



Evaluation of the moodle-based learning system applying the end user computing satisfaction method

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ABSTRAK

Pembelajaran elektronik dengan memanfaatkan perangkat teknologi seperti komputer, tablet maupun telepon pintar telah berkembang pesat pasca pandemic COVID-19 namun belum menghasilkan temuan yang konklusif. Maka, tujuan penelitian ini untuk menginvestigasi minat siswa terhadap sistem pembelajaran elektronik berbasis Moodle. Metode yang digunakan End User Computing Satisfaction (EUCS) dengan pengujian sistem pada Moodle dengan sampel penelitian 70 siswa. Moodle merupakan sistem pengelolaan pembelajaran elektronik dimana guru dapat menyusun mata pelajaran, membuat group kelas, memberikan materi (mengunggah materi), memberikan tugas baik berbentuk ujian, kuis, tes, mengumpulkan tugas, menilai tugas yang dapat digunakan secara sinkronus maupun asinkronus. Hasil uji EUCS menunjukkan bahwa setelah menggunakan pembelajaran elektronik minat siswa mengalami peningkatan sebesar 86,34%. Selain itu capaian hasil belajar siswa juga mengalami peningkatan signifikan. Penerapan e-learning berbasis Moodle meningkatkan minat siswa dalam belajar karena siswa dapat mengakses kapanpun dan dimanapun.

ABSTRACT

Electronic learning using is utilizing technological devices such as computers, tablets, and smartphones has developed rapidly after the COVID-19 pandemic but has not produced conclusive findings. Thus, the purpose of this learning is to investigate students' interest in Moodle-based electronic learning systems. The method used is End User Computing Satisfaction (EUCS) by testing the system on Moodle with a research sample of 70 students. Moodle is an electronic learning management system where teachers can arrange subjects, create class groups, provide material (upload material), give assignments in the form of exams, quizzes, and tests, collect evaluations, and assess assignments that can be used synchronously or asynchronously. EUCS test results show that after using electronic learning, students' interest has increased by 86.34%. In addition, student achievement also experienced a significant increase. The application of Moodle-based e-learning increases students' interest in learning because students can access it anytime and anywhere.



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INTRODUCTION

The rapid development of information and communication technology at this time has encouraged various educational institutions to utilize e-learning learning systems to increase the effectiveness and flexibility of learning. especially during the COVID-19 pandemic, many changes have occurred in human life where Indonesian people are required to keep their distance from one another and continue to do activities at home to prevent the spread of COVID-19 (Ritonga et al., 2020; Mudzakkir et al., 2021). Teaching and learning activities carried out in schools, or face-to-face conventional learning are now required to study at home using various media, there are whatsapp, zoom, and google meet with all learning online, so from this condition, we are required to use technology to avoid the spread of the covid-19 virus or often referred to as distance learning. Learning can be done by adjusting the capabilities of each school where the learning process can use and utilize digital technology such as learning using e-learning (Magdalena et al., 2020).

E-learning is a form of learning method that utilizes computer media and internet networks (Elyas, 2018). The use of e-learning is expected to motivate the improvement of the quality of learning and student teaching materials, and student independence, with students and teachers being able to communicate and discuss with other users (Prayogi et al., 2017). The form of information technology development that can be used as a learning medium is using e-learning which is one of the innovations that can be utilized in the learning process; in the delivery of material using e-learning, we can also use it as a change in abilities, and various kinds of competencies possessed by students.

Through e-learning, students do not only listen to material descriptions from educators but also actively read, observe, analyze, demonstrate, and so on (Jupriaman, 2021). Teaching materials can be designed in various formats so that they are more interesting and more dynamic so that they can motivate students to be more enthusiastic during the learning process, one of which is by using Moodle. With Moodle-based e-learning, it can provide instructors or teachers to manage and promote learning, namely by compiling subjects, creating class groups, providing material (uploading material), giving assignments in the form of exams, quizzes, tests, submitting assignments, assessing assignments and so on (Prihatin et al., 2021; Herbimo, 2020). Applying Moodle-based e-learning can increase student interest in learning, where teachers can provide learning materials that they usually cannot show in class due to time constraints (Ryan & Zulfah, 2021).

