Optimizing Student Learning Outcomes in Higher Education: The Efficacy of Learning Management Systems (LMS)

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Abstract:

Technological developments have impacted all sectors, including the education sector. This requires the education sector, especially the learning sector, to be innovative. Be innovative in implementing learning, one of them is using e-learning such as Learning Management Systems (LMS) and others. This research aims to determine the effectiveness of using LMS in the lectures of Teacher Professional Education (PPG) students. This research is experimental research, with a sample of PPG students. Data analysis using N-Gain and t-test. Based on the research results, it was found that student learning outcomes had increased. As many as 77.8% of students' learning outcomes were of medium criteria, and 22.2% were high. Based on the t-test results, using LMS media can effectively achieve learning outcomes in PPG student learning evaluations. This research for Islamic education management implies that it can be a reference for future researchers to study the use of LMS in distance learning in Islamic educational institutions more profoundly and comprehensively.

Keywords: *Learning Management System, Learning Outcomes, Distance Learning*

Abstrak:

Perkembangan teknologi telah berdampak pada semua sektor tidak terkecuali pada sektor pendidikan. Hal ini menuntut sektor pendidikan terkhusus pada sektor pembelajaran untuk berinovatif. Berinovatif dalam melaksanakan pembelajaran dan salah satunya dengan menggunakan e-learning seperti Learning Management System (LMS) dan lain-lain. Penelitian ini bertujuan untuk mengetahui keefektifan penggunaan LMS pada perkuliahan mahasiswa Pendidikan Profesi Guru (PPG). Penelitian ini adalah penelitian eksperimen, dengan sampel mahasiswa PPG. Analisis data menggunakan N-Gain dan uji-t. Berdasarkan hasil penelitian, diperoleh hasil belajar mahasiswa mengalami peningkatan. Sebanyak 77.8% mahasiswa hasil belajarnya berkriteria sedang dan 22.2% tinggi. Berdasarkan hasil uji-t dapat disimpulkan, penggunaan media LMS mampu mengefektifkan pencapaian hasil belajar evaluasi pembelajaran mahasiswa PPG. Implikasi dari penelitian ini terhadap manajemen pendidikan Islam adalah dapat menjadi rujukan bagi peneliti selanjutnya untuk lebih dalam dan komprehensif dalam mengkaji penggunaan LMS pada pembelajaran jarak jauh di lembaga pendidikan Islam.

Kata Kunci: *Learning Management System, Hasil Belajar, Pembelajaran Jarak Jauh*

INTRODUCTION

The success of learning is largely determined by how the teacher manages the learning that is carried out. One of them is that teachers are able to use learning methods and media well. This is in accordance with what was conveyed by (Arsyad, 2010), that the use of learning methods and media properly and correctly can lead teachers to achieve learning objectives. Learning methods and media are interrelated in learning, because the determination or use of learning methods in learning can influence the use of media that will be used/used even though there are several other aspects that must be considered as well such as material characteristics, student characteristics and learning objectives and others. Nevertheless, one of the most important functions of the media is as a tool in the learning process that is able to influence the learning situation and conditions created by the teacher.

Hamalik argues that learning carried out using learning media can generate new motivation and interest in learning for students, even affecting students' psychology (Arsyad, 2010). In line with what Hamalik said in Arsyad, the use of learning media can improve students' understanding of concepts (Isnaniah & Imamuddin, 2020). For this reason, the use of learning media in the learning process is very important in assisting teachers in achieving the learning objectives that have been designed.

Along with the times, learning media continues to develop rapidly as if it does not want to be left behind with the development of an increasingly modern and complex era. According to Thomson, in this modern era with the sophistication of technology, learning can be carried out without having to meet directly (face to face) between teachers and students, meetings between teachers and students can be carried out using E-learning intermediaries (Sundayana, 2014). E-learning is learning by utilizing electronic circuits or devices (Internet or LAN) to deliver materials or other instructions (Berga et al., 2021) . E- learning has structure, application, system, and content (Putra et al., 2020). Content components and teaching materials contained in E-learning can be in the form of "tek" that can be delivered in the form of storage on the Learning Management System (LMS).

LMS is a learning management which functions as an introduction/provider of content or material or assignments for students, assessing student performance, storing student data, recapitulating all student activities and maximizing learning that occurs (Yasar & Adiguzel, 2010). This makes it easier for educators to manage and evaluate students. The utilization of LMS in learning has been widely used in supporting or used in distance learning which does not allow teachers/lecturers to collaborate face-to-face in a place or room with students. This is partly due to the distance that separates the lecturer from the students, so that one of the options is to use the LMS so that the implementation of learning/lectures continues.

