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Integrating Artificial Intelligence in Teacher Education: A Study of Teacher Educators' Awareness, Attitudes and Perceptions

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Abstract

Artificial Intelligence (AI) is increasingly influencing contemporary education by transforming teaching-learning processes, assessment practices, instructional planning, and educational administration. In teacher education, the effective integration of AI largely depends on teacher educators' awareness, attitudes, and perceptions regarding AI technologies and their pedagogical applications. The present study aimed to assess the awareness, attitude, and perception of teacher educators toward the integration of Artificial Intelligence in teacher education.

The study adopted a quantitative approach using the descriptive survey method. A sample of 200 teacher educators from government, aided, and private teacher education institutions in Odisha was selected through stratified random sampling. Data were collected using a researcher-developed structured questionnaire consisting of awareness, attitude, and perception scales. The tool was validated by experts, and reliability was established through Cronbach's Alpha method. The collected data were analyzed using percentage analysis.

The findings revealed that a majority of teacher educators possessed high awareness regarding AI concepts and educational applications. Most respondents demonstrated positive attitudes toward the integration of AI in teaching-learning processes, learner assessment, instructional planning, and academic administration. The study further indicated that teacher educators held favorable perceptions regarding the potential of AI to support personalized learning and improve educational effectiveness. However, concerns related to professional training, technological infrastructure, ethical issues, and data privacy were also identified.

The study concludes that teacher educators are gradually developing readiness toward AI integration in education. It emphasizes the need for continuous professional development programmes, institutional support, AI literacy, and ethical guidelines to ensure effective and responsible integration of Artificial Intelligence in teacher education.

Keywords: Artificial Intelligence, Teacher Education, Teacher Educators, Awareness, Attitude, Perception, AI Integration, Educational Technology, Professional Development.

Introduction

Artificial Intelligence (AI) is rapidly transforming the field of education by influencing teaching-learning processes, assessment practices, instructional planning, and educational administration. AI technologies such as intelligent tutoring systems, adaptive learning platforms, automated assessment tools, chatbots, and learning analytics are increasingly being integrated into educational settings to improve learning outcomes and instructional effectiveness (Holmes, Bialik, & Fadel, 2019).

In teacher education, teacher educators play a significant role in preparing future teachers to function effectively in technology-enabled classrooms. The successful integration of AI in teacher education depends largely on the awareness, attitudes, and perceptions of teacher educators regarding AI technologies and their pedagogical applications. Awareness refers to understanding AI concepts and applications, attitude reflects willingness to adopt AI-based practices, and perception relates to beliefs about the opportunities and challenges associated with AI integration.

Recent studies have shown that educators generally demonstrate positive attitudes toward AI integration, particularly in areas such as personalized learning, learner assessment, and instructional support (Salas-Pilco et al., 2022; Xue et al., 2024). However, challenges such as lack of professional training, inadequate infrastructure, ethical concerns, and data privacy issues continue to affect effective implementation of AI in educational institutions (Selwyn, 2019).

In the Indian context, the National Education Policy (NEP) 2020 emphasizes the integration of technology and Artificial Intelligence to promote innovation, digital literacy, and twenty-first-century skills among learners. Therefore, teacher education institutions are expected to equip teacher educators and prospective teachers with AI-related competencies.

Against this background, the present study aims to assess the awareness, attitude, and perception of teacher educators regarding Artificial Intelligence in teacher education and examine their preparedness for AI integration in educational practices.

Review of Literature

Artificial Intelligence (AI) has emerged as a major area of educational research across the world. Researchers have increasingly examined educators' awareness, attitudes, perceptions, preparedness, and challenges related to AI integration in educational practices. AI technologies such as intelligent tutoring systems, adaptive learning platforms, automated assessment tools, chatbots, and learning analytics are considered effective for improving personalized learning, instructional planning, learner engagement, and academic administration.

International studies indicate that educators generally recognize the pedagogical benefits of AI integration. Salas-Pilco, Xiao, and Hu (2022) reported that AI supports inclusive and personalized learning environments, although concerns regarding ethics, professional training, and technological preparedness continue to exist. Similarly, Celik, Ibrahim Celik et al. (2022) observed that AI enhances instructional efficiency and learner analytics but also creates concerns related to privacy, reduced human interaction, and teachers' professional readiness.

