Physical Education, Health and Social Sciences

https://journal-of-social-education.org

E-ISSN: 2958-5996

P-ISSN: 2958-5988

A Qualitative Case Study on the Experiences of Government School Teachers in Adopting AI Tools for Classroom Teaching: Insights from a Post-Workshop Survey

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DOI: https://doi.org/10.63163/jpehss.v3i3.646

Abstract

This research investigates the transformative potential of Artificial Intelligence (AI) in addressing persistent educational challenges in Pakistan. Despite constitutional mandates ensuring the right to education, the nation's schooling system remains marred by infrastructural decay, outdated pedagogy, and systemic inequities. Drawing on a successful pilot initiative titled *"The AI Assistant: Empowering Pakistan's Teachers in Low Resource Schools"(Dr Erum Hafeez & Zeenat Zehra, 2025)*, this study proposes a multi-dimensional framework for scaling AI-assisted learning. It explores the integration of AI to modernize curricula, support teachers, enhance inclusivity, and bridge digital divides. The paper presents policy recommendations, partnership models, and implementation strategies necessary for reimagining Pakistan's education system.

Keywords: AI, Teacher Training, Framework, Schools, Professional Development

Introduction

The integration of Artificial Intelligence in education is increasingly recognized as a transformative force in teaching and learning. While AI adoption has grown in developed education systems, its application in government school settings, particularly in developing countries, remains limited due to infrastructure, policy, and capacity challenges.

Problem Statement

In Khyber Pakhtunkhwa, government school teachers receive professional training primarily through DPD and RITE/PITE. However, very little emphasis has been placed on the use of Artificial Intelligence (AI) in teaching. As a result, the incorporation of AI tools into classroom teaching is largely absent, leaving teachers without the necessary orientation and strategies to effectively integrate AI into their teaching-learning processes.

Purpose of the Study

This study aims to examine the impact of a one-day "AI in Teaching" training workshop on government school teachers' knowledge, skills, attitudes, and readiness to adopt AI tools in their teaching.

Research Objectives

1. To assess the change in teachers' understanding of AI concepts after the workshop.
2. To explore teachers' confidence and readiness to apply AI in their classrooms.
3. To identify challenges and support needs for AI integration.
4. To provide recommendations for sustainable AI adoption in government schools.

Research Questions

1. How did the AI in Teaching workshop has influenced teacher's understanding of AI concepts and tools?
2. What challenges and support needs do teachers identify for integrating AI in their classrooms?
3. How do teachers perceive the usefulness and applicability of AI tools after the training?
4. To observe teachers' readiness in adopting Ai within the scope of their teaching?

Significance of the study

The findings of this study will inform policymakers, school administrators, and professional development institutes (such as DPD and RITE/PITE) about the effectiveness of Artificial Intelligence (AI) in teaching. They will also provide a way forward for incorporating AI into their respective educational environments, ensuring that teacher training and classroom practices evolve in line with emerging technological needs.

Literature Review

The integration of Artificial Intelligence (AI) in education has emerged as a transformative force, reshaping traditional pedagogical approaches and redefining teacher roles worldwide. With its potential to personalize learning, automate administrative tasks, and enhance instructional delivery, AI is increasingly being recognized as a critical driver of 21st-century education (Holmes et al., 2019). In Pakistan, however, the context presents unique challenges and opportunities. The Economic Survey of Pakistan (2025) reports that the literacy rate is 61% overall where male literacy stands at 68% and female literacy is still 52.8% of the total population, while strides have been made in expanding access to education, the integration of advanced digital technologies in schools is still restricted. The higher education sector has shown more experimentation with emerging technologies, yet adoption in government schools is significantly lagging. Globally, the AI in Education market is projected to surpass USD 20 billion by 2027 (MarketsandMarkets, 2022), reflecting the rapid pace at which countries are adopting AI-enabled solutions in schools and universities. This global trend underscores the urgency for Pakistan to align its education sector with international standards. According to the Oxford Insights (2023) AI Readiness Index, Pakistan ranked 117 out of 172 countries, indicating substantial gaps in preparedness compared to global leaders. Nations like China have made AI compulsory in middle school curricula (Zawacki-Richter et al., 2019), while the US has leveraged AI for adaptive learning and student performance analysis(Luckin, 2017). Despite ongoing governmental reforms and initiatives aimed at strengthening the education sector, there remains an urgent and unmet need to incorporate artificial intelligence (AI) into educational systems. AI integration can serve as a strategic complement to existing efforts, enable teachers to involve Ai tools in their teaching, managing their workload & preparing learners for the demands of a rapidly evolving digital economy

Research Methodology

Research Design

This study adopts a qualitative case study approach with phenomenological elements. The case is defined as a one-day AI training workshop conducted for government school teachers from approximately 100 schools of town 4 in District Peshawar. Two different circles of primary schools were invited for training on 15th & 16th august 2025 out which 85 teachers participated in the survey. The phenomenological dimension is included to capture the *lived experiences, perceptions, and attitudes* of teachers towards AI in education following the workshop.

