Journal of Practice Learning and Educational Development
https://digitalpress.gaes-edu.com/index.php/jpled
E-ISSN: 2809-1205
Vol 5, No. 1 (2025) 215-222
DOI: 10.58737/jpled.v5i1.398

Submitted: 03-01-2025
Revised: 06-02-2025
Accepted: 24-02-2025

Teachers' Perceptions and Readiness for AI-Based Virtual Assistants in Supporting Schools' Learning Transformation

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Abstract

The rapid development of Artificial Intelligence (AI) brings great potential to the education world holistically, not only changing the way of teaching and learning but also impacting the education system. However, the use of AI in learning is still relatively new and initiatives to introduce AI in schools have not been widely implemented in Indonesia. In fact, it is crucial for teachers to become proficient in using this technology to maximize its benefits for both teachers and students in preparing for future challenges. The purpose of this study is to explore teachers' perceptions toward the use of AI-based virtual assistants in supporting tasks at school and to examine and analyze the teachers' level of readiness and schools in facing the era of artificial intelligence. This descriptive study was conducted using a hybrid approach, namely a combination of both quantitative and qualitative. Initial data collection involved distributing a Likert-scale questionnaire to 30 teacher respondents from a senior high school that employs national standard curriculum combined with international assessments to value teachers' perceptions of AI use. Subsequently, in-depth interviews were conducted with three participants, including administrators and professional. Data analysis of the questionnaire demonstrated the validity and reliability of the perception instrument used. Furthermore, the interview results clarified the preparations that have been made, will be made, and have not yet been addressed by schools in maximizing the use of AI. This study concludes with recommendations that align with the needs of teachers to acquire these essential skills which can be supported by schools.

Keywords: teachers' perception, Artificial Intelligence (AI), learning transformation

Introduction

The teacher is an element of education that is very influential in the educational process (Chasani, 2022). The teacher influence is not only limited in educational process related to knowledge, but also includes guiding, motivating, and building character. However, in the digital era and technological advancements, the role of the teacher no longer stands alone. The use of artificial intelligence (AI) is starting to change the way teachers teach. Through AI, teachers can access more sophisticated learning tools to understand students' individual needs, and adaptive learning tailored to each student's level of understanding. Teachers' perspectives play a big role in AI-based transformational learning as they are the link between complex AI technologies and complex educational contexts. While AI technology can provide sophisticated tools and resources to enhance learning, teachers have a deep understanding of student needs, classroom dynamics, and desired educational goals. With the synergy between artificial intelligence and human expertise, the education process can become more dynamic, purposeful, and have a greater impact on the development of students' potential.

The use of artificial intelligence (AI) has become an interesting topic in the context of education. It has the potential of transforming the way teaching and learning is done in schools. Teachers' perceptions of the use of AI in supporting learning transformation is a key factor of how the learning activity is happen in the classroom. Therefore, we should be able to investigate teachers' views towards the use of AI in supporting transformation of teaching and learning in schools. By understanding their perspectives, we can see the challenges, opportunities and strategies that can be used to effectively integrate AI in students' learning experiences. Thereby, we can provide valuable insights for the development of better educational policies, research, and practices in the near future.

Artificial Intelligence (AI) is a multidisciplinary field that aims to automate activities that currently require human intelligence (Wahyudi, 2023). These innovative technologies have the potential to revolutionize various aspects of our lives, including education. In the context of teaching, AI can be leveraged as a powerful tool to enhance the learning experience and improve educational outcomes. By automating routine tasks and providing personalized support, AI can free up teachers and educators to focus on more important aspects of their role, such as mentoring and coaching. This transformation is especially important for teachers and educators who serve as change agents, as they can leverage AI to streamline their workflows and optimize their impact on students.