Zawacki-Richter et al. (2019) emphasized the need for teacher-focused AI training programmes in higher education institutions. Their study highlighted that most AI-related research concentrates on technological development rather than educators' pedagogical preparedness. Likewise, Zhou (2024) and Xue, Ying Xue, Ghazali, and Mahat (2024) found that teachers generally demonstrate positive attitudes toward AI integration, while technological self-efficacy, institutional support, and perceived usefulness significantly influence AI adoption in education.

Recent studies on Generative Artificial Intelligence have also attracted considerable academic attention. Ghimire, Prather, and Edwards (2024) reported that educators possess growing awareness and favorable attitudes toward

AI-assisted teaching-learning practices and instructional design. Similarly Oh and Ahn (2024) observed that teachers perceive AI as useful for automating administrative tasks, supporting personalized learning, and enhancing classroom efficiency, although ethical and socio-emotional concerns regarding teaching remain significant.

In the Indian context, the integration of Artificial Intelligence in education has gained momentum following the implementation of the Ministry of Education, Government of India National Education Policy (NEP) 2020, which emphasizes digital transformation, innovation, and technology-enabled learning. Indian researchers have increasingly explored educators' awareness, preparedness, perceptions, and attitudes regarding AI integration in schools and teacher education institutions.

Singh and Miah (2023) found that Indian teachers generally possess positive attitudes toward AI-based instructional tools and perceive AI as beneficial for classroom engagement and personalized learning. However, the study also identified inadequate professional training and infrastructural limitations as major barriers to AI implementation.

Similarly, Sharma and Joshi (2022) observed that educators with higher digital literacy and technological exposure demonstrate more favorable perceptions toward AI integration in education. Their findings further indicated that younger teachers and those possessing higher professional qualifications such as M.Ed. and Ph.D. showed greater readiness for adopting AI-supported pedagogical practices.

Kumar and Kaur (2023) reported that AI technologies improve administrative efficiency, learner assessment, and individualized instruction in Indian educational institutions. However, the researchers highlighted concerns related to data privacy, ethical issues, lack of infrastructure, and insufficient institutional support, especially in rural and semi-urban institutions.

Recent Indian studies have further expanded understanding of AI integration in teacher education. Ambika and Priya (2026) investigated prospective teachers' attitudes toward AI tools in teacher education and found that student teachers generally possessed favorable attitudes toward AI-supported teaching-learning practices. The study emphasized that positive attitudes were associated with digital competence and exposure to educational technologies.

Likewise, Arumugam (2026) examined student teachers' perceptions and preparedness regarding AI integration in curriculum planning. The findings revealed that student teachers considered AI beneficial for lesson planning, instructional innovation, and academic management, although concerns regarding technical training and ethical use persisted.

Bhattacharya et al. (2025) conducted a comprehensive mixed-methods study on Indian educators' perceptions and attitudes toward augmented reality and AI-supported applications in school education. The study found that educators generally perceived emerging technologies positively and considered them useful for enhancing classroom engagement, learner motivation, and interactive learning experiences.

Similarly, Biswal, Gorain, and Pallai (2026) examined students' perspectives regarding AI's role in teaching and learning. Their study revealed that learners viewed AI as supportive for personalized instruction, academic assistance, and digital learning environments, while also expressing concerns about overdependence on technology and reduced teacher-student interaction.

Verma and Singh (2024) emphasized the importance of AI literacy and continuous professional development programmes in teacher education curricula. The researchers recommended integrating AI-related competencies, digital pedagogy, and ethical awareness into teacher education programmes to prepare future teachers for technology-enabled classrooms.

Overall, the reviewed literature suggests that educators and teacher educators generally possess positive awareness and attitudes toward Artificial Intelligence integration in education. Although several studies have

examined teachers' attitudes toward AI integration, limited empirical research has focused specifically on teacher educators in Odisha. Further, few studies have simultaneously examined awareness, attitude, and perception dimensions in teacher education institutions.

Conceptual Framework of the Study

The present study is based on the Technology Acceptance Model developed by Fred Davis (1989). The model explains that users' acceptance of technology is influenced by their perceptions regarding its usefulness and ease of use, which subsequently shape their attitudes and behavioral intentions toward technology adoption.

In the context of the present study, teacher educators' awareness regarding Artificial Intelligence serves as a foundational factor influencing their attitudes and perceptions toward AI integration in teacher education. Higher awareness regarding AI concepts and applications may positively influence the perceived usefulness and acceptance of AI-supported educational practices. Positive attitudes and favorable perceptions further contribute to readiness for integrating Artificial Intelligence into teaching-learning processes, learner assessment, instructional planning, and educational administration. The conceptual framework assumes that awareness, attitude, and perception are interrelated dimensions that collectively influence teacher educators' preparedness for AI integration in education.

