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The Attitudes of Student-teachers toward Moodle as a Supplementary Learning Platform

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Abstract—During the COVID-19 pandemic, Moodle (Modular Object-Oriented Dynamic Learning Environment) emerged as a leading online learning platform, providing essential support for educational institutions transitioning to remote learning. However, its role as a supplementary tool alongside traditional teaching methods in non-pandemic contexts remains underexplored in academic research. This study aims to investigate the attitudes of higher education student-teachers toward Moodle as an asynchronous online learning platform that enhances traditional classroom learning. The research employed a descriptive-quantitative method, focusing on students from the Teacher Training and Education Faculty, specifically those in the Elementary School Teacher Education Department at Universitas Tanjungpura, Indonesia. Participants were selected through purposive sampling, targeting individuals with experience using Moodle in online and offline learning environments. Data were collected using a structured questionnaire to assess student-teacher attitudes toward Moodle. It underwent a rigorous validation process to ensure the instrument's validity, including expert reviews. The reliability of the questionnaire was assessed through a pilot test conducted with 25 elementary school student-teachers from a state university. The results indicate that most student-teachers have positive attitudes toward Moodle, particularly valuing its effectiveness in enhancing their traditional learning experiences. Despite these favorable views, further research is necessary to develop a more comprehensive understanding of Moodle as a learning management system. Future studies should explore a broader range of educational contexts and levels to better understand the diverse challenges and benefits of applying Moodle in different teaching environments.

Keywords—Moodle; supplementary tool; attitudes; higher education student-teachers; asynchronous.

I. INTRODUCTION

The rapid advancement of information and communication technology in the 21st century has significantly changed how learning is delivered and accessed. Traditional classrooms are no longer the only vehicle for learning and teaching activities as online learning platforms have grown rapidly. Among these platforms, Moodle (Modular Object-Oriented Dynamic Learning Environment), an internet-based e-learning tool, has become the choice for many educational institutions as an open-source learning management system that is feasible to use [1]–[3]. Due to its global popularity, Moodle surpasses other Learning Management System (LMS) platforms in terms of usage [1]. Moodle was first developed in 2002 by Martin Dougiamas, an educator who aimed to create an interactive and collaborative online learning environment. Over the years, Moodle has evolved into a comprehensive platform serving diverse higher education institutions globally [4].

Following the World Health Organization (WHO) announcement declaring the end of the COVID-19 pandemic [5], Moodle, one of the alternative primary learning delivery platforms during disasters, is no longer used to replace face-to-face learning. Moodle, renowned for its versatile and robust Learning Management System (LMS), can be a valuable supplementary learning resource [6]. With its Modular Object-Oriented Dynamic Learning Environment, this platform surpasses traditional educational boundaries, providing a comprehensive array of tools and features. Moodle is acknowledged as a catalyst for transforming conventional learning environments into dynamic, interactive spaces in academic discussions. Moodle complements in-person instruction as an additional learning

tool by enabling educators to generate engaging digital content, facilitate collaborative discussions, and assess student progress. Scholars and educators delve into the diverse functionalities of Moodle, emphasizing its adaptability across various educational levels and subjects.

Moodle offers a range of online modes crucial for facilitating effective teaching and learning experiences [7], [8]. Forums serve as asynchronous platforms for students and instructors to engage in discussions, fostering critical thinking and collaborative learning. Chat features enable real-time communication, promoting immediate assistance and community building. Assignments streamline the submission and grading process, enhancing efficiency and enabling constructive feedback. Quizzes provide versatile assessment tools, assessing comprehension and promoting self-paced learning. Workshops simulate peer review processes, fostering collaboration and critical evaluation skills. These online modes collectively enhance student engagement, promote active participation, and provide valuable opportunities for interaction and assessment in diverse learning environments, contributing to a richer educational experience.

Among the advantages of Moodle, the flexibility and adaptability of this learning management system make it an attractive choice for educators who want to supplement their traditional classroom teaching with online resources [9]–[11]. Moodle offers many benefits for students and lecturers as an additional learning platform, especially at the higher education level. Moodle provides students with opportunities and convenience to access lecture materials, participate in discussions, and submit assignments at any location if internet access is available [12]–[15]. This flexibility is particularly advantageous for learners who face geographic constraints, time constraints, or other commitments that may hinder their ability to attend physical classes regularly.