This design is suitable because:

- The workshop is a bounded system in time and context.

- The aim is to gain an in-depth understanding of teachers' perspectives rather than to test hypotheses.
- The study focuses on both practical application outcomes and the subjective meaning teachers attach to the training.

Research Questions

1. How did the AI training workshop influence teacher's understanding of AI concepts and tools?
2. What challenges and support needs do teachers identify for integrating AI in their classrooms?
3. How do teachers perceive the usefulness and applicability of AI tools after the training?
4. Which themes emerge regarding teachers' confidence, motivation, and readiness to adopt AI?

Participants

The participants were government school teachers from diverse backgrounds, representing up to fifty schools.

They varied in prior exposure to technology:

- Some were highly familiar with digital tools.
- Some had limited experience.
- Others were encountering AI for the first time.

Participation was voluntary, and responses were anonymous to encourage honest feedback.

Data Collection

Instrument:

Data was collected through a Post-Workshop Survey designed to measure five domains:

1. General Understanding – baseline familiarity and knowledge gain.
2. Skill Application – ability and readiness to use AI tools.
3. Attitude & Motivation – willingness to integrate AI in teaching.
4. Challenges & Support – barriers and needs for implementation.
5. Reflection – perceived value and improvement suggestions.

The survey combined:

- Closed-ended questions (Likert scales, multiple choice) for contextual patterns.
- Open-ended questions for qualitative depth.

Procedure:

- The survey was administered immediately after the workshop.
- Teachers completed the form in written format on-site for the first day of training.
- While teachers who attended training next day participated in completing their survey forms digitally.

Data Analysis

After the training workshop, teachers were asked to complete a structured post-workshop survey. The survey was designed around five key fields that reflected the focus areas of the study:

- General Understanding of AI
- Skill Application
- Attitudes and Motivation
- Challenges and Support Required
- Open-Ended Reflections

To analyse the responses, I adopted the Framework Analysis approach, which is especially suitable for applied qualitative research in education. This method provided a systematic way

to organize the survey data while allowing both numerical summaries and thematic insights to emerge.

The process followed in this study included the following stages:

1. **Familiarization**
   After collecting the survey forms, I carefully reviewed the responses to gain an overall sense of teachers' views and experiences regarding artificial intelligence (AI) in teaching.
2. **Identifying a Thematic Framework**
   Since the survey was already structured around the five key fields, these themes formed the basis of the analytical framework.
3. **Indexing(Coding)**
   Teachers' responses were categorized according to the predefined themes. For example, responses about increased confidence in using AI tools were indexed under "Skill Application," while difficulties such as lack of internet were coded under "Challenges."
4. **Charting**
   All the responses were then compiled in an Excel file, which made it easier to organize the data into tables. Each table summarized the responses in terms of frequency and percentages.
5. **Mapping and Interpretation**
   The summarized data were further represented in graphical form (charts and figures) to highlight patterns, trends, and comparisons across the five thematic areas. This step led me to interpret not only the quantifiable outcomes (such as percentage growth in understanding) but also the qualitative insights shared in open-ended responses.

By following this structured Framework Analysis, the study demonstrates both the quantitative outcomes of the workshop (e.g., knowledge gain, improved confidence, intention to integrate AI) and the qualitative depth of teachers' reflections (e.g., requests for advanced training and longer workshops).

Ethical Considerations

- Participants involved in the survey filled their forms with their consent.
- Data was stored securely and used solely for academic purposes.
- No personally identifiable information was published.

Summary

This methodology ensures:

- Rich, context-specific understanding of teachers' workshop experiences.
- Systematic analysis using Framework Analysis to identify actionable themes.
- Balanced consideration of both the measurable and experiential outcomes of the AI training.