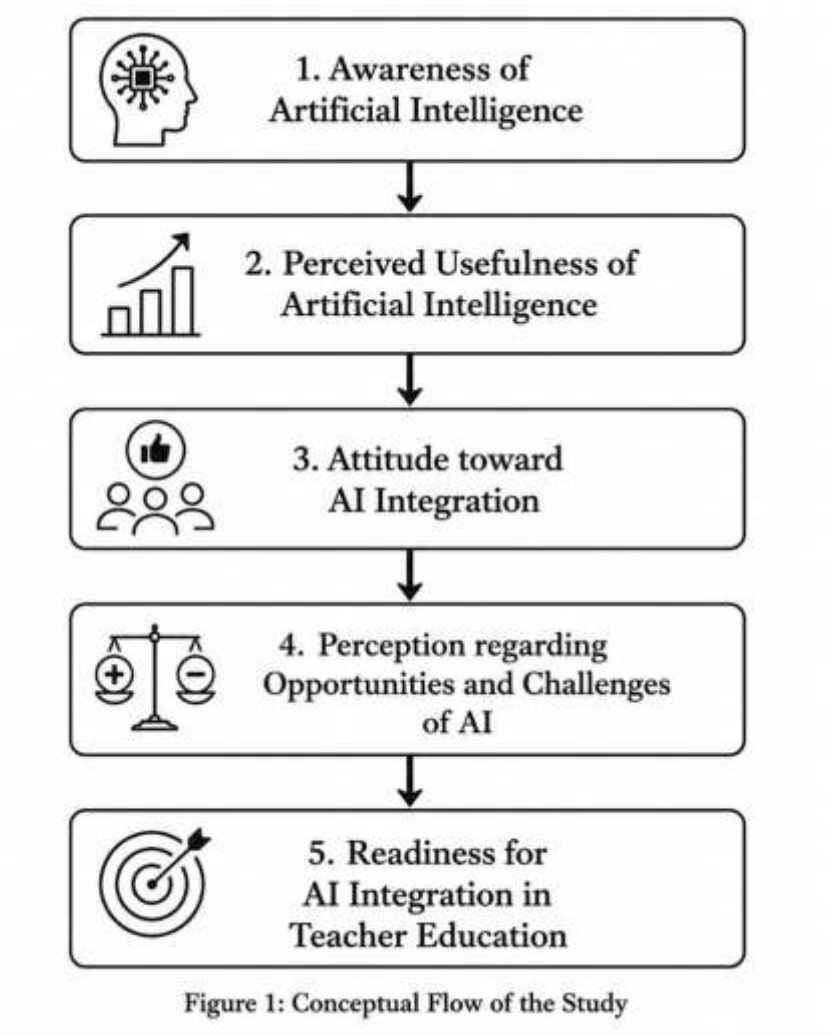

Figure 1: Conceptual Flow of the Study

Research Objectives

1. To assess the level of awareness of teacher educators regarding Artificial Intelligence and its educational applications.

2. To study the attitude of teacher educators toward the integration of Artificial Intelligence in teacher education.
3. To examine the perception of teacher educators regarding the integration of Artificial Intelligence in teacher education.

Hypotheses of the Study

H1: Teacher educators possess a positive level of awareness regarding Artificial Intelligence and its educational applications.

H2: *Teacher educators possess a positive attitude toward the integration of Artificial Intelligence in teacher education.*

H3: *Teacher educators possess a positive perception regarding the integration of Artificial Intelligence in teacher education.*

Methodology

The present study adopted a quantitative approach using the descriptive survey method to investigate teacher educators' awareness, attitude, and perception regarding the integration of Artificial Intelligence in teacher education. The descriptive survey method was considered appropriate because it facilitates the systematic collection and analysis of data related to existing educational conditions, opinions, and practices among teacher educators.

Research Design

The study employed a descriptive survey research design. The design was used to assess the level of awareness, attitude, and perception of teacher educators toward Artificial Intelligence and its educational applications. It also enabled the researcher to study the existing status of AI integration in teacher education and analyze responses based on selected demographic variables.

Population of the Study

The population of the study consisted of teacher educators working in teacher education institutions offering B.Ed., M.Ed., and related teacher education programmes in Odisha.. The population included teacher educators from government, aided and private institutions.

