The Influence of Digital Literacy of Educators Based on Artificial Intelligence (AI) on Learning Effectiveness and Educator Performance

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Abstract: - This study examines the effect of digital literacy of educators based on Artificial Intelligence (AI) on learning effectiveness and educator performance in the Non-Formal Education Unit of the Learning Activity Center (SKB) in Pekalongan Prefecture. With a population of 132 educators and a sample of 101 educators using simple rancom sampling technique, data were collected through questionnaires and analyzed descriptively and simple linear regression. The results showed that digital literacy of AI-based educaators had a positive and significant effect on learning effectiveness (59.1%) and educator performances (54%), with a significance value of 0.000 <0.005. The research conclusion emphasizes the importance of improving digital literacy thorugh training and collaboration, as well as the need for support from agencies and government in providing access to technology and adequate infrastructure. Future research is expected to explore other independent variables that may influence educational outcomes.

Key-Words: - Educator Digital Literacy, *Artificial Intelligence* (AI), Learning Effectiveness, Educator Performance

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1 Introduction

In the 21st century, having literacy skills is very important in life. Rapid advances in science, technology and information require human literacy skills to continue to develop and adapt. Therefore, it is important for us to continue learning and improving literacy [1]. In 2022, the Ministry of Communication and Information Technology (Kemenkominfo) in collaboration with the Katadata Insight Center, announced an increase in Indonesia's digital literacy index to 3.54. this figure is higher than the previous year which only reached 3.49. But despite the increase, quoted from CNBC Indonesia [2] according to Aviliani, a senior economist from INDEF, the level of digital literacy in Indonesia is still relatively low compared to other ASEAN countries. This shows that although many Indonesians are already technologically literate, the level of ability and skills stil varies. Meanwhile, digital literacy skills are need in various fields, especially in the field of education [3].

The condition of low digital literacy is caused by various factors, such as: condition of access and ifrastructute, individual and social, to support and policies from the government as well as support from units and leaders.

Educators as one of the tools in every educational unit are expected to have digital literacy skills that are not only good, but also adequate. In this case, what is meant by digital literacy is the ability of educators to integrate Information and Communication Technlogy into the learning process. This ability is very important to overcome various new challenges in the ever-changing world of education. Educators have an important role in optimizing the use of information and communication technology, especially in accessing the internet to manage the learning process and quality learning resources to support the development of students. Educators are required to be creative in utilizing technology in finding various quality learning resources and managing more intercative learning.

One of the most significant technological developments is the existence of Artificial Intelligence (AI). Artificial intelligence is now an important part of teaching and learning activities in schools and universities [4]. Through this Artificial Intelligence technology, schools can utilize applications that are able to automate various tasks, such as feedback, selection of learning materials, and

personalization of learning according to the needs of each student [5]

However, in general the use of this technology has not been fully utilized in learning. There are still a number of educational institutions that have not adopted technology in the learning process. Ideally, today's educational institutions need to utilize technological developments to facilitate the tasks of educators and students. It is time for all schools to start using technology in learning [6].

Education units that have not yet utilized *Artificial Intelligence* (AI) technology into the larning process still face a number of challenges such as the lack of adequate educator understanding of AI technology and limited access to technological resources.

However, digital literacy is still important to pursue because digital literacy is the key to preparing for future challenges. Until now, there have not been many studies that examine the digital literacy of educators, especially for educators in non-formal education units. So this research is important to do in order provide a deeper understanding of the extent to which the digital literacy of educators based on *Artificial Intelligence* (AI) can affect the effectiveness of learning and the performance of educators in the non-formal education unit Sanggar Kegiatan Belajar (SKB). So, in the future this research can also be a basis for developing policies and training programs in improving the digital competence of educators which in turn can improve the overall quality of education.

Digital Literacy

Mohammadyari dan Singh [7] suggest that digital literacy refers to an individual's ability to utilize digital devices to acces, utilize, and create new information. Furthermore, Tang dan Chaw [8] revelaed that digital literacy is a basic competency that must be possessed by every individual, especially in the context of distance learining. The application of digital literacy in learning depends on various aspects, such as media literacy, information literacy, digital literacy, learning skills, communication and collaboration skills, career management and digital identity, and mastery of information technology.

