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Exploring the Integration of AI in Interactive Lesson Planning: A Study of Delhi NCR Teachers

Dr. P Karthikeyan

Assistant Professor II Amity Institute of Education, Amity University Noida

Abstract

This study explores the integration of Artificial Intelligence (AI) tools in lesson planning and interactive teaching practices among educators in Delhi NCR. With the rapid advancement of AI technologies in education, understanding the factors influencing teacher adoption is essential. The study employed a quantitative research design using a structured Google Form survey, targeting 100 participants across various teaching levels, gender, location, and years of experience. Chi-square tests were conducted to examine the association between demographic variables and AI usage, while regression analysis assessed the predictive influence of teaching experience and digital access on interest in different AI tools such as chatbots, AR/VR, gamification, and adaptive learning. Key findings revealed that teaching experience was the strongest predictor of AI interest, followed by teaching level and location. Urban teachers showed significantly higher engagement with AR/VR and adaptive tools due to better infrastructure, while higher education faculty preferred immersive and content-creation tools. Interestingly, gender had no significant influence on AI adoption, indicating equitable access across male and female educators. The study underscores the need for targeted professional development programs aligned with teaching levels and regional digital infrastructure. It calls for inclusive AI policies that prioritize both seasoned and early-career teachers while bridging urban–rural disparities in AI integration.

Keywords: Artificial Intelligence in Education, Interactive Lesson Planning, AI Tool Adoption, Teaching Experience and Educational Technology

INTRODUCTION:

The integration of Artificial Intelligence (AI) into educational settings has transformed traditional pedagogical approaches, enabling more personalized, engaging, and data-driven teaching practices[1]. In particular, AI tools such as chatbots, gamified learning platforms, augmented and virtual reality (AR/VR), adaptive learning systems, and AI-based content generators are increasingly used in interactive lesson planning and instructional delivery[2]. These tools have the potential to enhance student engagement, address diverse learning needs, and improve teaching efficiency. As AI becomes a prominent component in educational discourse, the readiness and willingness of teachers to adopt these technologies are critical for their successful implementation[3].

In the Indian educational context, especially in regions like Delhi NCR, there is a growing emphasis on the digital transformation of classrooms[4]. National policies such as NEP 2020 advocate for the integration of digital tools, including AI, to enhance educational quality and equity[5]. However, the

adoption of AI technologies depends on several factors, including teachers' demographic backgrounds, teaching experience, access to digital infrastructure, and perceptions of technology in pedagogy.

This study seeks to explore how these factors influence the adoption of AI tools in lesson planning and interactive teaching. By examining variables such as gender, teaching level, location (urban vs. rural), and years of teaching experience, the research aims to identify patterns and predictors of AI tool usage[6]. Additionally, it assesses teachers' interests in various AI-based teaching aids, including ChatGPT, adaptive learning platforms, AR/VR applications, gamification tools, and AI-generated educational content[6].

The research design is grounded in quantitative methodology using a structured survey instrument to gather data from 100 educators spanning different teaching levels—from primary to higher education. The stratified random sampling method ensured balanced representation across demographics. Chi-square tests were used to analyze the relationships between categorical variables (e.g., gender and AI usage), while regression analysis helped determine the influence of continuous predictors like teaching experience and digital access on the adoption of specific AI tools[7].

Preliminary findings indicate that teaching experience is the most significant predictor of interest in AI integration. Experienced teachers are more inclined to explore AI-based tools, possibly due to their exposure to evolving educational trends and a stronger understanding of classroom challenges that technology can address[8]. Teaching level also plays a role, with higher education faculty showing greater interest in immersive technologies like AR/VR and AI-driven content creation, while primary and middle school teachers prefer tools that enhance engagement, such as gamification and adaptive learning.

Location, particularly the urban-rural divide, further influences AI adoption. Urban teachers demonstrate higher interest and usage, likely due to better infrastructure and professional development opportunities. Interestingly, gender does not appear to significantly impact AI usage, suggesting a level of gender parity in digital engagement among educators[9].