Various multimedia features on Moodle, such as videos, interactive quizzes, and discussion forums, can also enhance the learning experience by catering to different learning styles [16]. The asynchronous nature of the Moodle platform allows students to study anywhere independently at their own pace and enhance individual learning [17]. In contrast, in synchronous learning environments, activities occur in real-time, where students and instructors interact simultaneously, including live lectures, virtual classroom sessions, or real-time chat discussions. Moodle's combination of asynchronous and synchronous elements encourages bichronous learning, offering a balanced approach that accommodates students' different learning styles and preferences. From an educator's point of view, Moodle offers a centralized platform for managing learning content, tracking student progress, and providing timely feedback. This allows educators to create engaging and interactive learning materials, encouraging a dynamic virtual classroom environment. In addition, Moodle's data analytics and reporting features provide valuable insights into student performance, allowing educators to identify areas of improvement and adjust their teaching strategies.

Several studies in several countries have identified the benefits of Moodle as a learning management system in supporting learning activities. Badia et al. [18] examine the teachers' perspectives on using Moodle and show that the use of Moodle had a significant impact on teachers' and students' connection. Jeong [19] argues that using Moodle has been beneficial for teachers facilitating a flipped classroom; it successfully improves learners' English communicative competence and interactional and sociocultural competence. Ahmad and Al-Khanjari [20] found that using Moodle e-learning as a face-to-face learning supplement effectively increases student understanding in computer science skills courses. Amin et al. [21] discovered that Moodle positively impacted the performance of engineering education students in a research methodology class at a university in Indonesia. Students also showed a positive attitude towards Moodle e-learning even though they preferred the onsite learning model to deliver course material. In addition to the positive impact of Moodle on learning achievement, Moodle is also proven to increase student motivation [12], [22], [23].

One area of concern for Moodle in supporting face-to-face learning stems from its dependence on internet connectivity and technological infrastructure. Although Moodle provides robust tools for online interaction and content delivery, it may encounter obstacles in environments where internet access is unreliable. Students are unskilled with tools, lack access to technology devices, or where instructors lack comfort with technology [24]–[27]. Seamlessly integrating Moodle with in-person classroom activities may also demand additional effort and coordination, particularly for instructors less familiar with digital platforms [28]–[30]. Furthermore, Moodle's effectiveness in face-to-face settings may be hindered by compatibility issues with existing teaching methods, such as ensuring active student participation and contribution to discussions when adopting student-centered approaches [31]. Teachers may also encounter difficulties monitoring and assessing students' progress and providing timely feedback in online learning environments [26]. Consequently, while Moodle can enhance certain aspects of face-to-face learning, its reliance on technology and educators' pedagogy competence to adapt to this technology may pose challenges in fully supporting traditional classroom environments.

The attitude of its users also influences the use of Moodle as an online (asynchronous) learning platform. Several studies have shown that attitude significantly predicts students' intention to use Moodle. As a result, student attitudes significantly contribute to the intention to use the e-learning system [32]. Shittu et al. [33] argue that attitude was the stronger predictor of students' intention to use social software. Teo et al. [34] found that usefulness and ease of use significantly influenced Macau students' attitudes towards Moodle use. Rani et al. 's findings also support Teo's finding [35], confirming that ease of use and perceived usefulness are significant factors in determining the actual use of Moodle among higher education students in one university in Bengaluru, India. In addition, Peerapolchaikul et al. [36] medical students had a positive attitude toward Moodle, as this platform is preferable for supporting students' self-learning within a PBL curriculum. Consequently, students' attitudes influence their inclination to utilize an e-learning system.

Numerous scholarly inquiries have delved into the benefits, student acceptance, perception, collaboration, and

satisfaction regarding the utilization of the e-learning platform Moodle to augment the teaching and learning process within educational settings [12], [21], [37]–[49]. Despite the extensive use of Moodle during the pandemic, most research has focused on its role in remote or emergency learning scenarios. Few studies have examined its effectiveness as a supplementary tool in non-pandemic periods. Existing research predominantly covers well-resourced educational environments in developed nations, often overlooking contexts with limited infrastructure. This study differentiates itself by focusing on a state university in Pontianak City, West Kalimantan Province, Indonesia—a setting with limited resources. By refining the focus to specific facets of Moodle's use, including ease of utilization, student satisfaction, and course delivery, this research aims to fill the gap left by previous studies. It will provide insights into how Moodle can be effectively integrated with traditional teaching methods and contribute to improving educational practices in similar contexts.

This study holds significance in informing educators and institutions about the effective integration of Moodle e-learning into course delivery practices in Indonesia's higher education. By understanding student attitudes towards Moodle, educators can customize online asynchronous learning activities to cater to students' requirements, enriching their overall learning experience while ensuring that Moodle complements traditional teaching methodologies. Moreover, the study's findings have the potential to contribute to the enhancement of Moodle to better align with student needs, resulting in improvements across various dimensions such as ease of use, satisfaction, and communication. By exploring student attitudes towards using Moodle, institutions can make policies and decisions about effectively integrating Moodle e-learning into course delivery practices that can improve the overall quality of the learning experience for students in the digital age.

