Effectiveness of e-learning implementation as a distance learning strategy during coronavirus disease (covid-19) pandemic

Dedi Prestiadi

State University of Malang, Semarang street no.5, Malang City, 65145, Indonesia

dedi.prestiadi.fip@um.ac.id

Abstract. This study aims to determine the effectiveness of the implementation of e-learning as a distance learning strategy during pandemic coronavirus disease (Covid-19). The effectiveness will be examined from the results of previous studies through meta-analysis methods Meta-analysis is the study of several research results in a similar study. The unit of analysis in the study of meta-analysis of these are documents written are taken from the journals the results of the research are purposive in accordance with the theme of research on the implementation of e-learning in the process of learning. The primary research instrument is there on the researchers themselves aided by the guidance documentation. Data analysis that was carried out was the analysis of quantitative and qualitative data. Quantitative analysis is used to analyze data in the form of numbers and the percentage of e-learning effectiveness. Qualitative data analysis is used for the study of data in the form of descriptive data about the implementation of e-learning. The results showed that the implementation of e-learning was effective as a distance learning strategy during coronavirus disease (Covid-19) pandemic.

Keywords: E-learning, distance learning, Coronavirus Disease (Covid-19)

1. Introduction

Currently the world is being horrified by the presence of coronavirus disease (Covid-19) which has struck almost all countries in the world including Indonesia. Indonesia has officially announced that coronavirus disease (Covid-19) is declared a pandemic. Pandemic Coronavirus disease (Covid-19) occurring in Indonesia has a large impact on various sectors including education. The Indonesian government has issued a policy to change the learning system from a classical learning system to a distance learning system implemented online or through e-learning. The learning policy has been changed to an e-learning system so students can study at home to decide the spread of coronavirus disease (Covid-19) in Indonesia.

The implementation of e-learning has been established throughout all levels of education in Indonesia from elementary to tertiary levels. This learning policy through e-learning must be acceptable to all parties in order to decide on the spread of this virus. This change in distance learning system has a great impact on various education circles such as teachers, students and institutions that must continue to carry out distance learning despite the various limitations that exist. One impact that occurs is that all teachers and students must be able to adjust to using a variety of electronic media to be used as learning media. In addition, several institutions that were pressured in the form of infrastructure and financial problems, some parents and students asked for discounts and reduced tuition fees. With the consideration of cost, it cannot replace the position of the teacher in real life who explains and gives material directly. Indirectly, schools in a short period of time must reflect distance learning strategies or approaches that are synchronized with the capabilities of each school in terms of the ability of teachers, students, and do not forget the instruments that support this policy.

With the changes in the way of learning and teaching implemented by e-learning, this has changed the habits of teachers and students so far. Because so far the teacher teaches and students learn in the classroom, in the sense that learning and teaching activities are carried out in a building with the support of supporting facilities for the process. Learning through e-learning is very different from general learning that takes place in schools. Teachers and students do not face to face directly, but by utilizing a variety of electronic devices to establish communication in different

places. The change from studying in class to distance learning for some people is not easy. But behind the problems and obstacles that arise, explicitly learning by e-learning is very supportive of the continuity of learning in the midst of pandemic coronavirus disease (Covid-19). The goal is the learning process can be controlled remotely, time efficiency can be done anytime and anywhere (flexible). The role of educators as facilitators should be able to build learning and communication in an effective internet network. The effectiveness of e-learning is always expected to be able to strengthen the relationship of educators and students so that it triggers changes in character or better character. The role of educators as facilitators should be able to build learning and communication in an effective internet network. The effectiveness of e-learning is always expected to be able to strengthen the relationship of educators and students so that it triggers changes in character or better character. The role of educators as facilitators should be able to build learning and communication in an effective internet network. The effectiveness of e-learning is always expected to be able to strengthen the relationship of educators and students so that it triggers changes in character or better character.