The use of LMS media in managing Islamic education specifically in learning/lecturing has been widely implemented and even conducted research. Such as research conducted by Sudiana (2016); Ni'am, Wibawa, and Endah (2013), which concluded that the use of LMS in learning facilitates the process. LMS helps and simplifies learning assessment (Ademi & Loshkovska, 2020; Poon et al., 2017; Sholeh et al., 2023). Rakhmawati et al. (2021), learning by using LMS media in accordance with the learning stages. The use of LMS can increase learning independence (Cenka et al., 2022; Yatigammana & Wijayarathna, 2021; Maulidditya, Sudiana, and Pamungkas, 2020; Binyamin et al., 2017). Learning using LMS media can increase the average final grade (Jingga, Suteja, and Ayub 2021), effectively used in distance learning (online) (Rosita & Fatmasari, 2023; Astriani and Ismah 2023; Fitriani 2020), and effectively and efficiently used in supporting PBM (Hidayati et al., 2023; Bradley et al., 2021;Aldiab et al., 2019; Munir, 2010).

Managing Islamic education in the form of utilizing LMS in learning is also carried out by lecturers of UIN Sjech M. Djamil Djambek Bukittinggi. Learning by utilizing this LMS is used in the context of implementing lectures for Teacher Professional Education (PPG) students in position. One of them is implemented in the lecture of PPG PAI students for Elementary Schools (SD). PPG PAI Elementary students come from various regions, such as Java, Sulawesi, Kalimantan, and Sumatra. In order for the lectures to be carried out, LMS media is used as a medium in maximizing lecture activities. The use of LMS also aims to provide excellent service to students. Excellent service is provided in order to improve the quality of education (Lukman & Vegatama, 2023). This research was conducted in order to analyze the effectiveness of LMS in Learning Activities Evaluation of Islamic education learning. This research is positioned in order to enrich studies related to the use of LMS as a medium in learning.

RESEARCH METHODS

This type of research is experimental research. The population in this study were elementary PAI PPG students. Sampling was carried out by purpose sumpling (sampling with a specific purpose) to PAI SD class A. This purposeful sampling was carried out because PAI SD class A is a local where the person in charge / lecturer in the course of evaluating Islamic education learning in this local is none other than the researcher himself. PPG PAI elementary school students in class A amounted to 18 students. The research design used was a one-group pretest-postest research design as shown in Table 1.

Table 1. One-Group Pretest-Postest Research Design

Class	Pretest	Treatment	Posttest
Eksperimen	T_1	X	T_2

Description:

T1   : Pretest, initial test before using the LMS
X   : Treatment, Learning with the use of LMS
T2   : Posttest, the final test after using the LMS (Suryabrata, 2004).

The instrument used is a test. The test given is a test made by the PPG center team, so in this case the test is no longer tested. Tests are used to collect data related to student learning outcomes using the LMS. The test was given at the beginning of the meeting (Pretest) and at the end of the meeting (Postest). Giving tests at the beginning and at the end aims to determine the improvement/effectiveness of the LMS as a learning media in lectures. To determine the level of effectiveness, the data obtained were then analyzed using N-Gain and t-test. For N-Gain with the formula:

$$N - Gain = \frac{postest\ score - pretest\ score}{maximal\ score - pretest\ score}, \text{(Meltzer, 2002)}.$$

The calculation results of the N-Gain, then interpreted using the N-Gain index as in Table 2.

Table 2. Criteria for N-Gain Index

N-Gain Index	Description
N-Gain ≥ 0.7	High
0.3 ≤ N-Gain < 0.7	Medium
N-Gain < 0.3	Low

Furthermore, if based on the results of the t-test analysis, obtained $t_{count} > t_{tabel}$ then the use of LMS media is said to be effective. This means that the use of LMS media in learning evaluation courses is able to improve the learning outcomes of PPG PAI SD students.

RESULTS AND DISCUSSIONS

Lecture activities carried out using LMS media were carried out 4 times. Before the learning activities begin, students are first asked to work on questions (pretest). After working on the questions, then the learning activities were carried out 4 times, where at the end of the learning activities students were asked to take a formative test. After the learning activities are completed, students then work on the final question (posttest). The results of each activity of students working on formative questions are stored as learning outcome data for each learning activity. The results of students working on formative tests 1 to formative test 4 are shown in Table 3.