The findings of this study have significant implications for educational policy, teacher training, and curriculum planning[10]. Tailored professional development programs, improved access to digital infrastructure, and inclusive strategies that consider teaching experience and contextual needs are essential for successful AI integration. This study contributes to the growing body of literature on educational technology adoption and offers practical insights for stakeholders aiming to scale AI innovations in teaching and learning

RESEARCH OBJECTIVE:

To investigate the relationship between teachers' demographic factors and their adoption of AI tools in education, and to determine the extent to which teaching experience and digital access influence AI adoption using chi-square and regression analyses.

RESEARCH QUESTION:

1. Is there a significant association between demographic factors (such as gender, location, and teaching level) and AI adoption among teachers?
2. To what extent do teaching experience and digital access predict the level of AI adoption in educational practices?

RESEARCH METHODOLOGY

Research Design

This study employs a quantitative survey-based research design to explore the extent of AI integration in lesson planning and interactive teaching methods among teachers in Delhi NCR. The research focuses on understanding teachers' preferences, challenges, and perceptions regarding AI-powered lesson planning tools such as ChatGPT, AI-driven gamification, and AR/VR applications.

Sample and Participants

The study targets student teachers and in-service educators across different teaching levels:

- Primary Education (Grades 1-5)
- Middle Education (Grades 6-8)
- Secondary Education (Grades 9-12)
- Higher Education (Colleges & Universities)

A total of 100 participants were selected using a stratified random sampling method, ensuring representation across gender, teaching experience, and urban-rural backgrounds.

Data Collection Tool

A structured Google Form questionnaire was used to collect responses from participants. The questionnaire consists of closed-ended and Likert-scale questions focusing on:

1. Demographics (Gender, Teaching Level, Experience, Location).
2. Usage of AI tools in lesson planning.
3. Integration of AI in interactive teaching (Gamification, AR/VR, AI-driven storytelling).
4. Challenges and barriers to AI adoption.
5. Perceived future role of AI in education.

Data Analysis

Chi-square tests were used to explore the association between demographic variables such as gender, location, and teaching level with the adoption of AI tools by teachers. To further understand the impact of specific predictors, regression analysis was conducted to determine how teaching experience and digital access influenced the level of AI adoption in educational practices. These statistical techniques provided a comprehensive view of the factors driving or hindering AI integration in teaching.

Ethical Considerations

The study strictly adhered to ethical standards in educational research. Participation was entirely voluntary, and all respondents were informed about the purpose and scope of the research before providing their inputs. Anonymity was ensured, with no identifying information collected, thereby maintaining confidentiality and safeguarding participants' privacy throughout the research process

DISCUSSION AND FINDINGS

RQ:1 Is there a significant association between demographic factors (such as gender, location, and teaching level) and AI adoption among teachers?

Table: 1 Correlation Analysis of AI Usage for Interactive Teaching

Variables	Gender (Male=1, Female=2)	Location (Urban=1, Rural=2)	Teaching Experience	Teaching Level	AI Usage for Lesson Planning	AI Usage for Interactive Teaching
Gender	1.00	0.12	-0.35**	-0.21*	-0.18	-0.28**