E-learning is not a new thing in education. The rapid development of technology as a result of the Industrial Revolution 4.0 is no longer concerned with what is learned, but rather how a person learns tricks by utilizing various existing technologies. Pandemic coronavirus disease (Covid-19) has provided an opportunity for Indonesian education to measure the success rate of e-learning implementation whether it can be implemented effectively or not. The concept of e-learning must be understood by all people involved in the world of education to try to get used to using technology and artificial intelligence in supporting the educational process in E-Learning.

E-learning is an important advance in the modern education system. Online learning through e-learning is a learning model used for distance learning,e-learning has been implemented since the mid-1960s by universities in the United States and in the United Kingdom[1]. This e-learning has an influence on the process of transformation of conventional education into digital form, both in content and system. E-learning is a type of teaching and learning that allows the delivery of teaching materials to students using Internet media, intranets or other computer network media[2]. E-learning can be concluded as a learning process that utilizes information technology in the form of computers equipped with telecommunications (internet) and multimedia (graphics, audio, video), as the main media in the delivery of material and interactions between teachers and students by using media in teaching can enhance student learning outcomes achieved[3].

Research on the implementation of e-learning has been carried out with a variety of methods and research objectives. Research conducted by Ardiansyah and Diella on the implementation of e-learning towards learning outcomes yields the conclusion that e-learning based on Assessment for Learning (AFL) in the form of providing feedback has a significant effect on learning outcomes.[4]. Muyaroah (2019) in his research concluded learning with e-learning makes students more happy in learning because it is packaged concisely. With the high interest and motivation of learning possessed by students, it is proven by the increasing learning outcomes obtained by students[5]. Meanwhile in another study conducted by Hanum (2013) about the effectiveness of e-learning as a learning medium concluded the implementation of e-learning was quite effective in supporting learning[6].

Implementation of e-learning is online learning that can be implemented in two ways, synchronous and asynchronous. Synchronous is the learning process happening at the same time when the teacher is teaching and students are learning. This allows direct interaction between teacher and student, both via the internet and intranet. Synchronous e-learning training is mostly used for seminars or conferences which are often called web conferences or webinars and are often used in online university classes or lectures. Asynchronous is a learning activity carried out at different times between teacher and student. This activity is more popular in the world of e-learning because it provides more benefits for trainees that is able to access training anytime and anywhere.[7]. As in research conducted by Novantara and Herwanto (2017) about the implementation and effectiveness of mobile learning by using synchronous and asynchronous learning methods in learning concluded that media learning applications for synchronous and asynchronous activities can help students understand English learning[8].

Other research related to the implementation of e-learning has also been carried out by Liza (2019) who examined the effectiveness of the use of e-learning learning media in the

Qowaidullughoh course in the PAI FAI UHAMKA study program concluding that there was an increase in the effectiveness of the pre-test and post-test results through e-learning learning[9]. While other research conducted by Ulva et al (2018) concluded the application of e-learning with media schoology can improve student motivation and learning outcomes[10]. And research by Effendi (2016) on implementation through a blanded learning model concludes that blanded learning can be used as an effective learning model[11]. The study of a comparison between online learning models through e-learning with conventional learning models has also been carried out by Astuti et al (2019) who concluded that e-learning has advantages in terms of lecture time which is more flexible when compared to conventional methods[12].

Various kinds of research on the implementation of e-learning as described can be concluded that there are many educational institutions that implement e-learning. From various types of research can be used as material for the study of the effectiveness of the implementation of e-learning that has been done in various places. Based on the results of research that has been done a lot, the authors are interested in conducting meta-analysis research from various kinds of research articles on the implementation of e-learning. The purpose of this study is to determine the effectiveness of the implementation of e-learning in the implementation of distance learning during the pandemic Coronavirus disease (Covid-19) that is happening in Indonesia.

2. Method

This research method is to use meta-analysis. Meta-analysis research is a series of technical analysis by conducting a synthesis of various research results. Analysis in meta-analysis research is based on research results from various sources that have the same study. In other words, before integration is carried out, integration is first carried out, and documented corrections to the results of previous studies have been carried out[13]. Researchers are the main instrument to carry out the process of documentation and synthesis of the results of previous studies. After the focus of the research becomes clear, simple research instruments will be developed, which are expected to complement the data and compare data that has been found previously. Data collection techniques will use documentation techniques from similar research articles. The sampling of this research used purposive sampling technique. The choice of technique is because the data to be obtained from the sample is adjusted to the research theme.

