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Analysis of e-learning implementation in adult learning (andragogy)

Indah Namira Sari[1], Dinn Wahyudin[2], Rusman[3]
[1,2,3]Univeristas Pendidikan Indonesia, Bandung, Indonesia
indah.namirasari@gmail.com[1], dinn_wahyudin@upi.edu[2], rusman@upi.edu[3]

ABSTRACT

E-learning is relevant to be applied to adult learning as independent learners. This research aims to analyze the effectiveness of e-learning in adult learning (andragogy). In the context of adult learning based on continuous e-learning, there are significant changes in the objectives and content of teaching, social roles, forms, and nature of communication between teachers and students, based on e-learning. The research method uses a literature study of 77 articles found and analyzed based on the steps used. The research results showed that articles regarding e-learning in adult learning were found on the topics "learning outcomes" in higher education, "implementation according to plan" in job training institutions, "application in work practice" in job training institutions, satisfaction, and efficiency. Based on these results, it can also be seen that measuring the effectiveness of e-learning in adult learning mostly uses quantitative and qualitative methods. Meanwhile, although the mixed method exists, it is not as big as the other two methods. Then, the factors supporting the effectiveness of e-learning in adult learning were found in the number of selected articles, namely those related to the quality of teachers/students/lecturers, infrastructure, quality of teaching materials, and quality of learning strategies.

ABSTRAK

E-learning memiliki relevansi untuk diterapkan pada pembelajaran orang dewasa sebagai pebelajar mandiri. Tujuan penelitian ini untuk menganalisis efektivitas e-learning pada pembelajaran orang dewasa (andragogi). Dalam konteks pembelajaran orang dewasa pembelajaran berbasis e-learning secara berkelanjutan, maka terdapat perubahan signifikan dalam tujuan dan isi pengajaran, peran sosial, bentuk dan sifat komunikasi antara guru dan peserta didik, berbasis e-learning. Metode penelitian menggunakan studi literature terhadap 77 artikel yang ditemukan dan dilah berdasarkan langkah-langkah yang digunakan sebagai metode. Hasil penelitian menunjukkan bahwa artikel yang mengenai e-learning dalam pembelajaran orang dewasa ditemukan pada topik "hasil pembelajaran" pada pendidikan tinggi, "pelaksanaan sesuai dengan rencana" pada lembaga pelatihan kerja, "aplikasi dalam praktik kerja" pada lembaga pelatihan kerja, kepuasan, dan efisiensi. Berdasarkan hasil tersebut juga dapat dilihat bahwa pengukuran efektivitas e-learning pada pembelajaran orang dewasa sebagian besar menggunakan metode kuantitatif dan kualitatif. Sementara untuk metode campuran meskipun ada tetapi tidak sebesar kedua metode lainnya. Kemudian ditemukan faktor-faktor pendukung efektivitas e-learning pada pembelajaran orang dewasa dari jumlah artikel yang terseleksi yakni berkaitan dengan kualitas guru/pegajar/dosen, sarana prasarana, kualitas bahan ajar, dan kualitas strategi pembelajaran.

Kata Kunci: *andragogi; efektivitas e-learning; e-learning; studi literatur*

INTRODUCTION

The education and learning landscape has been transforming from traditional (classroom-based) to digital (e-learning/online) learning platforms as a result of the development of information and information technology (ICT). The trajectory of e-learning has some exciting potential outcomes as recent innovations and trends increase. In the future, more features in online learning platforms may be built to support learners' ease of working together and socially interacting. On the other hand, e-learning requires learners' ability to learn independently. Learner independence is essential in e-learning because it can determine the success of the learning process. The higher the learning independence, the better the support for learner-centered learning. Thus, e-learning as a learner-centered learning tool creates opportunities to explore learners' interests and creative thinking, inspiring more original and innovative ideas (Sweller, 2019).