With the development of technology, especially in the form of artificial intelligence (AI), the global education landscape is undergoing significant changes (Rochmawati, et al, 2023). The use of AI in education promises great potential in transforming teaching and learning and impacting the education system. One of the advantages of AI is that it can analyze data quickly and accurately depending on the completeness of the presented data. AI can process and analyze data from various sources, such as test results, class participation, and student assignments. This can assist teachers' administration in understanding student learning patterns, identifying problems, and making data-driven decisions to improve learning outcomes. For students, AI can provide virtual tutors who can facilitate students' learning outside of school hours. These virtual tutors can answer questions, provide additional explanations, and help complete assignments. AI-based learning assistants can also remind students of study schedules, assignments to be completed, and materials that need to be repeated. With AI, students can also translate learning materials into different languages, and can also be customized for students with special needs. This will expand access to education for students in different parts of the world as well as from different backgrounds.

Therefore, the goal of this study is to explore teachers' perceptions of AI-based virtual assistants in educational settings and to assess the readiness of teachers and schools for integrating AI technology. The research aims to provide insights into the potential benefits and challenges of using AI in schools by understanding teachers' views and identifying the current level of preparedness. It is done by distributing a Likert-scale questionnaire about the usage of AI assistants to 30 teachers who will act as respondents. This will help in developing strategies to enhance teachers' proficiency with AI tools, ultimately supporting the effective integration of AI in the education system to meet future demands.

Method

This descriptive study was conducted using a hybrid quantitative-qualitative approach in explaining something that was studied and drawing conclusions from the observable phenomena of the variables studied using numbers (Sulistyawati, Wahyudi, & Trinuryono, 2022). Initial data collection involved distributing a Likert-scale questionnaire to 30 teacher respondents from a private senior high school in Tangerang, Banten that employs national standard curriculum combined with international assessments to value teachers' perceptions of AI. The results of the open questionnaire data were then tested for reliability using the Cronbach's Alpha formula with a result of 0.878 meaning that the research instruments used were consistent and reliable to measure (Rosita, Hidayat, & Yuliani, 2021). Subsequently, in-depth interviews were conducted with three participants, including school principal, curriculum coordinator, and education technology expert. Interview questions designed for

principals and curriculum coordinators were administered to gather in-depth insights from the perspective of principals and curriculum coordinators on the use and preparation of AI in their educational settings. The interviews were also conducted to find out the readiness of schools and teachers in adopting AI technologies as well as the challenges that may be faced in the process. Meanwhile, interview questions were also asked to education technology experts to explore their views on the potential, challenges, and steps needed to integrate AI in Indonesia's education system. Then, data analysis was conducted to look at teachers' perceptions of the use of artificial intelligence virtual assistants, the potential of AI in changing the education system, the importance of increasing technological competence for teachers, the challenges of implementing artificial intelligence in schools, and the preparations that school leaders can make in equipping teachers to master artificial intelligence technology to make maximum use of it in learning and administration.

Result and Discussion

From the questionnaires distributed to teachers, there were 30 respondents who responded. The following are the results of the data processing of all the questionnaires. In terms of daily teaching, 30 percent of respondents said they often use AI-based virtual assistants, while 33.3 percent said not often. Meanwhile, 36.7 percent answered neutral. This is in line with the school administrator's statement in interview that the teachers in the school have not received adequate training related to the use of AI in the educational environment, so it is natural that they are confused about the answer or indeed prefer the conventional way, namely without using AI-based virtual assistants. Nonetheless, most respondents answered that they were comfortable when interacting with AI-based virtual assistants to get information or advice related to teaching (see Table 1). Based on the research conducted by Moura & Carvalho (2024), the majority of teacher participants reported experiencing various benefits from using ChatGPT. They highlighted that AI tools like ChatGPT not only assisted in streamlining their tasks but also enhanced their ability to work more effectively and efficiently. This feedback underscores the potential of AI to significantly improve the educational process and support teachers in their roles.

Tabel 1.

