

# THE IMPACT OF MOODLE-BASED LEARNING MANAGEMENT SYSTEMS (LMS) ON LEARNING ACHIEVEMENT IN THE COVID-19 PANDEMIC

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## Abstract

Since the COVID-19 pandemic ravaged the world, tutor-student meetings have been hampered. This issue also contributes to the learning process requiring students' autonomy, which means that it will be difficult to have techniques and the role of technology in the world of education now and in the future. The purpose of this study was to evaluate the findings of a learning evaluation that involved remote learning via e-learning modules and a Moodle-based Learning Management System (LMS). The two-sample dependent t-test was administered to 30 students in class 12 A at PKBM Darul Fiqri, Cimahi City, using the SPSS 22.0 application. The study's findings indicate that this learning module may have an effect on students' overall achievement.

**Keywords:** Learning Management System (LMS), Moodle

## Abstrak

Sejak adanya pandemi COVID-19 yang melanda dunia, maka pertemuan antara tutor dan warga belajar menjadi terhambat. Isu ini juga yang membuat proses pembelajaran menuntut adanya kemandirian para warga belajar, sehingga hal ini juga akan menjadi tantangan masa kini dan tantangan di masa depan untuk memiliki teknik dan mengedepankan peran teknologi dalam dunia pendidikan. Tujuan penelitian ini adalah untuk menganalisis hasil evaluasi warga belajar dalam penggunaan pembelajaran jarak jauh melalui modul pembelajaran e-learning dengan Learning Management System (LMS) berbasis Moodle. Metode penelitian ini adalah kuantitatif melalui Uji T Dua Sampel Dependent dengan menggunakan aplikasi SPSS 22.0 kepada 30 orang warga belajar dari kelas 12 A di PKBM Darul Fiqri Kota Cimahi. Hasil penelitian menunjukkan bahwa pada umumnya modul pembelajaran ini dapat memberikan pengaruh terhadap prestasi warga belajar.

**Kata kunci:** Learning Management System (LMS), Moodle

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## INTRODUCTION

As learning is the primary component of education as an educational interaction between instructors and their surroundings, the teaching and learning processes play a critical role in implementing education (Guo et al., 2019). Education's issues, contemporary features, and projected future challenges need the creation of new roles and purposes. Confronted with current and anticipated future issues in engineering and the role of technology in education (Monteiro et al., 2019).

To succeed in managing and administering a regulated national teaching system, the operational quality of education must be increased in response to dynamic educational changes

and innovations. The achievement of educational quality is dependent upon educators achieving their performance goals, which are reflected in the teaching and learning processes that are based on learning techniques, learning models, and learning innovations (Dewi, 2018). Since the COVID-19 pandemic has hit the world, tutor-student sessions have been impeded. Additionally, this issue necessitates the learning process's independence from the learning community.

Students who participate actively in their learning environment, successfully develop and use their abilities, and have good motivating ideas about their learning abilities can considerably increase the quality of education. Through the use of smartphones, pupils can gain independence. With numerous advanced capabilities available on cellphones, this may motivate users to use them when the learning process is considered to be more beneficial (Huda et al., 2019).

Electronic-based learning (E-learning) is a type of education that makes use of information technology, and it is gaining a growing amount of influence and importance in the world of education. Web-based (website) learning is a form of instruction that makes use of a website that is accessible over the internet (Widarma & Siregar, 2020). The electronic use of cellphones and the use of online media in the learning process is projected to be more beneficial. According to various research, this type of learning can leverage Problem Based Learning (PBL) in conjunction with mobile learning powered by the Moodle LMS (Learning Management System), thereby increasing students' learning freedom (Bunyamin & Syazili, 2019).

Using the Moodle platform, the built learning environment offers students with access to all necessary learning materials, including assignments, self-assessment quizzes, electronic circuits, and communication tools, independent of their location or time zone. Additionally, students have access to tests and feedback messages during the learning process, which increases their engagement and motivation. Tutors in a Moodle system maintain a constant overview of student progress and have access to a variety of tools, including video conferencing for discussions, delivering feedback on homework, accessing statistics, and performing further verification from separate academic groups. The analysis of student evaluation data indicates that the use of distant learning courses can boost the effectiveness of training and foster the development of abilities such as computer-aided design, information technology, and teamwork (Pandiev, 2020).

## **METHOD**

This study makes use of quantitative data. Competency data were gathered through the use of research media, namely by administering a pre- and post-test to ascertain the influence of using Moodle-based e-learning on learning achievement. The data gathering method employs data analysis tools and the SPSS 22.0 application's Two-Sample Dependent T-Test. The data analysis method entails categorizing data by variables and respondents, tabulating data by variables for all respondents, presenting data for each variable analyzed, doing calculations to address the problem formulation, and performing calculations to evaluate the proposed hypothesis. The hypothesis in this study is  $H_0$  that is there is no influence in the use of Moodle on learning achievement and  $H_a$ , namely there is an influence in the use of Moodle on learning achievement. The population of this study is composed of students studying at PKBM Darul Fikri Cimahi City, totaling 30 students in class 12 A.

