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The Use of Artificial Intelligence (AI) among Teachers in Implementing ICT-Based Education for the RBT Subject

Noornee Razak, Helmi Norman

Unoversiti Kebangsaan Malaysia

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Abstract

Artificial Intelligence (AI) can be defined as a system that demonstrates intelligence by analyzing its environment and independently taking actions to achieve specific objectives. This study aims to identify the level of skills, usage, and the impact of using Artificial Intelligence (AI) technology among teachers in implementing Information and Communication Technology (ICT)-based education for the RBT subject in primary schools within the Petaling Perdana District. It also examines the relationships between skill levels, usage, and the impact of AI utilization. This survey-based study involved 100 respondents and utilized a Likert-scale questionnaire consisting of four main sections: demographics, AI usage skills, level of AI usage, and the impact of AI usage. Data analysis was conducted using descriptive statistics and Spearman's Rank test. The findings indicate that teachers' skill levels are high (mean=3.91), their level of AI usage is moderate (mean=3.55), and the impact of AI usage is high (mean=3.77). The Spearman's Rank test found significant relationships between skill levels and the impact of AI usage, as well as between the level of usage and its impact on teachers' engagement with AI technology. These findings suggest several initiatives to ensure the full implementation of AI usage, including organizing incentive training programs, developing supportive technological infrastructure, and raising awareness of AI technology utilization. This study supports the view that AI integration has the potential to improve the quality of education through data analysis, automation, and enhanced learning effectiveness.

Keywords: Artificial Intelligence (AI), Skills, Usage, Impact

Introduction

Information and Communication Technology (ICT) is an advancement whose capabilities can no longer be denied. Within the elements of ICT, there exists another relatively new technology being introduced in the field of education, which is Artificial Intelligence (AI). Mastery of AI among individuals enables them to keep up with the rapidly evolving world driven by technological advancements.

Generally, AI technology can be defined as a system that demonstrates intelligence by analyzing its environment and taking autonomous actions to achieve specific objectives

(Wojciechowski & Korjonen, 2023). According to Milicevic et al. (2024), AI is defined as a system that performs intelligent actions by analyzing its surroundings and making decisions with a certain degree of autonomy to achieve particular goals. In conclusion, AI technology can be defined as a system capable of making its own decisions based on the environment with specific objectives in mind.

According to Harry (2023), the use of AI in education has the potential to transform the learning landscape by personalizing experiences, increasing efficiency, and reducing teachers' workload. With the presence of AI, it can assist teachers in planning and executing teaching and learning activities (PdPc) in a more organized and systematic manner. This is because the use of AI technology indirectly helps students acquire future-oriented skills to face the job market, gain new knowledge, and understand the importance of artificial intelligence in today's digital era (Sahara et al., 2023).

Although this technology has been in use for some time, it has not yet been fully integrated into Malaysia's education system. This is due to various constraints and challenges associated with the technology. One of the reasons for the limited use of AI in education is that many teachers have yet to fully utilize AI effectively in the teaching and learning process (Savas, 2021). The benefits of AI include improving administrative efficiency, creating engaging learning materials, and more (Tuba & Agah, 2023). By incorporating AI into teaching, it can support teachers in preparing ICT-integrated teaching materials, resulting in a more effective and meaningful learning process (Putri & Hasan, 2023).

Problem Statement

The use of Artificial Intelligence (AI) technology in education offers a wide range of potential to enhance the teaching and learning process. In today's increasingly advanced digital era, AI has become an essential part of various aspects of life, including the field of education. AI technology presents numerous opportunities to improve the quality and effectiveness of education, such as through adaptive learning, big data analysis to understand student performance, and virtual teaching assistants. However, the integration of AI in education also brings about several challenges and issues that need to be addressed.

