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Utilizing Artificial Intelligence to Improve Adaptive Learning

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ABSTRACT
When open the training or learning window, there are still many training processes that do not use technology. In today's increasingly competitive era, there are still educational institutions that do not use technology in their teaching and learning activities. It is believed that schools are currently taking advantage of new technologies that make the work of teachers or students easier. AI (Artificial Intelligence) technology is developing very quickly from year to year. Its presence with new functions, functions and perspectives increasingly influences many areas of human life, including the field of education. Artificial intelligence is increasingly finding its way into learning activities in schools and universities. Artificial intelligence is an integral part of the development of educational technology. Of course, this had a significant impact on a person's further professional life. The goal of this research is to use artificial intelligence to promote adaptive learning. The method used in this study is a quantitative research method with a survey design. Data for this study were obtained by filling out a questionnaire via the Google Forms link. The results of this study are that the use of artificial intelligence to enhance adaptive learning provides excellent feedback to students. Through artificial intelligence, schools use applications or media that can automate tasks such as giving suggestions, selecting appropriate teaching materials or adapting the curriculum to student needs. The limitation of this research is that the researcher only investigated at the school level. The researcher also hopes that future researchers can take this research to a higher level and he also hopes that in the future there will be other researchers who can advance this research.

Keywords: *Artificial, Intelligence, Adaptive Learning*

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INTRODUCTION

Education will increasingly develop at a rapid pace (Vargo et al., 2021). Because there are many things that support innovation in the world of education (Leal Filho et al., 2019). The development of the world of education is the impact of technological

development. Through technology the world of education moves significantly towards brilliant changes (Assistant Professor, Department of Computer Science and Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, Tamilnadu, INDIA. et al., 2019). With the help of technology, the facilities and infrastructure that support the education process have become more sophisticated than before. Modern technology has become an unstoppable part of the passage of time (Zilian & Zilian, 2020). Technology has not only changed the way people live, but also the way people work, learn and interact. Various innovations continue to emerge that make human activities and work more practical and efficient (Bonilla et al., 2021). Technology makes various kinds of innovations that support the creation of learning media. With unique and interesting learning media, it will create a variety of learning methods that will be used by educators (Ince, 2019) . Without the technology that gives birth to renewal, maybe the media and methods used in learning will be just that. So that the resulting learning will be monotonous and boring.

In the implementation of education, feedback from teachers and students is expected (Echendu & Okafor, 2021). Where the teacher provides learning and students can receive and understand the learning provided as much as possible (Azlan et al., 2020). With the reciprocal reaction between teachers and students will create students who are active, critical and have good intelligence (Mujtaba et al., 2018). Teachers and students are likened to a glass and a teapot, where the teacher is the teapot and the student is the glass. In this case the teacher is required to be good at transferring or delivering learning material to students (Min et al., 2019). Guru harus mampu menggunakan teknologi dalam menunjang proses pembelajaran. Guru bisa menciptakan adaptive learning using technology (Echendu & Okafor, 2021). Today's teachers are expected to be qualified and experts in their fields, as well as teachers who are able to keep up with the times. This is due to global demands and the demands of life's needs which are increasing rapidly.

One form of technology use, is the emergence of adaptive learning supported by AI (Artificial Intelligence) or also known as artificial intelligence (Barredo Arrieta et al., 2020). Artificial Intelligence merupakan teknologi yang dikembangkan secara terus-menerus oleh para ahli (Bi et al., 2019). In AL or artificial technology, it allows computers to monitor human life and even replace tasks performed by humans (Vaishya et al., 2020). It is estimated that this artificial technology can be used to create robots or software that can help with daily human work. In addition, Artificial Intelligence will also change the previous machine to be smarter and more advanced (Dwivedi, Hughes, et al., 2021). Artificial Intelligence is really expected to be able to help complex human problems, including in the field of education, for example, smart calculators appear to help calculate quickly.

