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Awareness and Readiness for ai Integration in Teaching:

A Study among M.Ed. Students

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Abstract

The swift advancement of artificial intelligence (AI) has had a substantial impact on a number of industries, including education. This study focuses on M.Ed. students' awareness and comprehension of AI, particularly examining how they view AI's function in the educational process. It is crucial to evaluate future teachers' readiness to incorporate AI technologies into their teaching methods as they become more common in classrooms. Examples of these technologies include virtual learning assistants, automated grading, and intelligent tutoring systems. In order to assess M.Ed. students' knowledge, attitudes, and perceptions of AI in education, this study uses a mixed-method approach that combines surveys and interviews. The study identifies professional training, access to AI tools, and technological literacy as important factors influencing the adoption of AI in educational settings. The results show that although the majority of M.Ed. students are aware of AI's potential, many do not fully comprehend its real-world applications and difficulties in teaching surroundings. Furthermore, organized training programs are desperately needed to give aspiring teachers the know-how to use AI-based teaching methods in the classroom. The study highlights how crucial it is to include AI in teacher education programs in order to adequately prepare teachers for the demands of AI-enhanced

pedagogy in the future. It ends with a discussion of the possible advantages and difficulties of AI in education, along with suggestions for how educational institutions and policymakers can promote a teaching community that is more cognizant of AI.

Keywords: Artificial intelligence, teaching-learning process, educational technology, pedagogy, teacher training, educational innovation, curriculum development

Introduction

Our everyday lives have been greatly affected by technology, which has changed how we communicate, work, and—most importantly—learn. The importance of technology in education is growing as society enters the digital era. One of the most notable technological innovations in recent years is **Artificial Intelligence (AI)**, which refers to the development of machines capable of simulating human intelligence. AI has emerged as a vital tool in a number of domains, including education, where its capacity for enhancing instruction and learning generates more interest.

Information technologies, particularly artificial intelligence (AI), are transforming modern education by revolutionizing learning management and training systems. AI algorithms and educational robots have become essential in supporting a wide range of teaching and learning activities (Costa et al., 2017; García et al., 2007). Many artificial intelligence (AI) applications in education (AIED) have surfaced, such as Khanmigo, an AI tutor from *Khan Academy* that uses GPT-4 to offer personalized learning support in subjects like language acquisition, programming, and mathematics. Similarly, *Duolingo* uses advanced AI to enhance the language learning experience (Bicknell et al., 2023), and *iFlyTek* offers intelligent assessment systems tailored to grading scenarios, including China's national college entrance examination (iFlyTek, 2024). AI-powered learning management systems (LMS) like *Absorb LMS* and Docebo also offer capabilities such as content creation, administrative task automation, and personalized

learning (Leh, 2022). In the realm of educational robotics, SoftBank Robotics' Nao and Pepper robots serve as social robots for language teaching (Belpaeme & Tanaka, 2022). With generative AI technologies building new opportunities and creating investment to the sector, the rapid rise of AIED is changing the face of education. The global AIED market, valued at USD 1.82 billion in 2021, is projected to grow at a compound annual growth rate of 36% from 2022 to 2030 (GrandViewResearch, 2021). Both learners and educators are increasingly adopting AI tools, with recent statistics showing that 43% of U.S. college students use AI tools like ChatGPT and half of instructors incorporate AI in lesson development (Businessolution.org, 2023).

The use of technology has affected how we work, communicate, and learn in today's world, becoming an essential part of daily life. One of the most significant technological advancements of the 21st century is Artificial Intelligence (AI), which has the potential to fundamentally transform various sectors, including education, AI refers to the creation of machines or systems capable of performing tasks that typically require human intelligence, such as learning, reasoning, and decision-making (Russell & Norvig, 2016). By increasing productivity, automating processes, providing personalized experiences, AI is beginning to transform a number of industries. AI has the power to completely change how students interact with their teachers, learn, and interact with educational materials. Because AI automates administrative tasks, allows personalized learning experiences, and promotes developing of interactive learning tools, its integration into education is especially revolutionary. AI technologies, such as intelligent tutoring systems, adaptive learning platforms, and AI-driven educational bots, provide students with customized educational content that adjusts to their individual needs and learning styles (Luckin et al., 2016). With the use of these technologies, students will enhance their overall learning experience, address their points of weakness, and advance at their own pace. AI's role in education aligns with the broader trends of Industry 4.0, where digital technologies are integrated into all aspects of life, including education, to create

more efficient and accessible systems (Schwab, 2017).