Students at the Elementary School Teacher Education Department of the Teacher Training and Education Faculty of Universitas Tanjungpura have been utilizing Moodle's asynchronous online mode as an additional learning platform since the early stages of the COVID-19 pandemic up to the present. Throughout this period, they have developed varying attitudes towards its use, considering factors such as ease of use, usefulness, satisfaction, communication, interaction, and lecture delivery. This investigation seeks to identify student-teachers' attitudes towards their experiences within the asynchronous online mode environment provided by Moodle, which supports classroom lecturing activities.

II. MATERIALS AND METHOD

The following flowchart (Figure 1) visually represents the methodological steps undertaken in this study, illustrating how each component contributes to the overall research process.

A. Research Design

The method utilized in this study was a descriptive-quantitative design. This method was selected for its effectiveness in systematically collecting and analyzing numerical data, allowing for precise measures of attitudes and in-depth insights into participants' perceptions regarding

using Moodle as a supplementary platform for face-to-face learning [50].

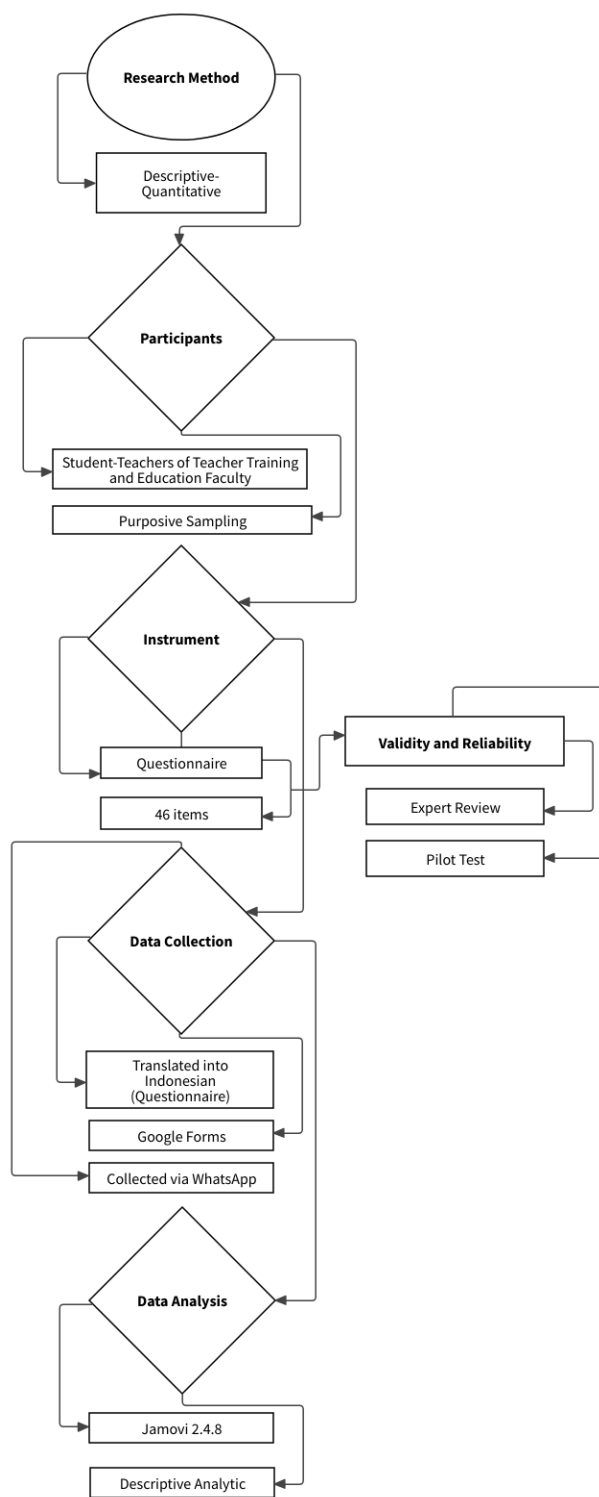Fig. 1 Flowchart of research method

B. Participants

The study focused on students from the Teacher Training and Education Faculty, specifically from the Elementary School Teacher Education Department at Universitas Tanjungpura, Indonesia. Participants were selected through purposive sampling, targeting those with specific experience using Moodle in online and offline learning environments.

