

The Effectiveness of Utilising Web-learning Media Towards Islamic Education Learning (PAI) Outcome in The Era of Industrial Revolution 4.0

Dina Mardiana¹, Daniar Chandra Anggraini²

¹Faculty of Islamic Studies, University of Muhammadiyah Malang

²Student of Faculty of Islamic Studies, University of Muhammadiyah Malang

Corresponding Author: dinamardiana@umm.ac.id

This study aims to analyse the effectiveness of e-learning in the Al-Irsyad Al-Islamiyyah Women's Junior High School in Malang. The study was conducted on students in grades VII at the school, by using a quantitative approach and a research survey. The primary data sources were students in grades VIIA and VIIB, school web data and teachers. The instruments of data collection used questionnaires, observation and documentation of archives in Al-Irsyad Al-Islamiyyah Women's Junior High School in Malang as the object of research. Sampling data sources is done purposively. Data were analysed using a test instrument validity, reliability test, as well as a descriptive analysis of data pre-test and post-test. Furthermore, the data elaborated and described T-test using SPSS 21,00. The results of the study show that the class learning based on the e-learning strategy in the experimental class (VIIA) is more effective than learning in the control class (VIIB) in terms of student learning

outcomes. Through the calculation of normalised gain values between the experimental classes, it shows a higher number than the control class, namely $g = 0.70$ in the experimental class and $g = 0.60$ in the control class.

Keywords: Web learning, Islamic Education Learning (PAI), Industrial Revolution 4.0

INTRODUCTION

The quality of education that develops at the certain scope of society process, can be seen from the intellectual level that is happening in the community (Mead, 2008), especially in communities with high levels of heterogeneity (Sutinen, Kallioniemi, & Pihlström, 2015). In a general scope, the level of heterogeneity can be found in a world community based on knowledge (knowledge-based Society) (Warsita, 2008), which with the globalisation and progress of science and technology today, becomes a form of community that is no longer insulated by distance and territorial boundaries. Based on the description before, it can be said that the quality of public education in the world can be assessed through the intellectual process which currently stands at 4.0 era of the industrial revolution, characterised by digitisation (Suwardana, 2017) and digital competence (Ibda, 2018).

The progress of science and technology which is reflected in the era of Industry 4.0, becomes a case challenging that educational institutions, especially for the adaptation, should be done regarding two things. First, educational institutions should be a blueprint for students who can develop their potential, to have religious-spiritual power, intelligence, and the skills needed by themselves, society, nation, and state. The educational goals can be achieved by increasing the competence of teachers through training (Bahrissalim, 2018). Also, educational institutions have an important role in forming students' self, intellectual and social ideal prototypes. Second, educational institutions must have self-availability at the technical-implementation level (methods and technical learning in the classroom) (Prastowo, Mujadi, Purnaida, & Santosa, 2018), learning support facilities, etc.), as well as conceptual-managerial (curriculum



used in educational institutions, governance of teacher empowerment and employees, etc.), so as to accommodate learning needs in the current Industrial 4.0 era.

Among the characteristics that can be observed from the era 4.0 learning model is the IT-based learning process. Research is related to IT-based learning, for the effectiveness of its application in educational units, some of which are still focused on mere descriptive normative aspects. The effectiveness of learning, for example, is aimed at the implementation in the form of a percentage of respondent data regarding responses to the use of Information Technology in the teaching and learning process, as research conducted by Hanna concluded the ineffectiveness of IT-based learning media in PAI learning (Hanna Ashroffie, 2014). Other research that has a point of view on aspects of effectiveness of the application of information technology (IT) in education, carried out by Hubalovsk, who in his research said that e-learning can be done at the level of primary education with caring individual abilities possessed by each learner. Through such research, one can see the importance of the utilisation of Information technology in the learning process (Hubalovsky, Hubalovska, & Musilek, 2019).

On the other hand, government regulation - both central and regional - through Law No. 20 of 2003, Law No. 14 of 2005 concerning teachers and lecturers of Minister of Education and Culture No. 16 of 2007, Regulation of the Minister of National Education (Permendiknas) of the Republic of Indonesia Number 41 of 2007 (RI, 2007) and Permendiknas No. 78 of 2009, have provided sufficient space for educational institutions to implement e-learning as one of the media to align IT-based learning needs in the industrial era 4.0.