Related to that, e-learning has relevance to be applied in adults' learning. This is because adults can learn independently and can utilize various learning resources to solve their learning problems. Adults are considered more independent, which implies that their motivation influences the regulation and adaptation of their behavior, and for the most part, they do not learn for external purposes. The application of modern principles for adult learning, utilizing the assumptions that adults are independent and self-directed, have varying levels of prior experience, integrate learning with the demands of their daily lives, are more interested in problem-centered approaches, and are more motivated by internal drives than external drives. In the context of adult e-learning-based learning on an ongoing basis, there are significant changes in the purpose and content of teaching, social roles, forms, and nature of communication between teachers and learners, based on e-learning. Online and blended learning (OBL), it is worth noting that there is no comprehensive framework to guide the design of OBL environments that meet the needs of adult learners, and this needs to be supported by adult learning theory (Diep et al., 2019).

The first one is that adult learners have time constraints and greater responsibilities, so life-oriented, structured, and flexible online courses suit them. Secondly, adult learners have lower scholastic aptitude and fewer technological skills than normal learners, so preparatory learning is necessary. Finally, integrated online discussions regarding online learning approaches are recommended, as adults tend to have ineffective and superficial discussions in open discussions (Mahmudah, 2020). Based on other research results, this illustrates that online learning for adults requires a more complex design than online learning designed for ordinary learners or students. It is necessary to do so so that the learning outcomes obtained can be maximized and aligned with the learning objectives that have been designed.

Previous studies have conducted studies related to adult learning or andragogy. The andragogy paradigm in the digital literacy era shows that andragogy applies learning rules through conversation, problem-solving, and the exchange of experiences through information technology (Wahono et al., 2020). Another study also added that the concept of andragogy can theoretically and practically increase independence and critical thinking skills (Sayuti, 2022).

Andragogy learning using online models can improve critical thinking skills (Kaddoura & Husseiny, 2021). Another research that focuses on andragogy in individuals with social and professional roles states that andragogy has distinctive characteristics that have implications for learning methods, classroom environment, teacher warfare, and learner involvement (Birsanu, 2020). Adult learners can decide about learning activities and methods in the andragogy learning process.

This research contributes to theory and practice by expanding the systematic understanding of online learning for adults. In relation to that, this research will analyze e-learning in adult education in terms of effectiveness, organization, and job training institutions. This study aims to identify the effectiveness of e-learning for adults in higher education and job training institutions.

LITERATURE REVIEW

Learning effectiveness

Learning effectiveness is the success rate of learning methods in achieving learning objectives that have been applied. One of the learning objectives is to improve students' skills with fun learning methods (Rahayu & Adam, 2022). Meanwhile, Watkins stated that the effectiveness of learning is something that encourages teachers to apply learning methods that are fun and not boring so that learning objectives can be easily achieved and continued the explanation from Rusman that learning is said to be effective if the learning can provide experience, shape students' abilities, and help in achieving learning objectives optimally (Fathurrahman et al., 2019).

From the statements above, learning effectiveness can be said to be the measure or standard of the success of a learning method in achieving its goals. According to Peraturan Pemerintah Nomor 4 Tahun 2022 tentang Perubahan atas Peraturan Pemerintah Nomor 57 Tahun 2021 tentang Standar Nasional Pendidikan (see: https://jdih.kemdikbud.go.id/detail_peraturan?main=2978), the context of learning standards includes five aspects of effectiveness: 1) graduate competency standards, 2) content standards, 3) process standards, 4) educators and education workers standards, and 5) infrastructure standards. Therefore, a lesson can be effective if it meets these five standards (Andini, 2018).

The development of the current era has led to changes in learning methods, one of which is the use of technology in learning activities. E-learning is a learning method that combines technology and educational practices so that learners can more easily accept learning. Teachers and learners agree on the perceived effectiveness of e-learning in their learning, as evidenced by the provision of higher assessment scores for e-learning (Encarnacion et al., 2021). Teachers and learners' perception of e-learning is that it is an effective tool in delivering lessons and developing their skills. E-learning can be used as one of the best strategies in learning activities because it does not limit space and time, so all learners can use it using mobile phones and internet connections.