Previous learning using a centralized learning method that took place in a directed learning method like this sometimes makes students feel bored to understand the material being taught by the teacher. Learning media uses technology, namely zoom, google meet, WhatsApp where the material delivered is not structured in detail and the use of storage space is very limited, so it is necessary to develop learning to be more effective and efficient using Moodle-based e-learning. with materials and assignments as well as assessment and use of e-learning learning can be associated with any resources uploaded to one's server or available on the internet. Learning must continue to be developed following the current digital era, so that it continues to conduct research related to learning, in this case based on Moodle for implementing e-learning in learning. In the current digital era, it really supports the system in the learning process if the use of technology is used properly so that it can contribute highly to learning (Ritonga et al., 2022; Wiguna & Indrayani, 2022).

This research used the EUCS method for Moodle-based e-learning learning in student interest, which was analyzing e-learning user satisfaction (Pibriana & Fitriyani, 2022) by using a Likert scale regarding Moodle-based learning, so in this research, it is essential in developing learning media to increase learning innovation which one can use educators and students in a more active learning process because with Moodle this is in line with technological developments as the platform of choice because of its nature open source so that it is free to use and modify according to learning needs and desires that can be used online and offline.

METHOD

The method used in this study for the stages of making e-learning was the waterfall method. Then, for the analysis of testing the use of Moodle learning media using the EUCS method, which stands for End Use Computing Satisfaction, which consists of several variables (Pratama dan Hartomo, 2022), namely Content, Accuracy, Format (Mulya et al., 2020; Mariezki et al., 2021) while the analysis of testing on students namely increasing interest in learning in students by using qualitative and quantitative descriptive analysis techniques.

By first finding the percentage interval

$$1. I = \frac{\Sigma \text{respondent}}{\text{highest likert score}} \quad (1)$$

Analysis of the percentage of students learning interest using moodle-based e-learning

$$2. \text{index \%} = \frac{\Sigma \text{score}}{\text{Likert highest score}} \times 100\% \quad (2)$$

Waterfall method

The method in this study uses the waterfall, also called the classic life cycle. The waterfall method is a software development process in which the system is sequential and the completion process continues to flow down like a waterfall passing through stages, such as software engineering, analysis, design, implementation, testing, and maintenance (Figure 1). The waterfall method has an arrangement that must be passed with gradual stages that must be completed so that it can proceed to the next stage (Badrul, 2021; Achyani & Saumi, 2019).

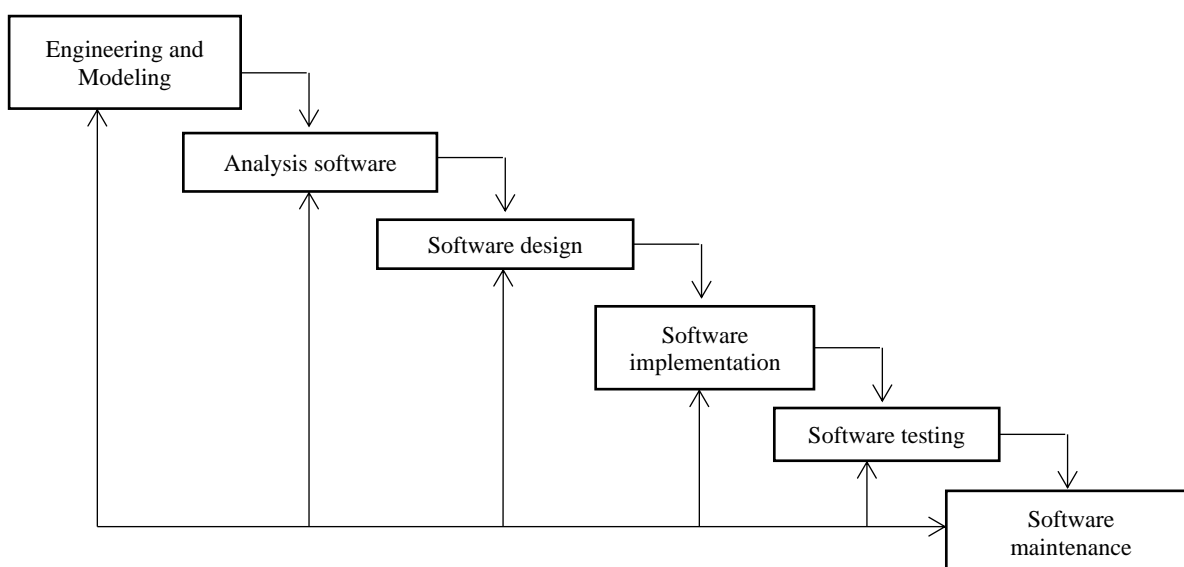


Figure 1. Waterfall method

The stages passed in the waterfall method by Sasmito (2017) that include several steps: Engineering and modeling are used for software needs in the manufacture of Moodle-based e-learning by collecting data related to the program to be made, this data collection is in the form of observations, interviews, literature studies. Furthermore, the design includes making learning flows and e-learning learning materials (Sani et al., 2022), the initial design of learning, design of input, design of output, then the design that is made is tested to run or there are obstacles such as errors then the next stage requires maintenance, including development, because the software that is made is not always just like that.

