Analysis of Student Response to the Utilizing of LMS in Applied Physics Course Post Covid-19 Pandemic

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Abstract – A study on the analysis of student response to using POLBAN's LMS E-Learning in the Applied Physics course post the Covid-19 pandemic has been conducted. This research aims to determine the extent of student acceptance and enthusiasm in utilizing the LMS after face-to-face classes are reintroduced. The research is categorized as qualitative descriptive research. The research method involved distributing questionnaires to 107 students taking the Applied Physics course from the Chemical Analyst and Mechanical Engineering study programs at the Bandung State Polytechnic during the odd semester of the academic year 2022/2023. The questionnaire responses were processed by calculating the total average scores for each question. Based on the interval scale analysis of acceptance ratings, the research findings indicate that the level of student acceptance towards using E-Learning in the Applied Physics course posts during the Covid-19 pandemic falls under the " Accepted " category. It is evident from calculating the overall average score for all statements, which amounts to 403.17 points out of 535 points. Therefore, it can be concluded that utilizing LMS in face-to-face classes is still highly suitable as a support and companion for post-Covid-19 pandemic teaching.

INTRODUCTION

In the odd semester of the academic year 2022/2023, Bandung State Polytechnic resumed full face-to-face lectures, including practical sessions in laboratories and theory classes. In the previous semester, a blended learning approach was implemented, combining offline activities for practical sessions and online activities for theory classes. The utilization of LMS or e-learning during the online learning period was strongly encouraged for all courses at Bandung State Polytechnic. At the beginning of the Covid-19 pandemic, various online learning platforms were used, including Google Classroom, MS Teams, and Moodle-based e-learning provided by the campus IT management. However, over time and with regular training, almost all lecturers at Bandung State Polytechnic began utilizing the Moodle-based e-learning platform, including the Applied Physics course taught by students from the Chemical

Analyst and Mechanical Engineering study programs.

The Applied Physics course consists of three credits, with two credits for theory and one credit for practical sessions. Before the Covid-19 pandemic, all administrative aspects of the Applied Physics course did not use the LMS, including distributing learning materials such as modules and lecture slides, submitting assignments, and conducting exams. All administrative tasks were paper-based. However, during the online learning period amid the Covid-19 pandemic, all administrative aspects of the course transitioned to a digital mode centralized in the Learning Management System. This transition continued during the adjustment period when face-to-face classes resumed using the blended learning method, including e-learning.

With the resumption of full face-to-face lectures, the utilization of Polban's e-learning platform is no longer mandatory.

Lecturers have the freedom to decide whether or not to continue using the e-learning platform. However, the LMS can still be effectively utilized.

Throughout the online learning period, using Polban's Moodle-based LMS platform in the Applied Physics course has been highly beneficial for lecturers in supporting administrative aspects of teaching. Lecturers can organize and deliver supplementary learning materials structured and systematically, including modules, lecture notes, slide presentations, and instructional videos. Additionally, various assessment methods, such as multiple-choice and essay-based exams, can be conducted within the e-learning platform. Furthermore, lecturers have the flexibility to set deadlines for assignment submissions, allowing them to track the digital footprint of enthusiastic and diligent students. Therefore, continuing the utilization of Polban's e-learning LMS remains a suitable choice for lecturers, even with the resumption of face-to-face classes. However, further exploration is needed to determine whether students can also accept and benefit from the LMS, despite the return to face-to-face lectures and to what extent they remain enthusiastic about utilizing the platform.

Research on the impact of LMS or e-learning platforms has been extensively conducted. Alfi Fitrah et al. examined the effectiveness of Moodle-based LMS utilization on the learning outcomes of 11th-grade students at SMK Negeri Padang. The research showed that students who utilized the LMS had better learning outcomes in electrical installation compared to those who did not utilize the LMS (Fitrah, 2022). Similarly, research conducted by Noor Laily et al., Dewi Yana et al., and Mega Puspita Sari also yielded significant findings. Noor Lally's research showed a significant improvement in students' learning outcomes in Fluids after utilizing the LMS (Akhmalia & Maharta, 2018). Dewi Yana's research compared students' learning outcomes using three different LMS platforms, namely Schoology, Canvas, and Quizlet. The results indicated that Quizlet was the most effective platform among the three in enhancing students' learning outcomes in English (Yana & Adam, 2019). Furthermore, Mega Puspita Sari's research found that e-learning effectively taught basic physics (Sari, 2022).

