develop new methods for improving self-education skills.

In parallel, a significant share of enrolled students and teachers appeared to be quite satisfied with the level of theoretical preparation that the e-learning provides, whereas

practical online training was assessed as sufficient only by 17.5% and 11.5% of students and teachers, respectively. Considering that this result is rather high, there is a necessity to study practical training in an online mode more profoundly to improve practical e-learning curricula and encourage more close attention paid to blended forms of education in a number of specialties (and medical as well). On the whole, the higher students' skepticism about knowledge testing using Moodle Learning Analytics can be explained by their biased attitude associated with a negative experience of getting poor grades.

The research allowed the inference that Learning Analytics and other e-assessment systems are largely considered from the technical perspective. Whereas the psychological angle of e-examination is rarely considered, it can affect the testing success significantly. Accordingly, it seems reasonable to further investigate e-assessment components by using factorial analysis with reference to both the subjectivity/objectivity elements and psychophysiological characteristics. This could have important implications for further research and therefore is expected to improve the e-assessment system and become a new advantage of using Moodle Learning Analytics.

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CONFLICT OF INTERESTS

This research has no conflict of interests.

DATA AVAILABILITY

Data will be available on request.

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