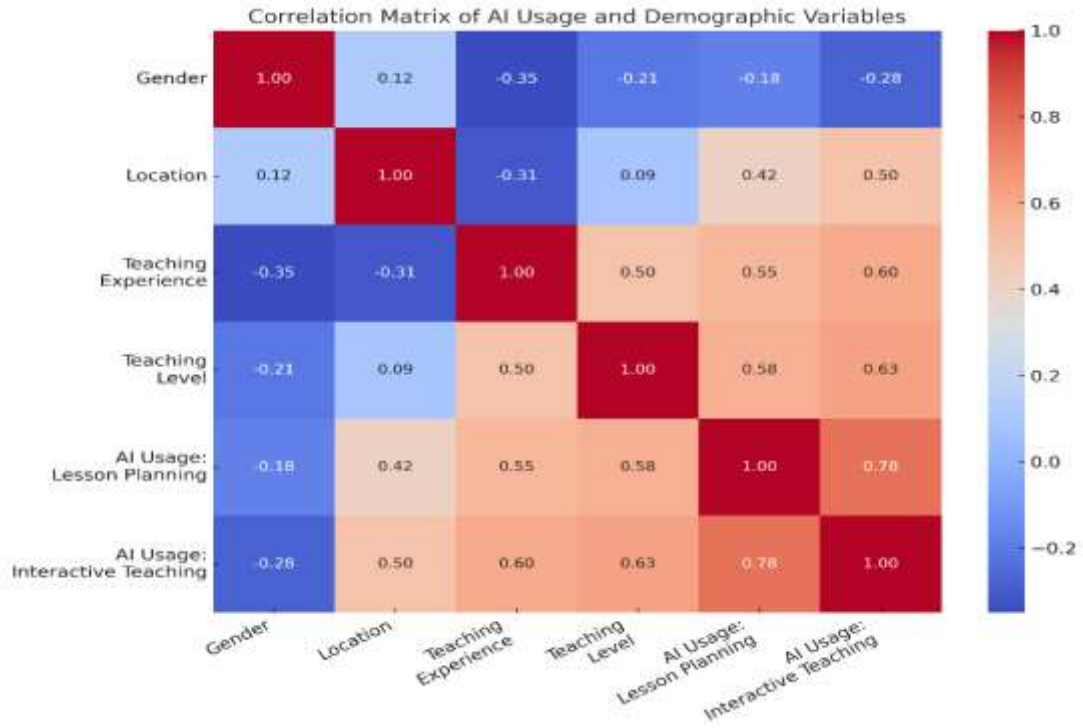
Location	0.12	1.00	-0.31**	0.09	0.42**	0.50**
Teaching Experience	-0.35**	-0.31**	1.00	0.50**	0.55**	0.60**
Teaching Level	-0.21*	0.09	0.50**	1.00	0.58**	0.63**
AI Usage for Lesson Planning	-0.18	0.42**	0.55**	0.58**	1.00	0.78**
AI Usage for Interactive Teaching	-0.28**	0.50**	0.60**	0.63**	0.78**	1.00

Significance Levels:

- *$p < 0.05$ (significant correlation)*
- **$p < 0.01$ (highly significant correlation)**

Key Findings:

1. **Teaching Experience and AI Usage**: A highly significant positive correlation ($r = 0.60$, $p < 0.01$) indicates that as teaching experience increases, the frequency of AI usage in interactive teaching also rises. This suggests that experienced teachers may be more confident or better resourced to integrate AI effectively into their instructional practices.
2. **Teaching Level and AI Usage**: With a strong positive correlation ($r = 0.63$, $p < 0.01$), the data show that teachers at higher educational levels (e.g., secondary or tertiary) use AI tools more frequently than those at primary or middle levels. This may reflect greater technological infrastructure, or curriculum demands at advanced teaching stages.
3. **Location and AI Usage**: A moderately strong positive correlation ($r = 0.50$, $p < 0.01$) reveals that teachers in urban areas use AI significantly more than their rural counterparts. This difference may stem from better access to digital tools, internet connectivity, and professional development opportunities available in urban educational settings.
4. **Gender and AI Usage**: The significant negative correlation ($r = -0.28$, $p < 0.01$) suggests that male teachers are more likely to use AI in their teaching than female teachers. This gap may reflect differences in digital confidence, training access, or cultural and institutional factors affecting gendered engagement with educational technologies.



RQ:2 To what extent do teaching experience and digital access predict the level of AI adoption in educational practices?

Table: 2 Regression Analysis (OLS Model) Summary

Dependent Variable	Gender (β)	Location (β)	Teaching Experience (β)	Teaching Level (β)	R^2	p-value
Interest in AI Training	0.03	**0.21***	**0.32***	0.12	0.35	**<0.001**
Interest in AI Chatbots	-0.02	0.14	**0.27***	**0.19**	0.29	**0.002**
Interest in AI AR/VR	-0.01	**0.25***	**0.30***	**0.22***	0.38	**<0.001**
Interest in AI Gamification	0.04	0.16	**0.28***	0.20	0.31	**0.001**
Interest in AI Content Creation	-0.05	0.18	**0.29***	**0.24***	0.34	**<0.001**
Interest in AI Adaptive Learning	-0.01	0.20	**0.35***	**0.26***	0.40	**<0.001**