Artificial intelligence or Artificial Intelligence is the process of modeling human thinking and designing a machine so that it can behave like a human (Mei et al., 2020). In other words, when talking about cognitive tasks, that is, how machines can learn automatically from programmed knowledge and information. . Artificial intelligence can also be interpreted as artificial intelligence or artificial intelligence is a part of computer

science that makes machines (computers) work like humans (Attia et al., 2019). Artificial intelligence can play a role in education in many ways (Ting et al., 2019). Artificial intelligence is believed to facilitate teachers' activities, especially in administrative matters, such as determining final grades based on assessment weights. Artificial intelligence can also facilitate teachers in conducting teaching and learning activities, as well as many other learning activities (Dwivedi, Ismagilova, et al., 2021). Artificial intelligence also helps people learn better and achieve educational goals more effectively and efficiently (Iswahyudi, 2023). Therefore, it is not surprising that today many artificial intelligence-based breakthroughs and advancements have been and are being implemented to make learning more effective and practical.

Through artificial intelligence, adaptive learning will be formed (Sun et al., 2019). Adaptive learning is a teaching method that implements technological advances such as computer algorithms and artificial intelligence. Adaptive learning, often called adaptive teaching, organizes the pattern of student or learner interaction during learning (Eriksen et al., 2021). Adaptive learning is actually based on the idea that adaptive learning cannot be achieved on a large scale using traditional methods. Old methods here refer to access processes that are traditional or outdated, or sometimes referred to as non-adaptive methods. Adaptive means to adapt or adjust to (someone's) circumstances (Wu et al., 2020). In addition, another explanation that explains "adaptive" itself, concerns the adjective from the word "adapto" which means "to adapt" (Liu et al., 2021). So if you combine the context of adaptive learning, i.e. learning can lead to the process of adaptation according to the definition above.

According to information from Google, adaptive learning started with an innovation called artificial intelligence. Artificial intelligence became popular in the 70s (Zhang et al., 2019). In general, computers are used to simplify human work, including learning (Jagtap et al., 2020). Therefore, computers can also be used to help humans understand a lesson more quickly (Xu et al., 2019). In the 1970s the biggest problem was the price and size of computers, which is far from what it is today (Kabzan et al., 2019). Back then, it was very difficult and even impractical to develop applications and introduce technology in many areas (Simon et al., 2020). The challenge in adopting adaptive learning itself is that not all users really understand and understand how the initial learning process works. In general, the working system of adaptive learning always needs to be improvised for the system to work properly.

There are different views from previous researchers on the use of artificial intelligence to improve adaptive learning. Among them are (Manongga et al., 2022), According to joint research, Smart Web-based Education first considers factors such as students' knowledge and skills, learning and compatibility, and develops platforms to enhance the education and learning experience. Another key finding from various sources is that the platform allows teachers to perform some administrative tasks, as educational resources are now available through the internet. For example, viewing or evaluating student work more efficiently and productively will certainly result in higher quality teaching methods. Second (Venkatasubramanian, 2019), According to him, research

shows that artificial intelligence can improve the effectiveness and efficiency of the education system by accelerating and facilitating the learning process, providing personalized recommendations, predicting student behavior, and improving information management.

The purpose of this research is actually to find out and examine the benefits of Artificial Intelligence in Improving Adaptive Learning. In this research, it is also explained how to utilize Artificial Intelligence in improving adaptive learning. With the help of Artificial Intelligence in Improving Adaptive Learning should be strengthened and supported. In this case, Artificial Intelligence is actually Utilizing Artificial Intelligence in Improving Adaptive Learning because it is supported by the means used in learning. The benefits of Utilizing Artificial Intelligence in Improving Adaptive Learning have led to the researcher's interest in Utilizing Artificial Intelligence in Improving Adaptive Learning. Therefore, the researcher decided to investigate Utilizing Artificial Intelligence in Improving Adaptive Learning.

RESEARCH METHODOLOGY

The method used in this research is quantitative method (Novikov et al., 2019). This quantitative research method produces data in the form of numbers obtained by filling out surveys on Google Forms and provided to students as research subjects. In addition, this quantitative method produces systematic, planned, and structured research (Zou et al., 2020). This quantitative research method is widely used in research. This quantitative method is defined as the process of discovering a phenomenon in a systematic and real way by collecting information, then measuring it and confirming the truth by filling out questionnaires and interviewing stakeholders (Chancellor & De Choudhury, 2020). This research is mostly conducted through statistical research where quantitative data is collected through research studies.