Sample and Sampling Technique

A sample of 200 teacher educators was selected for the study. The respondents were selected through stratified random sampling technique to ensure proper representation of teacher educators based on gender, educational qualification, teaching experience, and institutional type.

Research Tool

Data for the study were collected using a structured questionnaire developed by the researcher after an extensive review of related literature and existing studies on Artificial Intelligence in education. The questionnaire consisted of four sections:

1. **Personal Information Section:**
   This section included demographic variables such as gender, educational qualification, teaching experience, institutional type, and technological exposure.
2. **Awareness Scale:**
   This section measured the level of awareness of teacher educators regarding Artificial Intelligence concepts, tools, and educational applications.

3. **Attitude Scale:**

This section assessed the attitudes of teacher educators toward the integration of Artificial Intelligence in teacher education using a five-point Likert scale ranging from Strongly Agree to Strongly Disagree.

4. **Perception Scale:**

This section examined teacher educators' perceptions regarding the opportunities, challenges, ethical issues, and future implications of Artificial Intelligence in education.

Validity and Reliability of the Tool

To ensure content validity, the draft questionnaire was reviewed by experts in teacher education, educational technology, and research methodology. Necessary modifications and refinements were made based on their suggestions to improve clarity, relevance, and appropriateness of the items.

A pilot study was conducted on a small group of teacher educators to test the reliability and usability of the instrument. The reliability coefficient obtained through Cronbach's Alpha was 0.84, indicating good internal consistency.

Data Collection Procedure

The researcher collected data from teacher educators through both online and offline modes. Prior permission was obtained from the concerned institutions before administering the questionnaire. The respondents were informed about the objectives and purpose of the study and were assured that their responses would remain confidential and would be used only for academic and research purposes. Ethical considerations were maintained throughout the study. Participation was voluntary, and confidentiality of responses was ensured.

The completed questionnaires were collected, screened, and organized systematically for analysis. The collected data were analyzed using percentage analysis to interpret the awareness, attitude, and perception levels of teacher educators regarding Artificial Intelligence in teacher education.

Results and analysis:

Table-1: Level of Awareness regarding Artificial Intelligence among Teacher Educators

Level of Awareness	N	Percentage (%)
High Awareness	148	74

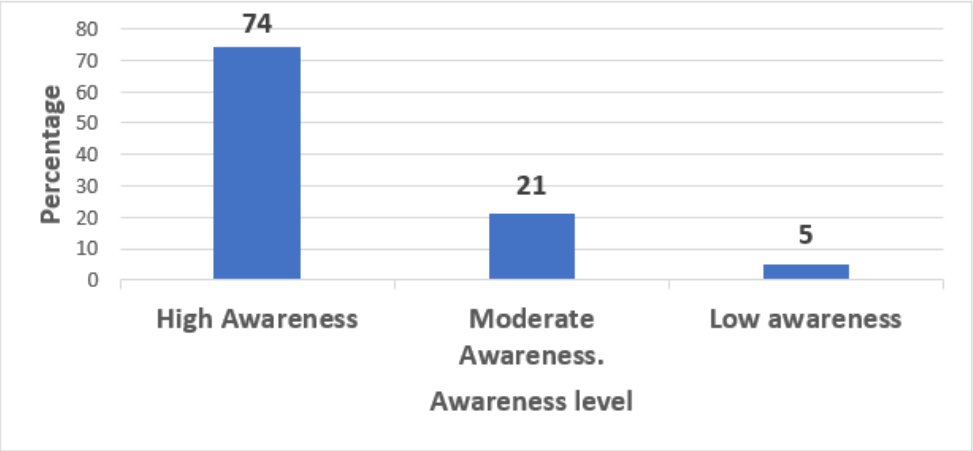

Figure-2: Graph showing Percentage Level of Awareness regarding Artificial Intelligence among Teacher Educators

Moderate Awareness.	42	21
Low awareness	10	05
Total	200	100

The findings revealed that 74% of teacher educators possessed a high level of awareness regarding Artificial Intelligence and its educational applications. This indicates that most teacher educators are familiar with AI concepts and educational uses. Thus, the descriptive findings indicate a positive trend.