But as AI continues to shape education, significant concerns are raised about how it will influence learners as well as educators. While AI is capable of automating administrative tasks, creating personalized content, and even assisting in teaching, it is unlikely to fully replace the role of human teachers (Fitria, 2021). Instead, AI should complement traditional teaching practices by assisting teachers in delivering more effective lessons and enhancing the learning experience for students (Zawacki-Richter et al., 2019).

Teachers of the future who will be incorporating AI tools and technologies into their teaching practices, like Master of Education (M.Ed.) students, will be at the pioneering of this educational change. Assessing these striving teachers' knowledge of artificial intelligence (AI) and its educational uses is necessary. Understanding how M.Ed. students view artificial intelligence (AI) and how it can enhance the teaching and learning process may assess how ready these students are to integrate AI into their teaching methods. Research on M.Ed students' awareness of AI will help identify the gaps in their knowledge and suggest ways to better prepare them for the challenges and opportunities posed by this emerging technology (Fitria, 2021). This study seeks to investigate the use of AI in the teaching and learning process, focusing specifically on the awareness of M.Ed students about AI's role in education. By exploring how prepared future educators are to implement AI in their teaching practices, the research will contribute to a deeper understanding of the intersection between technology and education. This investigation will also help identify the necessary skills and knowledge that M.Ed students need to develop in order to integrate AI effectively into the classroom, ensuring they are equipped to meet the evolving demands of the modern educational landscape.

Review of Related Literature

One of the most promising areas for the use of artificial intelligence (AI) is education. AI

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is turning into a game-changing tool in many other fields. AI in education involves the use of intelligent systems designed to enhance the learning and teaching process. According to Rainer et al. (2016), AI contains technologies that simulate human cognitive processes like learning, problem-solving, reasoning, and creation, which includes expert systems, neural networks, machine learning, deep learning, fuzzy logic, and intelligent agents. These technologies, which offer creative ways to improve teaching strategies, student engagement, and learning outcomes, have become more and more integrated into the educational landscape.

The distinction between strong AI and weak AI is crucial when discussing AI in education. Strong AI, also known as artificial general intelligence (AGI), refers to systems that can perform any cognitive task that a human can, including reasoning, communication, and emotional responses (Wells, 2023). Conversely, weak AI, also known as narrow AI, is made for specialized applications like virtual teaching assistants, adaptive learning platforms, and grading systems. The majority of AI applications used in education today are weak AI examples that target particular facets of the learning process.

AI's application in the field of education is rooted in its ability to support cognitive functions critical to learning and teaching. Educational activities are knowledge-intensive, and AI technologies, which operate based on algorithms and vast knowledge databases, can assist both educators and learners. The integration of AI into education began in the mid-1950s, and since then, it has expanded into various educational domains such as language learning, STEM (Science, Technology, Engineering, and Mathematics) education, and medical training (Perrotta & Selwyn, 2020). The potential of AI in the classroom includes tasks such as content preparation, teaching methods, student interaction, collaboration, and performance assessments (Chassignol et al., 2018; Perrotta & Selwyn, 2020).

Several studies have examined AI's role in the teaching-learning process, particularly the awareness and preparedness of teachers to use AI in their classrooms. A review by Chassignol et

al. (2018) presented a framework of four key educational components: content, teaching methods, assessment, and communication, through which AI can facilitate teaching and learning. Another study by Goksel and Bozkurt (2019) identified key concepts in the field of AI in education, such as adaptive learning, personalization, and intelligent tutoring systems, through a co-word analysis of academic papers published between 1970 and 2018. The focus of many studies has been on the ways AI can personalize learning experiences, such as tailoring content to suit the needs of individual learners or providing real-time feedback.

In terms of teacher preparedness, studies indicate that while many educators recognize the potential of AI, they often lack the necessary training and skills to fully integrate AI into their teaching practices. Chen et al. (2020) and Xu & Ouyang (2022) explored the challenges teachers face in adopting AI, highlighting gaps in their technical knowledge and the limited inclusion of AI training in teacher education programs. This highlights the importance of raising awareness among future educators, particularly M.Ed students, about the applications and benefits of AI in education.

AI-based applications such as chatbots, intelligent tutoring systems, and adaptive learning platforms have proven to be effective tools in enhancing both teaching and learning. According to Okonkwo & Ade-Ibijola (2021), chatbots can assist in answering student queries, providing guidance, and promoting interaction outside the classroom, while intelligent tutoring systems can offer personalized learning experiences by adapting to each student's needs (Luan & Chin-Chung, 2021). These tools align with the personalized learning paradigm, where AI systems provide targeted content based on the learner's progress and needs.