Data Presentation & Analysis

Introduction

This chapter presents the results of the post-workshop survey administered to 85 government school teachers who participated in the AI training program. The data were analysed using Framework Analysis, grouping responses into the following thematic areas:

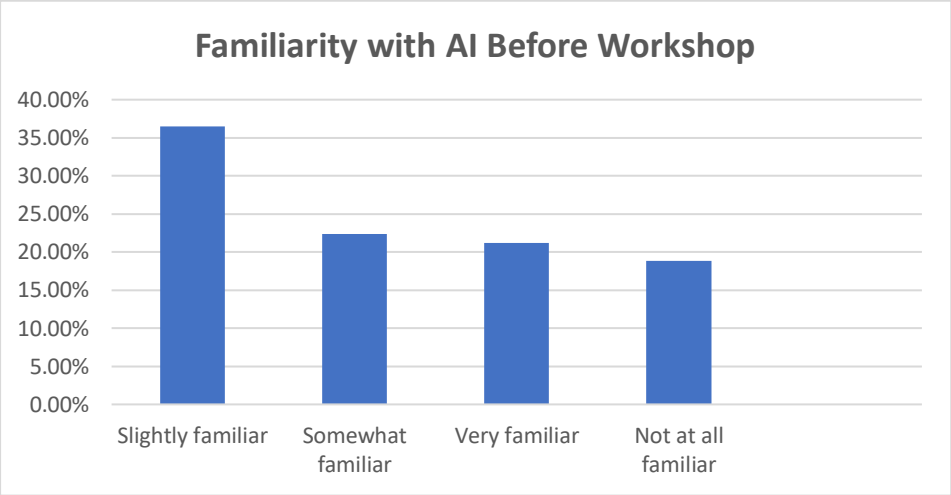
1. General Understanding of AI
2. Skill Application
3. Attitudes and Motivation
4. Challenges & Support Required
5. Open-Ended Reflections

General Understanding of AI

Table 1: Familiarity with AI Before Workshop

Familiarity Level	No. of Teachers	Percentage
Slightly familiar	31	36.5%
Somewhat familiar	19	22.4%
Very familiar	18	21.2%
Not at all familiar	16	18.8%
Total	85	100%

Figure 4.1:



Most teachers reported being slightly familiar (36.5%) with AI, while 18.8% had no familiarity at all. Only 21.2% entered the workshop already very familiar with AI.

Table 2: Understanding of AI concepts after the workshop

Rating	No. of Teachers	Percentage
1	0	0%
2	3	3.5%
3	13	15.3%
4	27	31.8%
5	41	48.2%
Total	85	100%

Note: (Scale: 1 = Very Poor, 5 = Excellent)

More than 80% rated their understanding as 4 or 5, showing a significant improvement in AI literacy after the workshop.

Most Commonly Learned New AI Tools/Concepts:

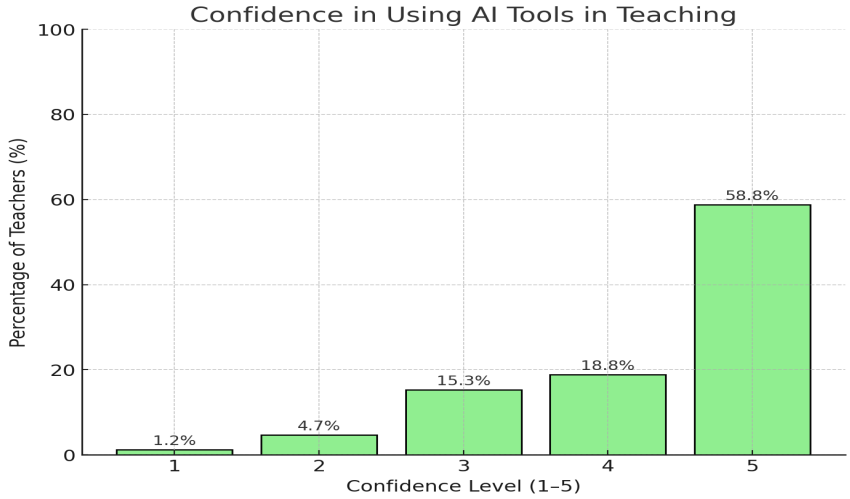
- Google Gemini (most frequent)
- Gamma.ai
- ChatGPT
- Meta AI

Skill Application

Table 3: Confidence in using at least one AI tool in teaching

Confidence Level (1–5)	No. of Teachers	Percentage
1	1	1.2%
2	4	4.7%
3	13	15.3%
4	16	18.8%
5	50	58.8%
Total	85	100%

Figure 4.2:

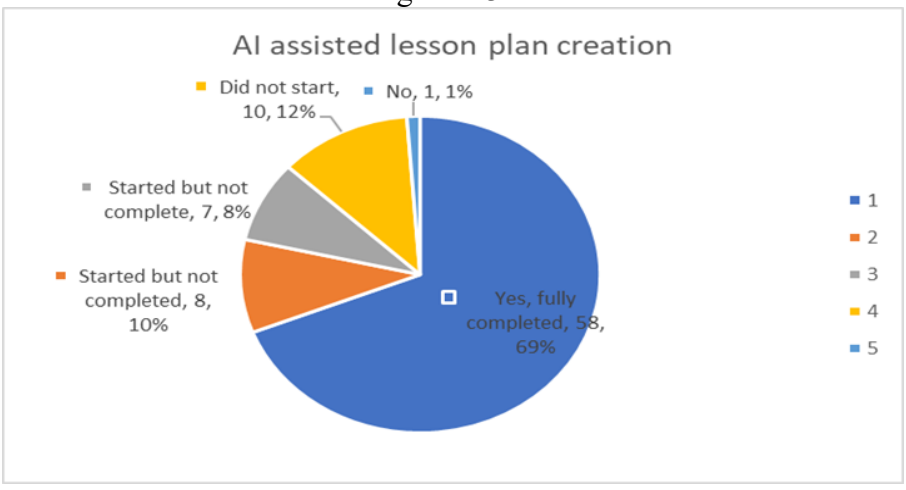


Over 77.6% (levels 4–5) expressed strong confidence in using at least one AI tool in teaching.

Table 4: AI-assisted lesson plan creation during the workshop

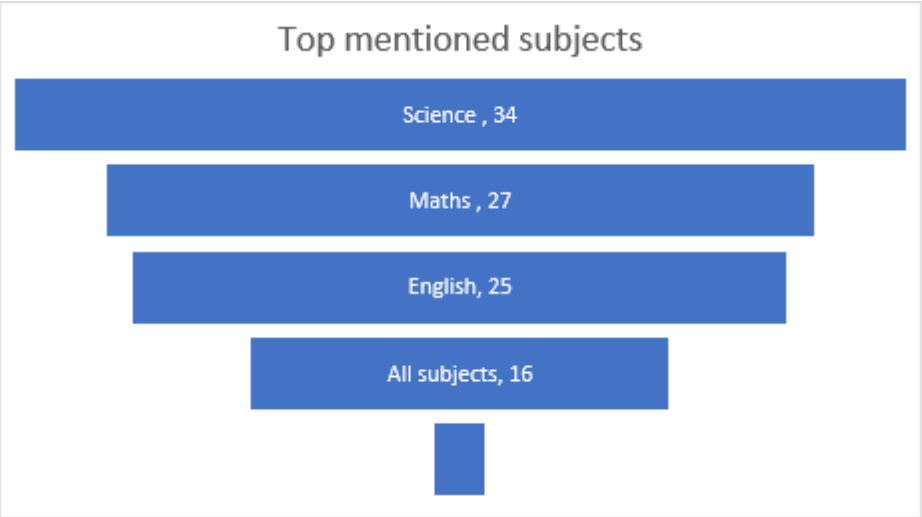
Response	No. of Teachers	Percentage
Yes, fully completed	58	68.2%
Started but not completed	8	9.4%
Started but not complete	7	8.2%
Did not start	10	11.8%
No	1	1.2%
Total	85	100%

Figure 4.3:



Almost 69% teachers successfully completed a lesson plan using AI during the workshop.

Fig 4.4 Subjects Teachers Plan to Enhance with AI Tools (Top Mentions):



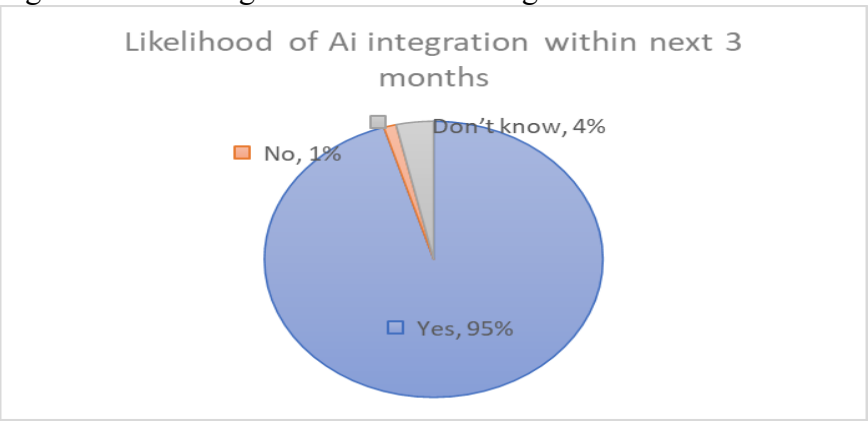
Above figure shows a list of top mentioned subjects to be enhanced with the help of Ai as mentioned by the teachers in the survey form.