In the context of education, digital literacy is very important to deal with the dynamics of the digital era. As for effective digital literacy competencies to be applied in the school environment [9] there are several stages as follows: Accessing, selecting, understanding, analyzing, verifying, evaluating, distributing, producing, participating and collaborating.

1. Accessing, educators and learners need to have the ability to access information digitally strating from the technical ability to operator devices, such as computers or *smartphones* as the initial stage of their ability. In addition, it is also necessary to understand how to effectively use search engines to find the information we need.
2. Selecting, after obtaining information from various sources, educators and learners need to have the ability to distinguish which information is correct and reliable. This is done by checking the origin of the information, such as who the author is and which source the information comes from.
3. Understand, each individual has a different understanding of the same information. In the context of using digital media, the ability of educators and learners to interpret the meaning of the content they access is crucial. Understanding here is not just reading words but also involves the ability to analyze how technology can shape our behavior, perceptions and beliefs.
4. Analyzing, as a digital media user, having the ability to identify or analyze content encountered is indispensable. A lot of content on social media is designed to convince us of a certain view. Therefore, as educators and learners, we must be able to identify bias or subjective viewpoints contained in content before accepting the information as truth.
5. Verifying, verifying skills enable to educators and learners to analyze information from different points of view. By comparing the same information from different sources, we can assess the accuracy and objectivity of information.
6. Evaluate, if previously only looking for and understanding information, then at the evaluation stage we are required to think more deeply. Educators and learners must be able to assess the truth, relevance and impact of information. In addition, they must also be able to make wise decisions based on the analysis that has been done.

7. Distributing, this competency is not limited to just disseminating information, but also involves active participation on social media. Educators and learners must be able to use various features provided by social media, such as giving likes, dislikes, or comments, as well as rating products or services.
8. Producing, the producing competency emphasizes our ability to create original content. This can be in the form of social media or blog posts, videos, or even other creative forms.
9. Participate, this competency requires us to not only be passive users, but also actively engage in *online* communitites. This involves the ability to interacy with others, share opinions, and make meaningful contributions.
10. Collaborate, this competency is the stage where educators and learners are expected to have the ability to collaborate or work with others to spread digital literacy more widely. By working together, it can reach more people and make a bigger impact.

Application of Artificial Intelligence (AI) in Learning Activities

Andreas Kaplan and Michael Haenlain [10] define artificial intelligence as the ability of a system to understand information and the surrounding environment, learn from that information, and use the knowledge gained to achieve certain goals.

John McCarthy [10] defines artificial intelligence as understanding the human thought process and developing computer systems that can mimic human cognitive abilities and behavior.

According to Ulandari [11], there are two main approaches to the application of AI in education. First, AI can be used to automate teaching tasks previously performed by teachers. Intelligent tutoring systems that can customize learning content for each individual have become commonplace in many classrooms [12]. One of the roles of AI is to enhance human intellectual capacity and support a more effective and effiecient learning process.

There are various ways to implement AI in the learning process. Along with the times, the education sector needs to adapt and collaborate to overcome the challenges.

The emergence of AI marks a new chapter in the history of educational development. Effective use of this technology can accelerate the learning process and encourage learner independence. The role of educators in the learning process is becoming more specific, providing in-depth explanations of the subject matter. However, the main goal of education, character building, remains the top priority. As for learners, educational technology gives learners autonomy in organizing their own learning process, which will eventually equip them with the skills needed in the world of work.

Educator Performance

According to Pianda [13] performance is the result achieved from an activity or job. In the context of education, the success of an educator in achieving institutional goals is largely determined by his ability to teach. The teaching competence of educators can be assessed from their performance while in the classroom.

Several experts have identified five key aspects that can be used as a measure of a person's performace, including in the field of education, namely [13]:

1. Quality of Work
   This indicator measures educators' ability to plan effective learning and integrate research findings in learning practices.
2. Work speed/performance
   This indicator measures the educator's ability to modify learning materials according to the characteristics of student and complete the teaching program in accordance with the established academic calendar.
3. Initiative in work
   This indicator measures the educator's ability to innovate learning by using various learning models that are appropriate to the teaching material and eddectively utilize school resources.
4. Workability
   This indicator relates to the educator's ability to lead a conducive classroom situation, manage teaching and learning activities, and assess student learning outcomes.
5. Communication
   This indicator measures educator's ability to establish effective communication with students who have learning difficulties and their

openness to input to improve the quality of learning.