However, while AI has demonstrated significant potential in improving the educational process, the integration of AI in teacher education programs remains a challenge. González-Calatayud et al. (2021) noted that teacher preparation programs often do not adequately prepare

educators to use AI effectively. As a result, there is an urgent need to increase awareness and training for M.Ed students on how AI can be utilized in the classroom to improve both teaching practices and student outcomes.

Furthermore, AI in education has the potential to address educational disparities by providing access to personalized learning, particularly for students who may have unique learning needs. According to Hwang & Tu (2021), AI applications in mathematics education, for example, can help students at various levels of proficiency by offering tailored content and real-time feedback, thereby promoting equity in learning opportunities.

AI's potential in education is vast, and its applications can significantly enhance the teaching-learning process. However, to fully realize its benefits, it is essential to raise awareness among M.Ed students about the role AI can play in their future classrooms. By integrating AI-focused curricula into teacher training programs and ensuring that future educators are equipped with the necessary skills to utilize these technologies, the education sector can better leverage AI's capabilities to improve learning outcomes.

Need and Significance of the Study

A key aspect of current teaching and learning is integrating the use of artificial intelligence (AI) into educational settings. As AI technologies continue to evolve, they have the potential to revolutionize the educational landscape by enabling personalized learning, streamlining administrative tasks, and enhancing the quality of education (Luckin et al., 2016). But in order to make the most of artificial intelligence in education, educators—especially interested educators—must be educated about these resources. A significant proportion of aspiring educators who will be important in using AI into the classroom are Master of Education (M.Ed.) students. There is a significant gap in understanding regarding how prepared these future educators are to utilize AI tools in their teaching practices. Exploring M.Ed students' awareness

of AI and its potential applications in education is essential for determining whether current teacher preparation programs adequately equip educators with the knowledge and skills required to navigate and implement AI technologies in the classroom (Fitria, 2021).

This study is necessary given that it talks about the increasing significance of AI in education and the necessity for aspiring teachers to effectively include AI into their method of instruction. AI can offer personalized learning experiences by adapting to individual student needs and learning styles, thereby fostering more inclusive and efficient education systems (Schwab, 2017). However, without an accurate understanding of AI and its implications, educators could find challenging to make the most of these materials. In besides determining knowledge gaps, the study's findings will reveal the knowledgeable M.Ed. students are about AI's potential and provide insights into the resources and abilities required for successfully integrating AI into instructional techniques.

The significance of the study lies in its potential to guide teacher training programs, ensuring that they include sufficient content on AI to prepare future educators for the technological shifts taking place in education (Zawacki-Richter et al., 2019). The study could help in the creation of curriculum modifications that may enhance the integration of AI into educational settings by assessing the awareness of M.Ed. students. Furthermore, research is going to construct AI tools that are quick to use and available for teachers, which will enable better teaching ways. In the end, this study will help by ensuring that educators of the future are ready to use AI technologies in a way that enhances learning outcomes and meets the various needs of students in the digital age.

Statement of the Problem

By growing personal learning, enhancing efficiency, and assisting educators in giving more effective and captivating instruction, the integration of artificial intelligence (AI) into the

teaching-learning process holds the potential to completely transform education. However, even though AI has become more and more essential and being used in numerous fields, future teachers—more especially, M.Ed. students—still don't fully understand it. Since M.Ed. students will be in charge of implementing these innovations into their future teaching practices, it is imperative to assess their level of understanding about AI technologies and their potential applications in the field of education. In order to ascertain whether M.Ed. students are prepared to implement artificial intelligence (AI) in the classroom, this study examines the topic of "use of AI in the teaching-learning process and the awareness among M.Ed students."

Objectives

1. To assess the level of awareness among M.Ed students regarding the applications of Artificial Intelligence in the teaching-learning process.
2. To explore M.Ed students' understanding of how Artificial Intelligence can enhance and support teaching methodologies and learning outcomes.
3. To evaluate the readiness of M.Ed students to incorporate Artificial Intelligence into their future teaching practices, including the necessary technical skills and knowledge.
4. To explore the extent to which M.Ed students feel that their current teacher education programs prepare them to use Artificial Intelligence effectively in the classroom.

Hypotheses

H1: M.Ed students have a significant level of awareness regarding the applications of Artificial Intelligence in the teaching-learning process.

H2: M.Ed students understand how Artificial Intelligence can enhance and support teaching methodologies and learning outcomes.