Table-2: Level of Attitude toward AI Integration among Teacher Educators

Level of attitude	N	Percentage (%)
High positive attitude	156	78
Moderately positive attitude	34	17
Negative/Uncertain Attitude	10	05
Total	200	100

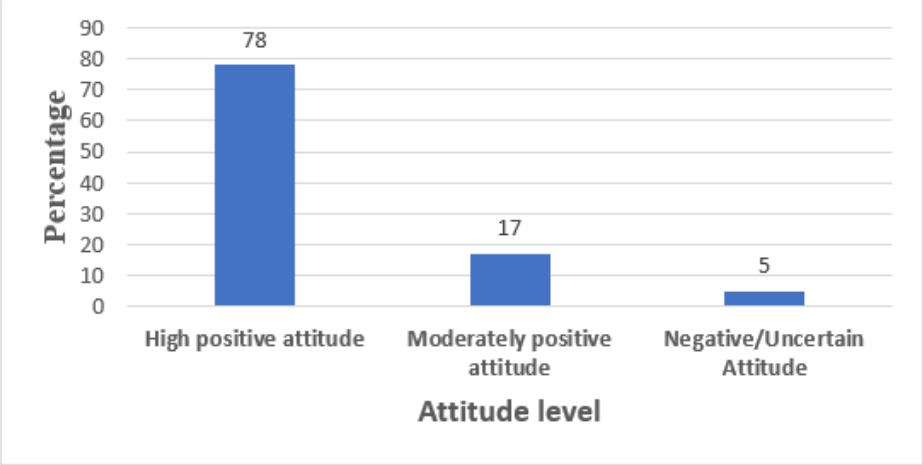

Figure-3: Graph showing Percentage Level of Attitude toward AI Integration among Teacher Educators

The analysis showed that 78% of teacher educators demonstrated a highly positive attitude toward AI integration in teacher education. The findings suggest that teacher educators are favorable toward the adoption of AI technologies in teaching-learning processes. Therefore, the descriptive results support the hypothesis.

Table-3: Perception regarding AI Integration among Teacher Educators

Level of Perception	N	Percentage (%)
Positive perception	152	76
Moderately positive perception	38	19
Concerns or negative perception	10	05
Total	200	100

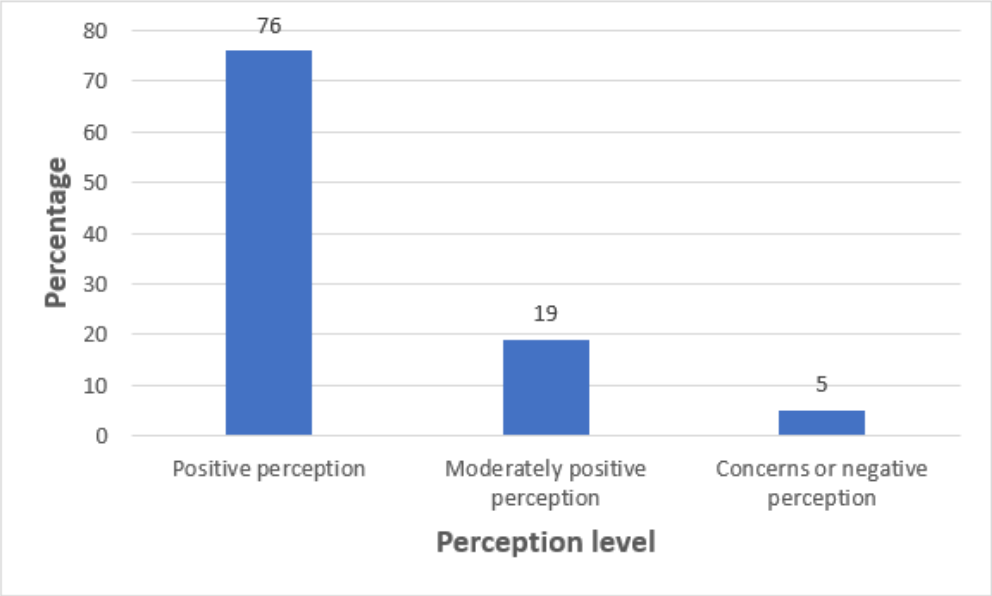

Figure-4: **Graph showing Percentage Level of perception toward AI Integration among Teacher Educators**

The study revealed that 76% of respondents held positive perceptions regarding the opportunities and challenges associated with Artificial Intelligence in education. This indicates an overall optimistic perception toward AI integration among teacher educators. Hence, the descriptive findings support the hypothesis.

