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LEARNING TRANSFORMATION: TEACHERS AND THE DYNAMICS OF ARTIFICIAL INTELLIGENCE (AI)

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Abstract:

The aim of this research is to reveal and analyze aboutthe future of teachers with Artificial Intelligence (AI), harmony between teachers and Artificial Intelligence (AI) and teacher competence in dealing with Artificial Intelligence (AI). This research method is qualitative research with a library research approach. The data source in this article is research results in the form of journal articles. The research results show that the presence of artificial intelligence (AI) in education brings challenges and opportunities for the future of teachers. Even though AI can replace some routine tasks in learning, the teacher's role remains crucial in guiding, motivating and developing students holistically. Teachers in the future must be able to build an atmosphere that meets the psychological needs of students, including the need for competence, autonomy and involvement in groups. The introduction of artificial intelligence brings about a significant change in the educational paradigm, where personalization of learning becomes more possible and efficient. Even though there is a paradigm shift from a one-size-fits-all model to responsive adaptation, the teacher's role remains central in designing targeted learning strategies. The success of teachers in the future depends not only on mastery of technology, but also on the ability to guide, motivate and shape students' character. Teachers are also faced with the task of facing the Industry 4.0 revolution, requiring a deep understanding of new concepts such as artificial intelligence, IoT and big data. Efforts to increase teacher competency must involve selective recruitment, bottom-up competency improvement, and the application of technology in learning, such as blended learning. Even though technology plays an important role, teachers cannot be replaced because their role as character builders and facilitators of social interaction remains irreplaceable. Therefore, continuing to develop teacher competence is the key to overcoming educational challenges in the era of artificial intelligence.

Keywords: *teacher, industry 4.0, artificial intelligence*

Introduction

The rapid development of technology and the emergence of connections between technological developments have resulted in phenomena that have never previously occurred in the industrial era 1. This phenomenon refers to the industrial transformation 4.0. Artificial intelligence technology, also known as Artificial Intelligence (AI) (Muhammad, 2018), become part of this phenomenon. Industry 4.0 is related to progress in the production sector, while Society 5.0 places humans at the center of innovation by utilizing the results and impacts of Industry 4.0 technology (Kharis & Zili, 2022). Artificial Intelligence

(AI) is a term used in Industrial Society 4.0 and Society 5.0 (Supangat et al., 2021). AI is a computer program that involves machine learning, hardware, and software. In development (Rumaisa et al., 2021), AI uses science inspired by reverse engineering the neocognitron patterns that work in the human brain. Industry 4.0 products have been widely used in various sectors, including education, in development and application in everyday life (Hairani, 2022).

Along with global demands to increase the effectiveness and efficiency of the education process, the presence of AI promises innovative solutions that can have a positive impact on student development and improve the education system as a whole (Safitri, 2020). It is important to understand that the implementation of artificial intelligence does more than just introduce new technology into the classroom, it creates a new foundation for interactions between educators, students, and the curriculum. With the sophistication of algorithms and the ability of machines to learn from data, AI enables unprecedented personalization of learning. Each learner is considered a unique entity with specific learning needs, and artificial intelligence opens the door to crafting accurately tailored learning experiences (Ayuni & Watini, 2022).

The era of industrial revolution 4.0 also has an impact on the world of education. The use of digital technology in the learning process, completing various tasks, and increasing teacher competence, cannot be separated from the flow of information and technology developments. Facing these challenges, teachers as the front guard in the world of education are required to be ready to change and adapt. The role of the teacher will not be replaced by any sophisticated machine. Because teachers are needed to shape the character of the nation's children with good manners, tolerance and good values. Teachers are also able to foster social empathy, build imagination and creativity, and strengthen the spirit of national unity and unity (Utomo, 2019).

The Minister of Education and Culture, Muhadjir Effendy, in his written remarks commemorating National Teachers' Day and the 73rd PGRI Anniversary at the West Java Province level, revealed that teachers need to increase their professionalism regarding mentality, commitment and quality in order to have competence in accordance with the development of the Industrial Revolution 4.0 due to the Industrial Revolution. 4.0 requires teachers to be able to take advantage of super-fast advances in information technology to improve the quality of the teaching and learning process and prepare superior human resources (Utomo, 2019).