Among the education units that have implemented the regulation in the teaching-learning process is Al-Irsyad Al-Islamiyyah Woman's Junior High School in Malang. The school is under the auspices of the Al-Irsyad Al-Islamiyyah Malang foundation located on Arief Margono Street Number 11 Malang City. The foundation houses several educational institutions below it, including the level of Elementary School (SD) and Junior High School (SMP). In addition to Islamic values that are used as the basis of the learning process, more points possessed by Al-Irsyad Al-Islamiyyah Woman's Junior High School are the use of Information Technology (IT) carried out through e-learning as learning media in the web form. Numerically, the number of students who carry out the teaching and learning process in this

school shows an increase from year to year. Of the 16 students in the 2015/2016 period, now there are 87 students in the 2018/2019 period, indicating that the presence of the concept of e-learning in Al-Irsyad Al-Islamiyyah Woman's Junior High School began to get a positive response from the community using education services. An observation carried out during the research shows that web-based learning in educational units is carried out in three forms, namely teaching and learning activities in the classroom, assignment, and evaluation of the results study. Through the web address, akademik.alirsyadmalang.org has prepared an online-based learning system tool that can monitor all the activities of students, both when learning in the classroom, while working on assignments, or while carrying out examinations. Some of the features on the web can facilitate both teachers and students in several academic activities, including the question module, assignments, examinations, and final evaluation results. E-learning web start page view implemented by Al-Irsyad Al-Islamiyyah Woman's Junior High School is presented in Figure 1.

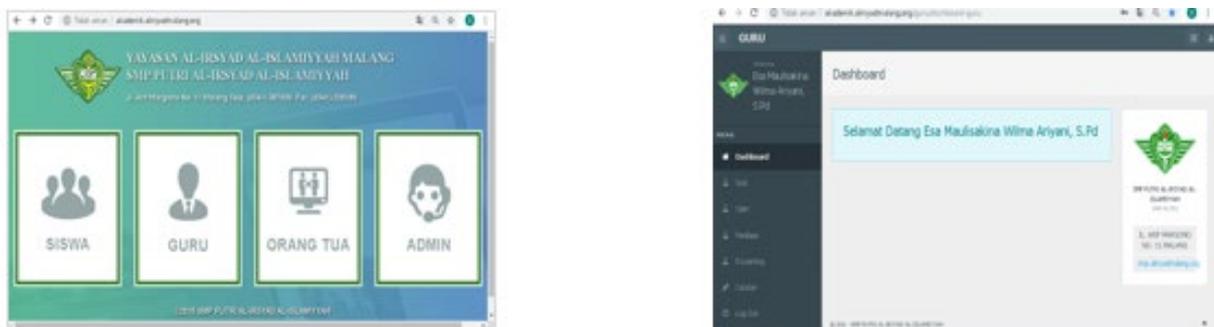


Figure 1. Display of web pages

Al-Irsyad Al-Islamiyyah Woman Junior High School in Malang

The application of e-learning through the school web has been supported by the internet and electronic media in each class, as well as provision for students' notebooks for teaching and learning activities in schools. The superiority of this school is how the use of IT is carried out through the cyber class. Through this concept of the cyber class, Teaching and Learning Activities (KBM) is implemented based on IT, including learning media and evaluation of learning outcomes that are paperless.

Based on the description above, this study aims to analyse the effectiveness of the implementation of e-learning-based on teaching and learning processes with research questions: How is the effectiveness of the use of e-learning in teaching and learning activities (KBM) on the learning outcomes of students in Al-Irsyad Al-Islamiyyah Women's Junior High School in Malang?

Searching for the previous research results, which have relevance to the research theme, begins with scientific work that discusses the theme of e-learning. Departing from the definitive concept, a paper created by Moore, Deane, Galyen gave a classification of definitions of three terms: e-learning, online learning, and the distance learning environment. The conclusion of the research states that there are differences in perceptions and expectations of 43 respondents, regarding the definition of e-learning, online learning and distance learning (Moore, Dickson-Deane, & Galyen, 2011).

The implementation domain in the form of a model, is conducted by Yudi Prayudi in his research. He also examines an e-learning evaluation model called eLRI (e-learning Readiness Index), which with the evaluation model, is able to provide analysis of strengths and weaknesses (strength and weaknesses of ICT in a country) (Prayudi, 2009). Factors supporting the success of e-learning as a curriculum model became the research topic of Hassan Selim concerning four categories, namely instructors, students, elements of IT and support from the university. The result, 8 elemental categories can support the success of the e-learning based curriculum model (Selim, 2007).



