Analysis of the moodle application instrument with the exam browser to measure online learning outcomes in digital communication simulation subjects

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A B S T R A C T

This study was used to determine the feasibility of the instrument before being used for further research. This study uses a quasi-experimental research design. In this study, to calculate the validation results from three validators who are experts in their fields using the arithmetic average, the validated instruments are: (1) the validation questions get 87.51% results; (2) validation of attitude assessment got 90.27% results; (3) validation of student skills assessment got 92.71% results; (4) the validation of the assessment of the Learning Implementation Plan (RPP) got 92.16% results; (5) validation of the syllabus assessment got 86.95% results; (6) Moodle assessment validation with browser exam got 87.25% results; (7) the validation of the student learning module assessment got 84.71% results; (8) the validity of the items is declared valid; (9) the reliability of the items is declared reliable; (10) the differentiating power of the items has very good criteria; and (11) the level of difficulty of the items showed that of the 40 items tested, the percentage was 35% (14 questions) in the medium category, and 65% (26 questions) in the easy category. From the calculation results that have been mentioned, the Moodle application instrument with a browser exam to measure online learning outcomes is declared feasible and can be used for further research.

INTRODUCTION

Along with the development of increasingly modern times, especially in the world of education, all the needs of the educator community are increasingly complex, so education by all means forms a system, strategy and educational process that is so diverse. However, even so, everything related to education, be it systems, strategies and processes in it, is nothing but to achieve one of the learning objectives in accordance with the rules of learning, as well as for the achievement of quality and quality education for prospective teachers as teachers. facilitator and students as objects in which the teaching and learning process takes place (Rahman and Amri, 2013).

How a learning activity from a student will be very influential in the progress of competence which will also change the results of student learning achievement. From this explanation, the teacher plays a very important role in changing learning outcomes, whether it will improve student learning outcomes, or vice versa (Widiasworo, 2018. Teachers are required to be able to master all the knowledge of students, in addition to the knowledge of -

teachers, they must also change the attitudes and behavior of students towards a better direction than before. Teachers must also master technology so that they are not far adrift with modern times, where the millennial era can be mastered by students today. Teachers must understand technology and the internet. In addition, teachers must understand about Distance Teaching, Distance Learning, and Distance Education. According to Keegan (in Rohman and Amri, 2013) states that the Distance teaching process seeks to develop quality self-study materials that can be used by educational institutions to provide lessons from afar. Distance learning emphasizes more on the student learning process. Meanwhile, distance education is a combination of the terms distance teaching and distance learning and is more appropriate to use. In the distance education system, students learn separately from the teacher, because the learning materials used must be specially arranged so that it is relatively easier for the students to learn themselves. The success of distance learning cannot be separated from the satisfaction, comfort, and understanding of students about the lesson, so that

students can easily digest what the teacher means in distance learning. Therefore, the teacher is a component that greatly determines the success of the learning process, the teacher should always present learning activities that make students interested in following it. This interest will make students more active in developing their curiosity in order to master certain competencies (Widiasworo, 2018).

(Muazizah, Nurhayati & Cahyono, 2016) conducted a study entitled the effectiveness of using Moodle-based e-learning with a guided inquiry approach to student learning outcomes. In this study, the results of the analysis showed that the average posttest results of the experimental class and the control class were 83.33 and 78.47, respectively. The data that has been obtained were analyzed by means of the one-party mean difference test which shows that t_{count} is greater than $t_{critical}$. This means that the average cognitive learning outcomes of the experimental class are better than the control class. The results of the affective and psychomotor qualitative analysis of the experimental class in each aspect were better than the control class. Based on the results of the study, it can be concluded that the use of Moodle-based e-learning with the Guided Inquiry approach is effective in improving student learning outcomes for high school hydrocarbons in class XI.

(Khoir, Murtinugraha & Musalamah, 2020) conducted a study entitled the development of moodle-based e-learning learning media in the research methodology course. In this study, the results obtained were a) Assessment by media experts got a score of 78.4% which was included in the appropriate category; and b) Assessment by material experts who get a score of 81.54% which is included in the very feasible category. From the results of this feasibility, it can be concluded that the E-Learning learning media developed is suitable for use as a variety of learning media for the Research Methodology course.