Teacher Readiness is the state of knowledge and skills possessed by the teacher, in relation to the next state that the teacher will achieve (Klarisa et al., 2023). Teacher readiness in question is a teacher who has good competence in knowledge and skills in carrying out his profession as a teacher, to achieve the goals that have been set. In AI learning, a competent teacher with a background in the field of Information and Communication Technology is required. Several efforts that teachers can make to improve teacher professional competence, namely: a) attending teacher upgrading to improve their ability to carry out the learning process, b) participating in teacher deliberations in the field of study, c) attending training, seminar workshops and courses in the field of ICT related to learning AI, d) increasing knowledge through mass media regarding AI learning (Koriati et al., 2021). So when the teacher has made these efforts it can be said that the teacher is ready to carry out AI learning at school.

Thus, in this era of industrial revolution 4.0, if teachers are only limited to transferring knowledge to students in class, the role of teachers can be replaced by technology, but the role of teachers will not be replaced by technology no matter how sophisticated it is in educating character, morals, and

providing examples to students.

Therefore, the aim of this research is to reveal and analyze aboutthe future of teachers with Artificial Intelligence (AI), harmony between teachers and Artificial Intelligence (AI) and teacher competence in dealing with Artificial Intelligence (AI).

Research Methods

This research uses qualitative research methods with a library research approach. The data source in this article is research results published by a researcher in the form of journal articles. Due to the limited ability of researchers to collect data sources in the form of so many journal articles in the Google Scholar search engine, researchers use the help of SLR (systematic literature review), namely by formulating the problem with several questions, using keywords in the search engine, carrying out filtering and feasibility. , analyze and draw conclusions.

The future of teachers with advances in artificial intelligence (AI) will certainly face challenges and opportunities that will likely be replaced, where the role of teachers will face significant transformation. Although there is a high possibility that some routine and repetitive tasks in the learning process can be replaced by artificial intelligence, the teacher's role remains key in guiding, motivating and developing students holistically.

In the Big Indonesian Dictionary it is explained that a teacher is an individual whose job, livelihood or profession is teaching (Indonesian Ministry of Education & Culture, 2012). The term "teaching" includes giving lessons, and can also include the act of training and giving reprimands so that those taught get a good lesson and perhaps become deterred (Indonesian Ministry of Education & Culture, 2012). On the other hand, the concept of "educator" according to WJS Poerwardarminta refers to someone who is involved in the educational process, including maintaining and providing training related to morals and intellectual intelligence (WJS Poerwadarminto, 1984).

In the Arabic context, teachers can be called ustāz, mu'allim, or mudarris (M. AlKalili, 1993). The origin of the word mu'allim comes from the word 'allama which has the root 'ilm. M. Quraish Shihab explained that mu'allim can be interpreted as a person who transfers his knowledge clearly (Shihab, 1999). Meanwhile, mudarris, which comes from the word darrasa, is defined as a person who gives lessons about something to other people (Ma'luf, 1977).There are also other terms such as mu'addib and ustaz, with muaddib focusing more on cultivating adab or ethics, while ustaz is more widely used in the context of Islamic religious education, such as Islamic boarding school teachers, Koran teachers, or muballig who are considered religious teachers (Daud, 2003).

Overall, all these terms reflect one concept, namely the teacher as an educator. The word “educator” comes from the word “didik” which means direction or guidance, with the addition of the affix “pen” which indicates the perpetrator, so it is interpreted as a person who gives direction or provides guidance (Indonesian Ministry of Education & Culture, 2012).

According to Karwati and Priansa (2014), teachers act as the main facilitators in schools whose task is to explore, develop and optimize students' potential so that they can become part of a civilized society. Sanjaya (2012) adding that teachers, as people who interact directly with students, have a dual role as planners and learning designers as well as implementers or both at the same time.

The world has entered the Society 5.0 era after experiencing an acceleration in technological development during the Industrial Revolution 4.0

period, especially during the COVID-19 pandemic. No matter whether we like it or not, whether we want to or not, and whether we are ready or not, this life will continue and develop. Therefore, it is important to change the paradigm and be willing to learn so as not to be left behind (Hikmawati et al., 2023). Artificial Intelligence (AI) is a concept originating from the Industrial Society 4.0 and Society 5.0 eras that includes "computer programs, learning machines, and hardware and software." This science is used to develop intelligence through hardware and software solutions, inspired by reverse engineering of the neutron patterns operating in the human brain (Zahara et al., 2023). In the ever-growing digital era, artificial intelligence (AI) has emerged as a revolutionary force that cuts across various sectors of human life. One area increasingly affected by these advances is education (Zahara et al., 2023). The implementation of artificial intelligence in learning contexts has provided the foundation for radical changes in teaching and learning approaches.