This meta-analysis study uses quantitative and quality data analysis. The meta-analysis procedure in this study was carried out with bare-bone meta-analysis, which is a meta-analysis that is intended to correct documents from previous studies whose information is available in almost all studies. The steps in this meta-analysis are: 1. Identifying and formulating research problems. 2. Collecting data through selection of articles or research results that are relevant to the research problem. 3. Explanation and evaluation of data 4. Analysis and interpretation of research results.

3. Result and Discussion

Result

This meta-analysis study was carried out on research articles in the form of articles from various national journal sources with a total of 20 studies related to the effectiveness of e-learning. Furthermore, the results are classified into several meta-analysis studies as follows:

Meta-analysis based on Research Objectives

The results of the meta-analysis research conducted on the articles used as a study get results about the research objectives in general include: first measuring the effectiveness of e-learning to the learning process carried out in a particular field of study, second knowing the comparison between the implementation of e-learning with conventional models, third development of an application-based e-learning learning system to improve the quality of learning and fourthly measure the impact of the use of e-learning in learning. The results of a study of 20 articles can be seen in table 1.

Table 1. Objectives in E-Learning Research

No	Aim	Frequency	Percentage
1	Measuring the effectiveness of e-learning	8	40.0%
2	Comparison of e-learning and conventional	2	10.0%
3	Development of e-learning learning systems	7	35.0%
4	The impact of using e-leaning	3	15.0%
	Amount	20	100%

Meta-analysis based on the type of research

Based on the results of a meta-analysis of 20 research articles that were sampled, the results obtained by the type of research conducted on e-learning include experimental research, research and development (R&D), evaluation research, mixed research through sequential explanatory models, qualitative research, quantitative research, and case studies. In general, based on the type of research can be seen in table2.

Table 2. Types of E-Learning Research

No	Types of research	Frequency	Percentage
1	Experiment	7	35.0%
2	R & D	4	20.0%
3	Evaluation	1	5.0%
4	Mix	1	5.0%
5	Qualitative	3	15.0%
6	Quantitative	2	10.0%
7	Case study	2	10.0%
	Amount	20	100%

Meta-analysis based on Research Samples

The results of a meta-analysis of 20 articles used as a study in this study obtained data about the sample used in e-learning research in the form of research subjects consisting of college students, nurses, teachers, and students. Meta-analysis based on samples can be seen in table3.

Table 3. E-Learning Research Samples

No	Research Samples	Frequency	Percentage
1	Teacher	1	5.0%
2	Nurse	1	5.0%
3	College student	9	45.0%
4	Student	9	45.0%
	amount	20	100%

Meta-analysis based on Analysis of Research Data

The results of a meta-analysis of 20 research articles seen from the analysis of the data used in e-learning research obtained data that the analysis of the data included: quantitative data analysis (t-test), descriptive analysis, mixed, Rational Unfield Process (RUP), ANAVA analysis (F test) and TOPSIS analysis. Meta-analysis based on data analysis can be seen in table4.

Table 4. Analysis of E-Learning Research Data

No	Types of research	Frequency	Percentage
1	Quantitative	7	35.0%
2	Qualitative	4	20.0%
3	Mix	6	30.0%
4	ANAVA	1	5.0%
5	TOPSIS	1	5.0%
6	RUP	1	5.0%
	amount	20	100%

Discussion

From the results of a study of 20 research articles on e-learning with a variety of different types of research and diverse samples it can be seen that the implementation of e-learning has been carried out by many educational institutions both at the tertiary and secondary level. E-learning as a distance learning system by utilizing various kinds of electronic devices can be used as a solution during the pandemic coronavirus disease (Covid-19) in Indonesia. According to Mitchell (2015) through e-learning will change the culture of learning because learning can occur without having to face-to-face learning in class[14]. The implementation of e-learning will run effectively if the teacher's role as a learning facilitator can facilitate learning and design interesting learning and is supported by other devices such as the internet and other electronic media. This is consistent with research conducted by Hanum (2013) that effective e-learning learning is learning that utilizes information and communication technology optimally in the learning process as a tool[15].

