WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Level of Awareness and Usage of Artificial Intelligence Tools among Pre-service Teacher Trainees: A Study in Darbhanga District

Md. Afroz Alam

Assistant Professor (Education), CTE Darbhanga, School of Education & Training, Maulana Azad National Urdu University (MANUU), (A Central University, Accredited Grade A+ by NAAC), Hyderabad, INDIA.
afrozmanuu@gmail.com
afroz@manuu.edu.in

A B S T R A C T :

The rapid integration of Artificial Intelligence into educational processes has dramatically changed the teaching-learning landscape, and therefore, it is imperative that the prospective teacher is sufficiently aware and competent to deploy AI tools in a manner commensurate with the emerging challenges. This quantitative, survey-based study explores the extent of awareness and usage pattern of AI tools among 140 pre-service teacher candidates undergoing teacher education training in the Darbhanga district of Bihar, India. For the assessment of the level of awareness, the frequency of use of the tool, and the variety of tools being used, a structured questionnaire was used. Data were analyzed by using descriptive statistics, mean score, and correlation analysis. The findings indicate that the trainees are moderately aware of the AI tools; however, their usage is observed as low to moderate. Further, the most frequently reported AI tools used were ChatGPT and AI quiz generators. The correlation between awareness and frequency of use is positive and significant. The study highlights the importance of the integration of structured AI training into the teacher education curriculum for future teachers to work competently in an AI-integrated classroom.

Keywords: Artificial Intelligence, Pre-service Teachers, AI Awareness, AI Usage, Teacher Education, ChatGPT, Adaptive Learning Tools.

Introduction

Artificial Intelligence has been a game-changer in educational practice, pushing the boundaries of education to include personalized learning, intelligent tutoring systems, automated assessment, and content generation. In light of this increase in applying AI in pedagogical approaches at educational institutions in general, pre-service teacher candidates also need to be prepared to integrate such AI tools into their classrooms in the future. With AI tools like ChatGPT, Khanmigo, Google's Socratic, adaptive learning platforms-e.g., Knewton, Byju's AI modules-and automatic quiz generators increasingly available, AI literacy has become a core competency for novice teachers. However, a gulf still exists between the availability of these tools and their actual use by pre-service teachers. Understanding levels of awareness, usage patterns, and types of AI tools employed is bound to provide a clear insight that shall help improve the teacher education programs in tune with NEP 2020 emphasis on technology-enabled learning.

Md. Afroz Alam

Assistant Professor (Education), CTE Darbhanga, School of Education & Training, Maulana Azad National Urdu University (MANUU), (A Central University, Accredited Grade A+ by NAAC), Hyderabad, INDIA.

Conceptual Framework

The study underpinning this article draws on two complementary theoretical perspectives that explain, together, awareness of and engagement with AI tools by trainees within educational settings: the Technology Acceptance Model and the Digital Literacy Framework for Teachers. The Technology Acceptance Model, as proposed by Davis (1989), treats technology adoption as a function of two major determinants: perceived usefulness and perceived ease of use. According to TAM, individuals are more likely to adopt a technology when they believe that such a technology enhances their performance and is easy to use. In the present study, AI awareness significantly influences PU and PEOU. The higher the awareness of AI concepts and tools, the better the position of the trainee to appreciate the instructional usefulness of AI and to consider those tools more accessible and manageable, increasing therefore the likelihood of its real use.

Drawing on TAM, UNESCO's (2018) Digital Literacy Framework for Teachers places particular focus on the development of the core

digital competencies required to effectively teach in technology-enabled learning environments. These include information literacy, the creation of digital content, and the pedagogical use of technology. By allowing teachers to critically evaluate information that is available in digital formats, to develop AI-supported instructional resources, and to integrate emerging technologies meaningfully into teaching–learning processes, AI awareness directly contributes to the development of these competencies. As such, AI awareness forms a key basis of digital competence and preparation for AI-enabled teaching. Conceptually, taken together, these frameworks suggest a successive causation in which awareness about AI influences the frequency of its use, which in turn serves to enhance teaching preparedness. The higher the level of awareness, the stronger the perceptions of usefulness and ease of use, the stronger the digital competencies, and the higher the likelihood of confident and effective integration of AI tools into educational practice.