E-learning

E-learning presents a new learning environment for learners, requiring different skills to succeed (Romiszowski, 2004; Suprianti et al., 2020). In addition, e-learning is also known as instructional content or learning techniques facilitated by electronic technology and aims to improve learners' skills, knowledge, and productive abilities in a global situation (Welsh et al., 2003; Trakru & Jha, 2019). Stockley also defines e-learning as a way of delivering training or education programs by electronic methods (Trakru & Jha, 2019). Thus, in essence, e-learning is web-based learning that involves the integration of the Internet with learning, including the use of computers or electronic devices such as mobile phones, in some way to deliver training, education, or learning materials.

E-learning Principles

E-learning includes principles that can be integrated directly into learning design, showing how educational technology can be effectively utilized and designed to support impactful learning. Among these principles, Liaw and Duang categorize the characteristics of e-learning, which consist of (Okunna, 2022):

1. Multimedia: E-learning is a diverse media environment. The media in question consists of hardware and software with digital information.

2. Information Bank*:* E-learning combines several types of information and duplicated teaching materials to suit the needs of learners.
3. Collaborative platform: The e-learning system supports collaboration in communication. Users have control over their learning situation.
4. Internet-supported learning: E-learning can support the network's access to information and training, learning resources, and information directly from experts around the world.
5. E-learning allows the utilization of a wide range of operating systems and provides the opportunity to access other learning resources from various platforms.

In addition to the five principles above, e-learning-based lessons must also consider matters related to operational management. To obtain maximum results in utilizing e-learning, criteria regarding quality management for e-learning also need to be applied (Gunadi, 2023).

Adult Learning (Andragogy)

Simplified, adult learning, or andragogy, can be interpreted as a science and art used to help adults learn (Kurniati et al., 2022). Jarvis stated that the concept of andragogy is described as the art and science of helping adults learn (Tezcan, 2022). In the andragogy learning model, the principles developed by Knowles regarding adult learning are as follows (Tezcan, 2022):

1. Learning objectives should be designed and created with the involvement of adults. They should understand the extent to which the desired outcomes will be achieved
2. Experience is fundamental to the learning process. It is the learner's responsibility to receive the experience and interpret it as valuable.
3. Adults are oriented towards learning directly related to their work, career, and life.
4. The learning process is problem-centered and requires motivation or encouragement.

Thus, adult learning (andragogy) is the study of how adults learn, master new knowledge, competencies, and new skills. Adult learners are autonomous, self-directed, and seek learning based on personal needs. Adult learners must be able to apply what they learn in real-life situations. In addition, adults have a base of knowledge and life experiences, seeking continuous learning based on personal interests, desires, and necessities.

Applying Andragogy to Higher Education and Job Training

Adult learning theory plays an important role in the planning and implementing higher education and job training programs. Applying andragogy theory to higher education programs is important for several reasons. The characteristics of adult learners and the principles of adult learning in higher education come into focus through the lens of andragogy. Thus, andragogy as an adult's preferred learning style and cognitive learning develops relational significance for adult learners in higher education. As a consequence, the implications of linking learning styles and reflecting on andragogy as a learning style are considered (El-Amin, 2020).

There are other reasons for applying the concept of andragogy to higher education and job training programs, such as 1) educational philosophies and theories are an important part of truth-based education practices; 2) various learning theories can assist learners in choosing the most appropriate learning strategies and objectives, as well as the best evaluation approaches; 3) teachers can integrate learning theories, learning content, and learners' understanding to improve learning outcomes; 4) teachers do not need to take full responsibility for everything in the learning process (Mulkhalalati & Taylor, 2019).