The existence of AI in education can provide innovative solutions to increase the efficiency and effectiveness of learning. Machine learning can provide in-depth data analysis of each student's needs and progress, helping teachers design more personalized and responsive curricula. However, this will not reduce the need for the presence of teachers as mentors and facilitators of social interaction.

Teachers in the future need to be able to take proactive steps to face these challenges. First, teachers must continue to develop their technology skills to understand and integrate AI solutions into their teaching. A deep understanding of how to use and manage AI tools will be a valuable asset.

Apart from that, teachers must also focus on aspects that cannot be replaced by technology, such as the ability to guide, motivate and shape students' character. Building emotional and social connections between teachers and students will become increasingly important in an era where AI takes a greater role in the technical aspects of learning.

Teachers also need to be innovative in designing interesting and collaborative learning strategies. Creativity in utilizing technology to create unique and immersive learning experiences will be a special attraction that AI cannot do.

By taking these steps, teachers can see change as an opportunity to improve the quality of learning, explore students' potential more deeply, and remain relevant in realizing adaptive and inclusive education in the era of artificial intelligence.

Along with global demands to increase the effectiveness and efficiency of the educational process, the presence of AI promises innovative solutions that can have a positive impact on student development and improve the education system as a whole (Safitri, 2020). It is important to understand that the implementation of artificial intelligence does more than just introduce new technology into the classroom, it creates a new foundation for interactions between educators, students, and the curriculum. With the sophistication of algorithms and the ability of machines to learn from data, AI enables unprecedented personalization of learning. Each learner is considered a unique entity with specific learning needs, and artificial intelligence opens the door to crafting accurately tailored learning experiences (Ayuni & Watini, 2022).

In this context, a paradigm shift from a one-size-fits-all approach to an adaptable approach is key in designing a responsive curriculum (Liriwati, 2023). Educators can use data collected by artificial intelligence systems to identify students' strengths and weaknesses, so they can design more targeted teaching strategies (Tanggur, 2023). Additionally, interactive aspects of artificial

intelligence, such as ChatGPT, open up more dynamic communication channels between learners and learning resources. This creates a more collaborative learning atmosphere and reduces communication barriers, ensuring that each learner gets the support they need to achieve success.

The use of technology in learning provides convenience and access for teaching staff and students in increasing creativity in preparing teaching and learning activities based on digitalization (Pontjowulan, 2023). The variety of technology and learning media available today can be easily accessed, creating a learning atmosphere that is more flexible in terms of space and time. The application of this learning media has significant benefits in increasing direct interaction between teaching staff and students, which in turn can motivate students to be more active in self-exploration and increase knowledge.

Overall, it can be concluded that the presence of artificial intelligence (AI) in the world of education brings innovative solutions that can increase the effectiveness and efficiency of the learning process. The introduction of AI not only includes the adoption of new technologies in the classroom, but also creates a new basis for more dynamic interactions between teachers, learners and the curriculum. Through the ability of algorithms and machines to learn from data, AI enables personalized learning that recognizes the uniqueness of each learner with specific learning needs.

In this context, there is a paradigm shift from a single approach model towards adaptation in designing a responsive curriculum. Teachers can utilize data collected by artificial intelligence systems to identify students' strengths and weaknesses, designing more targeted teaching strategies. The existence of interactive AI, such as ChatGPT, opens dynamic communication channels between students and learning resources, creating a more collaborative learning atmosphere and reducing communication barriers.

The use of technology in learning also provides convenience and accessibility for teachers and students, increasing creativity in preparing digitalization-based learning activities. With a variety of technology and learning media that are easily accessible, it creates a learning environment that is more flexible in terms of space and time. In this context, harmonious integration between teachers and AI is the key to achieving optimal learning effectiveness, where both complement each other to provide the needed support and motivate students towards success.

Teachers must be able to build an atmosphere that can meet students' psychological needs, which include: needs for competence, every student needs to feel capable, meaning that interactions in learning are able to make students feel capable. This can be done by giving awards for students' learning outcomes. Needs for Autonomy, every student needs to feel 'autonomous' by gaining freedom and trust because every autonomous learner will not depend on the teacher in learning. Needs for relatedness, every student needs to feel like he is part of a group, and interact in the group. So the learning process must be able to foster collegiality and mutual support interactions. Sustainable learning, so that students are able to get through the era of disruption, and enter a new era called the Abundant Era, namely the abundance of information, media and learning resources (Utomo, 2019).