Rationale of the Study

Pre-service teachers represent the future teaching workforce. Their preparedness to integrate AI tools is central to 21st-century school education. Although AI tools are widely available, the extent of awareness and actual usage among trainees remains under-researched, especially in the Indian context. Therefore, this study provides empirical evidence to support policy-level and institutional-level interventions for integrating AI competency in teacher education programmes.

Variables of the Study

In the present study, the level of awareness of AI tools is treated as the independent variable, as it is assumed to influence trainees' engagement with artificial intelligence in educational contexts. This variable reflects trainees' conceptual understanding of AI, familiarity with AI-based educational tools, and awareness of specific AI applications relevant to teaching and learning. The dependent variable is the usage of AI tools, operationalized in terms of both frequency of use and type of AI tools employed. This includes the extent to which trainees utilize AI for academic tasks, lesson planning, assessment, and interaction with specific applications such as chatbot-based tools, adaptive learning platforms, and AI-supported instructional resources. In addition to these core variables, the study incorporates descriptive variables to contextualize the findings and examine patterns across different trainee characteristics. These include gender, programme of study (B.Ed. and D.El.Ed.), and year of study. While these variables are not manipulated, they provide valuable demographic and academic background information, enabling a nuanced understanding of variations in AI awareness and usage among different groups of trainees.

Review of Related Studies

Existing literature consistently indicates that while the adoption of artificial intelligence (AI) in education is accelerating, teacher readiness for effective AI integration remains limited. Research across diverse educational contexts suggests a gap between the growing availability of AI tools and teachers' capacity to meaningfully incorporate them into teaching–learning processes.

Holmes et al. (2022) reported that teachers generally exhibit moderate familiarity with AI tools, yet their classroom-level integration remains low, highlighting a disconnect between awareness and pedagogical application. Similarly, Zawacki-Richter et al. (2019) identified insufficient institutional support, limited professional development opportunities, and inadequate training as major barriers to AI adoption within teacher education programs. These structural constraints significantly hinder teachers' readiness to move beyond exploratory use of AI tools.

Focusing on the Indian context, Pandey and Singh (2023) found that pre-service teachers possess only surface-level awareness of AI applications and tend to rely predominantly on general-purpose tools, particularly chatbot-based applications, for completing academic tasks. Their findings underscore a lack of exposure to pedagogically oriented AI tools and a limited understanding of how AI can support instructional design and assessment. Reinforcing these observations, Chen and Chan (2021) demonstrated that awareness is a strong predictor of both usage and acceptance of AI-based learning applications, suggesting that enhanced awareness is a prerequisite for sustained and meaningful adoption.

Collectively, the reviewed studies point to a clear need for context-specific and empirically grounded research, particularly in relation to pre-service teachers' AI awareness and usage patterns. Such research is essential to inform curriculum design, targeted training interventions, and policy initiatives aimed at strengthening teacher preparedness for AI-enabled educational environments.

Objectives of the Study

- To assess the level of awareness of AI tools among pre-service teacher trainees.
- To determine the frequency and patterns of usage of AI tools among pre-service teachers.
- To identify the types of AI tools commonly used by pre-service teacher trainees.

- To examine the relationship between awareness level and frequency of AI tool usage.

Research Questions

- What is the level of awareness of AI tools among pre-service teacher trainees?
- How frequently do pre-service trainees use AI tools?
- Which AI tools are most commonly used by the trainees?
- Is there a significant relationship between awareness and usage of AI tools?

Hypotheses

- H_1: There is a significant positive relationship between AI awareness and AI tool usage among pre-service teacher trainees.
- H_0: There is no significant relationship between AI awareness and AI tool usage.

Research Design, Methodology and Tool

The current study adopted a descriptive survey research design, suitable for systematically outlining the prevailing levels of awareness and usage patterns of AI tools among pre-service teacher trainees. This design allowed for the gathering of quantitative data from a representative sample in order to study prevailing trends without the manipulation of variables. The study population consisted of all pre-service teacher trainees enrolled in teacher education programs, namely B.Ed. and D.El.Ed., in selected teacher education institutions within the Darbhanga district. Out of these, a sample of 140 pre-service teacher trainees was selected by employing a simple random sampling technique, which ensured that each trainee had an equal chance of being included in the sample, thus enhancing the representativeness of the sample.

