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The Evaluation of Research-based Learning on 'Moodle' Learning Management System Using CIPP Models

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Abstract

The purpose of this study was to evaluate the quality of research-based learning conducted remotely through the use of the Moodle learning management system using the Context, Input, Process, and Product (CIPP) evaluation model. Data sources include lecturers, students, faculty documents, study program materials, and Moodle learning management systems (LMS) used in lectures. Data were gathered using the CIPP evaluation checklist (2002), semi-structured interviews, document analysis, and observation. The data were analyzed using content analysis. The findings indicate that learning occurs entirely within the Moodle LMS, which includes lecture tools, is guided by lecturers with subject-specific expertise, is collaborative within the lecture system, and is conducted using appropriate and effective virtual synchronous and self-directed asynchronous learning approaches. Additionally, employing various approaches and learning strategies has a major influence on students' abilities, attitudes, behaviors, and values when it comes to developing educational research and writing a quantitative research proposal. However, because proposal assignments are often assigned towards the program's ending, the time necessary to complete them is typically quick. This looks to be an omission of certain students' abilities. Slow learners will fall behind on these assignments.

Keywords: Distance learning, research-based learning, CIPP model, LMS Moodle.

Introduction

Distance learning, which is one of the alternative education methods during the pandemic of Covid-19, has some weaknesses. Sadeghi (2019) and Sergio, Penedo, & Pereira (2018) explain that the weaknesses of distance learning are the lack of interaction between teachers and students due to the learning being conducted in different places. This also results in the inaccuracy of students in submitting their tasks because the students do not remind one another about it. Another weakness of distance learning explained by Sadeghi (2019) is that it causes the students to not optimally perform their motivation and learning focus because they feel that there is no competitor to achieve better. Further, he also asserts that distance learning, which uses internet devices in its implementation, can be disrupted if it is an error or damaged. However, the pandemic of covid-19 and social distancing rules force educational institutions to implement distance learning and adapt to such conditions (Burdina, Krapotkina, & Nasyrova, 2019). Besides, Knott (2020) explains that before the pandemic of covid-19, the integration of internet-based media in higher education has increased, especially to supervise and maintain students' works (Conrad & Openo, 2018). In shorts, distance learning enables the inaccuracy of students in submitting their tasks as well as reduces students' learning motivation and learning focus, even though it has been widely implemented all over the world as the impact of covid-19 pandemic.

Lou (2004) and Tokmak, Baturay, & Fadde (2013) emphasized that by implementing distance learning or learning through online media, educators and certain researchers addressed various problems concerning educational quality. Numerous studies demonstrate that difficulties associated with distance learning or learning through online media may be mitigated by conducting frequent evaluations and reviewing the learning to ensure the program's quality (Kromrey et al., 2005); (Syauqi et al., 2020); (Garad et al., 2021); (Wijaya et al., 2021). Therefore, an assessment is required to be utilized as a guide and source of information for future practice, ensuring the quality of distance learning conducted by educational institutions.

Eseryel (2002) divides evaluation into six categories: goal-based evaluation, goal-free evaluation, responsive evaluation, system evaluation, professional review, and quasi-evaluation. Darassalam (2010) presents numerous assessment models, including Tyler's goal-centered model, goal-free evaluation models, the Hammond model, the management-oriented evaluation model, and the Context, Input, Process, Product

model (CIPP). The essential aspect of this model is that it provides a comprehensive view of each element by assessing the background, inputs, processes, and outcomes from all perspectives (Stufflebeam & Shinkfield, 2007). This paradigm allows for systematic evaluation while satisfying the broad needs of the evaluation. Furthermore, Tokmak et al. (2013) divide evaluation into three categories: macro, meso, and micro. Darassalam (2010) describes the CIPP model as a viable approach for answering crucial concerns concerning learning with electronic aid in the macro-level evaluation category. Tokmak et al. (2013) also advocate the CIPP model for testing learning utilizing electronic help or distant learning in a bigger system or context since it includes the complete depiction process, including gathering and delivering valuable information to analyze alternative information conclusions. As a result, the CIPP model is one of the assessment models that may be used to review the context, inputs, processes, and products of distance learning implementation to determine the quality of the learning.