Furthermore, the aspect of implementing e-learning as a media was reviewed by Mohammad Yazdi in his research, who examined the efforts that could be made to create interactive learning, one of which was through module media application based on IT (Yazdi, Department, Faculty, and Science, & Nature, 2012). In line with this, the application of e-learning as a media was also used as a research topic by Darmayanti *et al*, who reviewed the implementation of the internet-based online learning with research objects at the Open University. (Darmayanti, Setiani, & Oetojo, 2007) . Other research that raised the theme of e-learning as a media was carried out by Suryani who classified IT-based learning media in a variety of ways, including computer network technology, multimedia, computer technology, and communication (Suryani, 2016). Based on previous studies that discussed e-learning, it was seen that the study conducted revolved around three things, namely conceptual-definitive discussion, e-learning as a model, and e-learning in the context of the media.

The second topic which was the previous study of this research, is in the terminology of industrial era 4.0. It began with the idea that was conveyed by Muhammad Yahya about the opportunity to face the era of industrial revolution 4.0 through a new literacy movement in the form of digital literacy, technology literacy, and human literacy (Yahya, 2018), as well as -as the conclusion of Harto's research- by increasing four competencies (digital knowledge; leadership; situational management; self-control management) (Harto, 2018). Another option in facing the challenges of era 4.0 was stated by Priatmoko in his research, which provided a solution in the form of a concept that he called the term self-discipline through three steps: changing the old mindset with a bureaucratic pattern; the application of self-driving in innovation and; reshape or create in all aspects that occur in the industrial era 4.0 (Priatmoko, 2018).

Due to this research including quantitative research inside it, the data have been obtained, elaborated and described by a T-test using SPSS 21,00 to determine the final score of the data, both pre-test and post-test directly. The formulation of the hypothesis by using the T-test is as follows:

H_0 = The effectiveness of e-learning media usage is higher than conventional media use in improving learning outcomes of Al-Irsyad Al-Islamiyyah Woman Junior High School in Malang.

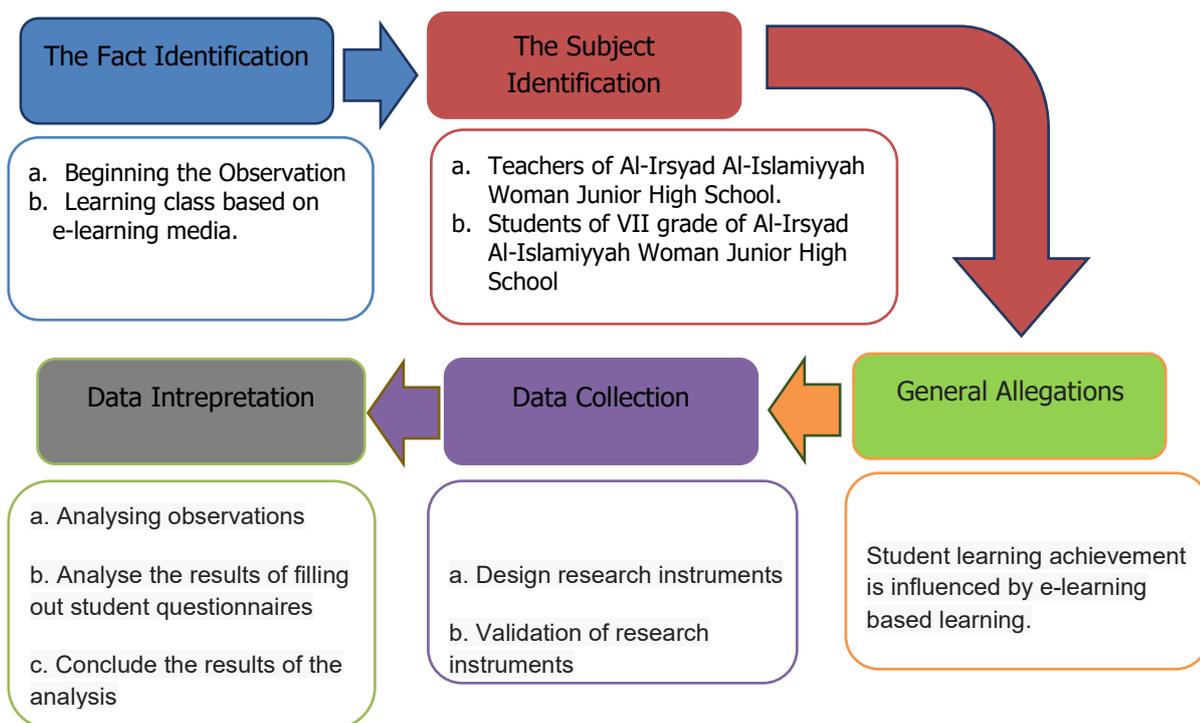
H_a = The effectiveness of e-learning media usage is lower than the use of conventional media in improving the learning outcomes of Al-Irsyad Al-Islamiyyah Woman Junior High School in Malang.