This method ensured that the feedback gathered was directly relevant to the study's objectives.

C. Instrument

The instrument for this study was a structured questionnaire designed to measure student-teacher attitudes toward using Moodle as a supplementary platform for face-to-face learning. The questionnaire consisted of 46 items divided into five key categories: ease of use and access (9 items), usefulness (9 items), satisfaction (8 items), communication and interaction (9 items), and lecture delivery (10 items). Each item was rated on a 5-point Likert scale, allowing participants to express their levels of agreement or disagreement. The instrument was adapted from established research by Shaharanee et al. [51] and Kassim [52], ensuring its relevance to the study context.

D. Validity and Reliability

It underwent a rigorous validation process, including expert reviews, to establish the instrument's validity. Two experts in the field evaluated the content to ensure that the items accurately reflected the intended constructs related to Moodle usage. This process confirmed that the items were relevant and appropriate for the target population, thereby enhancing the construct validity of the questionnaire.

The instrument's reliability was assessed through a pilot test with 25 elementary school student-teachers from a State University in Pontianak. The results of this pilot test showed strong internal consistency, with Cronbach's Alpha scores exceeding the acceptable threshold of 0.700 for all categories: ease of use and access (0.836), usefulness (0.871), satisfaction (0.876), communication and interaction (0.886), and lecture delivery (0.959). These reliability coefficients indicated that the items within each category consistently measured the same underlying construct, confirming the stability and reliability of the instrument for broader use in the study.

E. Data Collection

The finalized questionnaire was first translated into Indonesian to ensure accessibility for participants and then distributed electronically via Google Forms, providing a user-friendly experience. The link to the questionnaire was shared through WhatsApp, a widely used communication platform among the student-teachers, further enhancing accessibility and encouraging participation. Data collection occurred over three weeks, from September 25 to October 16, 2023, allowing ample time for respondents to complete the questionnaire at their convenience. Reminders were sent via WhatsApp throughout the collection period to boost response rates and minimize dropout. Researchers monitored responses in real-time through Google Forms, enabling them to track the number of completed surveys and adjust their outreach efforts as needed to maximize participation.

F. Data Analysis

Upon concluding the data collection period, all responses were systematically compiled and organized for analysis. The data were then prepared for statistical examination utilizing Jamovi 2.4.8, facilitating descriptive statistics analysis. A range of descriptive statistical measures were employed to summarize the responses effectively, including frequency, mean, percentage, and standard deviation. The overall attitudes of the student-teachers were assessed by calculating the mean score from the 5-point Likert scale, with negatively worded items reversed to maintain consistency in interpretation. This rigorous analytical approach gave comprehensive insights into the participants' attitudes toward using Moodle as a supplementary learning platform.

III. RESULTS AND DISCUSSION

A. Results

The questionnaire data reveals that the study included 217 students from the 3rd, 5th, and 7th semesters of the 2023/2024 academic year. All participants utilized Moodle for their studies during and after the COVID-19 pandemic. Table 1 provides further details about the participants.

TABLE I
DEMOGRAPHIC INFORMATION

Item	Values	Frequency	Percentage
Gender	Male	43	19.80%
	Female	174	80.20%
Semester	3	88	41%
	5	102	47%
	7	27	12%
Major	Elementary School Teacher Education Study Program	217	100%
Age range	17-20	217	100%

Analyzing students' attitudes towards Moodle revealed nuanced insights across the identified components. Table 2 presents a comprehensive overview of the obtained results, shedding light on the various dimensions of student perceptions with the supplementary use of Moodle in their learning experiences. The findings derived from the questionnaire analysis led to the conclusion that the dimension of "usefulness" garnered the highest mean score (Mean = 4.06), whereas "communication and interaction" exhibited the lowest mean score (Mean = 3.89). In the broader context, the aggregate assessment of student-teachers attitudes towards Moodle as a supplementary platform for face-to-face learning yielded an overall mean of 3.96, positioning them within the categorical classification of "Agree."

TABLE II
STUDENT-TEACHERS' ATTITUDES TOWARDS MOODLE AS A SUPPLEMENTARY PLATFORM OF FACE-TO-FACE LEARNING

Factor	Mean	S.D.	Meaning
Ease of use and access	3.92	0.82	Agree
Usefulness	4.06	0.76	Agree
Satisfaction	3.96	0.79	Agree
Communication and interaction	3.89	0.84	Agree
Lecture delivery	4.01	0.81	Agree
Total	3.96	0.80	Agree

1) *Student-teachers' attitudes to the ease of using and accessing Moodle:* The results indicate that most of student-teacher-respondents had a favorable attitude towards the "ease of use and access" of Moodle. The average mean score

for this aspect was 3.92, which falls into the "positive" category. The questionnaire consisted of nine statements, with the highest score (4.17) awarded to the statement, "I can easily access e-learning Moodle from various devices (e.g., computer, mobile, tablet)." The lowest score, 3.8, was given to the ease of navigating the e-learning Moodle system, but it still falls under the "positive or favorable" category. These findings suggest that some student-teacher-respondents may not be thoroughly familiar with the specific features of Moodle.