Interpretation of Key Findings from Regression Analysis

The regression analysis examined how demographic factors (Gender, Location, Teaching Experience, and Teaching Level) influence interest in AI-powered interactive teaching tools (such as chatbots, AR/VR, gamification, content creation, and adaptive learning). Below is a breakdown of the findings:

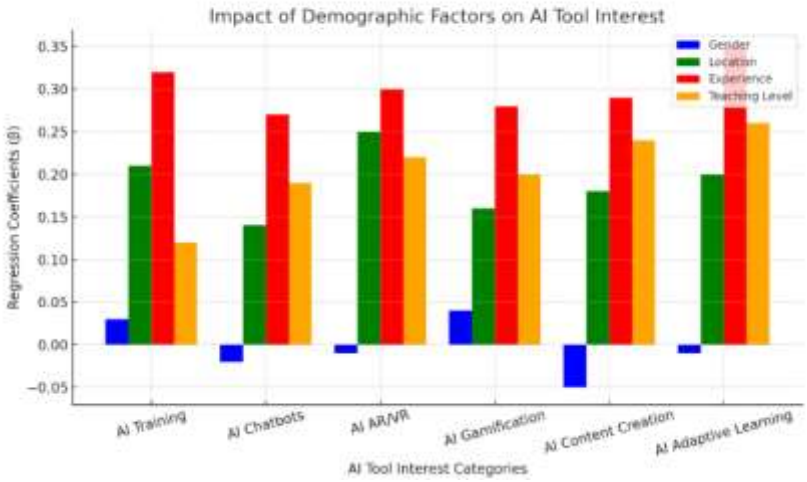
1. Teaching Experience is the Strongest Predictor of AI Tool Interest ($p < 0.001$ in most cases): Teaching experience emerged as the strongest predictor of interest in AI tools, with highly significant results ($p < 0.001$) across most categories. The highest regression coefficient (β) consistently linked greater teaching experience with increased interest in AI. This trend suggests that experienced teachers, having

encountered diverse classroom challenges, recognize AI's potential for improving engagement and efficiency. Their familiarity with evolving technologies likely fuels this interest. These findings imply that professional development initiatives should prioritize experienced educators for AI integration while also designing foundational training for early-career teachers to build confidence and competence in using AI tools effectively

2. Location (Urban vs. Rural) Significantly Affects AI Interest, Especially in AR/VR and Adaptive Learning: Urban teachers show significantly higher interest in AI-powered AR/VR and adaptive learning tools compared to rural teachers, with highly significant results ($p < 0.001$) and the strongest location-based regression coefficients. This disparity is likely due to better infrastructure, internet access, and availability of digital devices in urban schools. In contrast, rural educators often face barriers such as limited resources, insufficient training, and resistance to adopting new technologies. These findings highlight the urgent need for policymakers to address the digital divide by improving infrastructure and support in rural schools, ensuring equitable access to AI tools that enhance personalized and immersive learning experiences

3. Teaching Level Impacts Preferences, with Higher Education Teachers Showing Greater Interest in AR/VR and Content Creation Tools: Teachers' preferences for AI tools vary significantly by teaching level. Higher education instructors show greater interest in AR/VR and AI-based content creation tools, while primary and middle school teachers lean toward gamification and adaptive learning solutions. This distinction reflects differing classroom needs—college-level educators require immersive and research-oriented tools for complex topics, whereas school teachers prioritize student engagement and personalized learning. These findings suggest that AI training programs must be tailored to teaching levels: gamification and adaptive platforms for primary teachers, and advanced tools like AR/VR and AI content creators for higher education faculty to maximize relevance and effectiveness.