METHODS

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This research is qualitative research with a literature study approach. Research techniques carried out by researchers involve collecting several books, magazines, and leaflets related to research problems and objectives. This research uses literature searches to prepare a research framework (research design) and utilizes library sources to obtain research data (Kurnadi, 2019). The research was conducted in three stages, as shown in **Figure 1** below.
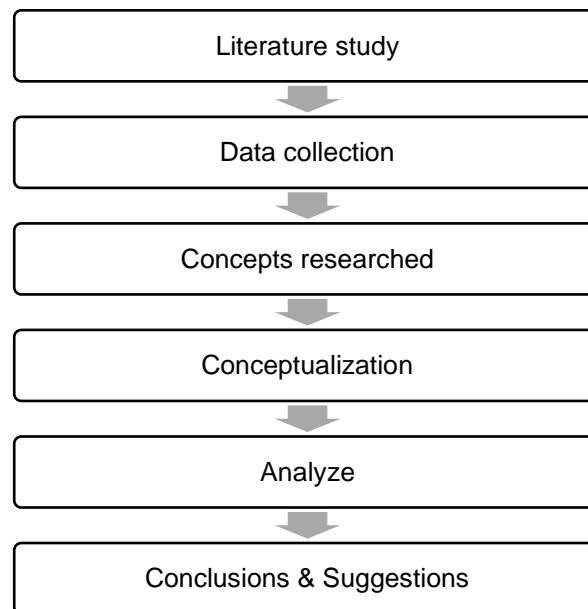

Figure 1. Literature Study Flowchart
Source: Research, 2023

Data Collection

Literature data related to the effectiveness of e-learning in adult learning in higher education and job training was collected through the academic database of sourced articles, Web of Science. Literature data search by combining the following terms: effectiveness concept, e-learning concept, adult learning (andragogy). Initially, specific search terms were used in different combinations according to each database. The criteria for including publications were books or articles available electronically in their entirety, published in Indonesian and English, from January 2017 to October 2022, concerning the identification, categorization, or explanation of the effectiveness concept, the concept of e-learning discussing its application in the practice of postgraduate education and job training.

Data Analysis

Data analysis techniques emphasize which references or literature should be cited as a reference for researchers to conduct research. It starts with reading the abstract of each study first to assess whether the problems discussed are what is to be solved in the research. Noting important and relevant parts of the research problem, researchers also note the sources of information and include a bibliography to keep from being trapped in elements of plagiarism. Suppose the information comes from other people's ideas or research results. Make notes, quotations, or information arranged systematically so the researcher can easily search again.

Drawing Conclusion

The conclusion is an important aspect of this research. It provides a brief, concise, and clear summary of the entire discussion so that readers can understand the research findings more easily.

RESULTS AND DISCUSSION

E-Learning Effectiveness in Adult Learning

The articles that were collected show that e-learning effectiveness can be interpreted differently. The study of e-learning effectiveness sourced from adult learning articles, divided into two types of education: higher education and job training, collected 77 articles. There are seven definitions of e-learning effectiveness in adult education, namely 1) learning outcomes, 2) achievement, 3) motivation, 4) satisfaction, 5) resource efficiency, 6) application in work practice, and 7) implementation according to plan, as presented in **Table 1** below:

Table 1. Definitions of E-learning Effectiveness in Adult Learning

No	Definition of effectiveness	Educational Institutions		Total
		Higher Education	**Job Training**	
1	Results	11	9	20
2	Achievement	3	5	8
3	Motivation	1	3	4
4	Satisfaction	3	7	10
5	Efficient	2	5	7
6	Applicative	3	9	12
7	According to the plan	5	11	16
	Total	**28**	**49**	**77**

Source: Research 2023

Based on **Table 1**, out of 77 articles, about 14,28% (11/77), in higher education, the effectiveness of e-learning is interpreted as "learning outcomes", which is 55% (11/20). The effectiveness of e-learning in the context of learning outcomes is a general measure. It has a broad scope, usually in the form of changes in learner behavior from e-learning treatment, measured by knowledge, attitudes, and skills. E-learning can be effective if the learning outcomes follow the predetermined output standards. Learning outcomes are compared with the set standards (minimum completeness criteria).