Learning model planning

The Global E-Learning Process Model is one way to structure the problems that indicate the need for engineering design documents. A logic model is a technique for organizing and documenting the structure and flow of data through a "process". The logical model is represented by a data flow diagram (DAD) (Wibowo et al., 2021) which is a global DAD (*context diagrams*) and lower-level DAD. The learning model planning is visualized in Figure 2.

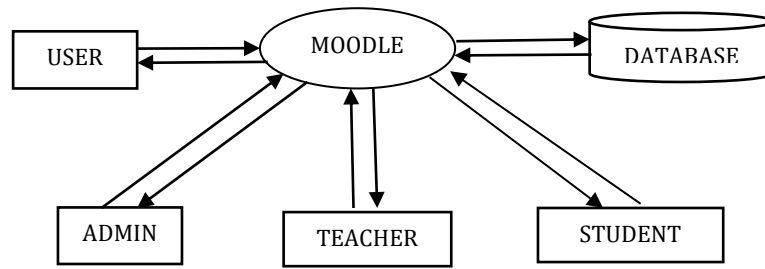


Figure 2. E-learning Process Model with Moodle

Modeling with use case diagrams describes the interaction of actors (humans) with the system, to understand what functions are in the system. Following are some use case concepts for e-learning systems, where this system has three actors namely administrators (admin), teachers (teachers), and students as shown in Figure 3.

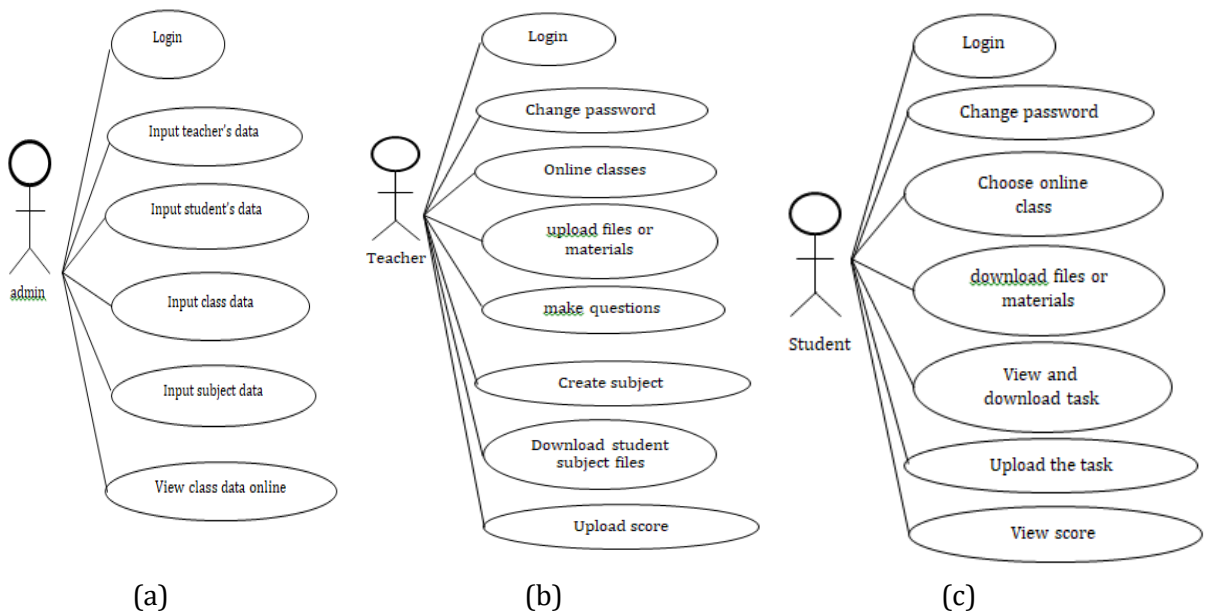
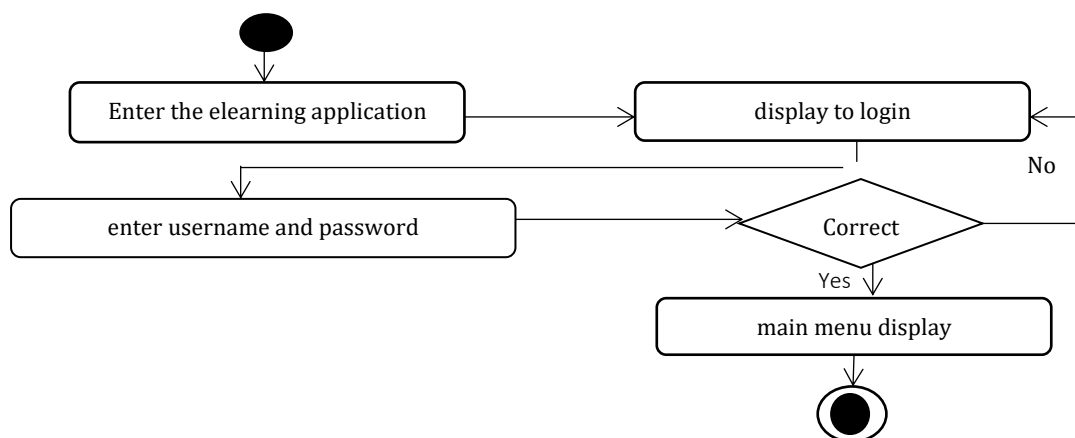