Discussion

The present study examined the awareness, attitude, and perception of teacher educators regarding the integration of Artificial Intelligence (AI) in teacher education. The findings revealed that most teacher educators possessed high awareness, positive attitudes, and favorable perceptions toward AI and its educational applications. The results suggest that teacher educators are increasingly recognizing the educational significance of AI in teaching-learning processes, learner assessment, instructional planning, and academic administration.

The study revealed that 74% of the respondents demonstrated a high level of awareness regarding AI concepts and applications in education. This finding indicates that teacher educators are becoming familiar with emerging AI technologies such as intelligent tutoring systems, adaptive learning platforms, automated assessment tools, and AI-supported instructional practices. The growing exposure to digital technologies, online learning platforms, and national educational policies emphasizing technology integration may have contributed to this increased awareness. These findings are consistent with the studies conducted by Salas-Pilco et al. (2022), Ghimire et al. (2024), and Vaghrodia and Raval (2024), which reported that educators generally possess growing awareness regarding AI applications in education.

The findings further showed that 78% of teacher educators demonstrated highly positive attitudes toward AI integration in teacher education. This suggests that teacher educators are willing to adopt AI-supported technologies for enhancing instructional effectiveness, learner engagement, assessment, and academic management. The positive attitude toward AI may be associated with the perceived usefulness and efficiency of AI tools in educational settings. The findings support the Technology Acceptance Model proposed by Fred Davis

(1989), which explains that perceived usefulness and ease of use influence technology acceptance behavior. Similar findings were reported by Teo (2011) and Yue et al. (2024), who observed that teachers' attitudes and technological readiness significantly influence the adoption of AI-supported educational practices.

The study also revealed that 76% of respondents possessed positive perceptions regarding the opportunities and challenges associated with AI in education. Teacher educators perceived AI as beneficial for promoting personalized learning, improving teaching efficiency, and supporting academic administration. At the same time, respondents expressed concerns regarding ethical issues, data privacy, inadequate infrastructure, and lack of professional training. These findings indicate that although teacher educators are optimistic about AI integration, successful implementation requires institutional preparedness and responsible use of technology. Similar concerns were highlighted in the studies conducted by Celik et al. (2022), Neil Selwyn (2019), and UNESCO (2021).

Overall, the findings of the study indicate that teacher educators in Odisha are gradually developing readiness toward AI integration in teacher education. The results emphasize the importance of strengthening AI literacy, professional development programmes, technological infrastructure, and ethical awareness to ensure effective integration of AI in educational practices.

Conclusion

The study concludes that teacher educators generally possess high awareness, positive attitudes and favorable perceptions regarding the integration of Artificial Intelligence in teacher education. Although AI is viewed as beneficial for improving teaching-learning processes and educational effectiveness, challenges related to infrastructure, professional training, ethics, and data privacy continue to influence its effective implementation. Therefore, systematic institutional support and AI-oriented professional development are essential for meaningful integration of AI in teacher education.

Educational Implications

The findings of the study have important implications for teacher education institutions, policymakers and curriculum planners. Since teacher educators demonstrated favorable orientations toward AI integration, teacher education programmes should incorporate AI literacy, digital pedagogy, and technology-enabled instructional practices into the curriculum. Professional development programmes and workshops should be organized to enhance teacher educators' competencies in using AI tools effectively and ethically. Educational institutions should also strengthen technological infrastructure and promote responsible use of AI in teaching-learning processes. Furthermore, policymakers should formulate clear ethical guidelines and support systems for integrating Artificial Intelligence into teacher education.

Limitations of the Study

The study was limited to teacher educators working in selected teacher education institutions in Odisha; therefore, the findings cannot be generalized to all teacher educators across India. The sample size was restricted to 200 respondents. The study adopted only a quantitative descriptive survey method and relied on

self-reported responses, which may involve personal bias. Additionally, the study focused only on awareness, attitude, and perception dimensions and did not examine actual classroom implementation of AI technologies.

Suggestions for Further Research

1. Similar studies may be conducted in other states and regions of India for broader generalization.
2. Comparative studies may be conducted across different demographic variables such as gender, qualification, teaching experience, and institutional type to examine differences in teacher educators' perspectives toward Artificial Intelligence integration in education.
3. Future research may employ mixed-method or experimental research designs to obtain deeper insights into AI integration in teacher education.
4. Studies may also examine the effectiveness of AI-based professional development programmes for teacher educators.
5. Further research may explore student teachers' readiness, competencies, and actual use of AI-supported teaching-learning practices.

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