Further, the interpretation of e-learning effectiveness as "implementation by the plan" is most dominant in job training, with 77 articles collected, about 14,22% (11/77), resulting in 68,75% (11/16). E-learning can be effective if there is conformity between the "implementation and the " plan". Thus, the effectiveness of learning is a measure of the success of a teaching and learning process between students and between students and teachers in an educational situation to achieve learning objectives. The effectiveness of learning can be seen from the activities of students during learning, students' responses to learning, and mastery of concepts. In achieving an effective and efficient learning concept, it is necessary to have a mutual relationship between students and teachers to achieve a common goal. It must also be adjusted

to the conditions of the school environment, facilities, infrastructure, and learning media required to help achieve all aspects of learner development.

In the Standar Kurikulum Pendidikan Nasional, this definition is related to process standards. The process standard is the implementation of learning, including introductory, core, and closing activities. Thus, the effectiveness of e-learning follows the criteria regarding the implementation of learning. This is done by evaluating the learning process to obtain the data and information needed to determine the extent to which the learning has gone and make judgments and improvements required to maximize the results.

Furthermore, the effectiveness of e-learning interpreted as "application in work practice" is the most dominant in job training, according to the article data collected, at around 11,68% (9/77), resulting in 75% (9/12). The effectiveness of e-learning described by "application in work practice" is the application of learning outcomes. This definition is the result of the training process conducted by the training institution. Thus, the effectiveness of e-learning is measured by the relevance between the learning process and the work environment. The learning is effective if the learning outcomes can be applied to the work environment.

The definition of e-learning effectiveness, conceptualized by "satisfaction", is dominant in training institutions. From the data of the number of journals/articles collected, about 9,09% (7/77) resulted in 70% (7/10) conceptualizing e-learning effectiveness as "satisfaction". This definition is a form of service that can satisfy clients or stakeholders. Measuring the effectiveness of e-learning conceptualized as "satisfaction" is usually done with a satisfaction index survey, a quantitative and qualitative measurement of public opinion in obtaining education/learning services by comparing expectations and their needs.

Then the definition of e-learning effectiveness is conceptualized by efficiency, which dominates job training. From 77 articles collected, 6,4% (5/77) resulted in 71,42% (5/7). Learning effectiveness refers to the efficacy and success of all learning components organized to achieve learning objectives (Encarnacion et al., 2021). Practical learning includes all mental, physical, and social objectives. In measuring the definition of e-learning effectiveness, it is conceptualized with efficiency by comparing the results and resources used.

Methods for Measuring E-Learning Effectiveness in Adult Learning

The previous section explained the definitions applied in research examining e-learning effectiveness. The next step is to examine the research methods for measuring effectiveness and the resulting consequences. Of the 77 abstracts coded in detail, 49 abstracts identifying their research design are outlined in **Table 2**.

Table 2. Effectiveness measurement method

No	Method	Total	Percentage
1	Qualitative	23	46,95%
2	Quantitative	21	42,85%
3	Mixed	5	10,20%
	Total	49	100%

Source: Research 2023

Table 2 above shows the distribution of research using research methods, namely qualitative 46,93% (23/49), quantitative 42,85% (21/49), and mixed 10,20% (5/49). Qualitative research is conducted with case studies related to the effectiveness of e-learning. This method aims to measure the effectiveness of e-learning conducted by Education/Training Institutions that use e-learning. The second largest distribution related to the method used by research to measure the effectiveness of e-learning is the quantitative method. The research method is used descriptively and comparatively. Then, research using comparative quantitative methods is used to compare e-learning with conventional or both online learning (asynchronous and synchronous).