Learning Effectiveness

The effectiveness of learning according to Rohmawati [14] is a measure of the extent to which learning objectives are achieved through interactions between students and educators in the teaching and learning process. According to Yusuf [15] there are five indicators of effective learning, namely: (1) management of learning implementation, (2) communicative process, (3) learner response, (4) learning activities, (5) learning outcomes.

1. Management of learning impelementation
   According to Reigulth [15] at the implementation stage of learning, there are several important aspects that need to be considered by educators, namely:
   a. Devide the learning material into several subtopics, then explain the relationship between the subtopics and inform the perquisites for mastering the next subtopic.
   b. Delivering learning materials with simple language and easy to digest by students, and proviing concrete examples.
   c. Writing keywords on the board aims to provide a clear picture of the structure of the material presented.
   d. After the delivery of material on a topic is complete, a brief evaluation should be conducted to measure the level of understanding of the learners before moving on the next topic.
   e. Guide learners to distinguish between essential subject matter and supplementary material.
   f. Respond to learners' questions.

   The closing section aims to summarize all the material that has been presented, connect between topics, evaluate students' understanding thorugh a post-test (if any), and provide an introduction to the material for the next meeting.
2. Communicative teaching and learning process
   According to Yusuf [15] communicative learning is a language learning method that focuses on developing communication. Educators are invited to interact and use language actively, as in real life.
3. Learner response
   Educators need to create an interesting learning atmosphere so that students are motivated and respond positively to learning.
4. Learning activities
   According to Yusuf [15] the learning process involves active interaction between educators and learners who optimize the use of the five sense, cognitive and intellectual abilities. The diversity of activites in schools creates a dynamic and interesting learning, so that students can learn optimally.
5. Learning outcomes
   Learner learning outcomes are the achievement of cognitive, affective, and psychomotor abilities obtained through the learning process. Learning outcomes are influenced by two main factors, namely internal and external factors.

2 Problem Formulation

This type of research is quantitive causal research. According to Sugiyono [16], a causal quantitative approach is a research method used to identify cause-and-effect relationships between two or more variables. This research is included in causal quantitative research because this research aims to determine the effect of digital literacy of educator based on Artifical Intelligence (AI) (X) on learning effectiveness (Y1) and educator performance (Y2).

The population used in this study were educators (pamong belajar and tutors) in the Non-formal Education Unit of the SKB in the Pekalongan Prefecture of Central Java Province consisting of SKB Pekalongan Regency, SKB Pekalongan City, SKB Tegal Regency, SKB Tegal City, SKB Brebes Regency, SKB Pemalang Regency, and SKB Batang Regency totaling 132 educators. Sampling was carried out using the Simple Random Sampling technique, totaling 101 educators with the following calculations:

Table 1.
Overview of the Study Population and Sample

NO	REGION/SKB	POPULATION	CONSIDERATIONS	SAMPLE
1	SKB Pekalongan Regency	16	$\frac{16}{132} x\ 99 = 12$	12
2	SKB Pekalongan City	18	$\frac{18}{132} x\ 99 = 13{,}5$	14

3	SKB Tegal Regency	23	$\frac{23}{132} x\ 99 = 17{,}25$	18
4	SKB Tegal City	25	$\frac{25}{132} x\ 97 = 18{,}75$	19
5	SKB Pemalang Regency	21	$\frac{21}{132} x\ 99 = 15{,}75$	16
6	SKB Brebes Regency	13	$\frac{13}{132} x\ 99 = 9{,}55$	10
7	SKB Batang Regency	16	$\frac{16}{132} x\ 99 = 12$	12
	Total	**132**		**101**

Source: Information from each SKB unit

The data collection technique used a questionnaire distributed via *googleform*. The questionnaire used in this study is a type of closed questionnaire. The questionnaire used is a Likert scale using a 1-5 scale calculation, namely Strongly Agree (SS), scored 5; Agree (S), scored (4); Undecided (RG), scored 3; Disagree (TS), scored 2: Strongly Disagree (STS), score 1. Each score obtained has an ordinal measurement level [17].