Attitudes & Motivation

Table 5: Likelihood of integrating AI in next 3 months

Response	**No. of Teachers**	**Percentage**
Yes	80	94.1%
No	1	1.2%
Don't know	3	3.5%
Total	85	100%

Figure 4.5: showing likelihood of Ai integration for the next three months



A strong 95% intend to integrate AI into their teaching within three months.

Table 6: Change in opinion about AI in education

Response	**No. of Teachers**	**Percentage**
Yes, positively	83	97.6%
No change	1	1.2%
Yes, negatively	0	0%
Total	85	100%

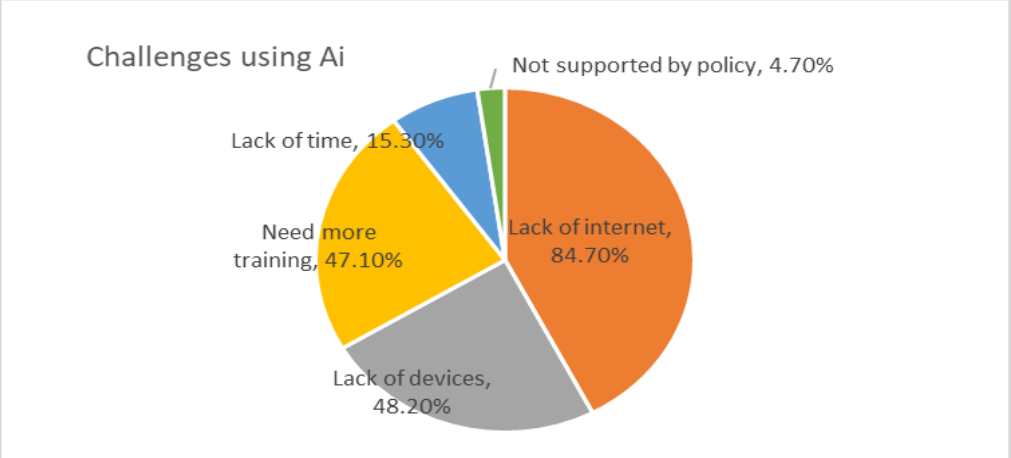
Almost 98% reported a positive change in perception about AI in education.

Challenges & Support Required

Table 7: Foreseen challenges in using AI

Challenge	Percentage
Lack of internet	84.7%
Lack of devices	48.2%
Need more training	47.1%
Lack of time	15.3%
Not supported by policy	4.7%

Figure 4.6:



Connectivity and devices emerged as the biggest constraints to AI adoption.

Additional training/support requested

- Advanced AI tool workshops (most requested)
- Continuous upskilling with Ai workshops

Open-Ended Reflections

Most Useful Part of Workshop:

- Practical demonstrations of AI tools
- Creating AI-assisted lesson plans
- Object detection using Ai
- Using AI for presentations and subject teaching

Suggestions for Improvement:

- Increase workshop duration from one day to two days
- Use of multimedia for the workshop
- More subject-specific AI examples
- More hands-on practice time

Summary of Key Findings

- Knowledge Growth: Teachers moved from low familiarity (18.8% "not at all") to strong understanding (80% rated 4 or 5 after).
- Practical Skills: Nearly 68% completed an AI-assisted lesson plan; over 77.6% confident using at least one tool.
- Positive Attitude: 97.6% reported a positive shift in perception of AI.
- Barriers: Internet access (84.7%) and lack of devices (48.2%) remain the greatest challenges.
- Support Needs: Teachers request more advanced, subject-specific, and hands-on AI training.

Discussion and Recommendations

Introduction

This chapter discusses the key findings from the post-workshop survey and framework analysis of the AI training program for government school teachers. The discussion connects the results to the research questions, existing literature, and the broader context of educational technology adoption in government schools.