Quesionnaire	Percentage	Description
How comfortable are respondents in interacting with AI-based virtual assistants to get teaching advice or information?	56,6	Comfortable
	23,3	Neutral
	20	Not comfortable

In addition to assisting with teaching, AI-based virtual assistants can also be used to help teachers with administration. Moreover, according to Chen, Chen, & Lin (2020), AI can be used as an adaptive learning method and learning approach (i.e., image recognition, computer vision, prediction system), personalized intelligent technology in building a smart school environment (i.e., data mining, virtual labs, face and speech recognition), and even facilitate online and mobile distance education (i.e., edge computing, virtual personalized assistants, real-time analysis). Based on the questionnaire results, 33.4 percent of respondents believe that AI-based virtual assistants are effective in helping with administrative tasks, while 23.3 percent answered that they are not effective. The remaining 43.3 percent answered neutral. Again, this is in line with the facts that respondents are not yet accustomed to using them due to the absence of training that supports this. Even so, more than half of all respondents believe that a lot of time can be saved if they use AI-based virtual assistants in administrative work (see Table 2).

Tabel 2.

Quesionnaire	Percentage	Description
How much time can be saved by using AI-based virtual assistants in administrative tasks?	53,3	A lot of time can be saved
	26,7	Neutral
	20	No time is saved

In terms of helping teachers with lesson planning, 10 percent are not convinced that AI-based virtual assistants can improve efficiency. Meanwhile, 43.3 percent answered neutral, and the remaining 46.7 percent answered very sure. Although there is a slight difference between those who answered neutral and very sure, it can be seen from this that teachers recognize that AI-based virtual assistants are able to be one of the right ways to help teaching planning with time, energy, and cost savings. Those teacher perceptions can be changed if teachers are given the opportunity to get to know and utilize AI while establishing an environment of critical discussion about AI developments so that teachers can wisely use AI. Such critical discussions should include topics on how to ensure inclusive and equitable use of AI in education, how to utilize AI to improve education and learning, how to promote skills development for work and life in the AI era, and how to maintain transparent and auditable use of education data (Tao, Diaz, & Guerra, 2019).

According to the data, most teachers also have high expectations of AI-based virtual assistants. For example, when asked to what extent they believe that artificial intelligence can enrich students' learning experience in the classroom, 53.4 percent answered that they strongly believe, followed by 40 percent who answered neutral and 6.7 percent who answered that they do not believe. Or when respondents were asked about how much they believe that artificial intelligence can help identify students' individual needs and provide customized learning more effectively, 43.3 percent answered very confidently, followed by 40 percent who answered neutral and 16.6 percent who answered unsure. Based on the research conducted by Chassignol, et al. (2018), personalized students learning method (i.e., students' needs, pace of learning, and knowledge level) helps prevent students from failing exams and provides support throughout their studies. While personalized education is typically associated with K-12 students, many higher education institutions are now adopting these practices as well.

Most teachers are optimistic that artificial intelligence can improve the quality of education in the future that can be seen from Table 3 below.

Table 3.

Quesionnaire	Percentage	Description
How optimistic are respondents about the ability of artificial intelligence to improve the quality of education in the future?	60	Very optimistic
	30	Neutral
	10	Not optimistic

This fact is also followed by how they see artificial intelligence changing the traditional role of a teacher. As many as 50 percent think that the role of teachers will experience major changes. The remaining 26.7 percent answered neutral, and 23.3 percent answered that there would be no change in the role of teachers. According to the data from the questionnaire, teachers are aware of the changes in their profession in education, but there are also interesting findings regarding their readiness. Only 36.7 percent feel that the teaching profession is ready to face changes in the world of education because of artificial intelligence. 16.7 percent answered that they were not ready, while most respondents, 46.7 percent, answered neutral. This is interesting since teachers in schools who have never been trained about AI are hesitant about whether they are ready to face the development of artificial intelligence. According to Dai, et al. (2020), teachers need to get AI training programs that can provide relevance in teachers' professional needs, reduce teachers' anxiety towards AI that is

predicted to replace teachers' position as educators, and can even promote teachers' confidence in adapting well psychologically to a future filled with AI. By cultivating AI literacy, teachers can achieve a level of AI readiness and eventually see the opportunities of utilizing AI in work effectiveness and efficiency.