Data were collected using a structured questionnaire titled AI Awareness and Usage Scale (AI-AUS), developed by the researcher. The instrument contained four sections. Section A collected demographic information such as gender, programme of study, and year of study. Section B contained an AI Awareness Scale with 15 items evaluated on a five-point Likert scale, aimed at assessing the conceptual and applied awareness of AI tools in education among the trainees. Section C consisted of 10 items that measured the frequency of AI tool usage in terms of a four-point scale, and Section D elicited information on the types of AI tools used from the checklist format.

The validity of the instrument was determined a priori through expert review. Seven experts in the areas of educational technology and teacher education reviewed the questionnaire, and a calculated Content Validity Index of 0.86 demonstrated satisfactory content validity. Reliability was determined by Cronbach's alpha coefficients. The reliability coefficient for the Awareness Scale was 0.82, and that of the Usage Scale was 0.79, all within acceptable limits. These results confirm that AI-AUS is a reliable and internally consistent instrument in the measurement of pre-service teachers' awareness and usage of AI tools in educational settings.

Data Collection, Analysis and Interpretation

Data for the present study were collected using a combination of online and offline modes to ensure wider participation. The AI Awareness and Usage Scale (AI-AUS) was administered through Google Forms as well as paper-based questionnaires, allowing respondents to choose a mode that was convenient and accessible to them. The collected data were analyzed using appropriate descriptive and inferential statistical techniques. Descriptive statistics, including mean and standard deviation, were employed to determine the levels of AI awareness and the frequency of AI tool usage among pre-service teacher trainees. Frequency and percentage analyses were used to summarize demographic variables and identify commonly used AI tools. To examine the relationship between AI awareness and AI usage, Pearson's product–moment correlation was applied. These statistical procedures enabled a comprehensive and systematic interpretation of the data in line with the objectives of the study.

Table-1: Awareness Level of AI Tools (N = 140)

Awareness Level	Mean	SD	Result
Awareness of AI concepts	3.42	0.64	Moderate
Awareness of AI tools in education	3.28	0.71	Moderate
Awareness of specific AI applications (ChatGPT,	3.10	0.78	Moderate

adaptive learning)			