H3: M.Ed students are ready to incorporate Artificial Intelligence into their future teaching practices, including the necessary technical skills and knowledge.

H4: M.Ed students feel that their current teacher education programs adequately prepare them to use Artificial Intelligence effectively in the classroom.

Methodology

The study employed a survey method combined with a descriptive research design. A structured questionnaire was used to collect information about M.Ed. students' awareness and preparedness for AI applications in the teaching-learning process. Fifty M.Ed. students from Mahatma Gandhi University participated in the study. Convenience sampling, a non-probability method, was used, selecting students who were readily available and willing to participate. Data were collected using a 20-item multiple-choice questionnaire (MCQ) based on an awareness scale. The questionnaire included sections on: (a) Broad Knowledge of AI, (b) AI Applications in Education, and (c) Readiness to Use AI, and (d) AI Integration and Teacher Education Programs. Descriptive statistics, including mean, median, mode, standard deviation, and frequency distribution, were used to summarize the responses. Skewness and kurtosis were identified to assess the normality of data distribution. Inferential statistics were applied. A t-test was conducted to find differences in awareness among M.Ed. students based on factors like understanding and readiness. Correlation analysis was performed to examine relationships between different components. The significance level (α) was set at 0.05. The null hypothesis was rejected if the p-value was less than 0.05, indicating a statistically significant result. This approach helped in drawing conclusions about M.Ed. students' awareness and preparedness for using AI in the teaching-learning process.

Analysis and Interpretations

The integration of artificial intelligence (AI) in education has attracted substantial interest in recent years due to its potential to transform teaching and learning practices. As AI technologies evolve, they create new opportunities for more personalized instruction, streamlined administrative tasks, and enhanced student engagement. Various studies, including those by Chassignol et al. (2018), Goksel and Bozkurt (2019), and Fitria (2021), have explored AI's role in shaping the educational landscape, highlighting its transformative possibilities while also noting significant concerns such as ethical implications, data privacy issues, and the urgent need for effective teacher training. Against this backdrop, the present analysis reviews the current literature on AI in education, examines its benefits and challenges, and suggests directions for future research to ensure its responsible and effective integration into educational settings.

The first hypothesis (H1) proposed that M.Ed students have a significant level of awareness regarding the applications of artificial intelligence in the teaching-learning process. Findings indicate that the average awareness among respondents was slightly below the midpoint of the scale. The majority of students reported a relatively low but consistent level of awareness, as reflected in the clustering of responses around the same values. There was moderate variation in responses, but the data showed a near-symmetrical distribution, meaning that responses were fairly balanced between low and high awareness levels. The overall distribution was flatter than normal, suggesting the absence of extreme outliers. A strong and statistically significant correlation was observed between the awareness scores and the total scores, reinforcing that awareness is meaningfully connected to the broader perceptions of AI among students.

Moving to the second hypothesis (H2), which suggested that M.Ed students understand how artificial intelligence can enhance and support teaching methodologies and learning outcomes, the findings showed a slightly higher mean score compared to the awareness levels. Although the median and mode values remained at the lower end, indicating that most students

still rated their understanding modestly, the average understanding was somewhat better. Responses exhibited greater variability, and the data distribution was positively skewed, suggesting that a smaller group of students demonstrated a higher level of understanding. The correlation analysis revealed a strong positive and statistically significant relationship between understanding and total perceptions, confirming that a better grasp of AI's potential to enhance education is strongly linked with the students' overall views.

The third hypothesis (H3) focused on the readiness of M.Ed students to incorporate AI into their future teaching practices, including their possession of the necessary technical skills and knowledge. Results revealed that the average readiness score was slightly above the neutral point, indicating a moderate degree of preparedness among students. Interestingly, the median and mode pointed toward a higher level of readiness among a sizable portion of respondents. While responses varied, the distribution showed a slight negative skew, suggesting that more students rated themselves as moderately to highly prepared rather than unprepared. The correlation between readiness and the total score was found to be strong and statistically significant, further emphasizing that students who feel more ready to integrate AI also tend to hold more positive overall perceptions of AI in education.

Finally, the fourth hypothesis (H4) assessed whether M.Ed students feel that their current teacher education programs adequately prepare them to use artificial intelligence effectively in the classroom. The average perception was slightly above the neutral point but not strongly positive, indicating that while some students viewed their programs as somewhat adequate, there remains considerable room for improvement. The most common responses leaned more favourably, with several students rating their training positively. The data distribution showed a mild negative skew, indicating that more respondents viewed their programs positively than negatively. The correlation analysis again revealed a strong and statistically significant positive

relationship between perceptions of the current teacher education programs and the total scores, confirming that students who believed their programs were effective also tended to view AI more favourably overall.