Based on the presented background, this research aims to analyze the students' response to the utilization of Polban's LMS e-learning platform in the Applied Physics course as a supporting and complementary tool for face-to-face lectures after the Covid-19 pandemic. The student's response can serve as input for lecturers and as a reference for the continued utilization of the LMS in the Applied Physics course in the Chemical Analysis and Mechanical Engineering programs.

RESEARCH METHODS

This study can be categorized as qualitative descriptive research. The data collection method used is a survey. The survey was conducted by providing a feedback questionnaire in the form of an e-questionnaire using Google Forms to 107 students who took the Applied Physics course in the Chemical Analyst and Mechanical Engineering study programs in the academic year 2022/2023. The questionnaire consists of 7 statements of agreement regarding utilizing LMS E-Learning Polban in the Applied Physics course. The agreement options include "strongly agree," "agree," "somewhat agree," "disagree," and "strongly disagree."

The responses from the questionnaire were then analyzed and processed by calculating scores for each agreement statement. The highest score is 5 points for

the "strongly agree" response and the lowest score is 1 point for the "strongly disagree" response. Each statement is then calculated for its total score, and the average score of all statements is obtained. The average score will determine the level of students' acceptance of the utilization of E-Learning based on a rating scale with categories such as "highly accepted," "accepted," "moderately accepted," "less accepted," or "rejected."

RESULTS AND DISCUSSION

The research on analyzing students' responses to utilizing LMS E-Learning Polban based on Moodle in the Applied Physics course has been completed. The student's response was obtained by completing a questionnaire using Google Forms. The questionnaire consists of 7 agreement statements, as shown in Table 1. Statements 1, 2, 3, and 4 refer to the content of the E-Learning, which is whether the content of the Applied Physics course E-Learning is perceived as comprehensive or not, whether the learning resources provided are helpful to the students, and how often the students engage with the materials. In addition to the content-related statements, statements 5, 6, and 7 ask the students to provide feedback on utilizing E-Learning to submit assignments and conduct. It aims to assess whether the students feel comfortable completing assignments and tests given by the instructors through the LMS.

Table 1. List of Agreement Statements Related to LMS E-Learning Polban in the Applied Physics Course

No.	Statement
1	The learning resources (modules, slides, and videos) are complete.
2	The learning resources (modules, slides, and videos) assist in the learning process.
3	I frequently study the learning resources on LMS.

No.	Statement
4	The distribution of learning resources through E-Learning Polban is more effective than other platforms such as Email, G-drive, WhatsApp, and others.
5	Submitting assignments through E-Learning Polban is more effective compared to other platforms.
6	Evaluations (Quizzes, Midterms, Finals) using E-Learning are more effective compared to other platforms like Google Forms.
7	Evaluations (Quizzes, Midterms, Finals) using E-Learning are more effective compared to paper-based or hardcopy formats.

Results

The results of the questionnaire responses from 107 students taking the Applied Physics course can be seen in Table 2. Table 2 also presents the calculation results for each agreement option and the total score for each statement.

Table 2. Results of Questionnaire Responses

Statement.	Agreement Statement Score					
	SS (x5)	S (x4)	CS (x3)	KS (x2)	TS (x1)	Total
1	15	65	23	4	0	412
2	39	44	22	2	0	441
3	4	34	61	8	0	355
4	15	45	38	9	0	387
5	36	48	17	6	0	435
6	21	47	33	6	0	404
7	19	42	38	7	1	392
Average overall score						403.71

Description:
SS: Strongly Agree
S: Agree
CS: Somewhat Agree
KS: Disagree
TS: Strongly Disagree

The next step is determining the acceptance interval scale after obtaining the average total score. The interval boundaries are based on the maximum score for each statement, divided into five categories of

assessment: strongly accepted, accepted, moderately accepted, less accepted, and rejected. Taking the minimum agreement score of 1 for the lowest statement, the lower interval boundary equals the total number of respondents, which is 107. The maximum total score for one statement is the number of respondents multiplied by the maximum agreement score of 535. The interval scale for the five acceptance categories can be seen in Table 3.