One of the main concerns identified is related to privacy breaches and student data security. Nikola et al. (2024) explained that the use of AI in education raises ethical concerns, including leaks of personal data, discrimination, and privacy intrusions by hackers into the system. This clearly highlights the anxiety among users of this technology—as much as it benefits the education sector, data privacy must be protected to avoid causing future burdens for its users. This statement is also supported by Aidah et al. (2023), who stated that the benefits of AI come with issues related to user data privacy, particularly among individuals who are still not fully proficient in using the technology.

Furthermore, although AI is widely acknowledged today as having a significant impact on education, it still does not offer a clear picture of its effects on classroom learning processes. This refers to the positive or negative impacts on students, teachers, or the learning process itself. Olaf et al. (2024) explained that the use of AI has yet to make a significant impact on educational transformation, as the quality and reliability of the technology are still uncertain and doubted by certain parties.

In addition, based on findings from several articles, it is evident that the education system is not yet fully prepared to implement AI in the learning process. Mehmet et al. (2022) stated that this lack of readiness can be observed through student and teacher competencies, technological infrastructure, and the selection of integration methods in the learning process. Sopayan (2024) also stated that the culture of AI usage has yet to be fully adopted, particularly among students and teachers in schools. Therefore, despite the potential benefits, AI cannot yet be fully utilized by its intended users.

In conclusion, it is undeniable that the use of AI technology has a significant impact on the education sector today. However, it must be remembered that the challenges arising from its use are indications that these issues must be addressed and taken seriously at all levels—especially within the field of education.

Research Objectives

Based on the background described, this study was developed to address the research questions related to The Use of Artificial Intelligence (AI) Technology Among Teachers in Applying ICT-Based Education for the RBT Subject in National Schools Around the Petaling Perdana District. More specifically, this study aims to address the following five specific objectives:

1. To identify the level of teachers' skills in using Artificial Intelligence (AI) technology for the RBT subject.
2. To identify the level of AI technology usage among teachers for the RBT subject.
3. To identify the impact of using Artificial Intelligence technology in the RBT subject.
4. To determine the relationship between teachers' skills and their level of AI technology usage in the RBT subject.
5. To determine the relationship between the level and impact of AI technology usage among teachers in the RBT subject.

Literatur Review

The use of Artificial Intelligence (AI) in education is not a new phenomenon. Its application is becoming increasingly important and gaining traction, especially among teachers and students. This is because AI is seen as capable of offering numerous benefits and advantages to both groups.

AI can be leveraged to support distance learning in various innovative ways. One example is through the provision of virtual simulations and Augmented Reality (AR), which allow students to practice laboratory skills online (Basweti et al., 2022). In addition, interactive videos supported by AI can visually explain lesson concepts, helping students understand the material more effectively (Pathak et al., 2020). Furthermore, AI-powered virtual tutoring robots can provide personalized explanations and feedback to each student (Jeong et al., 2020). With the presence of AI technology, learning becomes easier and more effective—even when conducted remotely—while ensuring students still receive high-quality educational experiences, regardless of their location.

AI also plays a crucial role in personalized learning. AI systems can classify students' learning profiles and suggest appropriate learning materials and methods (Mørchid et al., 2020). In addition, AI can design tailored learning modules aimed at overcoming students' weaknesses

based on their profile data (Anthropic, 2021). This approach allows learning to be more customized according to the unique characteristics and needs of each student. With this capability, students receive more effective and relevant education, which supports their development and academic achievement more optimally.

Task and test evaluations have also become more efficient with the help of AI. For instance, the University of Cambridge uses deep learning techniques and natural language processing (NLP) to automatically assess essays (Anthropic, 2021). AI-based assessment provides quicker feedback to students. In this way, AI not only speeds up the evaluation process but also ensures objectivity and efficiency in academic assessments. This helps students receive timely and accurate feedback, which is crucial for their development and learning progress.

In conclusion, the use of AI in education offers numerous advantages, including personalized learning and greater efficiency in evaluating assignments and tests. AI not only adapts learning materials and methods to suit individual student needs but also delivers fast and accurate feedback. This makes the learning process more effective and responsive, while holistically supporting students' academic growth.