The last distribution of research methods to measure the effectiveness of e-learning is the mixed-methods research and development (R&D). R&D is used to produce learning programs through methods and is conducted through needs analysis. After the needs analysis process, the program development process is carried out and then ends with the evaluation process. This is possible because qualitative and mixed methods research aims to explore one concept in depth, and the goal of this research is often to understand the 'why' of the concept, which requires a lot of time and resources.

As stated, most research on e-learning effectiveness focuses on measuring whether and/or which e-learning solutions are effective using quantitative measures. The purpose of empirical studies examining e-learning programs for teachers is to understand the complex approaches used to change teaching practices using e-learning. E-learning is an important tool for improving employee productivity and skills. E-learning offers a cost-effective and flexible alternative to traditional classroom-based training while improving knowledge retention and engagement. By providing virtual training and personalized learning experiences, performance will also improve as e-learning encourages users to keep up to date with the latest industry trends and improve their skills over time. The scalability of e-learning has a positive influence on performance (Permatasari & Hardiyan, 2018).

Qualitative analysis of teachers' interactions with e-learning showed three common strategies that teachers used to avoid significant changes in their work practices:

1. Finding statements to reject the content, meaning that teachers look for single statements in the e-learning content that can be used to prove that implementation in practice is impossible. Some stated that they would prefer to teach as suggested by e-learning, but the context of their work did not allow this.
2. Modifying the content to make the change less demanding, meaning that teachers consciously or unconsciously modify the content to function similarly to their current practice, allowing them to state that they already teach this way, or modify the content to make it easy to implement.
3. Determining content that is easy to implement, meaning that teachers use content elements that are easy to implement in their teaching without fundamentally changing them.

Factors Supporting E-learning Effectiveness

As a learning system, the success of e-learning can be influenced by many factors. Based on data from 77 articles and 31 articles reviewed, the results mention several factors of e-learning effectiveness, as presented in **Table 3**.

Table 3. Factors Supporting E-learning Effectiveness

No	Key Support Factors	Total	Percentage
1	Quality of teachers/educators/lecturers	15	48,40%
2	Quality of teaching materials	4	12,90%
3	Quality of infrastructure	8	25,80%
4	Quality of learning strategies	4	12,90%
	Total	31	100%

Source: Research 2023

1. Teacher/Educator/Lecturer Quality Factor

   Based on **Table 3** above, it can be seen that the most influential supporting factors of e-learning effectiveness are 48% or 15 out of 31 articles. The use of e-learning is closely related to the technological competence of teachers (lecturers or teachers). For example, in a study of lecturers' technological competence, what can determine effectiveness is the integration of computer activities with appropriate inquiry-based andragogy in the classroom. Lecturers' perceived assessment of the importance of online teaching competencies and their ability to conduct online learning are comparable in their characteristics (Wulandari & Agustika, 2020). Thus, the factor that largely determines the effectiveness of e-learning in adult learning is the lecturers, especially in digital literacy. Many teacher competencies apply, both for face-to-face and online teaching. However, professional development plans should include online learning skills for those who teach online.

2. Teaching Material Quality Factors

   Another supporting factor that can increase the effectiveness of e-learning is teaching materials, which are shown at 12,90% or discussed in 4 out of 31 articles. Teaching materials must be of good quality. The quality of teaching material can be determined from the analysis results. In analyzing, it is necessary to determine the quality criteria for the results of the development of teaching materials. Teaching materials are one of the aspects needed in learning, so the quality criteria also apply to teaching materials. The criteria used are the criteria for development results put forward by Nieveen, namely 1) validity, 2) practicality, and 3) effectiveness (Yunianti, 2023).