TABLE III
STUDENT-TEACHERS' ATTITUDES TOWARDS EMPLOYING MOODLE BASED ON PERCEIVED EASE OF USE AND ACCESS

No	Statement	Mean	S.D.	Meaning
1	Navigating through e-learning Moodle is straightforward and intuitive.	3.80	0.84	Agree
2	I find it easy to locate and access course materials on e-learning Moodle.	3.94	0.78	Agree
3	The layout and organization of e-learning Moodle's interface make it easy to find the information I need.	3.88	0.78	Agree
4	Logging into e-learning Moodle and accessing my courses is a seamless process.	3.86	0.91	Agree
5	E-learning Moodle's search function effectively helps me find specific resources or information within the platform.	3.81	0.82	Agree
6	Uploading and submitting assignments on e-learning Moodle is a straightforward process.	3.99	0.82	Agree
7	The instructions provided on e-learning Moodle are clear and easy to understand.	3.99	0.80	Agree
8	I can easily access Moodle from various devices (e.g., computer, mobile, tablet).	4.17	0.85	Agree
9	Moodle's interface is visually appealing and enhances my overall user experience.	3.85	0.85	Agree
Average		3.92	0.82	Agree

Most of the respondents underscore the ease of navigation, login, access, location of course materials, retrieval of specific information or resources, and the submission of assignments within the Moodle platform. The instructional directives and announcements issued by instructors through Moodle are perceived as clear and easily comprehensible. The seamless compatibility with various internet-connected devices, including tablets, iPhones, and smartphones, facilitates convenient access to this Learning Management System (LMS) and an aesthetically pleasing interface. To sum up, most participants agreed with the user-friendly features of Moodle. This consensus regarding ease of use and accessibility is supported by an average mean score of 3.92.

2) Student-teachers' attitude to the usefulness of employing Moodle: Table 4 delineates a prevailing favorable disposition among student-teacher respondents regarding the usefulness of Moodle as an adjunct platform for supporting face-to-face teaching and learning activities. The mean score, averaging 4.06, falls within the 'positive' categorization.

TABLE IV
THE ATTITUDES OF STUDENT-TEACHERS CONCERNING THE UTILIZATION OF MOODLE IN THE CONTEXT OF PERCEIVED USEFULNESS

No	Statement	Mean	S.D	Meaning
1	E-learning Moodle provides me access to a wide range of course materials supporting my learning.	4.07	0.71	Agree
2	Using e-learning Moodle enhances my understanding of the course content.	3.98	0.76	Agree
3	E-learning Moodle offers interactive features (e.g., discussion forums and multimedia resources) that engage me in learning.	4.12	0.75	Agree
4	E-learning Moodle helps me develop important skills (e.g., critical thinking, problem-solving) relevant to the course.	4.02	0.82	Agree
5	The supplementary resources on e-learning Moodle contribute to a deeper understanding of the course topics.	4.03	0.74	Agree
6	E-learning Moodle provides opportunities for self-directed learning and exploration beyond the classroom.	4.08	0.83	Agree
7	The activities and assignments on e-learning Moodle align with the course's learning objectives.	4.12	0.73	Agree
8	E-learning Moodle enables me to apply and practice what I have learned meaningfully.	3.96	0.78	Agree
9	E-learning Moodle positively impacts my course learning experience.	4.19	0.76	Agree
Average		4.06	0.76	Agree

The comprehensive examination of mean scores in Table 4 indicates a mostly favorable inclination among respondents towards the perceived usefulness of Moodle across nine distinct components. These components encompass facilitating access to a diverse array of course materials conducive to learning, enhancing students' comprehension of course content, integrating interactive features (e.g., discussion forums, multimedia resources) to engage students in the learning process, aiding students in the development of critical skills (e.g., critical thinking, problem-solving) pertinent to the course, contributing to a more profound understanding of course topics, providing avenues for self-directed learning and exploration beyond the traditional classroom setting, aligning activities and assignments with the course's learning objectives, facilitating the application and meaningful practice of acquired knowledge, and exerting a positive influence on students' overall course learning experiences.