E-learning as a distance learning strategy during the pandemic coronavirus disease (Covid-19) needs to utilize a variety of online learning platforms such as edmoodo or moodle that can be done by teachers to develop competency in the ability to use media, virtual collaboration and provide experience and convenience to students to obtain teaching materials, work on questions and other activities this is in line with research conducted by Ompusungu and Sari (2019), Muyaroah (2019), Nuriyanti et al (2013) [2][5][16]. In addition to the use of platforms in the implementation of e-learning, it is also necessary to develop other devices such as the use of Android-based mobile learning. This is consistent with the results of research conducted by Novantara that the Android-based learning media application can help students understand the lessons[8]. The development of E-learning is not merely to present subject matter online, but it must be communicative and interesting. The subject matter is designed as if students are learning in front of the teacher through a computer screen connected through the internet network[3].

Analysis of the comparison between e-learning with conventional learning shows that e-learning has strengths and weaknesses. The advantages of e-learning compared to conventional learning are in the flexibility of learning time, through e-learning, the learning time is not focused on one schedule but can be moved according to the circumstances. The next advantage is the convenience for students to collect assignments because they can be done without having to meet with the teacher. Nevertheless online learning also has some weaknesses including students having difficulty understanding the material and the teacher being unable to control students and students still having difficulty interacting with the teacher in the event of internet network disruption.

Although there are some weaknesses in the implementation of e-learning based on the conclusions of 20 articles that are used as meta-analysis material, it can be seen that e-learning can facilitate the learning process and have a good impact on students if it can be managed well by the teacher. The implementation of e-learning needs to utilize various digital-based media such as websites, software technology and various other devices in supporting the effectiveness of e-learning implementation. The use of various kinds of software is proven to increase the effectiveness of e-learning implementation in accordance with research conducted by Rolisca and Achadiyah (2014), Rahayu et al (2017) and Azizah et al (2017)[17][18][19]. The implementation of e-learning can affect the ability of students to adapt to technological developments, students can utilize various kinds of learning resources available on the internet to access various kinds of knowledge that can trigger inquiry learning and active learning[20].

4. Conclusions

Based on the results of a meta-analysis study of 20 articles on research on e-learning, it can be concluded that the implementation of e-learning is effectively applied as a distance learning strategy during pandemic coronavirus disease (Covid-19) in Indonesia. From the results of the meta-analysis, the implementation of e-learning can be effective to improve students' abilities if the teacher's role as a learning facilitator can provide ease of learning and design interesting learning through various online media. The implementation of e-learning also has advantages in the aspects of flexibility of learning time, as well as the ease of students in doing and pursuing assignments.

5. References

[1]   W. Abdullah, "Blended Learning Model in Improving Learning Effectiveness," *Fikrotuna*, vol. 7, no. 1, pp. 855–66, 2018.

[2]   VDK Ompusunggu and N. Sari, "Effectiveness of Edmodo-Based E-Learning Use on Mathematical Communication Skills," *J. Curere*, vol. 3, no. 2, pp. 58–66, 2019.

[3]   I. Indrawan, "Improving the Quality of Education," *Al-Afkar*, vol. 3, pp. 68–79, 2014.

[4]   R. Ardiansyah and D. Diella, "Implementation of Assessment-Based E-learning to Improve Student Learning Performance," *Biosf. J. Biol. and educators. Biol*, vol. 3, no. 1, 2019.

[5]   S. Muyaroah, "E-Learning Effectiveness with Moodle Application in Research Technology Development Study Program," *J. Ilm. Univ. Batanghari Jambi*, vol. 19, no. 1, p. 114, 2019.

[6]   NS Hanum, "The effectiveness of e-learning as a learning medium (evaluation study of the e-learning learning model of SMK Telkom Sandhy Putra Purwokerto)," *J. Educators. Vocational*, vol. 3, no. 1, pp. 90–102, 2013.