Data testing is done with validity tests, reliability tests, descriptive statistical analysis, and classical assumption tests. There are two classic assumption tests, namely normality test and heteroscedasticity test. Then the analytical tool used is Simple Regression Analysis and the coefficient of determination test.

Based on the framework that has been prepared, the researcher proposes a hypothesis as an initial guess of the results that will be obtained from this study, namely:

H_1 : digital literacy of educators based on *Artificial Intelligence* (AI) has a positive and significant effect on learning effectiveness.

H_2 : digital literacy of educators based on *Artificial Intelligence* (AI) has a positive and significant effect on educator performance.

3 Problem Solution

Descriptive Analysis of AI-Based Educator Digital Literacy Variables

Table 2.
Descriptive Statistics of Digital Literacy of AI-Based Educators

Descriptive Statistics

	N	Min	Max	Mean	Std. Deviation
Digital Literacy of AI-Based Educators	101	36.00	100.00	76.4158	11.14295
Valid N (listwise)	101				

Source: SPSS 27 *output*, research data processing 2024

Table 3.
Frequency Distributions of AI-Based Educator Digital Literacy Variables

No	Scor Interval	Total	Percentage	Category	Average
1	84 – 100	32	31,68%	Very High	76,4158
2	68 – 83	53	52,47%	High	
3	52 – 67	15	14,86%	High Enough	
4	36 – 51	1	0,99%	Low	
5	20 – 35	0	0	Very Low	
	Total	**101**	**100%**		**High**

Source: Research data processed in 2024

Table 4.
Frequency Distribution of AI-based Educators' Digital Literacy Indicators

No	Indicator	Average	Category
1	Access	7,95	High
2	Selecting	8,01	High
3	Understanding	8,06	High
4	Analyzing	8,52	Very High
5	Verifying	7,14	High
6	Evaluate	7,45	High
7	Distribute	7,78	High
8	Producing	8,19	High
9	Participate	6,54	High Enough
10	Collaborate	6,72	High Enough

Source: Research data processed in 2024

Based on these results, it is known that out 101 respondents, the highest value of the AI-based educator digital literacy variable is 100 and the lowest values is 36 from the questions given. The standard deviation is 11.14295 and the *mean* value obtained on the variable is 76.4158. the results of these descriptive statistics show that the *mean* value is greater than the standard deviation value, indicating a good representation of the overall data. This means that educators at SKB in the Pekalongan Prefecture already have digital literacy based on Artificial Intelligence (AI) as indicated by the average result of digital literacy of AI-based educators of 76.4158 in the high category.

Descriptive Analysis of Learning Effectiveness Variables

Table 5.
Descriptive Statistics of Learning Effectiveness

Descriptive Statistics

	N	Min	Max	Mean	Std. Deviation
Learning Effectiveness	101	22.00	75.00	60.2178	8.79841
Valid N (listwise)	101				

Source: SPSS 27 *output*, research data processing 2024

Table 6.
Frequency Distribution of Learning

Effectiveness Variables

No	Score Interval	Total	Percentage	Category	Average
1	63 - 75	32	31,68%	Highly Effective	60,2178
2	51 – 62	53	52,48%	Effective	
3	39 – 50	15	14,85%	Effective Enough	
4	27 – 38	0	0%	Less Effective	
5	15 – 26	1	0,99%	Very Less Effective	
Total		**101**	**100%**		**Effective**

Source: Research data processed in 2024

Table 7.
Frequency Distribution of Learning Effectiveness Indicators

No	Indicator	Average	Category
1	Learning Implementation Management	12,22	Effective
2	Communicative Process	12,15	Effective
3	Learner Response	12,02	Effective
4	Learning Activity	12,03	Effective
5	Learning Outcomes	11,78	Effective

Source: Research data processed in 2024

Based on the results, it is known that out of 101 respondents, the highest value of the learning effectiveness variable is 75 and the lowest value is 22 from the 15 questions given. The standard deviation is 8.79841 and the mean value obtained on the variable is 60.2178. The results of the descriptive statistics show that the mean value is greater than the standard deviation value, indicating a good representation of the overall data. This means that in general, the effectiveness of learning at SKB in Pekalongan is at an effective level indicated by the average result of learning effectiveness of 60.2178 in the effective category.