   Indicators of validity according to Nieveen include two things, namely 1) the strength of the theory in the components of teaching materials (content validity) and 2) internal consistency in all components of teaching materials (construct validity) (Istiqomah & Kurniasari, 2020). Based on this, it can be seen that to determine the quality of teaching materials, it is necessary to look at how the content of the teaching material product itself, whether it follows the applicable curriculum, and has stability based on a model or system. Such an assessment can only be done by experts, because only experts can know the strength of the theory and the suitability of the components in teaching materials. On the other hand, indicators or characteristics of practicality are (1) experts or teachers who state that something developed can be used, and (2) something developed is easy to use by teaching students, using what was designed by the developer. Meanwhile, indicators or characteristics of effectiveness are 1) a positive response from students to the learning program and 2) a positive impact on the achievement of learning outcomes (Istiqomah & Kurniasari, 2020).

3. Quality of Infrastructure

   The quality of facilities and infrastructure is the second most influential factor after the quality of teachers, which is reviewed in 8 out of 31 articles or 25,80%. Aspects of success in online implementation are seen from human resources, infrastructure availability, and technical learning implementation (Wahyono et al., 2020). Considering that facilities and infrastructure are a success factor in the teaching and learning process, the standards and procurement of learning facilities must follow the learning objectives. This applies to both online and face-to-face learning. The readiness of the learning support facilities should be considered, considering the characteristics, conditions, and availability.

The study's results show that implementing online learning by utilizing information technology facilitates the delivery of learning through virtual distance. Online learning activities cannot be separated from using devices and the internet. However, obstacles have been experienced in its implementation, such as inadequate facilities (Rahayu & Haq, 2021). This can be broken down into 1) weak internet network connectivity; 2) high internet quota requirements; 3) uneven ownership of devices for students; and 4) the ability of teachers to utilize information technology is not optimal. One of the components of the success of learning activities is supporting facilities and infrastructure, so efforts need to be made to optimize online learning so that students can access it evenly throughout Indonesia.

4. Learning Strategy Quality Factor

The quality of e-learning includes several aspects: learning design of learning activities, delivery strategies, interaction in the learning process, learning assistance services, learner interaction with teaching materials, collaboration, feedback system, and learning assessment. Online learning can be an alternative to meet the learning needs of adult learners, as well as adding skills when distance or busy work becomes an obstacle (Rahmawati & Hiryanto, 2023). The ability of facilitators to manage learning also affects the ability of learners to achieve the expected competency standards. Tutors must understand the principles of pedagogy and andragogy so that the strategies used in the learning process are tailored to the conditions and characteristics of the learners.

The research results found that the effectiveness of e-learning in adult learning, especially in universities and job training institutions, is more efficient than in children's education. Adults' learning needs and demands are more significant than children's. In addition, they have less time to study, so using e-learning is beneficial in improving their knowledge and skills (Yusuf et al., 2021). Although the benefits have not been fully realized, especially in higher education, increasing its use helps improve the quality and creativity in implementing learning (Kamilia & Wahyudin, 2021). The application of e-learning in recent years in learning has made e-learning one of the forms of learning that has received much attention. Hence, its development in the future is very possible for the sustainability of a more effective learning process.

CONCLUSION

The effectiveness of e-learning in adult learning can be divided into several topics. This research shows that from the total of 77 articles, the topics are 1) "learning outcomes" in higher education, "implementation according to plan" in job training institutions, "application in work practice" in job training institutions, and efficiency. In this study, it was also found that most of the articles applied the method of measuring the effectiveness of e-learning in adult learning, mostly using one of the qualitative or quantitative methods. Although some studies use mixed methods, based on the study results, the number is not more than the number of quantitative and qualitative studies. In addition, the results of the SLR study that has been conducted also found the results of the review in the form of factors supporting the effectiveness of e-learning in adult education from the number of articles selected, namely the quality of teachers, the quality of teaching materials, the quality of facilities and infrastructure, and the quality of learning strategies used. This article is expected to be one of the bases for further researchers to examine opportunities to develop e-learning to support the sustainability of a more effective learning process.

AUTHOR'S NOTE

The authors declare that there is no conflict of interest related to the publication of this article. The authors also emphasize that the data and content of the article are free from plagiarism.

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