Improvement of E-Learning Based On Hybrid Learning Methods At The University In The Era Of Industrial Revolution 4.0

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Abstract

Improved quality of learning indeed varies following the situation and conditions in institutions and policy leadership. Research methods used in this research will result in improved quality of learning techniques online. The results of this research can be shown in the level of success of the e-learning process with the results of testing the application of hybrid learning methods reaching is better. The e-learning process can be said to be effective if the needs and analysis result as expected. Efficiency and effectiveness may be following the real conditions that occur at an educational institution. The results of research still need to be improved to increase compliance with the process that exists in the world of education as well as a debilitation media online learning can be resolved or minimized. The results of this accuracy can be increased again by conducting a combination of learning mechanisms.

Keywords: *Hybrid Learning, E-Learning, Improved, Efficiency, effectiveness.*

I. INTRODUCTION

The development of information technology has increased along with the development of learning technology. E-Learning is part of the development of the current era of learning technology. The learning blended learning of distance learning as a liaison between the student and their lecturer. The development of e-learning has increased rapidly enough. Learning models can be categorized into traditional models, electronic models, and open models. Traditional models using the technique of learning in terms of face-to-face between teachers and pupils are both interacting with each other. Electronic models using the technique of learning by involving information technology, including through a webchat, when communication between teacher and student. In addition to that, material or study materials submitted online to the amount of material presented proportionally. The open model provides the learning process for free, and some of the students can learn according to their respective capabilities [1]. Improving the quality of e-learning based learning in developing countries is focused on several aspects of change that support improving the quality of learning. Three things can spur improvement in the quality of education, including the provision of qualified human resources, lecturer and student behavior in distance learning activities, and general community involvement in the process of improving the quality of learning [2]. Other factors in e-learning modeling that can improve the quality of learning include motivation, communication, efficiency, and technology in the use of internet-based technology that can be used to support distance learning [3].

The use of Information, Communication, And Technology (ICT) in education has changed the way of learning from conventional learning or traditional learning, which promotes face-to-face learning into digital-based learning with the use of technology and information. Many developments of digital-based learning media that make it easier for students to learn independently to produce online learning or offline learning.

Blended learning facilitates the transition of universities that want to switch to e-learning learning methods. The main obstacle of e-learning is that it requires a high cost and requires innovation and creativity in implementing learning material taught to students. E-learning has advantages in terms of time efficiency

and flexibility in completing the lecture module taught. Blended learning is a solution to the weaknesses of online learning because it combines online, offline, and face-to-face learning. Online learning consists of media that is equipped with a controller used by the user so that users can access the online media not equipped with a controller that can be used by users who do not need to be connected to the internet network such as CD or media tutorial material that has been made through the application.

Blended learning is a very effective, efficient learning to improve students' abilities to be fun, and students have a greater interest in learning with a diverse learning environment. Blended learning offers better learning, either separate or group, and the same or different time. Students who are still not literate in technology can be taught in schools utilizing training in the application of technology. Mastery in information technology and communication in Indonesia has not been evenly distributed, due to the vastness of the Indonesian territory and limited resources, it is expected that the government will provide technology investment in each region and provide training to teachers so that it can improve the quality of education in Indonesia and can implement blended learning models in Indonesia. Research related to the problem of increasing student learning to learn mathematics. The lack of a student's interest in learning mathematics is the reason for the decline in the quality of mathematics learning. Quality improvement in learning can be made by careful planning [4]. Other learning technologies based on ICT include using the web and audio-video recordings in learning activities. Approach learning by Blended learning is implementing audio-video technology, online graduation examinations, and monitoring and discussion of online learning [5]. The development of e-learning can improve the quality of learning, especially the distance learning system. Traditional learning models can be improved again by utilizing information system applications, resource development, online learning capacity building. Cloud-Based E-Learning as one of the important things in improving the quality of e-learning developed. The design of cloud-based e-learning can be said to be effective because all resources are stored safely on the server computer. The client computer used by the user can access all the resources provided in the online learning system through the computer topology that has been prepared. Students can use computers, laptops, mobile phones, or tablets accessing material prepared by teachers or instructors in higher education [6].

II.   LITERATURE REVIEW

The use of hybrid learning in improving online-based learning has a positive impact. Underlying the increase in online learning is the use of information systems and computer programming in building online learning systems. The hybrid learning approach using learning media such as video, audio, and interesting packaged material can make students interested in attending lectures online and able to be carried out continuously according to the online learning schedule. Feedback from online distribution by applying the hybrid learning approach can provide benefits to teachers and students in teaching and learning activities. The average student who follows an online learning system or e-learning has a positive impact and can improve the e-learning system [7]. Research related to the improvement of e-learning can be done by analyzing and optimizing weblogs from the developed learning system. Weblog mining is recording log files from those accessed by users of the distance learning system. The results of the weblog analysis can be used as a reference in exploring e-learning developed at a college [8]. Blended learning and e-learning have in common that is the teaching and learning process using information technology as a medium used for learning facilities. The main difference from the mechanism of e-learning and blended learning is in terms of the mechanism of online learning techniques. E-Learning only utilizes distance learning systems while blended learning integrates digital systems in learning and conventional systems in the process of teaching and learning activities. E-learning has weaknesses, including not all things online learning. Therefore it requires a blend of blended learning and e-learning. In this way, the hope is that it can meet the increasing process of learning and teaching activities.