Figure 3. Admin use case diagrams (a), teacher use case diagrams (b) student use case (c)

After each user enters e-learning, menus related to the learning system will appear, and the process flow is analogous, that is, the activity diagram explains the process flow in activities (Saputra et al., 2022; Kurniawan, 2020). Figure 4 shows the activity diagram login user process.



(a) User (b) E-learning system
Figure 4. Login activity diagram (a) user, (b) e-learning system

Figure 4 shows the activity that all users enter using their respective usernames and passwords so if it is correct the main menu display appears with each class diagram according to the category of each user, for example, students can download material, do assignments, discuss forums, and chat for discussions. Class diagrams that can describe the structure and relationships between classes in a Moodle e-learning-based learning system consist of five classes, namely e-learning, admin, teachers, students, and class categories (Figure 5).

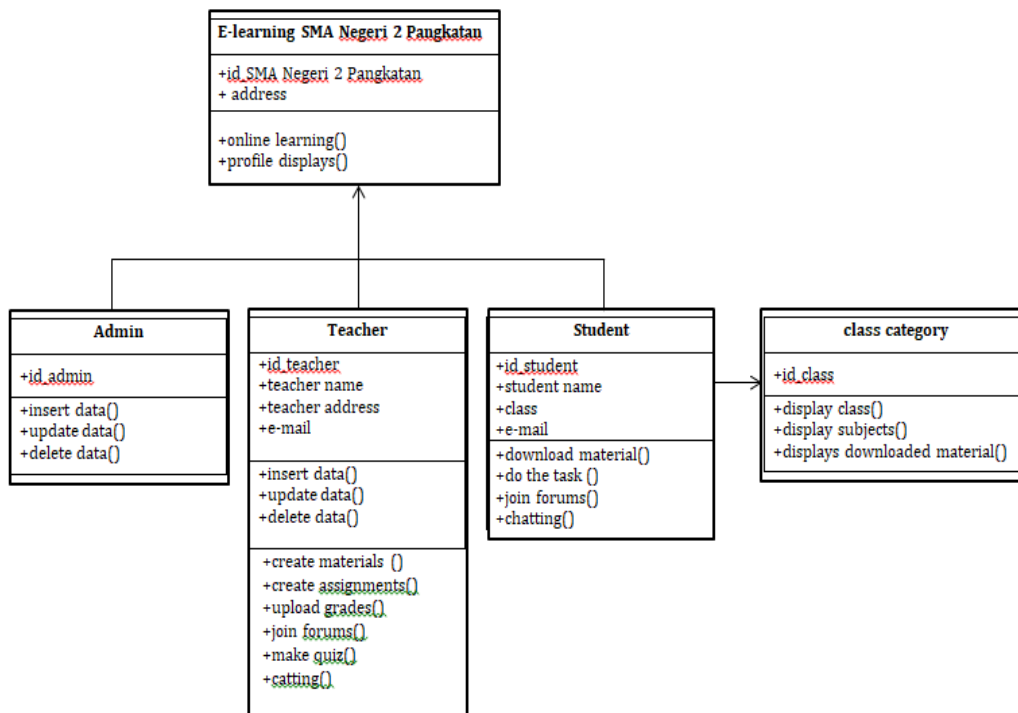


Figure 5. Class diagrams

RESULTS

Program display login page

The login page is useful for entering users who are already registered with SMA Negeri 2 Ranking e-learning, before the user enters the e-learning, they must first log in on the e-learning login page. Figure 6 displays the login on e-learning.