Remarkably, the component garnering the lowest score pertains to Moodle's usefulness in facilitating students to apply and practice acquired knowledge meaningfully, with a recorded quantitative value of 3.96. This observation suggests that several student-teachers face challenges optimizing Moodle to facilitate practical application and reinforcement of learned concepts. Nevertheless, it is crucial to underscore that, despite this limitation, most student-teacher respondents concur on the positive impact of Moodle

on their course learning experiences. This sentiment is notably encapsulated in the selected item statement, where respondents agree with a mean score of 4.19.

The collective findings affirm that student-teacher respondents acknowledge the substantial advantages of integrating Moodle as a supplementary platform in the post-COVID-19 educational landscape.

3) *Student-teachers' attitudes to the satisfaction of utilizing Moodle:* As shown in Table 5, the average mean score of student-respondent-teachers 'attitudes toward satisfaction in utilizing e-learning Moodle is 3.96, categorized as 'positive.' Most student-respondent-teachers are satisfied with using Moodle as an additional learning platform that supports face-to-face learning.

TABLE V
STUDENT-TEACHERS' ATTITUDES TOWARD THE USE OF MOODLE IN TERMS OF SATISFACTION

No	Statement	Mean	S. D	Meaning
1	E-learning Moodle is my first preferred LMS (Learning Management System) to support face-to-face learning.	3.88	0.81	Agree
2	The organization and presentation of course materials on e-learning Moodle are clear and logical.	3.97	0.75	Agree
3	E-learning Moodle provides adequate resources and materials to support my learning.	3.94	0.82	Agree
4	The feedback and support I receive from instructors through e-learning Moodle are timely and helpful.	3.87	0.80	Agree
5	E-learning Moodle's assessment features (quizzes, assignments) provide valuable feedback on my progress and understanding of the course material.	4.14	0.83	Agree
6	E-learning Moodle's interface and design contribute to a positive learning experience.	4.01	0.75	Agree
7	I would recommend e-learning Moodle as a supplementary learning platform to other students.	3.95	0.80	Agree
8	I am contented with my experience using e-learning Moodle as a supplementary learning platform.	3.94	0.79	Agree
Average		3.96	0.79	Agree

The highest mean score, recorded at 4.14, pertains to the efficacy of Moodle's assessment features, particularly quizzes, and assignments, in furnishing valuable feedback on student's progress and comprehension of course materials. Most participants expressed satisfaction with Moodle, attributing this to its clear and logically organized presentation of course materials, adequate provision of learning resources, timely and helpful feedback and support from instructors via Moodle, and a user-friendly interface and design contributing to a positive learning milieu. Consequently, most respondents reported contentment with using Moodle as a supplementary learning platform and indicated their willingness to endorse it to fellow students.

Conversely, the lowest mean score, recorded at 3.87, pertains to the feedback and support provided by instructors during e-learning activities facilitated through Moodle. This finding suggests that students harbor reservations regarding the timeliness and helpfulness of instructor support and responsiveness within the Moodle e-learning environment.

4) *Student-teachers' attitudes toward communication and interaction in Moodle:* The research findings reveal that most student-teacher respondents favor Moodle concerning communication and interaction. The average mean score for this aspect, standing at 3.89, falls within the "favorable" category. The questionnaire comprised nine statements, with "The discussion forums on Moodle facilitate meaningful and engaging discussions with fellow students" garnering the highest score of 4.03.

TABLE VI
STUDENT-TEACHERS' ATTITUDES TOWARD THE UTILIZATION OF MOODLE IN TERMS OF COMMUNICATION AND INTERACTION

No	Statement	Mean	S.D.	Meaning
1	E-learning Moodle provides effective tools for communication and collaboration with peers and instructors.	3.87	0.82	Agree
2	The discussion forums on e-learning Moodle facilitate meaningful and engaging discussions with fellow students.	4.03	0.80	Agree
3	E-learning Moodle's messaging system allows me to communicate easily with my instructors and classmates.	3.87	0.84	Agree
4	E-learning Moodle encourages active participation and interaction among students in the learning process.	3.98	0.83	Agree
5	The communication tools on e-learning Moodle promote a sense of community and connection with my classmates.	3.80	0.91	Agree
6	I feel comfortable asking questions and seeking clarification through e-learning Moodle's communication channels.	3.81	0.88	Agree
7	Moodle's communication features enhance my ability to connect with instructors and receive timely feedback.	3.82	0.84	Agree
8	I can easily share and receive feedback on my work through e-learning Moodle's communication tools.	3.90	0.84	Agree
9	E-learning Moodle facilitates effective communication and interaction in the learning environment.	3.95	0.83	Agree
Average		3.89	0.84	Agree

The statement "the communication tools on e-learning Moodle foster a sense of community and connection with my classmates" received the lowest score of 3.80. However, it still falls within the "favorable" category. This finding suggests that some students may not be able to interact maximally with their classmates, perform discussions regarding course materials, and collaborate on various activities as, essentially, Moodle is not just about delivering content, but it is also about creating an online environment where students can engage with each other, share ideas, and build a sense of belonging to a virtual learning community.