(Moreno-Ger et al., 2013) also conducted a study entitled "TrivialCV: Competitive Activities for the Classroom Integrated in a Moodle Virtual Campus". In the study it can be concluded that the results are successful from the point of view of student activity and participation during the sessions that have been shared and serve as a search for excellence for reviewing several courses. Students reacted positively to the initiative, and it has prompted researchers to organize new activities in later courses. For the next course, researchers will be more formal and natural in the final grades given to students.

Another relevant research was conducted by (Hasan et al., 2019) on "Gamified Collaborative Environment in Moodle". In this study, it can be concluded that adopting gamification in an online environment increases students' reactions and enjoyment. In this study, students reported that the gamified online discussion environment was fun and interesting compared to the traditional online discussion environment.

(Conijn et al., 2017) conducted a study on "Predicting student performance from LMS data: A comparison of 17 blended courses using Moodle LMS". In this study, we analyzed 17 mixed courses attended by 4,989 students in one institution using Moodle LMS. The results obtained are predictive models, despite the fact that they are collected in one institution, and the programs vary widely. Thus, the results of this study portability prediction model show a low number. In addition, this study shows that for the purpose of early intervention or when scoring values are between calculations, the LMS data has little additional value. This study outlines the implications of these findings and emphasizes the need to include more specific theoretical arguments and additional data sources other than just the LMS data.

(Zhu, 2017) conducted a study in China on "Construction of MOODLE Information Platform Database and its Application in Interactive Teaching of Grammar". and the knowledge of the student's English Grammar has improved greatly. (Salekhova et al., 2019) conducted a study on "Using LMS Moodle in teaching CLIL: a case study". In this study, it can be concluded that from registered users, 91% of all participants who had registered during the first week of the training opened. The site that this research conducted was able to penetrate a total of 923 participant visits. The largest number of visits was in the first two weeks of visits and was obtained by 23% of the participants and in the last week of the winter semester (45%). The content that is frequently visited is lecture notes that reach (18% of achievements), assignment content that includes audiovisual sources (48% of achievements) and discussion forums that reach (13% of achievements).

(Warin et al., 2016) conducted a study on "Multi-Role Project (MRP): A New Project-Based Learning Method for STEM" which uses the moodle platform because the MRP requires moodle as a database container, upload documents and provide multiple choice questions. The results showed that students applied the method well, developed close communication to coordinate the team and acquired technical and non-technical knowledge for a high level of satisfaction.

(Serrano-Cámara et al., 2015) conducted a study on "Modeling the Collaborative Instructional Framework CIF for LMSs by Using Educational Modeling Languages" which requires a Moodle 2.3 platform to order the CIF model. This study shows the results that (1) it does not support the standard C level of LD and only helps notifications between different users, (2) Reload LD editor only supports static content, (3) collaborative tools can be integrated in this study, and (4) Moodle allows to improve the accessibility and usability of the user interface and Moodle is very up-to-date and easy to use.

(De Medio et al., 2020) conducted a research on "MoodleREC: A recommendation system for creating

courses using the moodle e-learning platform". In this study it can be concluded that many users are interested in using the module for a (comparatively) good period of time, although only 46% of them actually use the feature. Finally the researcher should consider the limitations of the work described in this study, and possible future developments.

(Utakrit & Saelee, 2017) conducted a study on "Implementing Cooperative Learning Activities via Cloud Application to Enhancing ICT Literacy Skills of Vocational Teachers". In the study it can be concluded that all participants concentrated on integrating their creativity into their tasks to completion during the training days. Group formation demonstrated a positive impact on the participants' attitudes and how well they worked together. Based on this research strategy, the results of this study satisfy all stakeholders and can be used as a training model in the future.

(Pranoto, 2015) conducted a study on "Application of Moodle-Based E-Learning Learning Media in Building Science Subjects in Class X TGB SMKN 1 Kediri". In this study, it can be concluded, among others: (1) the results of the Moodle validation are 4.07 which are included in the good/valid category; (2) the results of the implementation of learning in the study obtained an average of 4.11 which was categorized as very sensual; (3) the average student learning outcomes were obtained at 83.1 which got the acceptable category, and (4) students' interest in moodle-based e-learning media got a percentage of 73.99%.