Regarding the implementation of distance learning, the mathematics education study program at IKIP PGRI Bojonegoro, Indonesia, has been organized with the assistance of the Moodle learning management system in collaboration with Universitas Muhammadiyah Ponorogo, Universitas Muhammadiyah Kotabumi, Universitas PGRI Madiun, STKIP PGRI Bangkalan, and STKIP Taman Siswa Bima. To assist the mathematics education program at IKIP PGRI Bojonegoro, Directorate General of Learning and Student Affairs provides distance learning implementation funds. These awards are used to fund the implementation of educational research method lectures and other initiatives. In educational research methods, remote learning is based on semester learning plans collected from lecturers in educational research methods, and it uses a research-based approach in both synchronous and asynchronous modes that are fully integrated with the LMS Moodle.

Based on the foregoing, it is critical to conduct evaluation research using the CIPP model on research-based learning organized through the Moodle learning management system as reference material and efforts to improve the implementation of the next distance learning. This evaluation aims to observe and report the application of research-based learning structured using Moodle learning management system. As a result, these findings can provide an overview of the plan's appropriateness with implementing research-based learning organized using the Moodle learning management system as a type of remote learning implementation.

METHOD
Research Design

This study was conducted in the learning of educational research methods in the mathematics education study program at IKIP PGRI Bojonegoro, Indonesia. This investigated the evaluation of the quality of education/lectures using the CIPP model. This study employed a qualitative study with a case study research design.

Population and Sample/ Study Group/Participants

The subjects of this study were the dean of faculty, the head of the study program of mathematics education, lecturers of educational research methods, students, and IT operators. This study also utilized related documents from the faculty, study programs, and all documents available at Moodle LMS.

Data Collection Tools

This study was based on literature reviews, expert validation, and diagnostic tests that the instruments utilized in this study were developed. The data were triangulated by comparing information gathered using a variety of instruments, including checklists (Daniel L Stufflebeam, 2017), semi-structured interviews, audio recordings, observations, and document analysis.

Data Collection

Interviews, recordings, observations, and documentation were some of the information gathering techniques employed in this study, among others. The authenticity of the interview data recorded with audio for interpretation and analysis according to the rules must always be maintained.

Data Analysis

The study was carried out through document analysis, and it examined the background/context of the lecture system, including its vision, mission, graduate profile, and attainment of course learning goals, among other aspects. Researchers employed a list of 31 elements to identify inputs, such as resources, curricula, and material, to conduct their research (Stufflebeam, 2002). The researchers conducted two class observations to understand the process and input better. Additionally, researchers designed ten questions to be used in conjunction with document analysis to measure the value of the product and compare it to inputs and processes.

FINDINGS

Aziz, Mahmood, & Rehmen (2018) defined educational evaluation as the collection and analysis of data to ascertain the extent to which educational objectives have been met to make informed decisions. The purpose of this study is to evaluate the quality of research-based learning delivered remotely via the learning management system Moodle by utilizing the context, input, process, and product (CIPP) evaluation model.

Due to the qualitative nature of this research, the researchers conducted the thematic and content analysis. Observation checklists (Stufflebeam, 2017), document analysis, and semi-structured interviews in the form of audio recordings were used to collect data. The researchers gathered literature based on various indices to meet their study objectives; this material was then supplemented with thematic analysis of the data. The following are the topics that were discussed in detail.

Context

Stufflebeam (2017) defines context evaluation as examining the requirements, challenges, possibilities, and difficulties that exist in a specific situation. In terms of context, based on observations on Moodle, it was determined that the achievement of educational research methods courses is that students can design education research and develop educational research proposals based on the principle of novelty in the field of mathematics education with independent performance, quality, measurable, and avoid plagiarism, and present them with a responsible attitude. Here is a look at Moodle in relation to educational research methods for learning accomplishment.

Based on Figure 1, it can be observed that the course learning outcomes (CLO) are shown in the LMS Moodle so that students who are enrolled in educational research method courses understand the aim of the course. This is supported by the findings of interview excerpts with lecturers who are experts in educational research methods, as seen below.

P: What is/are your purpose(s) of displaying the CLO(s) in Moodle?
S: All right, it is to make the students who take the course know and understand the course's objectives.

According to observation and interview data, the educational research methods learning outcome is that students can design education research and develop educational research proposals based on the principle of novelty in the field of mathematics education that are independent, of high quality,

Fig. 1: Course Learning Outcomes

quantifiable, and avoid plagiarism, as well as present them with a responsible attitude. This is presented in Moodle so that students who enrol in the course understand the course's objectives.