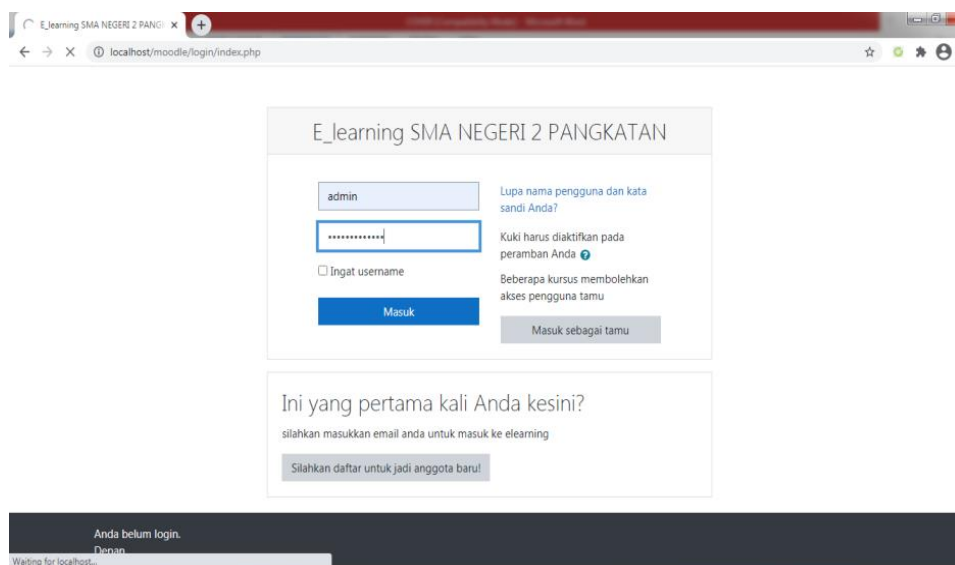


Figure 6. Login display on e-learning

Input display

1. First: Display user input Create a user with the file upload method by the administrator. Create a large number of users by following the following steps: site administration >> users >> upload users, a user upload form will appear, then fill in the requested fields, then upload users.
2. Both inputs are class categories as shown in Figure 7.

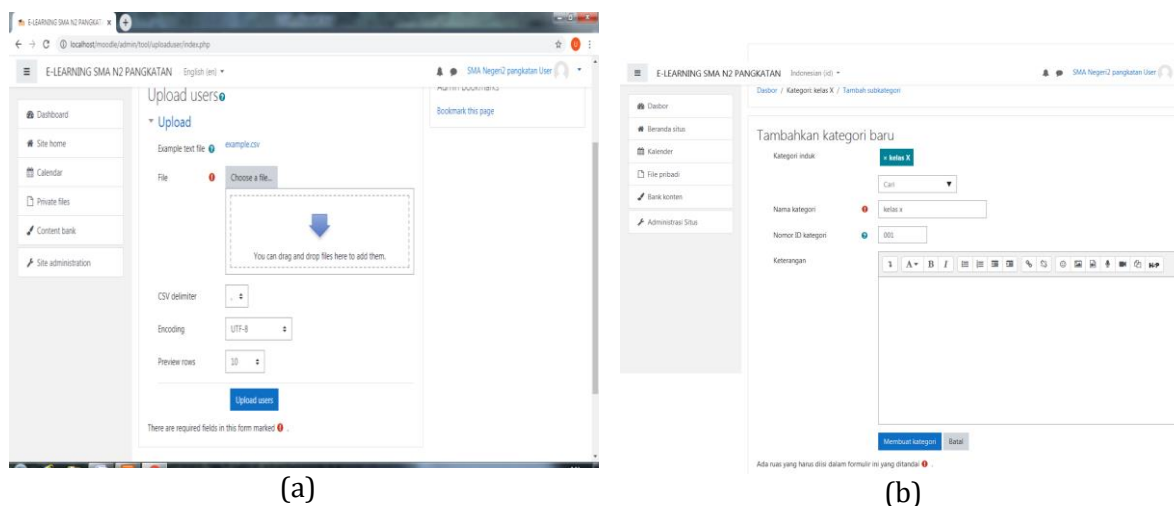


Figure 7. User input by uploading (a), Class category input display (b)