Research Methodology

A survey-based study was conducted among a randomly selected sample of teachers in the Petaling Perdana district, Selangor. The respondents consisted of teachers with more than one year of teaching experience. The research instrument was a modified questionnaire adapted from a study by Ghazali and Abdul Halim (2022), titled *"Secondary School Students' Readiness Towards the Use of Google Classroom Applications in the New Normal Learning Environment."* Relevant items from the original questionnaire were retained, while several elements were removed or adjusted to align with the current research topic, *"The Use of Artificial Intelligence (AI) Technology Among Teachers in Applying ICT-Based Education for the Design and Technology (RBT) Subject in National Schools Around the Petaling Perdana District."* Based on Krejcie and Morgan's (1970) sample size determination table, 100 respondents were selected from a population of 130 teachers. The questionnaire was distributed and completed within a one-month period.

The questionnaire was divided into four sections: A, B, C, and D. Section A collected demographic information such as gender, teaching experience in the RBT subject, and experience using AI. Section B contained nine items addressing the first research objective, which was to determine the level of teachers' skills in using AI technology for the RBT subject. Section C consisted of eight items related to the second objective, focusing on the level of AI usage among teachers. Section D assessed the impact of AI usage in the RBT subject at the primary school level. In this section, the researcher included instructional videos and practical examples to help teachers understand how to integrate AI effectively. The questionnaire used a five-point Likert scale: 5 = Strongly Agree (SA), 4 = Agree (A), 3 = Not Sure (NS), 2 = Disagree (D), and 1 = Strongly Disagree (SD). The data collected were analyzed using descriptive statistics, including percentage, mean, and standard deviation.

Research Finding

The results of the data analysis aim to examine the level of skills, the level of usage, and the impact of teachers' use of Artificial Intelligence (AI) technology. The analysis of each aspect was conducted by observing the frequency, percentage, mean, and mean interpretation.

For the interpretation of the mean scores, the researcher adopted the interpretation scale proposed by Jamil (2023), which categorizes the scores into three levels. These levels were used by the researcher throughout the study. The interpretation of the mean scores is presented in Table 1 below.

Table 1

Interpretation of Mean Scores

Range	Average Score
1.00 to 2.33	Low
2.34 to3.66	Medium
3.67 to 5.00	High

Table 2

Presents the mean and standard deviation for all three main constructs used in the study

Construct	Mean	Standard Deviation (SD)	Mean Score Interpretation
Skill Level	3.91	0.380	High
Level of Usage	3.55	0.460	Moderate
Impact of Usage	3.77	0.553	High

Findings from Table 2 present the mean values, standard deviations, and interpretations for the levels of skills, usage, and the impact of using Artificial Intelligence (AI) technology among teachers for the Design and Technology (RBT) subject in national schools around Petaling Perdana.

The teachers' skill level in using AI technology recorded the highest mean value of 3.91 with a standard deviation of 0.380, which is interpreted as high. This indicates that the majority of teachers possess strong skills in utilizing AI technology, likely due to prior training or experience in leveraging this technology.

The level of AI usage by teachers recorded a mean value of 3.55 with a standard deviation of 0.460, interpreted as moderate. This suggests that although teachers have high levels of skill, the actual use of AI technology in teaching the RBT subject remains at a moderate level. Factors such as time constraints, infrastructure support, or the limited integration of AI technology into the curriculum may influence this level of usage.

Regarding the impact of AI usage, the recorded mean value was 3.77 with a standard deviation of 0.553, also interpreted as high. This reflects a positive perception among teachers toward the impact of AI technology, whether in enhancing teaching effectiveness or increasing student engagement.

Overall, these findings suggest that AI technology holds significant potential in supporting ICT-based education for the RBT subject. However, further efforts are needed to enhance its overall usage in the classroom.