Meanwhile, based on the results of interviews with school principals, school coordinators, and educational technology experts, participants agree that AI has the potential to change the education system in Indonesia. According to the principal's interview, the potential of AI is very massive in the world of education because students are currently quite active as users. Since the teacher sees that students already have skills in that field, the teacher can challenge students to use these skills in learning. According to Hwang, et al. (2020) teachers can teach students to focus on collecting and analysing data using high-level thinking, such as inference and prediction, rather than just doing low-level tasks, such as editing and calculating. Hence, learners are trained to think deeply and find valuable implications underlying the data by using the AI tools. Meanwhile, according to the curriculum coordinator, AI is a very amazing technological development because it facilitates the work of teachers in making questions, as a reference for creating learning materials, or assisting in administrative matters with the necessary adjustments. This convenience must of course be accompanied by the teacher's ability to create tasks that challenge students in the learning process so that the use of AI is not misused and can be maximized. Teachers can create assessments that require students to demonstrate critical thinking, problem solving, communication skills, originality, and creativity, while accurately citing and referencing the work of others, ensuring a comprehensive evaluation of their abilities (Cotton, et al., 2023). According to educational technology experts and practitioners, the development of AI should have a significant impact on education, for example, AI provides significant added value because teachers can save time that would normally be spent on routine and administrative tasks by using AI. In addition, AI enables the provision of more varied and rich content, which can be tailored to the needs of individual students, hence learning becomes more effective and engaging, as the material presented can be more relevant and in-depth. This not only improves teachers' efficiency in managing time, but also enriches students overall learning experience.

However, AI is currently still in development because there are still many imperfections so that teachers cannot fully rely on AI. The resource person also added that there are still many teachers who are still not maximally literate in using AI, therefore the impact is still not felt significantly in the world of education today. In line with the opinion of Rochim (2024), there are many opportunities offered by artificial intelligence for teachers and students in the learning process, for example in designing adaptive learning that can be tailored to the needs and level of understanding of individuals and game-based learning where the level of difficulty and challenge of the game can be adjusted to the ability of students. In addition to lesson planning, artificial intelligence can also help teachers to evaluate learning and provide feedback on learners' work automatically.

By seeing the rapid development of technology in the form of artificial intelligence, the principal realizes that it is very important for teachers to have competence in mastering technology, especially in technological literacy. Hence, teachers can explore AI and understand the use of its features to simplify and make work more efficient. Meanwhile, according to the school curriculum coordinator, by mastering the development of AI technology, teachers can teach it to students to make good use of technology in learning activities. Educational technology experts said that it is very important for teachers to have soft skills by recognizing the ethical use of technology, especially AI. Thus, teachers can be responsible in using AI for the purpose of enriching learning. In addition, teachers should also be wiser in using virtual assistants, teachers should not enter personal information because currently all platforms are still in the development stage because the answers we give can be recorded and reviewed by third parties and used without the user's consent. Furthermore, the expert also stated that teachers should also try and learn AI in their daily lives to improve hard skills. At least it starts from the school leader together with the teachers who are equipped to improve the skills of using AI, then gradually to the students. Not only the teachers, but the learners will also

benefit from the improved technological competencies, such as a better understanding of technology and digital literacy, understanding of technology ethics and responsibility, improved technical skills for interdisciplinary collaboration, development of creativity and advanced problem solving, and adaptability in preparing for the future (Setiawi, Patty, & Making, 2024).