3. The input subjects (courses)

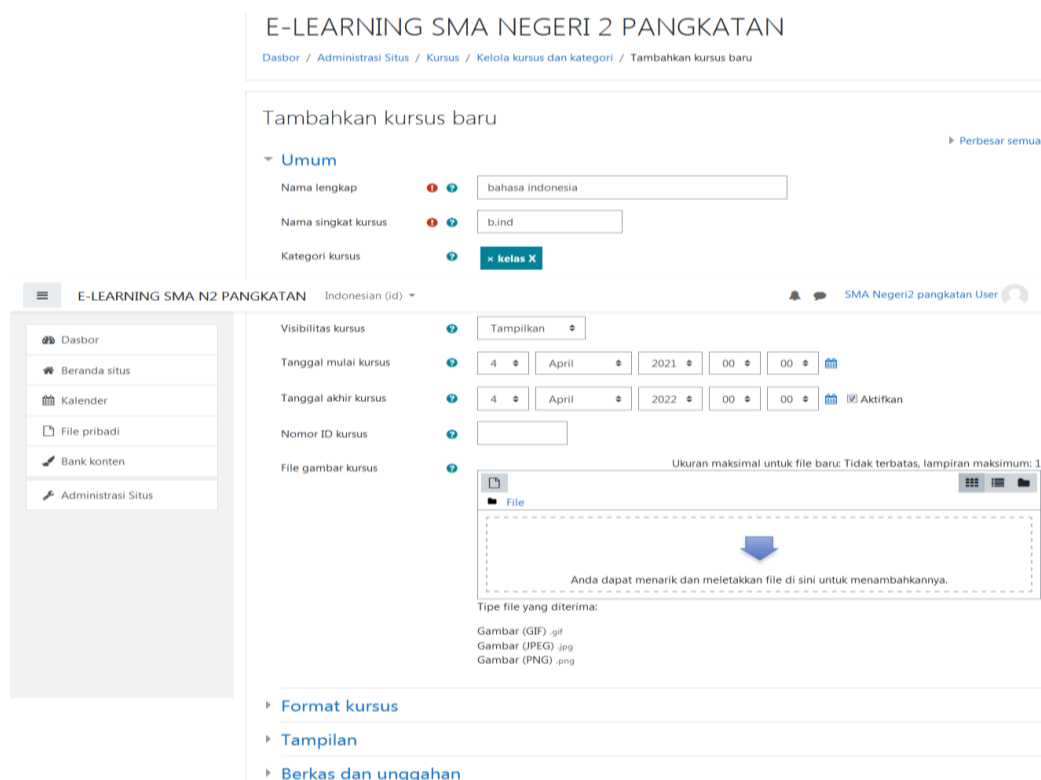


Figure 8. Subject input display

Figure 8 shows the process of entering subjects where each teacher can enter subject matter that is appropriate to the class entered and can immediately make a list of assessments and material to be studied. The result of testing learning programs is displayed in Table 1.

Table 1. Testing learning programs

Test name	Test form	Expected results	Test result
Link SMA Negeri 2 Rank	Open the app	Enter the display of the e-learning start page	Succeed
Testing the login menu	Fill in the username and password in the fields and press the login/log in button	If the username and password are correct, an e-learning display will appear. If they are incorrect, the password or password will be repeated	Succeed
Test add user	Adding users to e-learning	Users will be registered and can log in to e-learning	Succeed
Tests create classes on e-learning	Make class names that will be used and applied to e-learning	Can display classes that will be used in Moodle-based e-learning	Succeed
Testing add subjects	Make any subjects used in class	Can display subjects in each class	Succeed
Material upload testing	Fill in the material in the column you want to upload	can display material that can be downloaded	Succeed
Class menu testing	Create class names that appear in the column	Can display classes on e-learning	Succeed
Testing add subjects	Create and fill in the course column for the subjects used	Can display the subjects used in e-learning	Succeed
Testing quiz creation	Create and fill in the quiz you want to make in the quiz column	Can display Quiz and can be done by students	Succeed
Value menu testing	Press the value button	Displays the value of the results of assignments and student quizzes	Succeed

Output display

As for the display of output, the first displays the output of the user, as shown in [Figures 9](#) and [10](#).