(Riyanto & Nugrahanti, 2018) conducted a study on "Utilization of the Moodle Application in statistical learning for informatics students". In this study, it can be concluded that statistical learning using the Moodle application got positive results and it is known that the student learning outcomes tested increased drastically. It can be concluded that statistical learning using the Moodle application is better than manual or conventional learning. (Wicaksana et al., 2020) conducted a study on "The effectiveness of learning using Moodle on the motivation and interests of students' talents in the midst of the Covid-19 pandemic". In this study it can be concluded that many students are skilled and talented in using Moodle. There are positive results for participating in the process evaluation course and learning outcomes of biology using Moodle. The number of positive responses given by students who take biology courses, and students feel that the Moodle application is suitable as a breakthrough for future learning media.

The final research was conducted by (Herbimo, 2020) conducting a study with the title of applying the Moodle application as a distance learning model. By obtaining the following results: (1) There is an increase in student learning outcomes with the application of problem-based learning models on the Travel Document competency in class X Hospitality Accommodation at SMK Negeri 4

Yogyakarta; (2) After being practiced, the Moodle application is possible as an alternative to distance learning, this is evidenced by three observations, the motivation and learning outcomes of students increase; and (3) Moodle application is very helpful for educators in interacting, this can be proven by the cognitive and psychomotor results of students in increasing stages.

LITERATURE REVIEW

Moodle

(Puspita Sari & Setiawan, 2018) explained that MOODLE (Modular Object-Oriented Dynamic Learning Environment) media is a cloud-based media that can be accessed via a computer or smartphone that must be connected to the internet. This media can also minimize the misuse of smartphones by students during the learning process in the classroom, as well as familiarize students with ICT-based learning to welcome the digital era where the National Examination is currently being carried out online. (Amiroh, 2012) also explained that Moodle is the most popular open sources program among existing e-learning programs, such as Atutor, eLeap Learning Management System (LMS), and so on. This moodle app was developed by Martin Dougiamas in August 2020.

Moodle is defined on its official website as an open-source learning platform, with mobile and cross-browser compatibility, designed to create easy learning between teachers and students, viewable from the administrator's perspective, a strong and secure system that avoids cheating, and an environment learning that can be adapted to the surrounding environment (Esnaola-Arribillaga & Bezanilla, 2020). As for the things that can be done to make the appearance of e-learning more attractive and easy to operate as a medium in managing learning, namely by changing the type of theme, adjusting the appearance, and creating and managing menu facilities. which is simple, attractive and easy to operate. Both the theme, appearance and menu facilities available on the e-learning page that were developed were based on considerations of their usefulness and benefits for media managing learning (Hakim, 2018).

The ease of using learning media is an advantage and also one of the main factors that students and lecturers want to use Moodle e-learning media. Because, when a Moodle e-learning media is difficult to use, then this will be used as an excuse not to use Moodle e-learning media as a substitute for learning that is usually done in class (Natasia & Puspitasari, 2020).

Exam Browser

Miller, Vandome, McBrewster (in Schneider et al., 2012) state that exam browsers are kiosk software (can be called software services that cannot be pressed or released without pressing the appropriate button in the command)

that allows very secure control of browser components available, where Exam Browser is based on XULRunner (which is on the firefox/mozilla engine) and WebKit (which is on the safari engine).

Exam Browser is a browser software (exambro) based on Android by closing access to permissions for existing features on mobile phones. (Panyahuti et al., 2019). Sarrayrih and Ilyas (in Fegasanti and Priyatmojo, 2020) said Exam Browser is an application packaged in All in One Moodle CBT or AIOCBT mode which is a program to run computer-based exams but can also be accessed using Android/iOS. more flexible because it does not require a wired network.

Output Learning

(Cedefop, 2017) provides two interrelated definitions of the discussion of learning outcomes:

1. Learning outcomes are defined as statements about what students know, understand, and can do after completing the learning process, defined in terms of knowledge, skills and competencies.

2. Furthermore, learning outcomes are also defined as a set of knowledge, skills and or competencies that have been obtained by a person and can be demonstrated after completing the learning process, whether formal, non-formal or informal.

(Lonanda et al., 2017) explains that learning outcomes are the values generated in the learning process. So the teacher will make a decision whether the students have understood or vice versa in the learning process that has been discussed by the subject teacher. The learning outcomes are changes in behavior as a result of learning in a broader sense covering the cognitive, effective, and psychomotor fields (Mansur in Muflihah, 2021).

(Sulastri et al., 2015) also participated in explaining that learning outcomes are assessments that assess the learning process that has been carried out for a long time, it could also be that the learning outcomes will be stored and will not be lost because learning outcomes help students turn into individuals. who know more about the knowledge about the learning they have experienced so that students are processed to be even better than before.