Descriptive Analysis of Educator Performance Variables

Table 8.
Descriptive Statistics of Educator Performance

Descriptive Statistics

	N	Min	Max	Mean	Std. Deviation
Educator Performance	101	21.00	75.00	61.5446	8.79264
Valid N (listwise)	101				

Source: SPSS 27 *output*, research data processing 2024

Table 9.
Frequency Distribution of Educator Performance Variables

No	Scor Interval	Total	Percentage	Category	Average
1	63 – 75	27	26,73%	Very High	61,5446
2	51 – 62	63	62,37%	High	
3	39 – 50	10	9,91%	High Enough	
4	27 – 38	0	0	Low	
5	15 – 26	1	0,99%	Very Low	
Total		**101**	**100%**		**High**

Source: Research data processed in 2024

Table 10.
Frequency Distribution of Educator Perfomance Indicators

No	Indicator	Average	Category
1	Quality of Work	12,22	High
2	Speed or Accuracy of Work	12,36	High
3	Initiative in Work	12,35	High
4	Employability	12,26	High
5	Communication	12,23	High

Source: Research data processed in 2024

Based on these results that out of 101 respondents, the highest value of the learning effectiveness variable was 75 and the lowest value was 21 from the 15 questions given. The standard deviation is 8.79264 and the mean value obtained on the variable is 61.5446. the results of the descriptive statistics of the overall data. This means that in general, the performance of educators at SKB in Pekalongan is in the high category indicated by the average result of educator performance of 61.5445 in the high category.

Normality Test Results

Table 11.
Normality Test Results

Variables	Sig.	Decision
X > Y1	0.080	Normal
X > Y2	0.200	Normal

Source: Research data processed in 2024

Based on the results of the normality test with Kolmogrov-Smirnov in the table above, the probability value p or Asymp. Sig. (2-tailed) on X against Y1 is 0.080 while on X against Y2 is 0.200. because the probability value is greater than the significance level, which is 0.05. This means that the normality assumption is fulfilled.

Heteroscedasticity Test

Table 12.
Heteroscedasticity Test Results

X > Y1		X > Y2	
Variables	**Sig.**	**Variables**	**Sig.**
Digital Literacy of AI-based Educators	0.405	Digital Literacy of AI-Based Educators	0.886

Source: Research data processed in 2024

Based on the table 12, it is obtained that

the probability value (Sig) of the AI-based Educator Digital Literacy variable on Learning Effectiveness is 0.405, while on AI-based Educator Digital Literacy on Education Performance is 0.886. Because the probability value (Sig) of all variables is more than the significance of 0.05 or 5%, it can be concluded that the assumption of homoscedasticity is fulfilled, which means that there are no symptoms of heteroscedasticity.

Simple Linear Regression Analysis

Table 13.
Hasil Analisis Regresi Linear Sederhana

X > Y1		X > Y2	
Variabel	**B**	**Variabel**	**B**
Constant	13.852	Constant	17.226
Digital Literacy of AI-Based Educators	0.607	Digital Literacy of AI-Based Educators	0.580

Source: Research data processed in 2024

Based on the results of the simple linear regression analysis in the table above, the regression model for the effect of AI-based Educators' Digital Literacy on Learning Effectiveness is obtained as follows:

$$Y = 13.852 + 0.607X$$

Where:
Y = Learning Effectiveness
X = Digital Literacy of AI-Based Educators

Based on the simple linear regression model above, the following information is obtained.

1. The constant is 13.852 which means that if there is no change in the value of the independent variable (Digital Literacy of AI-Based Educators) then the dependent variable (Learning Effectiveness) value is 13.852.
2. The regression coeeficient on the AI-based Educator Digital Literacy variable is 0.607 and is positive, meaning that if the AI-based educator Digital Literacy variable increases by 1 point significantly, the AI-based Educator Digital Literacy variable will increase the value of the Learning Effectiveness variable by 0.607.

Meanwhile, the results of the regression model for the effect of AI-based Educator Digital Literacy on Educator Performance are as follows:

$$Y = 17.226 + 0.580X$$

Where:
Y = Educator Performance
X = Digital Literacy of AI-Based Educators

Based on the simple linear regression model above, the following information is obtained.