The implementation of using AI as a virtual assistant in schools also faces its own challenges in schools. According to the interview with the principal, the biggest challenge faced by teachers is supervising students in the use of AI because the use of gadgets can break the concentration of students in learning. Learners can easily access social media, online games, and news updates through short messages. Besides, there are also teachers, especially those who are senior in age, who are quite slow in receiving this information or development so they may only know but are unable to use it effectively. For those reasons, schools should be able to facilitate teachers to learn together and see the positive side of these technological developments. Meanwhile, according to the expert interviewees, there might be fear among school leaders, and even teachers, to use AI because many of them think that what is written in AI is still not accurate. Many teachers are also worried that their jobs will be replaced by AI. Moreover, there is also a concern that there will be dependency in using AI so that users only need to copy and paste results without providing original thoughts. The number of teachers who have not been trained to use AI causes the use of virtual assistants to not be maximized, so it is necessary to provide training for teachers. The training could be a good opportunity to introduce and teach teachers to master AI with the purpose of eliminate teachers' fears of digital technology that is always developing.

In preparing teachers for the development of AI technology, the principal and curriculum coordinator said nothing significant has been done yet, but teachers have started using it, especially to help check the quality or plagiarism index of essay assignments made by students. On that account, the school plans to hold seminars or training or professional development among teachers internally to practice and share what has been mastered. School leaders should set an example to encourage teachers to master AI technology. Schools can also encourage the use of AI technology in the classroom by including the criteria for using technology in learning in the teacher quality assessment at the end of the semester or school year. Expert speakers also added that teachers must first find out about AI, the nature of AI, and the benefits and limitations of AI to understand its potential in the world of education. Then teachers should also learn to write appropriate and specific prompts when using AI to produce more optimal results. Furthermore, according to the expert, teachers need to learn to use AI to be able to distinguish between student work that uses AI and the original. Teachers should assess the assignments in depth and ask students to share their personal reflections and experiences, so that students do not just copy and paste, but also modify the answers from AI. Research conducted by Murniyetti, et al (2023) explains that ongoing training and professional development is essential in the current era as it can help teachers understand and apply AI technology in teaching effectively. Professional development ensures that teachers not only keep up with the latest technological developments, but also understand the ethical and social implications. Additionally, professional training enhances teachers' confidence and competence, provides insights and skills for teaching in diverse environments, and ensures learner inclusiveness. Ultimately, with continuous professional development, teachers are expected to lead and manage change in the education system.

Evaluation of the use of AI technology in schools is equally important because although it is an innovation in learning, teachers still must assess its effectiveness and benefits for students. According to the principal and curriculum coordinator, the way to evaluate it is through supervision and teacher performance appraisal using a clear rubric, especially on the indicator of using digital media in learning. Other than that, according to educational technology experts, one way to evaluate it is by referring to the principles of technology use contained in the SAMR model, namely substitution, augmentation, modification, and redefinition. According to Hamilton, et al (2016), the SAMR model consists of four classifications of technology use for learning activities, namely

substitution where technology provides a substitute for other learning activities without functional changes, augmentation where technology provides a substitute for other learning activities but with functional improvements, modification where technology allows learning activities to be redesigned, and redefinition where technology allows the creation of tasks that cannot be done without using technology. This framework can help teachers and school leaders to see whether the use of AI is just a substitute, or the level of use can be further enhanced to a level that can transform classroom learning and the way teachers work to be more effective and efficient.

Conclusion

The emergence of technological innovation in education always has two sides of the coin that must be addressed wisely by teachers and school leaders. School leaders must be able to prepare teachers to master AI technology so that the teaching profession cannot be replaced. Conversely, teachers must be able to prepare students to face the uncertainty of rapid technological change in the future. In improving teachers' technological competence in utilizing AI virtual assistants, teachers and school leaders must also synergize between schools or find suitable vendors to equip teachers with the required hard skills and soft skills. Mastery of the required technology must also be accompanied by an understanding of ethics in the use of technology so that its use can be maximized for the greater good. The government has provided various digital learning platforms for teachers, such as the Platform Merdeka Mengajar (PMM). The government has also provided funds to assist schools in improving human resources, in this case teachers, hence it can encourage schools to actively prepare teachers to face the times.

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