Table 3
Presents the results of the correlation test on the impact of AI usage and the two dependent variables: teachers' skills and the level of AI usage in the classroom

Construct / Test	Spearman's Rho	Significan Value
Skill	0.00	P < 0.05 (H0 : Rejected)
Level of Usage	0.00	P < 0.05 (H0 : Rejected)

Based on Table 3, the findings indicate a significant relationship between teachers' skills and the impact of using Artificial Intelligence (AI) technology in teaching the Design and Technology (RBT) subject. The analysis using Spearman's Rank correlation revealed a correlation coefficient of $r = 0.617$, $p < 0.01$, indicating a moderate to strong positive relationship between the two variables. This means that the higher the teacher's skill level in using AI technology, the greater the positive impact they experience on teaching and learning.

This significant relationship highlights that skill level plays a crucial role in determining how effectively AI technology can be utilized. Therefore, the null hypothesis is rejected, confirming that there is a significant relationship between teachers' skills and the impact of AI usage in the RBT subject. These findings carry important implications for empowering teachers in the use of AI technology. Enhancing teachers' skills through intensive training, workshops, and ongoing support can lead to a more substantial impact on the effectiveness of AI in RBT teaching. Moreover, the results underscore the need to strengthen infrastructure and technological resources in schools to help teachers apply their skills optimally. In conclusion, focusing on improving teachers' skills not only enhances their capabilities but also contributes to achieving technology-driven educational goals at the primary school level.

For Construct 2, Spearman's correlation analysis showed a significant relationship between the impact of AI technology use and the level of AI usage by teachers in teaching the RBT subject ($r = 0.540$, $p < 0.01$). This correlation coefficient indicates a moderate positive relationship between the two variables, suggesting that higher levels of AI usage by teachers are closely associated with more positive effects on teaching and learning. These findings confirm that the more frequently the technology is used, the clearer its positive impact on teaching becomes. Therefore, the second null hypothesis is also rejected, affirming that there is a significant relationship between the level of AI usage and its impact on teaching RBT. The significant relationship between the usage and impact of AI technology indicates that increasing accessibility and frequency of AI use can bring greater benefits to RBT instruction. Hence, initiatives to broaden teachers' exposure to AI—such as offering training opportunities and providing relevant digital resources—are essential to be further developed.

Additionally, these findings support the need for schools to offer continuous support in helping teachers consistently leverage AI technology. With a systematic approach, the positive effects on learning can be further enhanced.

Conclusion

This study is titled Artificial Intelligence (AI) Technology Among Teachers for the Implementation of ICT-Based Education for the Design and Technology (RBT) Subject in National Schools in the Petaling Perdana District. The findings of this study are presented through the mean values and their interpretations, as shown in Table 2.

The findings reveal that the level of teachers' skills in using Artificial Intelligence (AI) technology for the Design and Technology (RBT) subject is high, with a mean score of 3.91 and a standard deviation of 0.380. This indicates that teachers possess strong capabilities in handling and effectively utilizing AI technology. Such skills are essential, as Borham et al. (2022) noted that the use of AI can motivate teachers to teach more efficiently, save time, and improve students' understanding of various topics. High competency in this area serves as a crucial foundation to ensure that the integration of AI technology yields maximum benefits in the teaching and learning process.

The level of AI usage among teachers, however, is at a moderate level, with a mean score of 3.55 and a standard deviation of 0.460. Despite possessing strong skills, the adoption of AI in teaching is not yet fully widespread. Constraints such as limited professional training, insufficient exposure to AI applications, or technical challenges may have contributed to this finding. Bagir et al. (2022) assert that AI technology holds immense potential to transform education, but its advantages can only be fully realized when it is implemented consistently and comprehensively. This finding highlights the need for more structured training programs and continuous technical support to enhance AI utilization among teachers.