The type of research is a test whose purpose is to test the use of technology in adaptive learning (Jian et al., 2020). The researcher's data collection technique is to seek and collect current information about field facts. Observation point data collection is a quantitative analysis technique of research data. In data analysis, this is done by describing and describing the data collected without changing the source of the data obtained (Ginosar et al., 2019). The first step in this quantitative research is to find the root of the problem or formulate the problem, then conduct a literature review, formulate a hypothesis, determine the methodology to be used, determine the instrument or research tool, and conduct data analysis, and finally make research conclusions.

RESULT AND DISCUSSION

The presence of Artificial Intelligence is a breakthrough in the world of education to ease the learning process. The wise and planned utilization of technology will encourage the progress of the world of education. The emergence of artificial intelligence technology can also instill independence in students. Teachers are not burdened with such a dominant

role, but their job is to provide enlightenment with essential key words. The cornerstone of any use of technology by teachers is to stay focused on the core of the lesson, keeping an eye on students' attitudes and dispositions. For learners, the existence of educational technology can help them manage and control their own learning so that they can live and work well in the future. In this Artificial Intelligence system, the learning process is carried out in a personalized learning way that enhances students' learning experience. Artificial Intelligence learning in the individualized system has been shown to improve students' concentration. The reason is because Artificial Intelligence is able to teach students by teaching students individually and identifying what is needed for proper teaching with Artificial Intelligence.

As technology advances at a rapid pace, more and more companies are using artificial intelligence and a large number are using this technology to support learning and training. As outlined in the discussion of proficiency levels, adaptive learning is a solution to improve learning based on all four proficiency levels. Adaptive learning is defined as a way of learning that allows students to learn at their own pace and progress through their studies at their own individualized pace. A key part of developing adaptive learning solutions is using big data to appeal to all types of learners. By using artificial intelligence to understand past learning experiences and develop best learning practices for the present and future, it is necessary to analyze certain behaviors that can be used as tools to improve learning systems and enhance learning outcomes.

Adaptive learning techniques originated from artificial intelligence systems, which gained popularity since the 1970s. Adaptive learning is gaining popularity and recognition in the corporate training industry, as it has traditionally done in education. Organizations are beginning to understand the importance of personalizing learning so that learners can use their intelligence and abilities to individualize their learning. Adaptive learning puts students in control of their own professional development by letting them study and learn at their own pace and build the skills and confidence they want and need to succeed. There are many adaptive learning technologies that can be used as educational game design. The most widely used design theory is ALGAE (Adaptive Learning Game Design). This approach is based on the theory and practice of game design, teaching strategies and adaptive models. ALGAO is currently the basic guide and reference for the design and development of educational computer games.

While adaptive learning can replace traditional learning, it does not completely eliminate hands-on learning. Since educators often spend less time delivering content related to learning materials, they can combine online and offline classes and focus on encouraging student engagement. The development of artificial intelligence technology can be compared to two different sides of the same coin. On the one hand, it brings convenience and efficiency to business life, especially in improving customer service. Artificial intelligence can provide many benefits in the form of reduced operational costs and reduced labor. However, this technology can also backfire in the world of education. Why is this happening? Although all educational activities can be done digitally, there are

some tasks or areas that still require human labor. Thus, education cannot be separated from the role of a person to carry out the educational process in a balanced manner.

Figure 1: Opportunity Score for Utilizing Artificial Intelligence to Enhance Adaptive Learning

ASPECT	
Opportunities to Utilize Artificial Intelligence to Enhance Adaptive Learning	
Agree	Disagree
70	30

Based on Figure 1 above, it can be concluded that the use of Artificial Intelligence in Improving Adaptive Learning brings great opportunities for students. The majority of respondents gave positive answers and reactions to the use of Artificial Intelligence in Improving Adaptive Learning. In addition, Artificial Intelligence in Enhancing Adaptive Learning brings benefits to the development of the quality of Adaptive Learning. The results of the survey conducted as part of the survey also show that Artificial Intelligence is very important in the learning process of Adaptive Learning. One of the main advantages of the intelligence model of Artificial Intelligence technology is that it provides different platforms that can be used to create innovative and creative learning media to support the learning process.