The Teaching-Based Learning optimization (TLBO) algorithm is a mechanism for ways to increase e-learning. Each student variable and population increase in the algorithm are mathematically calculated. The results of the analysis of these algorithms can be said to be effective and efficient in improving e-learning [9]. The following research discusses the improvement of e-learning using the hybrid learning

approach. Higher education requires improving the quality of learning and learning technology innovations used. The research sample data used from the lecture process uses an e-learning learning system. The data period used is from 2017 to 2019. The data in the following research is from the lecture system that is currently running in the Maulana Malik Ibrahim State Islamic University Graduate Program in Malang.

III. METHODOLOGY

The following research has several stages of research. The methodology used in the following research is as shown in Figure 1. In Figure 1, it shows the literature study, engineering requirements, analysis of e-learning, hybrid learning, and recommendations.
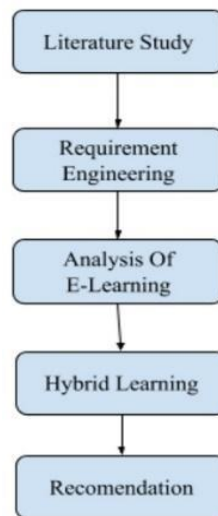

Figure 1. Research Methodology

A.   Literature Study

The stages of the literature study determine supporting literature in the following research activities. Library studies that are relevant to this research are used for reference in the process of the research conducted. The phenomenon that arises and the renewal of the methodology of each reference used is the basis of the following research. Everything that is done in the following research process is the development of the methodology that has been carried out in previous studies.

B.   Requirement Engineering

The stages of requirement engineering are related to research needs developed based on previous research. Based on the data obtained, there is a need to develop e-learning, including devices used, web-based, and internet connections. These needs can be increased again following the results of the needs analysis. The results of the engineering needs are used for the next stage of reference.

C.   E-Learning Analysis

The hybrid learning approach discussed in the following research is the development of e-learning. The results of e-learning analysis found several disadvantages, including not all things in learning, can be done by distance learning. Sometimes face-to-face learning activities are needed not only in the distance learning system. Learning in higher education is needed as effectively as possible so that the main goals in education can be achieved and on target.

D.   Hybrid Learning

Increasing e-learning can be done in several ways, including integrating hybrid learning approaches with e-learning. In the following research phase, an analysis of the use of the hybrid learning approach was

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carried out by combining conventional learning with the learning system. Online. The following is a hybrid learning approach proposed in the following research.

E.   Recommendation

The stages of the following research are recommendations for improving e-learning. The results of this recommendation can be used as a reference for the e-learning implementation process. The impact of increasing e-learning for students in higher education is indeed quite significant. Students can learn independently and set the desired time to complete the lecture material provided by the lecturer.

IV.   RESULTS

The process of increasing e-learning does find obstacles, especially for universities that are not ready for the technology used. The following are the results of increasing e-learning shown in Table 1.

TABLE I.   LEARNING USAGE

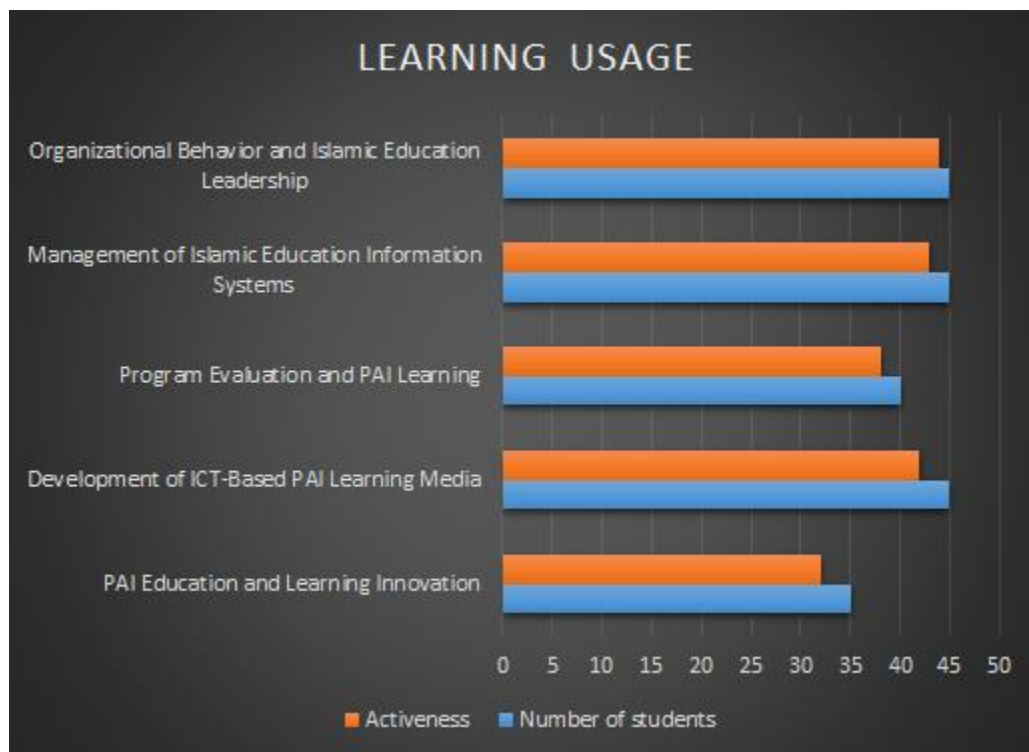| Courses	Number of students	Activeness
PAI Education and Learning Innovation	35	32
Development of ICT-Based PAI Learning Media	45	42
Program Evaluation and PAI Learning	40	38
Management of Islamic Education Information Systems	45	43
Organizational Behavior and Islamic Education Leadership	45	44