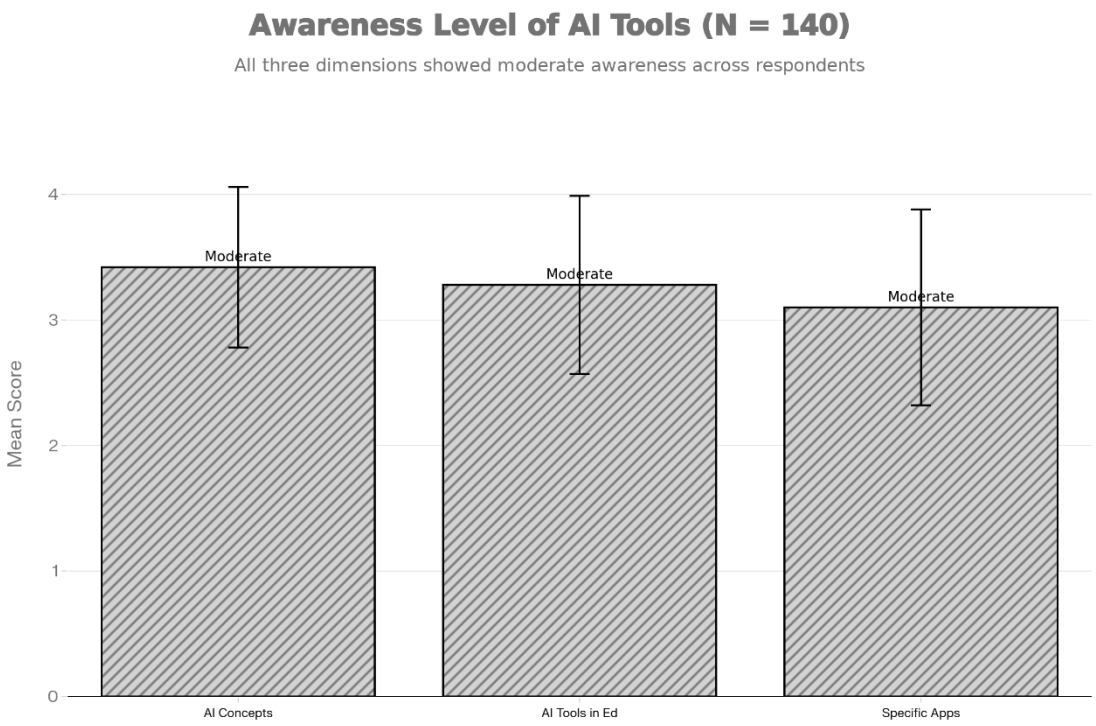

Fig-1: Bar graph showing mean awareness levels of AI tools with standard deviations and result interpretations (N = 140)

Interpretation: Table-1 presents the mean scores and standard deviations related to trainees' awareness of artificial intelligence (AI) concepts and tools in education (N = 140). The findings reveal that trainees possess a moderate level of awareness across all examined dimensions of AI. Specifically, awareness of AI concepts recorded the highest mean score (M = 3.42, SD = 0.64), indicating that trainees have a reasonable conceptual understanding of AI, including its basic principles and general functions. The relatively lower standard deviation suggests a fair degree of consistency among respondents in their conceptual awareness. Awareness of AI tools in education yielded a slightly lower mean score (M = 3.28, SD = 0.71), reflecting a moderate understanding of how AI-based tools are integrated into teaching–learning processes. This suggests that while trainees are familiar with the presence and potential of AI in educational contexts, their exposure to or hands-on experience with such tools may be limited or uneven. Furthermore, awareness of specific AI applications, such as ChatGPT and adaptive learning systems, showed the lowest mean score (M = 3.10, SD = 0.78). Although still within the moderate range, this result indicates comparatively lesser familiarity with concrete, application-oriented AI technologies. The higher standard deviation in this dimension points to greater variability among trainees, implying that some are well-acquainted with these tools, whereas others have minimal awareness. Overall, the aggregate awareness mean score (M=3.26) confirms that trainees demonstrate a moderate level of awareness of AI tools and applications. This level of awareness suggests an emerging familiarity rather than advanced proficiency, highlighting the need for structured training, curriculum integration, and practical exposure to AI technologies in teacher education programs.

Table-2: Frequency of AI Tool Usage

Usage Dimension	Mean	SD	Interpretation
Frequency of AI use for assignments	2.34	0.82	Low-moderate
Frequency of AI use for lesson planning	2.10	0.76	Low
Use of adaptive learning apps	1.96	0.68	Low
Use of chatbot-based tools	2.52	0.89	Moderate