1. The constant is 17.226 which means that if there is no change in the value of the independent variable (Digital Literacy of AI-Based Educators) then the dependent variable (Educator Performance) value is 17.226.
2. The regression coefficient on the AI-Based Educator Digital Literacy variable is 0.580 and positive, meaning that if the AI-Based Educator Digital Literacy variable increases by 1 point significantly, the AI-Based Educator Digital Literacy variable will increase the value of the Educator Performance variable by 0.580.

Coefficient of Determination

Table 14.
Coefficient of Determination Results

Variables	R Square
Digital Literacy of AI-Based Educators on Learning Effectiveness	0.591
Digital Literacy of AI-Based Educators on Educator Performance	0.540

Source: Research data processed in 2024

Based on the results of the coefficient of determination test above, the R^2 (R Square) value of the regression model is used to determine how much the ability of the independt variable (independent) to ecplain the dependent variable (dependent). Based on the table 14, it is known that the R value^2 on the effect of AI-Based Eductor Digital Literacy on Learning Effectiveness is 0.591, this means that 59.1% of the variation in the dependent variable Learning Effectiveness can be explained by variations in the independt variable, namely AI-Based Educator Digital Literacy. While the remaining amount (100%-59.1% = 40.1%) is influenced by other variables outside of this Study.

The effect of AI-Based Educator Digital Literacy on Educator Performance is 0.540, this means that 54% of the variation in the dependent variable Educator Performance can be explained by the variation in the independent variable, namely AI-Based Educator Digital Literacy. While the remaining amount (100%-54% = 46%) is influenced by other variables outside this study.

Research Hypotesis Test
T Test (Partial)

Table 15.
Partial Test Result

X > Y1		X > Y2	
T Statistic	Sig.	T Statistic	Sig.
11.948	0.000	10.785	0.000

Soure: Research data processed in 2024

Based on the t test results, presented in the table 15, it is obtained that the AI-based Educator Digital Literacy variable has a significant value of 0.000, this value is smaller than 0.05. As for the t count, the value is 11.948> t table (1.983), so the AI-Based Educator Digital Literacy variable affects the Learning Effectiveness variable. So that the first hypothesis, H_1 : Digital Literacy of AI-Based Educators has a positive and significant effect on the Learning Effectiveness variable "accepted".

While the effect of AI-Based Educator Digital Literacy on Educator Performance has a significance value of 0.000, this value is smaller than 0.05. As for the t count, the value is 10.785>t table (1.983), so the AI-Based Educator Digital Literacy variable affects the Educator Performance variable. So that the second hypothesis, H_2: Digital Literacy of AI-Based Educators has a positive and significant effect on the Educator Performance variable "accepted".

4 Discussion

The Influence of Digital Literacy of Educators Based on Artificial Intelligence (AI) on Learning Effectiveness

The first hypothesis proposed in this study is that the digital literacy of educators based on Artificial Intelligence (AI) has a positive significant effect on learning effectiveness. Based on the results of the research that has been done, it turns out that the hypothesis is proven. The results of this study indicate that the digital literacy of educators based on Artificial Intelligence (AI) has a positive effect with a regression coeeficient of 0.607, t count obtained a value of 11.948> t table (1.983) and significance with a significance value of 0.000 smaller than 0.005 on learning effectiveness. Based on these results, it can be stated that the first hypothesis in this study is accepted. The accepted hypothesis means that the higher the digital literacy of educators based on Artificial Intelligence (AI), the more effective learning effectiveness SKB in the Pekalongan Prefecture of Central Java Province.

Descriptive statistical analysis of digital literacy of AI-based educators shows that the average value is included in the high category, namely 76.4158. High digital literacy of AI-based educators will have an impact on effective learning effectiveness as well, because digital literacy of AI-based educators affects learning effectiveness. The AI-based educator digital literacy variable is measured using ten indicators, namely accessing, selecting, understanding, analyzing, verifying, evaluating, distributing, producing, participating, and collaborating. Based on the results of descriptive statistics, the indicator of analyzing is included in the very high category, the indicators of accessing, selecting, understanding, verifying, evaluating, distributing, and producing are included in the high category, and the indicators of participating and collaborating are included in the moderate category.