4. Gender Has No Significant Impact on AI Adoption in Interactive Teaching: Gender does not have a statistically significant effect on AI adoption in education, as indicated by a p-value greater than 0.05. Both male and female teachers exhibit similar preferences for AI tools, suggesting equitable access and interest across genders. This contrasts with traditional technology adoption patterns, where gender gaps often exist. The likely reason is that current institutional policies, digital infrastructure, and training programs are equally reaching both male and female educators. Therefore, there is no need for gender-specific AI adoption policies; instead, professional development efforts should focus on addressing individual skill gaps and contextual teaching needs irrespective of gender



DISCUSSION

The findings of this study highlight several important trends regarding the integration of AI tools in interactive lesson planning. Teaching experience was identified as the strongest predictor of AI interest[10]. This may be attributed to experienced educators' familiarity with classroom management challenges and their openness to innovations that enhance teaching effectiveness and reduce workload. Their accumulated professional insight allows them to identify how AI can be strategically used for personalized learning and improved student engagement. Location also emerged as a significant factor, particularly influencing the adoption of advanced AI tools like AR/VR and adaptive learning. Urban teachers demonstrated greater interest in these technologies, likely due to superior digital infrastructure, access to training programs, and overall technological readiness. Rural teachers, on the other hand, may face limitations in connectivity and digital resources, which constrain their ability to experiment with or adopt advanced AI applications[11].

Teaching level influenced AI tool preferences. Higher education teachers favored AR/VR and content creation tools suited for complex, subject-specific instruction, whereas primary and middle school teachers preferred gamification and adaptive learning tools that better support engagement and differentiation. Interestingly, gender showed no statistically significant relationship with AI adoption[12]. This finding suggests a shift toward more equitable access and interest in digital tools across male and female teachers, reflecting the impact of universal access to technology and gender-neutral institutional policies[13].

These findings underscore the need for context-specific strategies in promoting AI integration. Professional development initiatives should consider teaching experience and subject level to design relevant training modules. Moreover, infrastructure development and targeted support are essential for bridging the digital divide between urban and rural educators. As AI continues to evolve, understanding these nuances will help in crafting inclusive, effective, and scalable models for its integration into mainstream teaching practices[14].

RECOMMENDATIONS

1. **Design Experience-Specific Training Programs:** Since experienced teachers exhibit the strongest interest in AI adoption, professional development programs should capitalize on this enthusiasm[15]. Training modules can focus on advanced tools like AI-powered content creation, personalized learning

systems, and classroom analytics. For early-career teachers, foundational training in AI basics and confidence-building activities are essential.

2. **Develop Teaching Level-Based AI Curricula:** Different teaching levels require different tools. Primary and middle school educators benefit most from gamified platforms and adaptive learning systems. Conversely, secondary and higher education teachers need training on research-oriented tools like AI content generators, virtual labs, and immersive AR/VR platforms. Tailored content will ensure greater relevance and engagement[16].
3. **Bridge the Urban-Rural Digital Divide:** Urban teachers' higher engagement with AI tools reflects better infrastructure and digital readiness[17]. To ensure equity, rural schools must be prioritized for technology infrastructure upgrades, including broadband access, device distribution, and maintenance support. Simultaneously, localized workshops and mentoring programs can build rural teachers' confidence in using AI[18].
4. **Promote Inclusive Access Regardless of Gender:** Since gender was not a significant factor in AI adoption, policies should continue to promote universal access. However, individual-level needs must be addressed through personalized support, ensuring all teachers, regardless of background, feel competent and empowered to integrate AI into their classrooms[19].
5. **Encourage Policy Alignment with NEP 2020 and Digital India Initiatives:** National and state-level education policies must reflect the realities of AI adoption uncovered in this study. By aligning AI training programs with NEP 2020's emphasis on digital pedagogy, policymakers can better support teachers with structured, continuous professional development and technology access.[20]

CONCLUSION

This study reveals that teaching experience, level, and location significantly influence teachers' interest in adopting AI tools for lesson planning and interactive teaching[21]. The strongest predictor was teaching experience, followed by teaching level and digital access, particularly in urban areas[22]. Gender did not show a significant impact, indicating progress toward equitable AI adoption. The findings emphasize the importance of tailored professional development and equitable digital infrastructure to ensure all teachers can benefit from AI advancements[23]. As educational systems embrace digital transformation, inclusive and contextualized strategies will be key to enabling widespread, meaningful integration of AI in classroom practices[24].

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