Input

Input evaluation, according to Stufflebeam (2017), covers available and current resources to attain goals and meet needs. The study's findings revealed that the Learning Management System (LMS) utilized was moodle. Based on the findings of interviews with information technology operators at IKIP PGRI Bojonegoro, it was discovered that the usage of Moodle was based on the platform's benefits, especially since all actions integrated into this platform can be monitored using a manager's account. This implies that, in addition to instructors and students enrolled in these courses, third parties can oversee distance learning activities. These third parties could be members of the study program's quality assurance team. Unlike other platforms, parties who enter or become members of a group can learn about the activities in the group, so no other party can directly control all of the group's activities. This was confirmed through an interview with the head of the mathematics education study program. Here is an excerpt from the interview.

P: Why do you use Moodle instead of other platforms?
S: Yeah, it is because Moodle is one of the platforms recognized by the Ministry of Education and the first platform recommended by the government to maintain the quality of education in Indonesia during the pandemic. This is reinforced by a letter from the ministry of education related to reporting online learning performance, which in it mentions LMS that can be integrated with the online learning system in Indonesia is Moodle.
P: In addition to decreasing the number of covid-19 spread, what is/are the main reason(s) of the online learning system in Indonesia?
S: SPADA, also known as the Indonesia Online Learning System, is one of the projects of the Ministry of Research, Technology, and Higher Education's Directorate General of Learning and Student Affairs. To provide fair access to high-quality learning in higher education, SPADA Indonesia's online learning system allows students from one college to follow a high-quality course from another institution. The learning outcomes are recognized equally by the college where the student is enrolled.
P: About the Moodle platform developed in your institution, what does it look like so far?
S: In general, it can suit the demands of lecturers and students to organize online lectures as a container of course information. As a result, lecturers are keener to practice
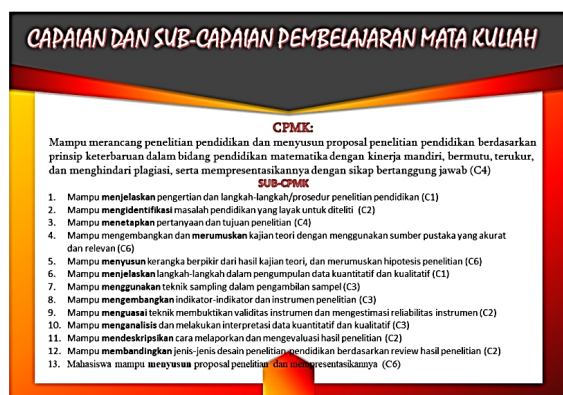
distance learning using this Moodle. Furthermore, the Directorate General of Learning and Student Affairs will provide two grants for online learning to this mathematics education program.

According to the findings of interviews with information technology operators and chairs of mathematics education study programs, the Moodle utilized in learning educational research method meets the demands of lecturers and students by allowing for the loading of a variety of material content.

eanwhile, in terms of the curriculum employed at the undergraduate mathematics education program, the Indonesian National Curriculum Framework is referenced. Mathematics education research method lectures are planned using Moodle by lecturers with doctoral/PhD degrees in education and research. Based on observations and interviews with the dean of faculty, it was determined that the learning device was developed by a working group of lecturers coordinated by the doctorate in educational research and evaluation and endorsed by the dean of the faculty of mathematics and natural sciences education. According to this report, students enrolled in educational research method courses came from IKIP PGRI Bojonegoro and Universitas Muhammadiyah Kotabumi. Additionally, the study demonstrated a balance between virtual and asynchronous synchronous learning since the lecture time was specified in the learning implementation plan.

Process

The term "evaluation of the research process" refers to the process of implementing research-based learning using Moodle and CIPP models. The primary purpose of process evaluation is to offer a description of all program activities (Stufflebeam, 2017). Additionally, the study examined the teaching and learning process from a synchronous and asynchronous perspective. The next sections discuss the findings in synchronous and asynchronous learning.

Asynchronous Learning

According to Amadea & Ayuningtyas (2020), Divayana, Heryanda, & Suyasa (2020), and Fahmi (2020), the implementation of teaching and learning activities carried out by lecturers and students did not take place at the same time. Asynchronous learning with LMS Moodle is often accomplished by distributing information in the form of files, learning videos, assignments, and presence. The next section described how asynchronous learning was integrated into learning. The course description is also included at the beginning of the LMS show. This is a look at Moodle.