According to (Widodo & Widayanti, 2013) the low student learning outcomes are thought to be caused, among others, due to: (1) the low understanding of students in receiving the lessons given by the teacher, making it difficult to answer questions; (2) there has not been an active atmosphere in the discussion, and (3) the lack of direct student involvement. Some students answered questions hesitantly, students' courage to express opinions and ask questions was also lacking. Teachers also more often teach by the lecture method. In addition, the lack of laboratory facilities makes it rare to carry out practical activities. Due to the rarity of practicum activities, the teacher only evaluates the cognitive aspect.

The value of learning outcomes is one indicator that can be used to measure a person's learning success. The value of learning outcomes reflects the results achieved by a person in terms of cognitive, affective, and psychomotor. In the teaching and learning process, there are many factors that influence the achievement of student learning outcomes, both from within students (internal) and from the outside environment (external). Internal factors are related to discipline, response and student motivation, while external factors are the learning environment, learning objectives, creativity in the selection of learning media by educators and learning methods. These factors influence each other and form a unity that underlies student learning outcomes (Maisaroh & Rostrieningsih, 2010).

Based on the description of the factors that affect student learning outcomes, it appears that learning is a complex process. Many factors influence it. The effort that needs to be made is to make the above factors positive, so as to support the achievement of maximum learning outcomes. Student learning outcomes can be known if the evaluation of teaching and learning activities is carried out. With the implementation of the evaluation, it can be seen the extent to which the mastery of learning materials that have been owned by students (Suwasti, 2016).

MATERIALS AND METHODS

This study uses a quasi-experimental research design. (Hastjarjo, 2019:195) also stated that the experimental research design is a control group design that does not receive treatment with the same pre-treatment and post-treatment samples accompanied by two pre-treatment measurements (untreated control group design with dependent pretest and posttest samples using a double pretest). (Jaedun, 2011:9) revealed that there are several kinds of experimental research designs, namely: (1) weak experimental designs; (2) the actual experimental design or can be called a pure experiment (true experiment); (3) quasi-experimental design (quasi-experimental); (4) pre-experimental design (pre-experiment); and (5) single experimental design.

In this study, the so-called independent variables are independent variables (moodle with exam Browser). The Moodle application is one of the LMS tools that is very easy to use because it provides e-learning features that can be modified according to needs as a learning support. (Rizal & Walidain, 2019:181)

The dependent variable is a variable that is influenced or as a result of the existence of an independent variable. In this study, the so-called independent variable is the Y variable (learning outcomes).

While the control variables in this study were learning tools, implementation time, teachers as teachers, curriculum used, learning facilities and infrastructure used in research in the experimental class and control class.

According to (Sugiyono, 2018:130) population is a generalization area consisting of objects, subjects that have certain quantities and characteristics that are applied by researchers to be studied and then drawn conclusions. The population in this study were all students of class X Multimedia expertise program at SMKN 1 Lamongan with the basic competencies applied in this study were to apply logic, and data calculation operations.

Meanwhile, according to (Sugiyono, 2018:131) the sample is part of the number and characteristics possessed by the population. If the population is large, and the researcher is not able to study everything in the population, for example due to limited funds, manpower and time, the researcher can use samples taken from that population. The sample in this study were students of class X Multimedia 1 which was used as an experimental class by using the Moodle test media with an online exam browser.

In this study, the data collection techniques used were: (1) interviews, (2) observations, (3) tests and (4) observation sheets of students' attitudes and responses to the Moodle application and exam browser.

Data collection techniques using tests aim to measure, although several forms of psychological tests, especially personality tests, are descriptive, but the descriptions lead to certain characteristics or qualifications so that they are similar to the interpretation of the measurement results themselves (Sukmadinata, 2012:223). The test used in this study is a test measuring learning outcomes.

The learning outcomes instruments used were pretest and posttest questions consisting of 40 multiple choice questions with 4 multiple choice answers and 5 essay questions. Pretest questions are given to students before students are given the material to apply logic, and data calculation operations that aim to determine the students' initial ability regarding the material to apply logic, and data calculation operations. Posttest questions are given to students after students are given the material to apply logic, and data calculation operations to measure students' abilities after students learn the material. The levels of cognitive domain learning outcomes consist of: (1) remembering (C1), (2) understanding (C2), (3) applying (C3), (4) analyzing (C4), (5) evaluating (C5), and (6) create (C6).