Table 3. Interval Scale Categories of Student Acceptance Regarding the Utilization of E-Learning Polban in Applied Physics Course Post-Covid-19 Pandemic

Score Threshold	Assessment Scale	Interval Score
449.4	highly accepted	449.41-535.00
363.8	accepted moderately	363.81-449.40
278.2	accepted	278.21-363.80
192.6	less accepted	192.61-278.20
107	rejected	107.00-192.60

Therefore, based on the calculation of the average total score for all statements, which is 403.71, the results of the questionnaire fall within the "Accepted" rating scale. It means that the students well accept the utilization of LMS E-Learning Polban in the Applied Physics course, which serves as a support and complement to face-to-face lectures.

Discussion

Research on the utilization of Learning Management Systems has been widely conducted. Even before the Covid-19 pandemic, many studies have explored the implementation of LMS in various fields, including science, social sciences, and languages. For example, a study by Akhmalia and Maharta (2018) investigated the effectiveness of the blended learning model based on LMS on static fluids and its impact on students' mastery of the subject.

The results showed that the control group utilizing LMS demonstrated effective and significant improvement in students' mastery of the subject.

However, it seems that the utilization of LMS before the Covid-19 pandemic was not fully optimized. It could be due to the uneven distribution and proficiency in internet and information technology among students, teachers, or content creators using LMS. Consequently, utilizing LMS in schools or campuses has not been fully implemented and is still in the research or experimental stage for specific subjects. However, various LMS platforms are available, such as Edmodo, Canvas, Moodle, Schoology, Quizlet, and Google Classroom. Another comparative study on LMS utilization conducted by Dewi and Adam (2019) compared the impact of Schoology, Canvas, and Quizlet on students' learning outcomes in the Educational Research Methodology course. Among the three LMS platforms, Quizlet was the most effective in improving students' learning outcomes in the ERM course (Yana & Adam, 2019). Many other studies have also examined the impact of different types of LMS on students' learning outcomes, showing positive and effective results.

With the announcement of the Covid-19 pandemic by the WHO in 2020, research on the implementation of LMS in online learning has increased significantly. Unlike before the pandemic, when the utilization of LMS was still in the study and experimental phase, during the Covid-19 pandemic, the use of LMS became highly recommended. Additionally, virtual meeting platforms became common to support the government's recommendation to limit direct interactions.

The study of LMS utilization during the Covid-19 pandemic can be examined from various aspects. For example, the

challenges faced include unstable internet connections and a lack of understanding of computer technology and information (Anugrah and Kusuma, 2021). Regarding its effectiveness on students' learning motivation, research shows that LMS Google Classroom is quite effective in the physics learning process and can enhance students' learning motivation (Sukesti & Sulisworo, 2021). Studies also indicate the positive influence of LMS on students' learning activities and processes (Septina et al., 2022), as well as its significant and effective impact on students' learning outcomes (Gunawan et al., 2021) (Tampubolon, 2021).

Considering the research findings on the benefits of LMS for learning, it would be unfortunate if the utilization of LMS ceased after the end of the Covid-19 pandemic. The comprehensive and engaging content created on LMS during the pandemic would be wasted if not utilized further. Therefore, in addition to the perspective of teachers who still see the need for LMS as a complement to face-to-face learning, the acceptance of this Moodle-based LMS utilization can be considered excellent based on the analysis of student responses. It is evident from the questionnaire response to statement number 2, where more than 75% of students felt that their learning was assisted by using LMS E-Learning Polban based on Moodle.

CONCLUSION

Based on the analysis and processing of the data from the questionnaire filled out by 107 students, it can be concluded that the utilization of LMS E-Learning Polban in the Applied Physics course is acceptable and can be used as a support and complement to face-to-face lectures after the Covid-19 pandemic. It can be seen from the average total score of the questionnaire, which is 403.71, falling within the "Accepted" interval of the rating scale. Based on the analysis of student responses, utilizing LMS, which provides comprehensive learning content, can greatly assist students during face-to-face lectures. It is evident from the questionnaire results that less than 5% of students reported infrequent or less enthusiastic engagement with the content materials in the LMS.

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