The instructor appears to have described the course in the image above. Based on the appearance of Moodle and interview findings, it was determined that the presentation of course
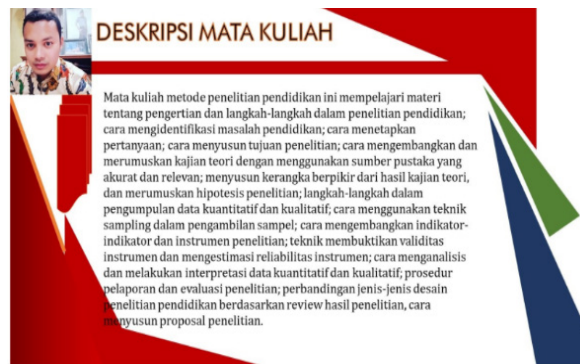

Fig. 2: The Display of Course Description in Moodle

descriptions is meant to provide students with an initial image of educational research method courses.

Amadea & Ayuningtyas (2020); Divayana, Heryanda, & Suyasa (2020); and Fahmi (2020) defined synchronous learning as the simultaneous execution of teaching and learning activities by lecturers and students. Educational research method courses are held to assist students in developing research skills by organizing research-based asynchronous learning by providing materials in the form of files related to educational research method materials related to the Definition and Importance of Educational Research. Understanding Research Problems, Criteria for a Problem Worthy of Research, Quantitative and Qualitative Research Problems, Understanding Research Objectives, Research Questions, and Research Hypotheses; Examples of Research Objectives, Research Questions, and Quantitative Research Hypotheses; Examples of Research Objectives and Research Questions on Qualitative Research Here's an example of the first meeting's display in the Moodle.

Each meeting is supplied with materials. As seen in figure 3 above, the lecturer distributes information in the form of files pertaining to the material's subject. The material is presented in the form of a powerpoint presentation. This ensures that students concentrate on the lecture topic throughout each meeting. The following is corroborated through recorded interviews with lecturers specialising in educational research methods.

1. P: What is/are your purpose(s) of giving instructional materials in one meeting?
S: It is just to facilitate students to focus on learning one certain topic before going through the next topic in-depth.

Along with PDF and PowerPoint materials, lecturers often supply instructional videos relating to the content presented. The length of the instructional video is limited to ten minutes to ensure that students are not overstimulated while watching the video. There are videos created intentionally by instructors who master courses, but academics also create videos from other universities via YouTube. This attempts to broaden the

Fig. 4: Video Capture in Moodle

Fig. 3: The Display of Meeting 1 in Moodle

P: Do you think that instructional videos will reduce students' boredom?

S: Yes, sure. I once sent them a questionnaire after they completed online courses. One of my questions was on the student's reaction to the video, which served as one of the learning materials. According to the survey results, 93 per cent of them believe that showing videos is not boring and prepares students for asynchronous learning.

Additionally, instructors provide specific projects on educational research methods, such as peer assessment of research proposals and papers. This is consistent with one of the features of research-based learning, which is to draw on cutting-edge discoveries and trace the history of their creation. This was confirmed in the following conversations with lecturers.

P: Why do you ask your students to review research proposals and articles?

S: Well, the main aim is to make the students familiar with research and its methodologies, of course.

P: Is there any correlation with the learning approach that you use?

S: Yes, of course. One of the teaching steps or syntaxes of research-based learning is using the research findings as learning resources.

Along with materials, instructional videos, and tasks, instructors on Moodle, also present a menu of attendance. Confirmation through interviews revealed that the accessible attendance option manages student attendance during lectures. Student attendance is assigned a 10% weighting in the grading system for the educational research methods.

According to the findings of the observations and interviews above, the educational research methods learning activities conducted by lecturers when asynchronous is to provide material in the form of files and videos related to the role of material and importance of research, quantitative research versus qualitative research, and topic selection for research. Additionally, lecturers assign publications for

scope of science gained by students via a variety of sources. Here is a video capture view that is incorporated with Moodle.

Kurniasari, Pribowo, & Putra (2020) discussed some benefits of asynchronous learning, including comfort, training duties, and flexibility to avoid oversaturating students. To facilitate the study of the topic of educational research method, lecturers frequently give instructional videos to ensure that students are not bored or dissatisfied with the asynchronous learning process. Additionally, instructors utilize asynchronous collaboration by providing a discussion area to examine the educational research method content presented by lecturers. This corresponds to the findings of the following interview excerpt.