In addition, most participants agreed that Moodle facilitates communication and interaction with students, their classmates, and their instructors. The platform's facilities and

features encourage active participation and interaction among students in the learning activities and improve students' ability to connect with their instructors to obtain timely feedback. Student-teachers feel comfortable asking questions and seeking clarification through Moodle's communication channels. In conclusion, Moodle facilitates effective communication and interaction between students and instructors in the learning environment.

5) Student-teachers' attitudes toward course delivery via Moodle: According to the data presented in Table 7, the average mean of students' attitudes within the "course delivery" component was calculated to be 4.01. This mean score (4.01) indicates a prevailing positive disposition among students toward Moodle as an additional learning platform, specifically concerning course delivery. Notably, the statement about the lecturer's communication of deadlines and time constraints for assignments, projects, and discussions garnered the highest rating, with a mean score of 4.24. Conversely, the statement receiving the lowest rating (mean = 3.90) was related to the lecturer's ability to ensure students' focus and adherence to the established learning trajectory.

TABLE VII
STUDENT-TEACHERS' ATTITUDES TOWARD THE USE OF MOODLE
REGARDING COURSE DELIVERY

No	Statement	Mean	S.D.	Meaning
1	The lecturer's guidance on participating in course learning activities was clear and precise.	4.00	0.81	Agree
2	The lecturer provided clear and specific instructions on how students should actively engage in various learning activities throughout the course.	4.05	0.82	Agree
3	The lecturer conveyed the deadlines and time limits for completing assignments, submitting projects, or participating in discussions.	4.24	0.77	Strongly agree
4	The lecturer clearly presented course topics.	4.01	0.81	Agree
5	The lecturer's ability to deliver course topics is easy to understand and comprehend.	3.93	0.77	Agree
6	The lecturer ensured that students stayed focused and on track.	3.90	0.84	Agree
7	The lecturers keep students engaged and focused on the course material.	4.02	0.84	Agree
8	The lecturer provided valuable feedback that improved my understanding of the course content.	3.97	0.83	Agree
9	Valuable feedback from the lecturer aids students in identifying areas for improvement and deepening their understanding of the course material.	4.00	0.84	Agree
10	The lecturer offered explicit instructions for actively engaging in learning activities.	4.07	0.80	Agree
	Total	4.01	0.81	Agree

Furthermore, concerning the use of Moodle as a supplementary platform to traditional learning for course delivery, most participants agreed that instructors provided clear and precise instructions for participating in course activities. They offered explicit and specific guidance on how students should actively engage in various learning activities throughout the course. Additionally, the course topics in the presentation were conveyed with clarity. The lecturers effectively discuss course topics, making them easily understandable, and they skillfully keep students engaged and focused on the course material. The instructors provided valuable feedback, improving students' understanding of the course material. This guidance was instrumental in helping students pinpoint areas for improvement, deepening their understanding of the subject, and being provided with clear instructions for actively participating in learning activities. In summary, students viewed the delivery of supplementary course content through Moodle positively.

B. Discussion

The findings of the current study's results establish that Moodle isn't just effective for online learning but also serves as a valuable support for students engaged in traditional learning methods. The findings reflect a favorable outlook on the use of Moodle, aligning with earlier research on the advantages and hurdles associated with this web-based platform [12], [13], [27], [53].

The existing study's findings confirm that students favor Moodle as a supporting tool for face-to-face learning activities. Table 3 depicts that utilizing Moodle in higher education for traditional learning encounters no significant issues. Participants agree unanimously on the app or web platform's ease and practicality across all surveyed dimensions. The average mean scores, standing at 3.92, affirm the student-teachers validation of Moodle's accessibility and user-friendly attributes in the educational context. These findings align with the research of Quansah and Essiam [49] and Legramante et al. [48], reinforcing the notion that Moodle is indeed user-friendly, as discovered in their respective studies. Conversely, this study contrasts with additional research finding substantiating the assertion that students encounter challenges in effectively utilizing Moodle, attributing this difficulty to a lack of requisite skills [24]. This empirical observation aligns consistently with the scholarly investigation conducted by Ghuonane and Rabahi [27], Mwatilifange and Mufeti [54], who clarified the global dimension of the issue by indicating that in certain regions, students face considerable obstacles in navigating and accessing the intricacies of the Moodle Platform.