RESULTS AND DISCUSSIONS

4.1 Aspects of the assessment of questions that are used as validation materials include: (1) material; (2) construction; (3) language. Validation of the assessment of the questions obtained results of 87.51% and received valid criteria and was very feasible to use.

4.2 Aspects of attitude (affective) assessment that are used as validation materials include: (1) instructions; (2) clarity; (3) content accuracy; (4) content validity; (5) no bias; (6) language; (7) construction. The validation of the attitude assessment got 90.27% results and got valid criteria and was very feasible to use.

4.3 Aspects of skill assessment (psychomotor) that are used as validation materials include: (1) instructions; (2) clarity; (3) language. Validation of the skill assessment got 92.71% results and got valid criteria and was very feasible to use.

4.4 Aspects of the assessment of the learning implementation plan (RPP) that are used as validation materials include: (1) clarity and completeness of identity; (2) the formulation of indicators and learning objectives; (3) the suitability of learning objectives; (4) sentences and grammar. The validation of the assessment of the learning implementation plan (RPP) obtained 92.16% results and obtained valid criteria and was very feasible to use.

4.5 Aspects of syllabus assessment used as validation materials include: (1) appearance and layout; (2) content; (3) learning resources; (4) language. The validation of the syllabus assessment got 86.95% results and got valid criteria and was very feasible to use.

4.6 Moodle media assessment aspects with browser exams that are used as validation materials include: (1) software; (2) visual communication; (3) language. The validation of the Moodle media assessment with the browser exam got 87.25% results and got valid criteria and was very feasible to use.

4.7 Aspects of student learning module assessment that are used as validation materials include: (1) characteristics; (2) content accuracy; (3) illustrations; (4) language; (5) formats; (6) appearance (cover); (7) manners. The validation of the student learning module assessment got 84.21% results and got valid criteria and was very feasible to use.

4.8 The validity of this item consists of 40 questions on the basic competence of applying logic, and data calculation operations, which have been tested on 20 students in other classes. Based on the results of the validity of the items that have been calculated using SPSS version 23, it was found that from the 40 items tested, the significance level (α) 0.05. Thus it can be concluded that the items to be tested are declared valid and feasible to use.

4.9 The reliability of this item uses the Cronbach's Alpha formula which is calculated through the SPSS version 23 application. The complete validity results of the item can be seen in table 4.1

Table 1. Item Reliability Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.934	40

Reliability test is used to test the level of consistency of the questionnaire. The reliability test used in this study is Cronbach's alpha technique. A questionnaire is said to be reliable if Cronbach's alpha value is > 0.60. (Kurniawan in Triana & Oktavianto, 2013: 189)

4.10 On the differentiating power of this item, it uses the product moment formula which is calculated through the SPSS version 23 application. Based on the results of the difficulty level of the items that have been calculated using SPSS version 23, it was found that of the 40 items tested, a percentage of 35% (14 questions) in the category medium, and 65% (26 questions) in the easy category.

4.11 At the item difficulty level, this item uses the product moment formula which is calculated through the SPSS version 23 application. medium, and 65% (26 questions) in the easy category.

CONCLUSIONS

Before conducting research, it is very important to analyze the instrument to be used, whether the instrument is valid and feasible to use. So this research was carried out before the instrument was tested, the instruments analyzed were as follows along with the results of the researcher's analysis: (1) the validation of the questions got 87.51% results and could be used when conducting research in the field; (2) validation of attitude assessment obtained 90.27% results and can be used when conducting research in the field; (3) validation of student skill assessment got 92.71% results and can be used when conducting research in the field; (4) validation of the assessment of the Learning Implementation Plan (RPP) obtained 92.16% results and can be used when conducting research in the field; (5) validation of the syllabus assessment obtained 86.95% results and can be used when conducting research in the field; (6) the validation of the moodle assessment with the browser exam got a result of 87.25% and can be used when conducting research in the field; (7) the validation of the student learning module assessment got 84.71% results and can be used when conducting research in the field; (8) the validity of the items is declared valid; (9) the reliability of the items is declared reliable; and (10) the differentiating power of the items has very good criteria; (11) the difficulty level of the questions can be obtained that 35% (14 questions) are in the medium category, and 65% (26 questions) are in the easy category.

Acknowledgement

Author's Contributions

All authors discussed the results and contributed to from the start to final manuscript.

Conflict of Interest

The authors declare that they have no competing interests.

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