P: What do you do to facilitate asynchronous learning in LMS?

S: I usually provide learning materials in PPt slides, PDF, and videos to not be boring.

evaluation. This is a syntactic adaptation for research-based learning. The Griffith Institute for Higher Education (GIHE) (2008) describes the research-based learning syntax as follows: 1) enriching teaching materials with lecturer research findings, 2) incorporating cutting-edge findings and tracing the history of their discovery, 3) incorporating contemporary research issues into learning activities, 4) incorporating research methodology materials into the learning process, and 5) incorporating activities into the learning process. Small-scale research, 6) enliven the learning process by involving students in institutional research activities, 7) enliven the learning process by encouraging students to feel a sense of belonging to the faculty's research culture, and 8) revitalise the learning process by instilling in students the values that researchers must possess. Thus, article evaluation is a critical step in retaining students in research.

Synchronous Learning

To facilitate the development of educational research design skills and the development of educational research proposals based on the principle of novelty in the field of mathematics education that are independent, of high quality, measurable, and avoid plagiarism, and are presented with a responsible attitude in synchronous learning, lecturers conduct meetings via google meet/zoom by initiating learning to relate to conveying learning goals, linking goals—connecting learning to the actual world and illustrative titles for quantitative and qualitative research publications. Additionally, offer detailed information about the educational research method's content. Additionally, it serves to conclude the learning process by reiterating the knowledge presented. This video capture demonstrates simultaneous learning via Google Meet.

In figure 5 shows, the instructor conducts meetings using Google Meet by introducing lectures to deliver learning objectives at the beginning of each session. Furthermore, he concisely explains the material that is connected to the subject of educational research methods. It is also important to wrap up the learning experience by reinforcing the information that has been presented. The following interview demonstrates that this is the case.
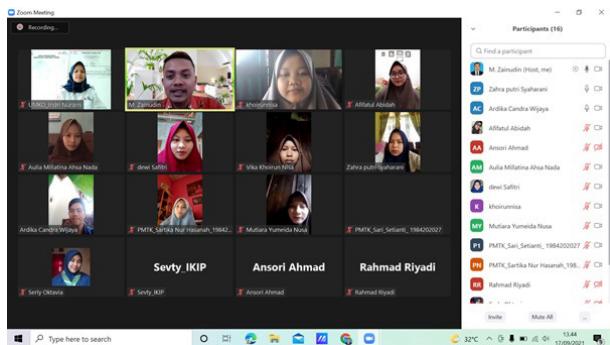

Fig. 5: Video Capture of Synchronous Learning on Google Meet

P: What do you do to facilitate synchronous learning?
S: I always made an online meeting via Google Meet in 20 – 40 minutes for each meeting.
P: What do you do in that online meeting?
S: I ensure the students that I am in. I am with them during the online learning process. I open the class, deliver learning goals, connect the topic with a real-life situation, explain materials, conclude the materials, and close the class.
P: How long is the duration?
S: Around 30 – 45 minutes.

Based on the findings of the observations and interviews, synchronous learning activities are carried out by lecturers who conduct meetings via Google Meet and begin lectures by conveying learning goals at the meeting and associating learning goals with real-world examples in the implementation of research. According to Divayana et al. (2020), the learning process is carried out by integrating direct contact between students and lecturers via an online learning community within a set time frame. In comparison, the utilization of Google Meet is dependent on the application's benefits. According to Purba & Sitanggang (2021); and Kurniawan, Zulianti, & Narulita (2020), Google Meet can assist lecturers and students engaged in learning activities in discussing or meeting interfaces or interfaces wherever they are by utilizing video conferencing with small and fast file size and a focus on efficient, easy-to-use management. Additionally, it serves to conclude the learning process by reiterating the knowledge presented. Additionally, instructors provide extensive information about educational research methods when students are learning them.

Product

According to Asadi, Akbari, & Samar (2016), product assessment is concerned with how well a person learns in a certain environment and how well goals are accomplished via experiences and activities structured in learning scenarios. Related to the evaluation of distance learning products in educational research method course using Moodle at IKIP PGRI Bojonegoro, and based on document analysis and interview results with lecturers who mastered the courses, the final outputs include questions to assess conceptual mastery, responses to questions regarding educational research challenges, quantitative study ideas, and midterm replies. These products are used to assess their suitability with the course learning outcomes. This is corroborated by the findings of an interview with instructors who specialize in educational research methods.