[7]   E. Susanti and M. Sholeh, "Design and Build E-Learning Applications," *J. Tech. Akprind IST*, vol. 1, no. 1, pp. 53–57, 2008.

[8]   P. Novantara, "Implementation and Effectiveness of Mobile Learning Using Synchronous and Asynchronous Learning Methods in English Language Learning in Android-Based Kuningan University," *Buffer Inform.*, vol. 3, no. 1, pp. 22-27, 2017.

[9]   F. Fitriliza, "Effectiveness of the Use of E-Learning Learning Media in the Qowaidullughoh Course in the Pai Fai Uhamka Study Program," *J. Educators. Islam*, vol. 10, no. 2, pp. 85–96, 2019.

[10]   NL Ulva, S. Kantun, and J. Widodo, "The Implementation of E-Learning with Media Schoology to Increase Student Motivation and Learning Outcomes in Basic Competence Describing Business Entity Concepts in the Indonesian Economy," *J. Educators. Econ. J. Ilm. Educational Sciences, Econ Sciences. and Social Sciences.*, vol. 11, no. 2, p. 96, 2018.

[11]   ZM Effendi, "The Effectiveness of Blended Learning in Increasing Access to Learning in LPTK," *Konaspi Viii*, no. 24, pp. 1–5, 2016.

[12]   CC Astuti, HMK Sari, and NL Azizah, "Comparison of the Effectiveness of the Learning Process Using E-Learning and Conventional Methods," *Proc. ICECRS*, vol. 2, no. 1, p. 35, 2019.

[13]   Widhiastuti, "Meta-Analysis Study of the Relationship Between Job Stress and Job Performance," *J. Psychol.*, vol. Vol. 1, no. 1, pp. 28–42, 2002.

[14]   RL Garza Mitchell, "Online education and organizational change," *Community Coll. Rev.*, vol. 37, no. 1, pp. 81-101, 2009.

[15]   NS Hanum, "The Effectiveness of E-Learning as Learning Media (Evaluation Study of Telkom Sandhy Putra Purwokerto E-Learning Learning Model) the Effectiveness of E-Learning As Instructional Media (Evaluation Study of E-Learning Instructional Model of Telkom San Insmk Model," *J. Educators. Vocational*, vol. 3, no. 1, pp. 90–102, 2013.

[16]   D. Dwi Nuriyanti and N. Rahayu Utami, "Unnes Journal of Biology Education Development of Moodle Based E-Learning as a Learning System for Motion Systems in High School Article Info _____ Article History: Received in October 2013 Approved in December 2013 Published December 2013, "Indones. Gedung D6 Lt.1 Jl Raya Sekaran Gunungpati Semarang Indones., Vol. 2, no. 3, 2013.

[17]   RU Candra Rolisca and BN Achadiyah, "Development of Learning Evaluation Media in the Form of Online Based on E-Learning Using Wondershare Quiz Creator Software in Accounting Subjects in High School Brawijaya Smart School (Bss)," *J. Educators. Account. Indonesia.*, vol. 12, no. 2, 2014.

[18]   FS Rahayu, D. Budiyanto, and D. Palyama, "Analysis of E-Learning Acceptance Using Technology Acceptance Model (Tam) (Case Study: Atma Jaya University Yogyakarta)," *J. Applied. Teknol. Inf.*, vol. 1, no. 2, pp. 87–98, 2017.

[19]   S. Azizah, E. Khuzaemah, and I. Rosdiana, "The Use of Problem-Based eXe-Learning Internet Media on Environmental Change Material to Improve Student Learning Outcomes in daily life and also student psychomotor (skills). The learning process can be learning materials and materials that are, "*Sci Educ. J. Educators. science*, no. 2005, pp. 197–213, 2017.

[20]   CMD Hart, D. Berger, B. Jacob, S. Loeb, and M. Hill, "Online Learning, Offline Outcomes: Online Course Taking and High School Student Performance," *AERA Open*, vol. 5, no. 1, p. 233285841983285, 2019.