## RESULTS AND DISCUSSION

### Results

#### *Planning*

At this stage, concepts and tasks associated with the material are implemented, most notably by preparing all teaching materials associated with the learning materials, syllabus, lesson plans, question tables, and question writing grids, as well as by preparing competency test questions for the pre-test and post-test. The following data demonstrates the worth of students studying mathematics for grade 12 A with a total of 30 students before and after using Moodle.

**Table 1.** Pre-test & Post-test Results Data

MATHEMATICS COURSES		
NO RESPONDENTS	SCORE OF <i>PRE-TEST</i>	SCORE OF <i>POST-TEST</i>
1	50	80
2	40	70
3	75	85
4	50	55
5	45	55
6	55	60
7	50	55
8	70	70
9	65	60
10	55	85
11	60	70
12	50	65
13	45	70
14	50	70
15	45	65
16	70	85
17	60	80
18	50	78
19	70	88
20	60	75
21	79	86
22	55	70

MATHEMATICS COURSES		
NO RESPONDENTS	SCORE OF <i>PRE-TEST</i>	SCORE OF <i>POST-TEST</i>
23	60	78
24	80	92
25	85	90
26	30	70
27	55	80
28	65	88
29	70	89
30	60	80
<b>Total</b>	1754	2244
<b>Average</b>	58.47	74.80

Source: Output of SPSS 22

The pre-test and post-testing of 30 pupils revealed an increase in learning achievement from 58.47 to 74.80.

#### *Data analysis*

To begin, conduct a paired t-test using the test results below:

**Table 2.** Normality Test

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre Test	.119	30	.200*	.975	30	.690
Post Test	.133	30	.185	.939	30	.083

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Output of SPSS 22

Based on the output table in the Shapiro-Wilk section for the pre-test value of 0.690 and the post-test value of 0.083, both values are greater than 0.05, it can be concluded that the two values were normally distributed, thus the requirements for the paired t-test were met. After the data analysis was known to be normally distributed, then proceed with the Paired Sample Test with the results in Table 3.

**Table 3.** Paired Sample Test

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre Test	58.47	30	12.684	2.316
	Post Test	74.80	30	11.158	2.037

Source: Output of SPSS 22

In Table 3 it can be seen that the average pre-test is 58.47 and the average post-test is 74.80 because the post-test score > pre-test value, This can be concluded that there is a descriptive difference between the pre-test and post-test in terms of average learning outcomes. Additionally, the results of the paired sample t-test contained in the paired sample correlation output table in Table 3 must be interpreted to determine whether the difference is significant or not.

**Table 4.** Correlation Sample Test

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Pre Test & Post Test	30	.644	.000

Source: Output of SPSS 22

Based on the results in Table 4, it is known that the correlation coefficient value is 0.644 with a sig value of 0.000, As a result, it can be concluded that there is no correlation between the pre- and post-test variables. Based on these findings, the author conducted the paired sample test described in Table 5 below:

**Table 5.** Test Results

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre Test - Post Test	-16.333	10.148	1.853	-20.123	-12.544	-8.815	29	.000

Source: Output of SPSS 22

Based on the data in Table 5, it is known that the value of sig (2-tailed) is  $0.000 < 0.05$ , then  $H_0$  is rejected and  $H_a$  is accepted, so it can be concluded that there is an average difference between pre-test and post-test learning outcomes, meaning that there is an effect of using Learning Management. The Moodle-based system for improving learning outcomes in math class 12 A for students at PKBM Darul Fiqri.

## Discussions

From the entire series of data tests that have been carried out by researchers, there is an increase in learning outcomes. The difference between the mean scores before and after the test shows

this. The hypothesis being tested is  $H_0$ : The learners who use Moodle-based e-learning achieve comparable learning outcomes to those who do not. Students who use Moodle-based e-learning achieve higher results than students who do not. Before conducting the T-test, normality checks were carried out to determine whether the data were normally distributed or not. T-Test Analysis with Two Dependent Sample T, significance level 0.05. Because the data being tested came from the same sample, namely class 12 A, the dependent sample test was used.

According to the researchers' findings, there is a statistically significant difference between the pre-test and post-tests. Where the average post-test score is 74.80, which is higher than the mean pre-test score of 58.47. The correlation coefficient value is 0.644 with a sig value of 0.000, indicating that there is no correlation between the pre-test and post-test variables. Based on the Two-Sample Dependent T-Test, it is known that the value of sig (2-tailed) is 0.000 < 0.05, then  $H_0$  is rejected and  $H_a$  is accepted, so it can be concluded that there is an average difference between the pre-test and post-test learning outcomes, meaning that there is an effect of using Learning Moodle-based Management System for improving learning outcomes in math class 12 A for students at PKBM Darul Fiqri, Cimahi City.