Table 3. Result of Students Formative for Each Test (KB)

Aspects	Formative Score for each KB			
	Formative test KB 1	Formative test KB 2	Formative test KB 3	Formative test KB 4
Max score	100	100	100	100
Min score	40	60	50	40
Mean	52.2	96.7	75.9	82.2
SD	15.5	10.3	11.3	20.5

Based on Table 3, the average data of formative test results in each learning activity is good. However, the average formative test activity in KB 1 obtained the

lowest average of While the highest formative test results were obtained in KB 2 with an average of 96.7. In general, the average formative test results of PPG PAI SD students are classified as good. The pre-test and post-test results of PPG PAI elementary school students are presented as in Figure 1.
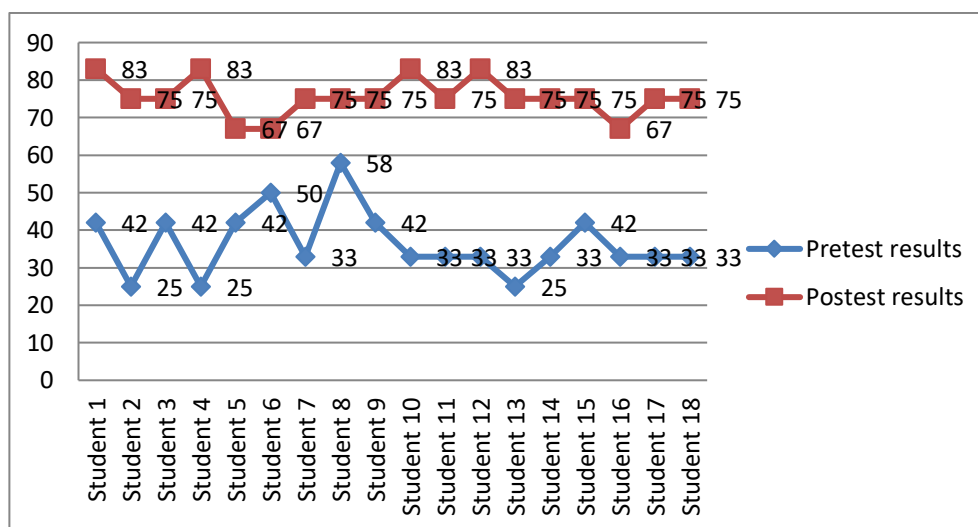

Figure 1. Pre-test and Post-test Results

From Figure 1, it can be seen that the acquisition of student scores when doing the post-test has increased compared to the pre-test results. This indicates that PPG PAI elementary school students are successful in their learning. Based on the pretest and posttest data obtained by students, then based on the results of the analysis based on descriptive statistics, the data obtained are shown in Table 4.

Table 4. Minimum, Maximum, Mean, and Std Deviation Scores

Test	N	Max	Min	Average	Std. Deviation
Pretest	18	58	25	36.5	8.713
Posttest	18	83	67	75.4	5.113

Based on Table 4, it is very clear that the acquisition or average of the posttest has increased significantly compared to the average in the pretest. This shows that PPG PAI SD students experience learning progress. For the results of the N-Gain analysis can be seen in Table 5.

Table 5. Pretest-posttest analysis results

Name	N-Gain	Category	Name	N-Gain	Category
Student 1	0.71	High	**Student 10**	0.75	High
Student 2	0.67	Medium	**Student 11**	0.62	Medium
Student 3	0.56	Medium	**Student 12**	0.75	High
Student 4	0.77	High	**Student 13**	0.67	Medium
Student 5	0.43	Medium	**Student 14**	0.62	Medium
Student 6	0.34	Medium	**Student 15**	0.56	Medium
Student 7	0.62	Medium	**Student 16**	0.50	Medium
Student 8	0.40	Medium	**Student 17**	0.62	Medium
Student 9	0.56	Medium	**Student 18**	0.62	Medium

Based on Table 5, data obtained as many as 77.8% of students achieved improvement with moderate criteria, and 22.2% of students achieved improvement with high criteria. Furthermore, based on the analysis with t-test, obtained t count = 2.45 and t_{table} = 1.73 with df= 0.05, this indicates the results of t_{count} = 2.45 > $t_{table=}$ 1.73. These results conclude that the use of LMS media is able to improve the learning outcomes of PPG PAI SD students.