Based on the explanation, it can be concluded that the digital literacy of educators based on Artificial Intelligence (AI) has an impact on the effectiveness of learning. Educators who have high AI-based digital literacy mean that they are able to use their ability to process data, analyze information, create more personalized and relevant learning content, including how they network to gain wider experience. Therefore, the higher the digital literacy of AI-based educators will encourage educators to continue to innovate in learning, improve the quality of education and improve student learning outcomes to face challenges in the digital era.

The results of this study are in accordance with what Ulandari [11] stated that the one of the roles of AI is to increase human intelectuall capacity and support a more effective and efficient learning process. So based on this, if educators have the ability to utilize AI technology, it becomes one of the determining factors of how learning can be carried out more effectively.

Previous research that is in accordance with the results of this study on the effect of digital literacy on learning effectiveness is research from Sri Purwati & Sukiman [18], Sukardi, Siti Aminah & Ika Oktiviana Dewi [19], Lu'luul Mukaromah & Cipto Wardoyo [20] which shows the results that educators' digital literacy has a positive and significant effect on the quality of learning.

The Influence of Digital Literacy of Educators Based on Artificial Intelligence (AI) on

Educator Performance

The second hypothesis proposed in this study is that the digital literacy of educators based on Artificial Intelligence (AI) has a positive and significant effect on educator performance. Based on the results of the research that has been done, it turns out that this hypothesis is proven. The results of this study indicate that the digital literacy of educators based on Artificial Intelligence (AI) has a positive effect with a regression coefficient of 0.508, the calculated t value obtained a value of 10,785> t table (1,983) and significance with a significance value of 0.000 smaller than 0.005 on educator performance.

Based on these results, it can be stated that the second hypothesis in this study is accepted. The accepted hypothesis means that the higher the digital literacy of educators based on Artificial Intelligence (AI), the higher the performance of educators at SKB in the Pekalongan Prefecture of Central Java Province.

So, it can be concluded that the digital literacy of educators based on Artificial Intelligence (AI) has an impact on educator performance. Educators who have high AI-based digital literacy mean that they are able to utilize AI technology to improve the quality of learning, such as developing more innovative learning materials, providing more personalized and immediate feedback to learners, and initiating the use of various AI tools in the learning process. This is reflected in improved quality of work, speed in responding to the technological developments, and higher initiative in implementing innovations in learning. The higher the digital literacy of AI-based educators, the higher their performace.

The results of this study are in accordance with those stated by Pianda [13] that performance is the result achieved from an activity or job. In the context of education, the success of an educator in achieving institutional goals is largely determined by his ability to teach. The ability to teach when supported by the digital literacy of AI-based educators will encourage educators to innovate in teaching, and adapt to technological developments so that they can integrate them into learning.

Previous research that is in accordance with the results of this study on the effect of digital literacy on educator performance is research from Nur Ahyani, Happy Fitria, Bukman Lian, & Hery Setio Nugroho [21], Fatmawati Kumalasari, Riyadi, & Hadiyah [22], Sulistyarini & Fatonah [23] which shows the results that educators' digital literacy has a positive and significant effect on teacher performance, and teacher pedagogical competence.

5 Conclusion

From the results of the study, it can be concluded that partially digital literacy of AI-based educators has a positive and significant effect on learning effectiveness and digital literacy of AI-based educators has a positive and significant effect on educator performance. The suggestions that can be given are: (1) educators can improve digital literacy, especially based on Artificial Intelligence (AI) by proactively participating in trainings and applying it in daily learning, (2) educators can also always collaborate with colleagues for various knowledge and experiences, (3) institutions need to provide easy access to technological devices and digital resources that support the use of AI and need to create an innovative learning culture and encourage educators to continue to develop themselves, (4) the government needs to facilitate the development of educator's digital literacy and provide adequate infrastructure. As well as making policies that support the use of AI in education. (5) future research is expected to develop other independent variables that may affect learning effectiveness and educator performance. Because the results of the coefficient of determination analysis in this study, the independent variables were able to explain the dependent variable by 59.1% and 54%. this means that there are still other factors that affect the effectiveness of learning and educator performance by 40.1% and 46%.

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