Tests are carried out through T-test by comparing t_{count} (t_h) with t_{table} (t_t) at $\alpha = 0.5$. If the calculation results show:

- a. $t_h \geq t_t$ then H_0 is received and H_a rejected.
- b. $t_h \leq t_t$ then H_0 accepted H_a rejected.

While in the process, data analysis in this study uses several instrument trials, including 1) Validity of the instrument; 2) Reliability test; 3) Level of difficulty; 4) Distinguishing power.

In order to make it easier to understand the description of research, the stages in research can be seen through the following flow chart:



A. REVIEW

Effectiveness of e-learning utilisation

Judging from the etymological side, e-learning is an acronym of E and learning. E is interpreted electronically, while learning is interpreted as a learning process. So that the concept of e-learning is an electronic learning system by using media in the form of computers, the internet, electronic and multimedia media (Daryanto, 2015).

E-learning is a concept that was born from the dynamics of the development of the era of information technology which is constantly developing progressively and efficiently. As a software program whose network in the virtual world, e-learning is one of the classified forms of innovation in the development area (Warsita, 2008) and has three advantages, namely accountability, accessibility and opportunity (Daryanto, 2015). That is, the teaching process can be obtained in a faster way with a relatively small cost, and can be done wherever and whenever, no longer insulated by space and region.

With the development of e-learning, future education will become increasingly diverse, open access and multidisciplinary, as Uno's idea of predicting the tendency of the world of education in Indonesia will build on three things: first, the development of distance learning. Through efforts to combine with internet technology, the interaction between students and teachers is not only real-time through face-to-face in class, but can also take place otherwise. If the real-time process happens, learning can be done in a chatroom or online meeting. The learning process through distance learning allows teachers to supply learning materials, assignments, and quizzes in a web form that can be downloaded by the students. Second, namely, sharing resources that allow information sources to be broader and not limited to teachers. Third, the empowerment of interactive information technology instruments in the form of multimedia (Lamatenggo, 2011).

The use of e-learning in the learning context is not immune to the role and support of information technology in it. As the previous description mentioned about the web, the use of computer-managed learning (CML) systems is important to monitor learning activities and assign assignment values to students (Daryanto, 2015).

Based on the narrative above, it can be said that the effectiveness of the use of e-learning in the world of education is one thing that is done. In this case, the area which is the field of e-learning is in innovation in the development of instructional media applied in teaching and learning activities.

Industrial era 4.0: utilisation of computer technology and internet-based development

In simple language, computer-based technology is a method of producing and delivering learning materials by utilising instruments sourced on the microprocessor (Warsito, 2008). Through computer-based technology, learning information that is delivered to students is displayed on a media screen with computer-based applications. Computer applications that are utilised in the realm of learning are commonly known as computer-assisted learning.

The internet as one of the real forms of the information revolution, has created media convergence through digital networks. The process of merging or convergence will be able to run well and can be accepted by the wider community - including the school community - one of which is through the path of dissemination that makes other people realise that there is a change and development of technology. As Seels & Richey's ideas in Warsita say, the dissemination process is important concerning the diffusion of innovations. The diffusion of innovation can be done by persuasion, implementation or decision (Lamatenggo, 2011). Therefore, the use of internet-based computer technology is intended for effectiveness, efficiency and improving the quality of learning.

The use of computer technology, as the idea presented by Deni, is one form of change or innovation in the field of learning. Apart from computer-based technology, there are three other regions, namely print technology, audiovisual technology and integrated technology (Darmawan, 2012).