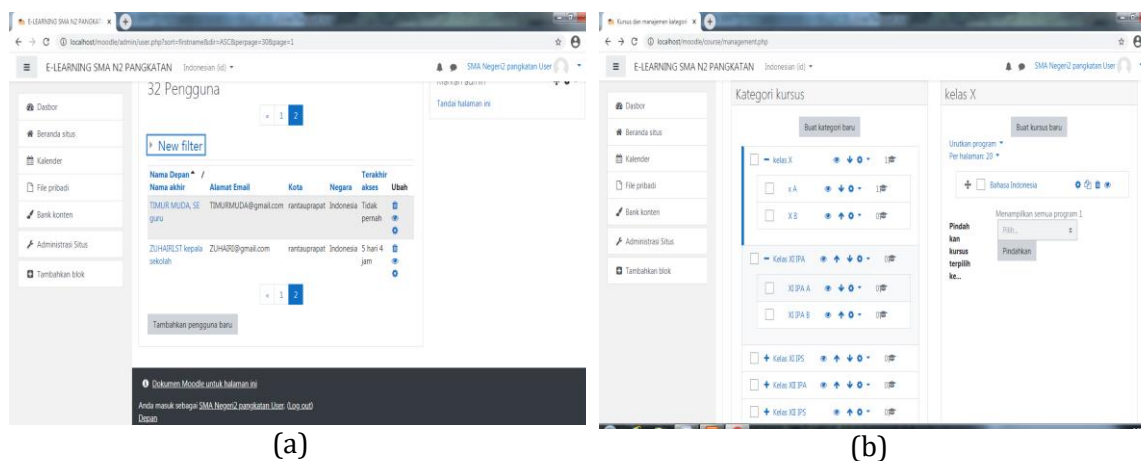


Figure 9. Display of e-learning user output (a), class list view (b)

Display output of subjects (courses)

In the output display of the subject, each user (student) can open it using the login code that has been owned. Then you can choose subjects according to a predetermined schedule, so that students can download course material files as reference material in broadening knowledge, and the use of technology as a medium in the advancement of education can be used very efficiently in increasing student interest. The results shown in [Table 2](#).

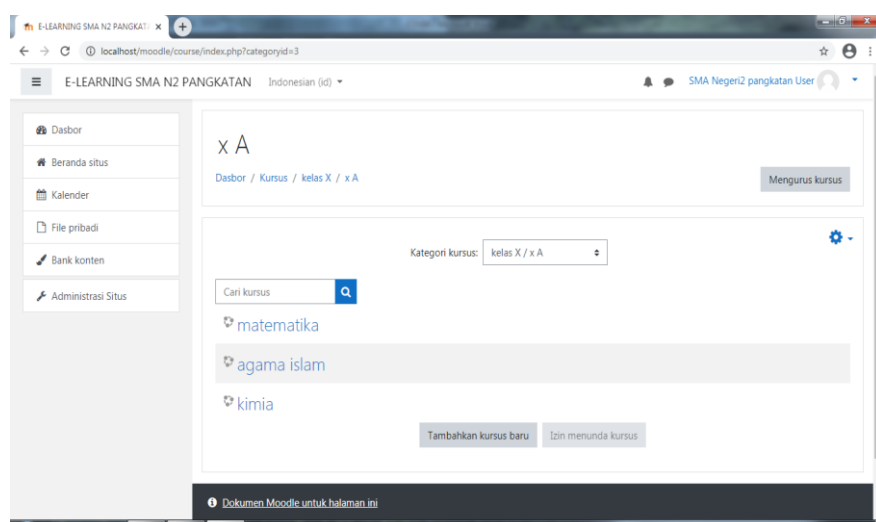


Figure 10. Display of the list of subjects

Table 2. Results of Questionnaire Analysis of Moodle-based e-learning students

No	Indicator	Likert Scale					Results (%)
		STS	TS	N	S	SS	
1	Moodle-based e-learning is fun			10	40	20	82.85
2	Easily accessible material on Moodle-based e-learning	1		4	15	50	92.28
3	Easily submit assignments in Moodle-based e-learning			8	50	12	81.14
4	Assignment grades and quizzes can be viewed directly in Moodle-based e-learning				30	40	91.40
5	Interact with user friends through discussions on Moodle-based e-learning			3	50	17	84.00
Average (%)							86.34