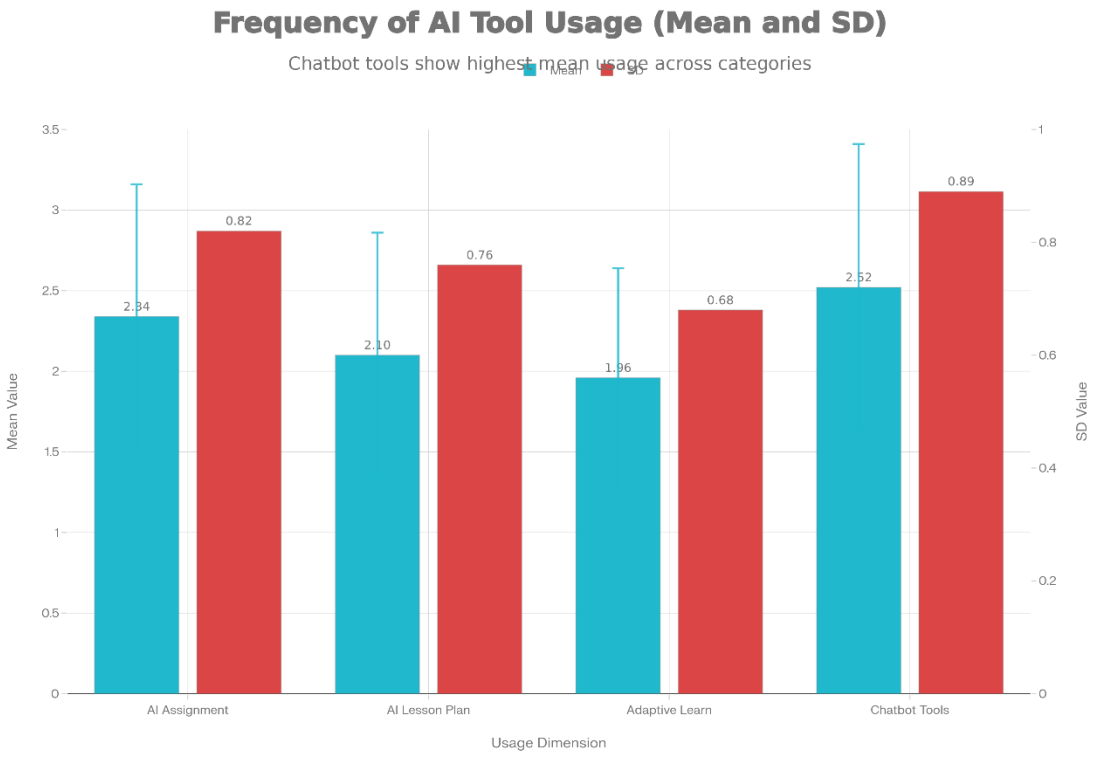

Fig-2: Bar graph showing Frequency of AI Tool Usage (Mean and Standard Deviation)

Interpretation: Table-2 illustrates the frequency with which trainees use various AI tools across different academic and instructional activities. The mean scores and standard deviations indicate that, overall, the use of AI tools among trainees is relatively low to moderate, suggesting occasional rather than regular integration of AI into their academic practices. The frequency of AI use for assignments recorded a mean score of 2.34 (SD = 0.82), reflecting a low–moderate level of usage. This suggests that trainees sometimes rely on AI tools for completing academic tasks such as drafting content, generating ideas, or clarifying concepts, but such use is not yet habitual or systematic. In contrast, the frequency of AI use for lesson planning was comparatively lower (M = 2.10, SD = 0.76), indicating a low level of utilization. This finding implies that trainees are still hesitant or insufficiently trained to employ AI tools for pedagogical planning, possibly due to limited confidence, lack of institutional support, or concerns regarding appropriateness and academic integrity. Similarly, the use of adaptive learning applications showed the lowest mean score (M = 1.96, SD = 0.68), categorizing it as low usage. This result points to minimal engagement with personalized or adaptive AI-based platforms, which may be attributed to limited access, inadequate awareness, or insufficient emphasis on such technologies within teacher education curricula. Notably, the use of chatbot-based tools, such as ChatGPT, demonstrated the highest mean score among all dimensions (M = 2.52, SD = 0.89), falling within the moderate usage range. This indicates that trainees are comparatively more inclined to use conversational AI tools, likely due to their ease of access, user-friendly interfaces, and immediate usefulness for generating explanations, examples, and academic support.

Table-3: Commonly Used AI Tools (Multiple Response)

AI Tool	Percentage (%)
ChatGPT	78%
AI-based quiz/worksheet generators	55%
Adaptive learning apps	38%
Automated assessment tools	32%
AI lesson planning tools	27%