METHODOLOGY

The research approach used in this research is the quantitative approach. The focus of this research is simple numerical data related to the pre-test, post-test, and data analysis derived from observations in the field, related to the effectiveness of the use of e-learning in Al-Irsyad

Al-Islamiyyah Women's Junior High School in Malang. Related to the type of research, the authors use this type of survey research in the educational unit at Al-Irsyad Al-Islamiyyah Women's Junior High School that is located in Malang city, by taking a sample of the population VIIA and VIIB grade of Al-Irsyad Al-Islamiyyah Women's Junior High School.

The subjects that were the source of the data in this study were teachers and students of class VIIA and VIIB of Al-Irsyad Al-Islamiyyah Women's Junior High School. In addition to the two research subjects, the research data sources will also come from questionnaires, as well as documentary records in Al-Irsyad Al-Islamiyyah Women's Junior High School as the object of research.

Secondary data sources that will be used in the research will be the pre-test and post-test conducted on 25 respondents, consisting of 10 new students from class VIIA and 15 new students from class VIIB. Sampling data sources is done purposively. Data collection techniques carried out in this study were obtained through interviews, documentation, and tests (pre-test and post-test).

RESULTS AND DISCUSSION

The processed data is the result of cognitive tests through pre-test and post-test. The sample of the research is 10 (ten) students of VIIA class as the experimental group. It was given treatment by using web media school while VIIB class in the control group became a comparison group with the number of 15 (fifteen) students given treatment with conventional learning media (without using e-learning). Research on samples were carried out within each of the three meetings. The test material used was Islamic Education (PAI) subjects for 1 (one) basic competence (KD) namely thaharah.

1. Test Validity of Question Items

Comparison of results between r_{count} with r_{table} Product Moment becomes a process in determining whether the question item is valid or not. Through 25 respondents, it showed r_{table} get $N-1 = 23$ d with a significance level of $= 5\%$ so that $r_{\text{table}} = 0,329$. Based on the result of r_{count} for each item, if it is compared with r_{table} , the question items are valid. The research data used are in the form of pre-tests scores, post-test scores, and gain scores. The acquisition of the gain score is derived from the difference between the pre-test score and the post-test score,

both from students who learn using e-learnings as a learning media and students who learn to use conventional learning media.

2. Reliability Test

Based on the result of the count from SPSS 21,00, the questions which are used for pre-test and post-test in the experimental class are reliable, with Cronbach's value > 0.894 . Similarly, the questions used in the pre-tests and post-tests in the control class are reliable with Cronbach > 0.874

3. Difficulty Index of Question Items

Based on the data obtained, the total question item of low classification was 12 questions, the category of middle 10 questions and the difficult question is 3.

4. Analysis of Data on Student Learning Outcomes

Observing the learning result from students, before and after being treated (treatment), then the required processing and data analysis of the scores was done, of pre-test and post-test previously obtained. From the second test, description recapitulation, that was obtained through data, was as follows:

a. Average Test Score of Student Learning Outcomes.

Data have been obtained through research shows that the mean (average) pre-test score and post-test of the experimental class was respectively 68.13 and 85.77, while in the control class, the mean (average) pre-test score and post-test were 67.81 and 81.31 respectively. Based on these data, it can be concluded that there is an increasing result in student learning outcomes, both in the experimental class and the control class.

b. Descriptive Statistics of Pre-test and Post-test Data.

Based on the data obtained, it appears that the mean (average) score of the pre-test experimental class was 1.4318 with a maximum score of 23 and a minimum score of 0,00. While in control class, the mean (average) score of pre-test 0.92884 with a maximum score of 22 and a minimum score of 0.00.

c. Normality test

The count of normality test in this research, show result $P = 0.200$ in the experimental class, and $P = 0.176$ for the control class. Furthermore comparing the value $P = 0.05$ obtained for the experimental class $P = 0.002 > \alpha (0.05)$ and for the control class $P = 0.176 > \alpha (0.05)$. Based on the data call, it can be concluded that both of the data distributions are normal.

D. Homogeneity Test.

Referring to the previous data, the obtained P-value = 0.02 in the pre-test between the experimental class and the control class. With comparisons right with the value $\alpha = 0.05$, the value for $P (0.02) > \alpha (0.05)$, so the conclusion is that the data was obtained from a population with the homogeneous variant. While in the pre-test, experimental class and control class the results were $P = 0.176$. By comparing the α value of 0.05, and because of the value for $P (0.176) > \alpha (0.05)$, it can be concluded that these data come from populations with variants that are homogeneous or similar.