Although the level of AI usage is moderate, the impact of AI on the teaching and learning process is reported to be high, with a mean score of 3.77 and a standard deviation of 0.553. This demonstrates that when AI is used, it produces substantial positive effects in enhancing the effectiveness of teaching. As explained by Al-Midlij (2023) and Kucuk (2023), AI can enrich students' learning experiences through more innovative instructional strategies, assist teachers in designing more effective curricula, and help identify students' strengths and weaknesses more accurately. Moreover, Zawachi-Ritcher et al. (2024) emphasize that well-applied AI technology can improve access to education. In this context, AI can help overcome geographical, physical, or economic barriers that often hinder students from accessing quality education.

For instance, AI-based learning platforms can provide instructional materials tailored to the individual needs of students, including those with physical or learning disabilities. AI also facilitates effective distance learning, allowing students in rural or remote areas to access the same educational resources as those in urban settings. This can help bridge the educational gap and enhance equity in education. Salam et al. (2023) stated that AI strengthens technological competencies and digital literacy among both teachers and students. It offers opportunities for teachers to master various advanced tools and software, including learning analytics, adaptive learning systems, and curriculum planning applications. Teachers

proficient in using AI can not only improve their teaching effectiveness but also serve as technological role models for their students. For students, AI fosters the development of essential digital skills such as information searching, independent learning, and problem-solving through technology. For example, AI tools like ChatGPT or intelligent tutoring systems can support students' self-paced learning with personalized guidance based on their learning levels. More importantly, the digital literacy fostered through AI usage helps both students and teachers prepare for the demands of an increasingly technology-driven workforce. In today's rapidly changing world, these skills are invaluable assets.

Overall, the study indicates that while teachers possess a high level of competency in using AI technology, its actual usage remains at a moderate level. Nevertheless, the impact of AI usage on teaching and learning is significantly positive. This suggests that AI holds great potential to transform education, particularly for the RBT subject. The technology not only enhances the learning experience for students but also supports teachers in planning, delivering, and evaluating more effective teaching strategies.

However, to fully harness the benefits of AI, several strategic efforts must be undertaken. Firstly, intensive and ongoing training programs should be introduced to equip teachers with deeper knowledge and practical skills in using various AI applications. As emphasized by Midlij (2023), these training sessions should focus on integrating AI with conventional teaching methods, enabling teachers to use the technology more creatively and innovatively. In addition, the development of supportive technological infrastructure is crucial. According to Putri and Hasan (2023), while the implementation of AI in schools is relevant, the lack of infrastructure remains a major barrier to its full utilization. Schools must be equipped with high-speed internet access, adequate digital devices, and the latest AI software. Without sufficient infrastructure, teachers may face difficulties in consistently integrating the technology into their teaching.

Moreover, efforts to increase awareness about the potential of AI in education should also be prioritized. Niam and Nordin (2024) highlighted that the adoption of AI among teachers is still limited due to a lack of awareness in exploring its applications in education. Awareness programs involving teachers, school administrators, parents, and the wider community can help dispel doubts or hesitations regarding this technology. With a better understanding of AI's benefits, acceptance and implementation in the educational context can be further enhanced.

Collectively, these efforts will help ensure that AI usage among teachers can be expanded in a systematic and comprehensive manner. When properly applied, AI has the power not only to transform how teachers teach and how students learn, but also to improve the overall quality and inclusivity of education. Thus, AI should not be viewed merely as a supportive tool, but rather as a catalyst for innovation and positive change within the education system.

This study contributes to the theoretical framework surrounding the integration of Artificial Intelligence (AI) in educational settings by providing empirical evidence on the skills, usage and impact of AI among teachers in the context of ICT-based education for the RBT subject. It enhances existing knowledge by highlighting the correlation between teachers' proficiency in AI technology and its positive effects on teaching practices and student engagement.

Contextually, this research is particularly relevant in the Malaysian educational landscape, where the integration of technology in classrooms is still evolving. By identifying barriers to AI adoption and suggesting targeted training initiatives, the study not only addresses the current gaps in teacher readiness but also offers practical solutions to enhance the educational experience. This relevance underscores the potential of AI to transform teaching methodologies, thereby contributing to broader educational reforms aimed at improving learning outcomes in primary education.

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