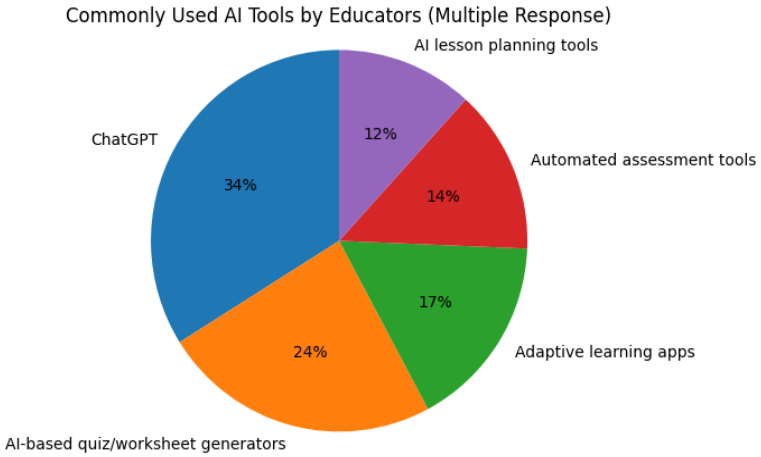

Fig-3: Pie Chart showing Commonly Used AI Tools (Multiple Response)

Interpretation: Table-3 presents the distribution of commonly used AI tools among trainees based on multiple responses, indicating that respondents often engage with more than one AI application. The findings reveal clear variations in the popularity and adoption of different AI tools. Among all listed tools, ChatGPT emerged as the most widely used AI tool, with 78% of trainees reporting its use. This high level of adoption suggests that conversational AI tools are highly accessible and perceived as immediately useful for academic purposes such as clarifying concepts, generating content, and supporting assignment-related tasks. The widespread use of ChatGPT aligns with its relatively intuitive interface and minimal technical requirements, making it more approachable compared to other AI-based applications. The second most commonly used category comprises AI-based quiz and worksheet generators, reported by 55% of respondents. This indicates a moderate level of engagement with AI tools designed to support assessment-related activities, reflecting trainees' growing interest in leveraging AI for creating practice materials and formative assessments. In contrast, the use of adaptive learning applications was reported by 38% of trainees, suggesting limited but emerging engagement with personalized learning technologies. Similarly, automated assessment tools were used by 32% of respondents, indicating that fewer trainees rely on AI for grading or evaluation-related purposes, possibly due to concerns regarding reliability, accuracy, or lack of institutional endorsement. Notably, AI lesson planning tools were the least utilized, with only 27% of trainees reporting their use. This finding reinforces earlier evidence of low AI integration in pedagogical planning and suggests that trainees may require more structured guidance and training to effectively adopt AI for instructional design. Overall, the results demonstrate that trainees predominantly favour general-purpose and easily accessible AI tools, particularly ChatGPT, over specialized pedagogical applications. This pattern highlights a usage gap between exploratory or supportive AI tools and those intended for deeper instructional and assessment-related functions, underscoring the need for targeted professional development to broaden and deepen AI integration in teacher education.

Table 4: Correlation Between AI Awareness and AI Usage

Variables	r-value	p-value	Result
AI Awareness & AI Usage	0.46	< 0.01	Significant positive correlation

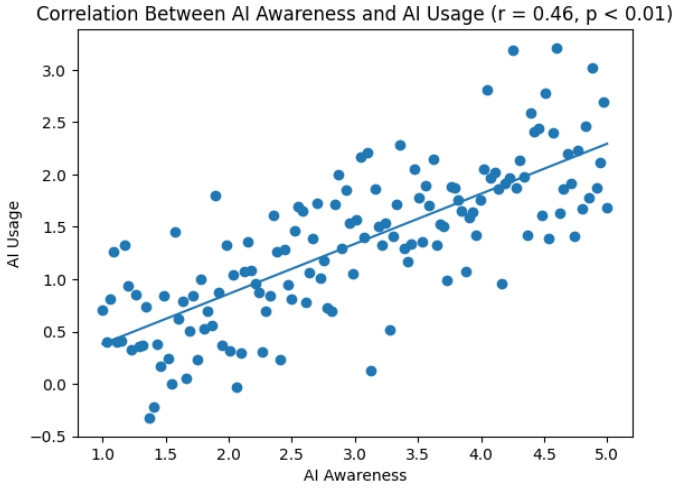

Fig-4: Scatter plot illustrating the significant positive correlation between AI awareness and AI usage.