E. Test Results of t-test.

Data acquisition shows the value of $P = 0.698$ and $t_{count} = 0.999$. By comparing the value of $P (0.698) > \alpha (0.05)$, and $t_{count} < t_{table}$, the conclusion that can be drawn is H_0 is accepted. In other words, the effectiveness of the application of e-learning through the academic web akademik.alirsyadmalang.org PAI is higher in learning than the use of conventional media, as the results study learners of VII class of Al-Irsyad Al-Islamiyyah Women's Junior High School show.

F. *Mann-Whitney* non-parametric statistical test.

Mann-Whitney non-parametric statistical test was performed in this study through a pre-test P-value: $0.825 > \alpha 0.05$ was obtained. Obtaining these numbers describe that the distribution of the data pre-test is normal and not homogeneous, while the results of the *Mann-Whitney* non-parametric statistical test in the post-test obtained a value of $P: 0.004 < \alpha 0.05$. This means that the distribution of post-test data is normal and not homogeneous.

G. Results of Gain Data Analysis.

Through data obtained from the value of pre-test or post-test in the experimental class, the normalised gain value of control class was 0.6 and an experimental class was 0.7. Furthermore, the value was interpreted into the criterion of the value $\langle g \rangle$, and the effectiveness of e-learning media through the academic web akademik.alirsyadmalang.org on the experimental class and the control class was high. If the comparisons of gain between experiment class and control class were obtained, it could be concluded that the effectiveness of the control class using conventional learning media was lower than the experimental class using e-learning.

The next analysis, using SPSS 21,00 software and based on research data which is proven through statistical test analysis, it can be concluded that the initial ability of control class students (VIIB) and experimental class (VIA) is homogeneous. This conclusion can be seen through the mean value or the average of the results of these two classes pre-test, and evidenced by T-test, to see similarities of two average values. The results obtained showed that there were no differences in initial abilities between the experimental and control classes.

There were no differences in the initial abilities because, in the two types of samples, namely the VIA and VIIB classes, they had not received teaching material which was the test material in this study. Different results were obtained when the sample was given treatment in the form of the e-learning as a process through the school web in the experimental class (VIA), and the treatment in the form of conventional learning processes in the control class (VIIB). The difference shown is in the final learning outcomes after three meetings. Retrieved mean (average) was at 85,76 for the experimental class, and 81.30 for the control class. Based on the value of the mean (average) of post-test it can be concluded that the experimental class learning outcomes were higher than the control class.

The difference in the results of the average value between the experimental class and the control class in this research indicates that there are differences in the learning outcomes of students in the subjects of the PAI thaharah chapter, which are the object of research in this research. The results were due to the experimental class using e-learning during the teaching and learning activities (KBM) taking place, which in this study took the duration of three face-to-face meetings, which required the students to be more effective in using material content through



the school web. This activity includes the ability to upload the results of assignments, download teaching materials, both from school web pages and online sources from the internet. The conditions of the class equipped with wifi and multimedia equipment also support students to feel comfortable and conducive to follow the learning process in the classroom.

In the end, the overall activity of e-learning is applied in Al-Irsyad Al-Islamiyyah Women's Junior High School. It has become a medium of learning, and is effective in improving learning outcomes of students of VIIA and VIIB class at Al-Irsyad Al-Islamiyyah Women's Junior High School.

CONCLUSION

Based on the formulation of the problem, the purpose of the study, the results of the analysis, and the exposure discussion of research, it can be concluded that the effectiveness of the use of e-learning media is higher than conventional learning media. This is indicated by the post-test hypothesis test and the normalised gain value. Post-test hypothesis test results with T-test indicated that P-value is higher than α value, so that H_0 , the effectiveness of the use of e-learning media is higher than the use of conventional learning media in improving the learning outcomes of Al-Irsyad Al-Islamiyyah Women's Junior High School in Malang," is accepted. In the data analysis from the normalised gain of the experimental class is higher than the control class. It's good education units implement and optimise application e-learnings that already exist in the school, with the aim of improving student learning outcomes. Also, schools are expected to improve the right implementation of e-learning as a learning media on other subjects, with the characteristics of the Islamic Education (PAI) subject.



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