DISCUSSION

On the results of testing the program using the black box method (Ningrum et al., 2019; Wijaya & Astuti, 2021) from the research conducted by Kiki using the Powtoon media model, the results obtained were influential and effective in learning the text of the observation report (Murtiyastuti, 2022). Thus, done Hidayah (2022) results obtained a significant increase in the learning process by applying the macromedia flash player learning media. Online learning is an appropriate system for using technological media (Mahardika, 2022). So that learning using media needs to be innovated, the results of testing the program for each item used based on Moodle are successful in other words there are no errors in the data structure, performance, initialization and termination where testing for software quality focuses on data for each form item in the system e-learning are used in improving learning media to increase students' interest in the teaching and learning process (McFerran et al., 2017).

Moodle-based e-learning is one of the innovations in e-learning that can be continuously developed using the use of Moodle learning media, both admins, teachers, and students can innovate in every learning activity to be more fun and enjoyable because in Moodle-based e-learning students can read the material, there are quizzes, grades and so on, anywhere and can also discuss with fellow friends and teachers for each lesson. The teacher in this case will be assisted in delivering the material because it is not constrained by time (Utami et al., 2021). The research was conducted using Moodle for a STEM-based Management System with a score of 3.76, which was converted to 94% (Ibrahim et al., 2022). This is done by measuring e-learning software using usability, the result is a good satisfaction score with an average score of 5.75 on a scale of 1-7 (Nawawi & Rubedo, 2022).

In this study, Moodle-based e-learning was developed by adding features in learning that were previously only a few features so that it really attracted students' attention to learn and find

out the results of each activity they carried out. His research on Moodle [Mulya et al. \(2020\)](#) found that its use is still in the download of material. In this case, an evaluation of the Moodle-based learning system continues to be carried out where the addition of a list of grade features, discussions, and results on learning is carried out on student interests ([Riyani et al., 2021](#)). The analysis was carried out using indicators as study material to find out what percentage of students enjoyed or liked by applying the EUCS method, while the number of students as respondents was 70 people in each indicator question analyzed from students.

The use of this Moodle has been done before in learning English for listening which was done with effective results ([Irawan & Surjono, 2018](#)). So that the development of e-learning with Moodle is carried out by developing more complete features, then testing the results of students' interest in learning with a questionnaire using a Likert scale with the results showing that the analysis of students using e-learning based on Moodle average % obtained from the calculation of 86.34%. Based on the results of the testing students are very happy to learn.

The results of Moodle-based e-learning research reveal that the features in Moodle are good specific, have good content, attractive appearance, and can be developed by adding various desired features so that the support adequacy in Moodle-based e-learning is in addition to utilization. The use of technology will also increase students' interest in learning. This was tested using End User Computing Satisfaction (EUCS) which was carried out by 70 students as respondents with the results obtained 86.34% meaning that students' interest in learning increased.

CONCLUSION

Evaluation of the Moodle-Based Learning System with the EUCS Method: The use of e-learning in SMA Negeri 2 Pangkatan can assist in the teaching and learning process, one of the innovations of Moodle-based e-learning learning to continue to be developed, both in the form of admins, teachers and students in each learning activity becomes more fun and exciting without having to be in class or face to face. Moodle-based e-learning is very efficient to use as an innovative learning medium because it can be used offline or online so that the teaching and learning process can continue to be carried out in accordance with the material for the next discussion meeting. Based on the results of the questionnaire analysis given in testing the e-learning program both input and output with the End User Computing Satisfaction (EUCS) method to 70 respondents, an average of 86.34% was obtained, this means that e-learning moodle greatly increases students' interest in learning tall. Moodle-based e-learning research that is carried out is only subject content, group classes, uploading material, assignments in the form of exams, quizzes, tests, submitting assignments, and assessment assignments. It is hoped that further research will be further developed by adding Moodle e-learning learning features in the form of posters and videos as well as adding a calculator feature that is used to assist in more difficult calculation subjects so that Moodle-based e-learning learning is more complete.

Author contributions

The authors make contributions to Moodle-based e-learning with various conceptions and design. The authors are responsible for the analysis, interpretation of the data and the discussion and results. The final manuscript was read and approved by the authors.

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Conflict of interest

The authors declares that this research has no element of interest.

Data availability statement

All data are available from the authors.

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