Student-teachers' attitudes towards using Moodle, gauged through perceived usefulness, are notably positive, as evidenced by the data presented in Table 4. This study contributes substantively to the evidence affirming Moodle's role as a valuable platform for complementing face-to-face learning. This finding is notably evident in the research by [20] and [36], where students, while expressing a preference for traditional face-to-face instruction, concurrently advocate for incorporating online Moodle activities as a preferred and effective mode of learning. This study persists in the research findings of El-Maghraby [47], wherein students exhibit a positive attitude toward Moodle, recognizing its efficacy in supporting face-to-face teaching within the classroom context. Additionally, the alignment is further underscored by the research conducted by Manan et al. [45]

and Truong [46], wherein students express a positive inclination towards utilizing Moodle as an additional platform for developing speaking skills at the tertiary level. The noteworthy highest mean score of 4.19, as delineated in Table 4, further underscores the affirmative impact of Moodle on students' overall course learning experience. This outcome is not unexpected, considering that the Moodle learning platform has demonstrated efficacy in aiding students' comprehension and mastery of course materials [20], [47].

Table 5 presents student-teacher attitudes toward utilizing Moodle based on perceived satisfaction, and the average mean score is still considered a positive output. It suggests that the student-teachers who were researched in this study were satisfied using this platform. The result aligns with the research findings of [39] and [44]. This finding also aligns with the study of [43], indicating that students experience satisfaction with Moodle. The factors influencing their satisfaction encompass perceived usefulness, perceived ease of use, computer self-efficacy, service quality, information quality, and system quality. In fact, despite most student-teachers' agreement on their satisfaction with Moodle, some respondents consider that the feedback and support they receive from instructors through e-learning Moodle could be more timely and helpful.

In addition, the findings about the variable of communication and interaction (Table 6) within Moodle affirm the absence of significant issues in utilizing it as a supplementary platform for face-to-face learning. The consensus among respondents indicates that this web platform effectively supports student-teachers in facilitating communication and interaction during learning outside the traditional classroom. Notably, the highest-scored item underscores that Moodle's discussion forums foster meaningful and engaging discussions among peers. This underscores the platform's capacity to give students a distinct advantage in conducting their learning through discussions with classmates. This study aligns seamlessly with the outcomes of the previous studies wherein Moodle is recognized for its contribution to e-collaborative learning, heightened student engagement, and its capacity to assist students in active learning and social interaction within the academic context [39], [42].

Lastly, the data extracted from Table 7 reveals a prevailing favorable perception among student-teachers regarding Moodle's efficacy in course delivery. This alignment is consistent with the findings of the preceding research, which posits that Moodle serves as an effective tool in enhancing the teaching process and fostering successful learning outcomes [21], [44], [46], [55]. However, the divergence in results becomes evident when specifically scrutinizing course delivery, as underscored in the study conducted by [54]. Their assertion emphasizes that the effectiveness of facilitating students' learning, particularly in the specialized domain of computer literacy courses, may need to be improved in a developing country.

IV. CONCLUSION

This study seeks to explore how Moodle complements traditional instructional programs for student teachers in higher education by assessing their attitudes regarding its ease of use, utility, satisfaction, communication and interaction, and course content delivery. Findings suggest that most student teachers view Moodle positively, recognizing its capacity to enhance and augment their learning journey.

The study highlights the importance of integrating Moodle into higher education teaching and learning practices in the Indonesian context. This is reinforced by the favorable attitudes expressed by student teachers, who view Moodle as a beneficial additional tool for traditional teaching and learning approaches. However, for a more thorough understanding, conducting in-depth interviews is crucial to exploring the underlying reasons behind the responses provided by student teachers in the survey.

Greater clarity is needed regarding the limitations posed by online facilities during Moodle-based teaching and the optimal use of Moodle in higher education settings as a supplement to traditional instructional activities, particularly in the aftermath of the COVID-19 pandemic. Conducting comprehensive interviews would offer valuable insights into these aspects.

Expanding similar studies across various educational settings and levels is crucial, considering the diverse resources available in different regions and institutions. This approach allows for a detailed examination of challenges that may vary in Moodle's application. Comprehensive research will offer a deeper understanding of Moodle's potential and challenges. Furthermore, assessing different Moodle features and exploring strategies for better integration with traditional teaching methods is essential. Longitudinal studies could also shed light on Moodle's long-term impact on learning outcomes and student engagement.

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