Interpretation: Table 4 presents the results of the correlation analysis on the relationship between trainees' awareness of AI and the actual use of AI tools. There is a moderately positive and statistically significant relationship between AI awareness and the use of AI tools, as revealed by the analysis, with a value of $r = 0.46$ at $p < 0.01$. The positive coefficient suggests that those trainees with more experience in AI concepts, tools, and applications are more likely to report a higher engagement with AI tools. Such a finding implies that awareness determines the substantive influence of willingness and the ability of trainees to engage with the AI technologies in academic and instructional settings. The more knowledgeable trainees about AI and its potential in education, the more they are likely to try and eventually adopt AI tools for different purposes. The statistical significance at 0.01 indicates that such an association can hardly be explained by chance. Therefore, the finding has provided empirical evidence to confirm the research hypothesis (H_1) on the positive relationship between AI awareness and AI usage among trainees.

Major Findings

- Pre-service teacher trainees showed moderate awareness of AI tools.
- Usage of AI tools is generally low to moderate, with chatbot tools being used most.
- ChatGPT emerged as the most commonly used AI tool (78%).
- A significant positive correlation ($r = 0.46$) was found between awareness and usage.

Educational Implications

- Teacher education institutions must integrate AI Literacy Modules within B.Ed./D.El.Ed. curricula.
- Strengthening both conceptual understanding and application-based competencies may enhance trainees' readiness to effectively utilize AI in future educational practices.
- Workshops and hands-on practice sessions should be conducted for AI tool training.
- AI-based lesson planning and assessment tools should be embedded into teaching practice supervision.
- Institutions should provide access to licensed AI platforms to ensure ethical and effective usage.

Conclusion

The results reflect that the trainees use AI tools occasionally, although there is a strong preference for chatbot-based applications over more advanced or pedagogy-oriented AI tools. This pattern therefore suggests an emerging but unequal use of AI technologies, emphasizing targeted training and guided practice as necessities that could trigger increased and pedagogically relevant frequencies of using AI tools in teacher-education institutions. In line with this assertion, the findings are supported by previous research which shows that teacher trainees often understand AI at a conceptual level but without practical application. Awareness seems to have a moderate rise because of exposures through social media and coursework, but low usage indicates a gap between awareness and actual classroom integration. Of particular note, the significant relationship between awareness and usage supports the Technology Acceptance Model's proposition that knowledge influences adoption. These findings emphasize that the enhancement of AI awareness should be done through a systematic approach in training, orientation initiatives, and through the curriculum. Enhancing trainees' conceptual and practical understanding of AI should increase and improve the use of AI tools with the possibility of enabling meaningful technology integration in teacher education and related learning environments. This study concludes that pre-service teacher trainees demonstrated moderate awareness but low-to-moderate use of AI tools; their awareness significantly influences their usage behavior, reinforcing the value of training and structured exposure. With the preparation of future teachers for AI-enhanced classrooms in view, strengthening AI integration within teacher education will be important.

REFERENCES

- Alam, M. A. (2025). *AI and Teachers' Professional Development: Enabling Educators for Sustainable Pedagogical Approaches.* In J. Ahamad et al. (Eds.), Artificial Intelligence for Education and Sustainability. (pp.204-214). Notion Press.com.
- Alam, M. A. (2024). Future Skills and Artificial Intelligence (AI) Literacy for Teachers: An Analysis, *Bhartiyam International Journal of Education & Research* (A quarterly Peer Reviewed International Journal of Research & Education), *13*(3), 1-17.
- Alam, M. A. (2024). *Artificial Intelligence in Higher Education Research and Development: A Review of Tools and Applications.* In S. Singh et.al (Eds.), Role of ICT & Educational Technology in Higher Education, (pp.23-35). Gonda: Surya Multidisciplinary Publication.
- Chen, L., & Chan, C. (2021). Pre-service teachers' acceptance of AI-based learning technologies. *Journal of Educational Technology &*

Society, 24(3), 45–58.

- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.
- Holmes, W., Bialik, M., & Fadel, C. (2022). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- Pandey, R., & Singh, A. (2023). AI awareness among pre-service teachers in India: A survey-based analysis. *Indian Journal of Teacher Education, 17*(1), 51-62.
- UNESCO. (2018). *Digital literacy for educators: Framework and guidelines*. UNESCO Publishing.
- Zawacki-Richter, O., Marín, V., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education, 16*(1), 1-27.