Information technology is developing rapidly, having an impact on all sectors including the education sector (Izmuddin et al., 2021). Information technology is a means and infrastructure of systems and methods in obtaining, processing, interpreting, sending, organizing, and using data in a comprehensive and meaningful manner. To keep up with the rapid development of information technology, many innovative ideas have been carried out, one of which is in the field of education and learning (Warsita, 2008).

Learning carried out in schools, especially on campuses, has involved / utilized technological media in supporting learning success in order to achieve the learning objectives it has designed. Learning objectives can be achieved well, if the teacher/lecturer designs/draws the lesson plan (RPP/RPS) as well as possible before implementing the learning (Imamuddin 2022; Imamuddin & Isnaniah 2022). One of the learning objectives by utilizing technological media is to help teachers/lecturers and students/students in facilitating the learning process. Learning that involves technological media is often called E-learning. E-learning is learning that is supported by the use of computer/laptop media and network technology (Wahyuningsih & Makmurar, 2017). One of the e-learning that is often used in learning is Learning Management System (LMS).

LMS is a digital application developed with the aim of simplifying the administration and management of learning that is carried out online or e-learning (Lopes, 2014). A web- based system that allows students and lecturers to provide materials, submit and return assignments, provide announcements and allow for two-way and even multi-way communication (Lonn & Teasley, 2009). The use of LMS in learning to develop student learning achievement (Ghavifekr & Rosdy, 2015). The use of LMS in learning provides its own challenges (Rafi et al., 2020). The use of LMS in learning has been widely practiced in universities (Prasetyo et al., 2021). Furthermore, Ramdhan & Siregar (2023) revealed that nearly all participants expressed ease in learning and perceived the modules within LMS as more effective. They also indicated that the materials/modules in LMS aligned well with the needs of TPE participants and found the learning procedures within SPACE easy to follow.

Learning/lectures using LMS as learning media have also been carried out by UIN Bukittinggi lecturers in order to succeed the learning/lecture objectives. The use of LMS in lectures is carried out in distance learning for PPG PAI SD students. The use of LMS in lectures for learning evaluation courses in this study is effective. The use of LMS media is able to improve student learning outcomes, as many as 77.8% of students have medium and 22.2% high learning outcomes. Furthermore, based on the results of the t-test obtained t_{count}= 2.45 > t_{tabel} = 1.73, this indicates the effectiveness of LMS media in lectures. This is in line with the

findings of Jingga, Suteja, and Ayub (2021), that the use of LMS in learning can increase the average final grade. LMS is effectively used in distance learning (Rosita & Fatmasari, 2023; Astriani & Ismah 2023; Fitriani 2020), and is effective and efficient in supporting PBM (Hidayati et al., 2023; Bradley et al., 2021; Aldiab et al., 2019; Munir, 2010).

The results of this study prove that the use of LMS in distance learning contributes significantly to the achievement of learning outcomes by providing a versatile, organized, and interactive platform that supports various instructional approaches and promotes a student-centered learning environment. So far, research and learning related to the use of LMS have only been conducted in universities, whereas primary and secondary schools also need LMS to organize quality distance learning. Quality distance learning using LMS is needed by every educational institution, including Islamic educational institutions. This is none other than to produce quality graduates. The more qualified graduates produced by an educational institution, the more qualified the educational institution is and the more desirable it is to the community.

CONCLUSION

The use of LMS media in learning can be used by lecturers and students in optimizing the learning that is carried out. This study concluded that learning carried out using LMS media was able to improve the learning outcomes of PPG PAI SD students. As many as 77.8% of students have moderate learning outcomes and 22.2% are high. Based on the results of the t-test, it can be concluded that the use of LMS media is able to streamline the achievement of learning outcomes of learning evaluation of PPG PAI elementary school students. Learning Management Systems (LMS) contribute significantly to the accomplishment of learning outcomes by providing a versatile, organized, and interactive platform which supports numerous instructional approaches and promotes a student-centred learning environment. In addition, students also become accustomed and trained in the use of LMS in class.

Based on the conclusions of this study, it is expected that lecturers carry out learning innovatively. Because there is no reason not to carry out learning in any situation and condition that occurs. Because learning can be carried out in various conditions, such as direct/face-to-face learning (offline) or indirect/ face-to-face (online/online). For indirect learning can be done by using e-learning and one of them is by using LMS media.

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