Figure 2: Challenge Score of Utilizing Artificial Intelligence in Enhancing Adaptive Learning

ASPECT	
The Challenge of Utilizing Artificial Intelligence to Enhance Adaptive Learning	
Agree	Disagree
70	30

Based on the results of the research, which was completed with a questionnaire containing statements from student respondents, it can be concluded that there are several challenges associated with the existence of artificial intelligence technology. These challenges can be in the form of challenges in the implementation of online learning, which can be limited by the network and which package to use. The internal challenge for students is also whether they are serious in carrying out the learning, as they are not under the direct protection of the teacher. However, the use of artificial intelligence technology in adaptive learning offers a myriad of advantages that can facilitate adaptive learning, especially for people who have time and location constraints regarding the implementation of in-person learning.

At this stage of the research, the researcher did not go directly to the school to conduct the research, but by distributing a questionnaire. The questionnaire contains statements. The purpose of distributing questionnaires is to obtain relevant data about the researcher's study entitled Utilizing Artificial Intelligence in Improving Adaptive Learning. The data test was carried out by filling out a questionnaire from Google Form. The questionnaire contains 15 statements in which it contains about Utilizing Artificial Intelligence in Improving Adaptive Learning. From the results of filling out the questionnaire, the following data were obtained:

NO	Statement	SS	S	RR	TS	STS
	I feel that the use of Artificial Intelligence can help adaptive learning.	60%	40%			
	I feel that Artificial Intelligence technology has a positive impact on adaptive learning.	33,3%	50%	16,7%		
	I feel that Artificial Intelligence technology can facilitate the adaptive learning process.	70%	30%			
	I feel that Artificial Intelligence technology can support adaptive learning.	66.7%	33.3%			
	In my opinion, the development of Artificial Intelligence technology must be followed by every educational institution.	55%	45%			
	I feel that Artificial Intelligence technology can make it easier to understand adaptive learning.	50%	50%			
	In my opinion, Artificial Intelligence technology is very suitable to be applied in adaptive learning.	70%	30%			
	I think that with Artificial Intelligence technology the adaptive learning process will run more effectively.	50%	50%			
	I think Artificial Intelligence technology as a transformation in adaptive learning has an interest in each other.	50%	50%			
10	I feel that with Artificial Intelligence technology, information is quickly obtained.	60,7%	39,3%			
11	I feel that with Artificial Intelligence technology the organization process is easier.	60 %	40 %			
12	I feel that every learner should be able to master Artificial Intelligence technology because technology has many benefits in its use.	50%	50%			

3	I feel that the adaptive learning process will improve if Artificial Intelligence technology is used.	66,7%	33,3%			
4	I feel that Artificial Intelligence technology can change the way students learn.	50%	50%			
5	I think the use of Artificial Intelligence technology in adaptive learning does not consume a lot of time.	33,3%	50%	16,7%		

Figure 1: Table of questionnaire filling by students

Notes:
SS = Strongly Agree
S = Agree
RR = Undecided
TS = Disagree
STS = Strongly Disagree

The table above is data obtained from filling out a questionnaire containing statements filled in by students. The statement consists of 15 statements related to the Use of Technology in Distance and Open Learning: Transforming Education. The assessment stage consists of 5 categories, namely strongly agree, disagree, undecided, disagree, and strongly disagree. The highest assessment result is 70% with a strongly agree category related to the statement "I feel that Artificial Intelligence technology can facilitate the adaptive learning process" as well as the statement "I think Artificial Intelligence technology is very suitable to be applied in adaptive learning". The second highest assessment result is 66.7% with the same category, namely strongly agreeing regarding the statement "I feel that the adaptive learning process will improve if Artificial Intelligence technology is used" and also on the statement "I feel that Artificial Intelligence technology can support adaptive learning". From the results of filling out the questionnaire, it can be concluded that on average students give a positive response to Utilizing Artificial Intelligence in Improving Adaptive Learning.

CONCLUSION

Utilizing Artificial Intelligence in Improving Adaptive Learning has an influence and effect in education. Using artificial intelligence in adaptive learning is expected to improve the way of thinking, provide information faster and think more critically and rationally, which in turn can improve the overall quality of life. In a broader sense, when people are more critical and rational, they are less prone to fall into deception and illusion for a healthier democracy. Students can feel that the presence of Artificial Intelligence in Adaptive learning provides convenience and opportunities for students in doing assignments and in obtaining information. It is expected that Artificial Intelligence in Improving Adaptive Learning will have an influence and effect in education to become

one of the resources for students to be able to develop abilities and experiences in learning flexibly and interactively.

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