Discussion of Findings

Improvement in General Understanding of AI

The survey results showed a marked increase in teachers' familiarity and understanding of AI concepts(Q1–Q3). Before the workshop, a significant proportion of teachers were "Not at all familiar" or "Slightly familiar" with AI, while post-workshop ratings showed 48% of total teachers have increased understanding of Ai concepts. The findings of this study provide valuable insights into the experiences of government school teachers in adopting AI tools for classroom teaching. Teachers demonstrated an encouraging level of general understanding of AI after the workshop, with most reporting that they were able to develop AI-assisted lesson plans. This aligns with findings from Holmes et al. (2019), who reported that hands-on, context-specific professional development significantly boosts technology adoption readiness among teachers.

Practical Skill Application

Many teachers reported successfully applying at least one AI tool during the workshop (Q4-Q6), with subjects like English, Science, and Mathematics most frequently mentioned for enhancement through AI. This immediate skill application reflects the experiential learning approach embedded in the training, consistent with Kolb's Learning Cycle (1984), where active experimentation consolidates new skills. However, some participants only began lesson plan creation but did not complete it, often citing limited time or no internet access at the time of workshop — suggesting that future workshops should allow for longer practice sessions.

Shift in Attitudes and Motivation

Teacher attitudes and motivation also emerged as critical factors. The majority expressed enthusiasm and recognized the potential of AI to improve lesson planning and classroom delivery. This mirrors global findings where teacher beliefs and attitudes are key determinants of successful technology adoption (Ertmer & Ottenbreit-Leftwich, 2010). Positive attitudes are likely to enhance sustainability of AI integration beyond initial training.

Structural Challenges

The most common challenges identified (Q9) were:

- Lack of internet access
- Shortage of digital devices
- Insufficient time in school schedules
- Need for ongoing training
- Limited policy support

These barriers echo findings from [Trucano (2013)] in rural ICT integration studies, highlighting the digital divide as a persistent obstacle in public education systems. Without addressing infrastructure and policy issues, even motivated and skilled teachers may struggle to sustain AI usage.

Support Needs

Teachers requested:

- Follow-up workshops
- More time for hands on practise

This is consistent with the concept of sustained professional development, which literature suggests is more effective than one-off sessions in producing lasting change (Darling-Hammond et al. (2017)).

Implications of Findings

For Teacher Professional Development

- Short-term gains in knowledge and confidence are possible with well-structured, practical training.
- Since there are professional developments trainings every month organised by Directorate of Professional Development (DPD), so embedding AI-focused training within DPD's existing professional development framework will create sustainability and consistency across schools in KPK.
- Collaboration between DPD and schools can help identify context-specific AI applications that suit local needs, making training more relevant and practical.

For Policy and School Leadership

- Infrastructure investment (internet, devices) is a prerequisite for AI adoption.
- School policies must explicitly support technology integration and provide teachers with dedicated time for lesson preparation using AI tools.

For Future AI Integration

- Introducing AI initially with a small set of user-friendly tools.
- Creating communities of practice among trained teachers may help share resources and troubleshoot challenges collectively.
- School leaders already working at primary school level could be involved to help teachers cope with challenges they encounter while using Ai tools during their teaching.
- Progress of teachers using Ai apps/tools could be monitored through Education monitoring authority staff during their monthly visits to evaluate the impact of Ai on classroom teaching.
- While the reports collected by Education monitoring authority would be used directly by DPD to custom design their future trainings for teacher using Ai within their teaching.

Recommendations

Training Design

1. Extend future workshops to 2–3 days to allow deeper exploration and practice.
2. Incorporate more subject-specific AI tool demonstrations.
3. Provide post-workshop online refresher modules.

Support and Resources

4. Develop printed and digital AI resource kits for teachers.
5. Establish peer-support or mentorship groups across schools.

Policy and Infrastructure

6. Advocate for improved internet connectivity in government schools.
7. Allocate dedicated devices for teacher use in lesson planning.
8. Integrate AI-related competencies into teacher professional standards.

Limitations

- The study focused on one workshop and may not generalize to all teacher populations.
- Data relied on self-reported measures, which may be influenced by social desirability bias.
- Follow-up data on actual classroom integration of AI tools was not collected.

Suggestions for Further Research

- Conduct longitudinal studies tracking how teachers use AI over 6–12 months after training.
- Compare AI adoption rates between schools with and without infrastructure support.
- Explore the impact of AI training on student engagement and learning outcomes.

Conclusion

The AI training workshop successfully improved government school teachers' understanding, skills, and attitudes towards AI integration in education. However, systemic challenges particularly infrastructure limitations and lack of sustained support — remain critical barriers to adoption. Addressing these barriers through policy, infrastructure investment, and ongoing professional development will be essential for realizing the full potential of AI in public school classrooms.

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