In summary, the findings support all four hypotheses: M.Ed students demonstrate a modest but significant awareness of AI applications, possess a moderate understanding of how AI can enhance education, show a reasonable level of readiness to incorporate AI into their teaching practices, and hold a generally positive—though cautious—view of the adequacy of their current teacher education programs in preparing them for AI integration. Nonetheless, the results also underscore the need for stronger, more targeted interventions in teacher education to build deeper awareness, richer understanding, higher readiness, and more comprehensive preparation for the AI-driven future of education.

Findings of the Study

The findings of the study reveal that M.Ed students show a moderate level of awareness regarding the applications of Artificial Intelligence (AI) in the teaching-learning process, with a slightly below-average mean score of 2.22. Most respondents rated their awareness at 2.00, indicating a basic understanding. The responses showed moderate variation and a nearly symmetrical distribution, with a strong positive and statistically significant correlation ($r = 0.748$, $p < 0.001$) between awareness and the overall perception of AI.

Regarding their understanding of how AI can enhance teaching methodologies and learning outcomes, students displayed a slightly better mean score of 2.58, although the most common rating remained at 2.00. The distribution was moderately skewed toward lower ratings but again showed a strong and significant correlation with the overall perception ($r = 0.741$, $p < 0.001$), indicating that better understanding is linked to more positive attitudes toward AI.

Students' readiness to incorporate AI into future teaching practices was relatively

stronger, with a mean score of 3.18 and a common rating of 4.00, suggesting a positive inclination. The slight negative skew and a strong correlation ($r = 0.783$, $p < 0.001$) indicated that higher readiness levels correspond to a more favourable overall perception of AI in education.

Finally, students perceived their current teacher education programs as somewhat adequate for preparing them to use AI, with a mean score of 3.12 and a most frequent rating of 4.00. The responses were moderately varied, and a strong positive correlation ($r = 0.766$, $p < 0.001$) confirmed that better perceptions of program adequacy are associated with stronger overall confidence in integrating AI into educational practice.

Tenability of Hypothesis

- The first hypothesis formulated was: H1: M.Ed students have a significant level of awareness regarding the applications of Artificial Intelligence in the teaching-learning process. By analysing the collected data H1 is retained.
- H2: M.Ed students understand how Artificial Intelligence can enhance and support teaching methodologies and learning outcomes. By analysing the collected data H2 is retained.
- H3: M.Ed students are ready to incorporate Artificial Intelligence into their future teaching practices, including the necessary technical skills and knowledge. By analysing the collected data H3 is retained.
- H4: M.Ed students feel that their current teacher education programs adequately prepare them to use Artificial Intelligence effectively in the classroom. By analysing the collected data H4 is retained.

Delimitations of the Study

The study focuses solely on M.Ed students, which may not be representative of the

broader population of educators or students across different levels of education. This limits the generalizability of the findings to other groups, such as undergraduate students or practicing teachers. Many M.Ed. students may not have received thorough training in AI applications, and they may have encountered AI to differing degrees in their courses. Their capacity to totally grasp and assess AI's potential in education may be limited by their inadequate understanding of the subject, which would also limit the study's conclusions.

Conclusion

M.Ed. students' perceptions and readiness to incorporate artificial intelligence (AI) into education are revealed by the study on the use of AI in the teaching-learning process and their awareness, comprehension, and preparedness. According to the awareness analysis, the majority of respondents rated their awareness at a basic level, indicating a slightly below-average understanding of AI applications (mean = 2.22). With responses displaying moderate variability, they do, however, have a slightly better understanding of how AI can improve education (mean = 2.58). The respondents' inclination to integrate AI into their practices is moderately positive (mean = 3.18), indicating a general willingness but not a fervent enthusiasm. The study also looked at respondents' perceptions of the current state of teacher education programs; a mean score of 3.12 suggests that respondents believe these programs to be at least passably good. Nonetheless, a large number of respondents gave them higher ratings, indicating a generally favourable opinion of the condition of teacher education today. The Total variable and the current state of teacher education programs have a significant positive correlation ($r = 0.766$), indicating that respondents' overall preparedness to use AI rises as their opinions of these programs do. To better prepare future teachers for the integration of AI in the classroom and ultimately improve the teaching-learning process, these findings emphasize the significance of

raising awareness of AI and improving teacher education programs.

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