The learning model is the aspiration for a particular method of instruction, complete with its objectives, syntax, environment, and management system. Additionally, this model of learning can be classified according to its learning objectives, syntax (sequence patterns), and learning environment characteristics. A sound learning model serves as a planning guide for classroom instruction or tutorials, assisting instructors in determining the most appropriate learning tools for the instructional materials being taught (Ujulawa et al., 2017). In this case, e-learning is a type of learning model that can be used as a guide for planning and learning.

E-learning is a form of interactive education that utilizes mass media, interpersonal media, and data warehouses. E-learning-based education offers more benefits than simply providing access to and dissemination of high-quality information; it cannot be compared to conventional education. By combining the content contained in web-based information resources, this web-based learning can incorporate additional information. Moodle can be used to create an e-learning environment (Sukma Adelina Ray et al., 2020). Based on the Two-Sample Dependent T-Test, it is known that the value of sig (2-tailed) is 0.000 < 0.05, then  $H_0$  is rejected and  $H_a$  is accepted, so it can be seen that there is an influence between the use of Moodle-based Learning Management System on improving learning outcomes in mathematics for students of grade 12 A at PKBM Darul Fiqri, Cimahi City.

E-learning is a complex process that is based on a particular pedagogical approach to education. A successful e-learning methodology must be based on the following criteria: involving students in the learning process, encouraging self-directed learning, developing student skills, and motivating students (Kucirkova et al., 2017). The process of e-learning is a form of limitless education model. Additionally, the COVID-19 pandemic has increased demand for online training models between tutors and students in the global education market.

Meanwhile, there is potential for e-learning that can be assessed from six dimensions: 1) Connectivity, namely access to information; 2) Flexibility, namely learning anytime and anywhere; 3) Interactivity, namely learning assessment can be done directly; 4) Collaboration is a discussion tool that supports collaborative learning; 5) Expanded opportunities, namely electronic content to strengthen and expand the class base; 6) Motivation, which can make learning fun

E-learning is defined as the facilitation and support of learning through the use of information and communication technology (ICT). E-learning can be used to complement the existing subject learning or as a means of integrating on-line and conventional learning practices (Kucirkova et al., 2017). According to this explanation, even after the pandemic has ended, learning modules utilizing e-learning can be used on an ongoing basis.

According to research conducted (Sukma Adelina Ray et al., 2020) it was found that there are advantages possessed by e-learning-based learning media using Moodle LMS. The first advantage is that, based on the findings of classroom-based research, learners can take a more active role in seeking opportunities to expand their own knowledge in order to gain a better understanding. Second, this type of educational media can provide more varied information throughout the learning process, such as demonstrating the outcomes of learning practices. Thirdly, a conducive learning environment results in improved academic performance. Fourth, students are more motivated to learn than those who use traditional media, especially if the material is always tutor-centered. Fifth, this instructional media includes images and videos that will pique students' interest and motivation to learn independently. Sixth, because this educational media product is accessible from anywhere and at any time as long as it is connected to the internet, it enables students to more easily engage in the teaching and learning process.

Anggraeni and Sole explained that Moodle is a popular LMS learning management system used by a large number of educational establishments. Among the reasons this model is growing rapidly are the following 1) It is open source and completely free. Because Moodle is an open source project, it can be customized to meet any mandatory requirements imposed by the institutions that use it. Moodle requires no funds to operate, except for the bandwidth used to download the 15 MB Moodle master; 2) Compact size, high performance. Moodle has a small memory footprint (approximately 15 MB), but it is capable of supporting academic and learning activities for groups of up to 50,000 people; and 3) Educator-centered or tutor-centered. Moodle was created by educators with substantial experience and training, not by computer experts. Moodle is capable of converting nearly all of the requirements of a traditional educational process to online learning; and 4) Ensuring that a sizable and collaborative community is maintained (Anggraeni & Sole, 2018).

The learning model through LMS with Moodle for residents of class 12 A PKBM Darul Fiqri Cimahi City can improve the academic achievement of students. This is because this feature focuses on being intuitive and visually appealing. The traditional method of teaching with a slow and modern learning rhythm has lost its relevance. As a result, it is necessary to develop progress-oriented training courses that can pique students' interest not only in academics but also in potential personal growth. In this case, tutors must provide practical assignments via a virtual learning platform in order to help students develop their competence. The results of this study are in line with the opinion of Zhang (Zhang et al., 2020) which states that the e-learning system is proven to improve student learning achievement because this system can collect a large amount of information, analyze the behavior of learners, and help tutors identify possible mistakes among learners during the training course.

## **CONCLUSION**

According to the study's findings and discussion, the researchers concluded that the use of Moodle in the package C program, which included 30 students from class 12 A in Darul Fiqri, Cimahi City, had a positive effect on students' achievement. This is because students can more easily comprehend the tutor-provided material and can access it according to the needs of the

learning community when using Moodle-based learning media. Additionally, e-learning platforms such as the Moodle-based Learning Management System are used to meet the demand for learning modules during the COVID-19 pandemic, as students can take a more active role in obtaining opportunities to build their own knowledge and can provide more diverse information during the learning process, thereby creating a conducive learning environment.

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