Teacher competency in facing the Industry 4.0 revolution covers various aspects. First, teachers need to have a deep understanding of emerging new concepts, such as artificial intelligence, Internet of Things (IoT), big data, and so on (Fantini & Tamba, 2020). Second, teachers also need to have adequate technology skills. Being able to use the latest hardware and software, as well as utilizing digital learning applications and platforms is an important skill in

facilitating interactive and engaging learning for students(Betri, 2020). Apart from that, teachers must also have the ability to develop and facilitate 21st century skills, such as critical skills, creativity, problem solving, collaboration, and analytical thinking. This competency will help students to become individuals who are adaptive, innovative, and able to face complex challenges in the world of work of the future (Mardhiyah et al., 2021).

Dinar in his article entitled "Increasing Teacher Competency Towards the Era of Industrial Revolution 4.0" published in the short info journal (puslit.dpr.go.id accessed 30 April 2019) stated that efforts to achieve teacher competency in the era of Industrial Revolution 4.0 can be done by 6 The methods are (1) the teacher recruitment system is carried out using a selective and standardized pattern according to the needs of technological developments. (2) a pattern of increasing teacher competency that is bottom up so that every problem and obstacle faced by teachers in the region can be accommodated and then studied together. (3) continuous improvement of the teaching profession through the PKB program. (4) lesson study to improve teacher competency. (5) e-literacy.

To achieve 21st century skills, learning trends and best practices must also be adapted, one of which is through integrated learning or blended learning. Blended learning is a way of integrating the use of technology in learning which allows appropriate learning for each student in the class. Blended learning allows reflection on learning (Wibawa, 2019).

In this way, the role of the teacher is irreplaceable, because technology cannot be a facilitator, motivator, inspirer, mentor, developer of imagination, creativity, character values, team work and social empathy. Technology also cannot replace the role of teachers as shapers of students' character. However, teachers are expected to continue to develop their competencies so that problems related to the lower quality of education in Indonesia compared to other countries can be resolved immediately (Utomo, 2019).

From the description above, it can be understood that teachers have a very important role in facing the challenges of the Industrial Revolution 4.0 era, especially in facing artificial intelligence (AI). Teachers need to create an atmosphere that meets students' psychological needs, including a sense of competence, autonomy, and involvement in the group. In the learning context, teachers must focus on building interactions of collegiality and mutual support to create sustainable learning. Apart from that, teacher competencies must also be enriched with a deep understanding of new concepts such as artificial intelligence, Internet of Things (IoT), and big data.

Efforts to increase teacher competency in facing these challenges are carried out through various methods, such as selective teacher recruitment, bottom-up competency improvement, continuous teacher professional improvement programs, and the implementation of lesson study. The importance of mastering technology skills is also a crucial aspect for teachers to be able to facilitate interactive and interesting learning. Even though technology has a significant role, the role of teachers as facilitators, motivators, inspirers, mentors and character developers remains irreplaceable. Therefore, teachers are expected to continue to develop their competencies to overcome the challenges of educational quality and guide students to face the complexities of the future world of work.

Conclusion

The presence of artificial intelligence (AI) in education brings challenges and opportunities for the future of teachers. Even though AI can replace some

routine tasks in learning, the teacher's role remains crucial in guiding, motivating and developing students holistically. Teachers in the future must be able to build an atmosphere that meets the psychological needs of students, including the need for competence, autonomy and involvement in groups.

The introduction of artificial intelligence brings about a significant change in the educational paradigm, where personalization of learning becomes more possible and efficient. Even though there is a paradigm shift from a one-size-fits-all model to responsive adaptation, the teacher's role remains central in designing targeted learning strategies. The success of teachers in the future depends not only on mastery of technology, but also on the ability to guide, motivate and shape students' character.

Teachers are also faced with the task of facing the Industry 4.0 revolution, requiring a deep understanding of new concepts such as artificial intelligence, IoT and big data. Efforts to increase teacher competency must involve selective recruitment, bottom-up competency improvement, and the application of technology in learning, such as blended learning. Even though technology plays an important role, teachers cannot be replaced because their role as character builders and facilitators of social interaction remains irreplaceable. Therefore, continuing to develop teacher competence is the key to overcoming educational challenges in the era of artificial intelligence.

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