Figure 2. Hybrid Learning

The main problem in the use of e-learning learning technology is that it requires a high cost. The resources prepared include innovations in learning materials, internet connections, and information technology that support distance learning. To bridge, it can take advantage of the hybrid learning approach.

In Table 1, the level of student activity is pretty good. These results are combined with the blended learning approach. These results are a combination of conventional learning mechanisms and e-learning learning systems. Figure 1 shows a graph of the level of development of the use of e-learning combined with blended learning.
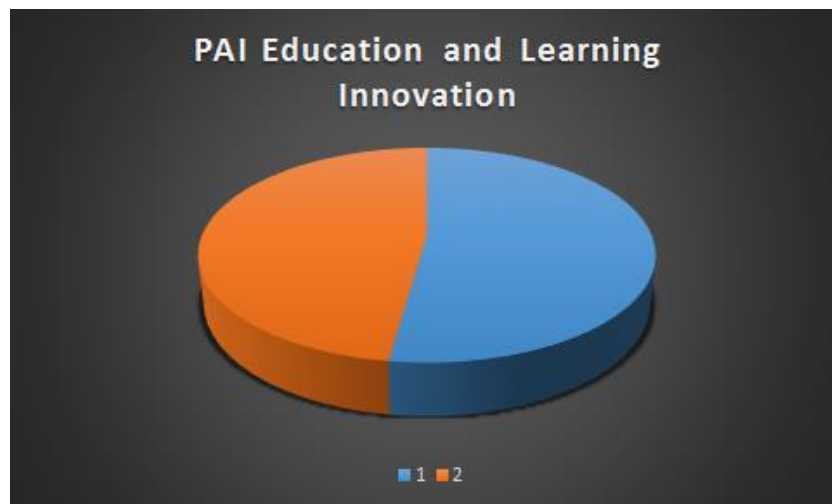

Fig. 2. Elearning Chart of PAI Education and Learning Innovation Courses

Figure 3 shows a graph of e-learning utilization in the PAI Education and Learning Innovation course. The percentage of these results shows the results of effectiveness are quite good.
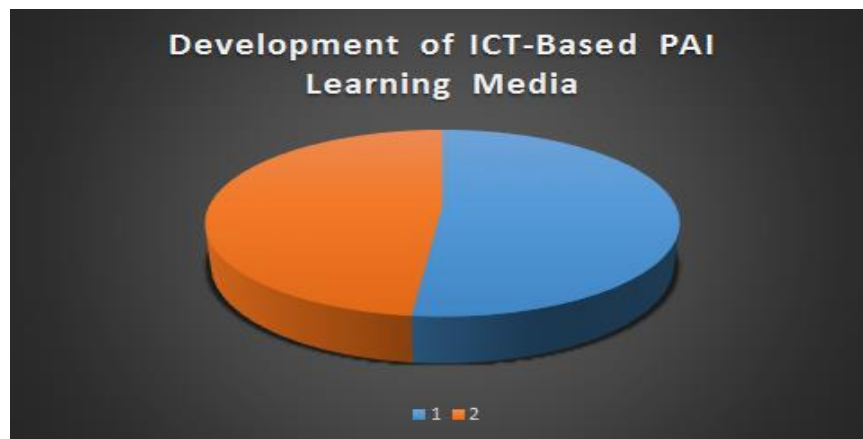

Fig. 3. Elearning Chart of Development of ICT-Based PAI Learning Media Courses.

V. CONCLUSIONS

From the results of the discussion in the following research, it can be concluded that some of the rights include the effectiveness of the online learning model more effectively and efficiently than the traditional learning model. In developing the learning model, a hybrid learning model is required aimed at addressing the problems encountered in the distance learning model. The results show the effectiveness of students involved in online learning by utilizing e-learning very effectively.

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