P: Why did you assign tasks dealing with concept mastery before the proposal writing task?

S: To facilitate students with basic theories of research, of course.

P: Based on students' proposal writing, what research approaches do students use?

S: The proposals were written before the mid-semester test; they usually write about quantitative approaches, such as experiment, causal-comparative, and correlational research.

P: How do you ensure that the students originally wrote the proposals?

S: I check the similarity index of each proposal. If it is more than 20%, I will reject it and ask the students to revise it.

Based on observation and interview data, educational research methods create questions to assess conceptual mastery, responses to inquiries regarding educational research topics, quantitative research ideas, and midterm answers. As a result, the proposal's plagiarism rate is limited to 20%.

DISCUSSION

Education with a quantitative approach based on the idea of novelty in mathematics education with autonomous, high-quality, quantifiable work, without plagiarism, and with a responsible attitude. Rizal & Walidain (2019) mentioned that the Moodle application is one of the easiest LMS devices to use because it has customizable e-learning features that can be used as learning support. Additionally, this study's findings indicate that including lecture materials, lecturers with relevant expertise, students who participate actively in each lecture, appropriate and effective procurement of synchronous and asynchronous learning, and the use of diverse learning methodologies and strategies has a significant impact on skills, attitudes, behaviors, and values when designing educational research and writing research proposals.

The findings demonstrate the enormous influence that context, input, and process have on student products. This is aligned with Darodjat & Muhammad (2015) and Fahruddin (2020)'s explanations that the relationship between context, input, process, and product is a logical sequence that impacts each other. A structured context will be fully realized if it is supported by suitable inputs and carried out through a learning process that utilizes all available resources to generate a meaningful or valuable outcome. The importance of a product in a program, specifically as a predictor of success, since the product may be utilized as one of the observer variables describing an individual's abilities in a given subject (Dewy et al., 2016). As a result, suitable inputs and procedures are required to produce a valuable output that may be used to create a context.

The review of the documents demonstrated that students participated in the activities and provided quantitative proposals. Students enrolled in the classes successfully assembled ideas in the field of education using experimental, correlational, and comparative designs. This is consistent with Al-ani (2015); Sari, Baedhowi, & Indrawati (2017); Ijrish & Shubber (2018); Herbimo (2021)'s explanations that Moodle management that can satisfy the demands of learners would influence the attainment of learning objectives. The study program helps students maintain the quality of their suggestions by providing Turnitin software to measure the similarity of their plans. The research findings also showed several unfavourable features, such as pupils being forced to produce projects and understanding numerous theories linked to the issue to be researched. Students are under much strain due to this rigid structure, which impairs their creativity and ability. Several subjects, for example, the usefulness of remembering multiplication, are less relevant to the present condition of education.

Furthermore, communication between lecturers and students has to be friendlier, and the timing of proposal guidance needs to be obvious so that students may be intensive in discussing ideas. Furthermore, professors place a greater emphasis on theoretical work and less emphasis on actual labor. This may be observed in the practice of creating a proposal for a single meeting.

CONCLUSION

The findings and discussion of this study led to the conclusion that learning is carried out entirely through a learning management system (LMS) called Moodle, which contains lecture devices (lesson plans; learning contract; teaching materials, including learning videos; assignment; attendance), which lecturers master with expertise in accordance with the course, which is carried out using a virtual synchronous and self-directed asynchronous learning approach, and which is collaborative. However, because the proposal assignment is given near the end of the program, the time required to complete it is typically extremely short. This does not appear to be sufficient to suit all the learners' skills. According to the instructor, students who tend to think slowly will be left behind in the completion of these assignments.

SUGGESTION

The researchers suggest that further study needs to be conducted to evaluate learning device specs to offer an overview of successful distance learning equipment. The further study may be undertaken on the specifications of assessment instruments for distance learning through Moodle, including the instruments' validity and reliability. Additionally, further study might be conducted on the criteria for implementing collaborative asynchronous learning and the associated impacts.

Limitation

The research is limited because when students collect tasks in the form of huge files, the learning management system crashes numerous times, interfering with the process of obtaining research data. Despite these constraints, the study advises that more storage space on Moodle is required and that students should transmit assignments in the form of file links that have been transferred to their drive.

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