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The AI Assistant: Empowering Pakistan's Teachers in Low Resource Schools

[1]Dr. Erum Hafeez*, [2]Syeda Zeenat Zehra

1. Associate Professor Media Science, Iqra University Airport Campus, Karachi, Sindh, Pakistan
2. Student Researcher, Department of Media Science, Iqra University Karachi, Sindh, Pakistan
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| ***Corresponding Author:** | erum.hafeez@iqra.edu.pk |

ABSTRACT

This study explores the integration of mobile-based Artificial Intelligence (AI) tools in a low-resource government school setting in Karachi, Pakistan. It specifically investigates how public sector teachers utilize generative AI technologies within the classroom environment. The research is grounded in the assumption that AI remains largely absent from Pakistan's public education system, primarily due to infrastructural constraints and limited teacher training. As a response to this gap, the study implements a localized AI intervention in the Government Girls Lower Secondary School (GGLSS) in District Malir, Karachi. Using a qualitative case study approach, a field experiment was conducted involving 20 teachers. A structured 90-minute workshop introduced participants to mobile-friendly generative AI tools such as ChatGPT and Meta AI. To support continued learning and real-time pedagogical assistance, a dedicated WhatsApp group was created for the participating teachers. Following the intervention, in-depth, face-to-face interviews were conducted to capture firsthand experiences and reflections. Thematic analysis of the data revealed that 98% of the participants incorporated AI tools into their daily teaching practices. Approximately 70% reported improvements in lesson delivery and a noticeable reduction in workload. Teachers identified AI-assisted lesson planning and audio storytelling as the most impactful applications. The intervention also fostered increased technological confidence among teachers, which translated into higher student engagement in the classroom. This empirical case study suggests that scalable, mobile-based AI training can effectively support digital inclusion in Pakistan's public education system. It highlights the transformative potential of low-cost, context-sensitive AI interventions in enhancing teaching quality and bridging the technological divide in under-resourced schools.

| **KEYWORDS** | Artificial Intelligence, Digital Literacy, Government Schools, Teacher Training, Mobile-Based Learning, Pedagogical Tools, Pakistan |

Introduction

Artificial Intelligence (AI) is globally redefining the future of education by transforming traditional classrooms into adaptive and data-driven environments. From personalized learning pathways to automated grading and multilingual support, AI's integration in education is proving invaluable across diverse teaching contexts. Countries with robust digital infrastructure have swiftly adopted AI tools, enabling enhanced student engagement and efficiency in lesson delivery. However, in developing countries like Pakistan, AI adoption in education systems remains scarce and uneven.

While private institutions, elite schools, and some donor-supported trust schools have begun experimenting with AI-driven resources (e.g., Khan Academy's Khanmigo, LUMS workshops, AIOU's faculty training) (propakistani, 2024) (dawn, 2024), Pakistan's public school sector, which serves the majority of children, remains largely excluded due to infrastructural limitations, funding constraints, and lack of training (Bandey, 2023) (Faiz Ullah, 2024) (col, 2024).

Our previous research highlighted these disparities and led us to initiate a field experiment that not only educates teachers about AI but also equips them to use AI tools despite infrastructural constraints. We chose to focus on a government school in Karachi with known resource deficits to test the feasibility and impact of localized AI-based support in real-world conditions.

This case study, the first of its kind at a low-resource public school in Pakistan, aims to answer a central question: can mobile-based, context-appropriate AI tools empower public school teachers to improve their teaching methods and reduce their administrative burden? With an innovative and hands-on workshop model, this project sought not only to train teachers but also to spark a movement of digital literacy and AI adaptation in low-resource educational settings. The overwhelmingly positive response reinforces the need for scaled interventions to equalize AI literacy and uplift Pakistan's education system from the bottom up.

Literature Review

Countries with strong digital infrastructure have rapidly integrated Artificial Intelligence into classrooms through personalized tutoring systems, automated grading, and AI-supported curriculum design (Das, 2024; Holmes et al., 2021). Adaptive learning platforms and AI chatbots help educators offer differentiated instruction tailored to students' pace and needs, effectively supporting teachers rather than replacing them (Tahiru, 2021). These systems are not only responsive to individual learning styles but also align closely with national curriculum standards, easing teacher workloads.

AI in Pakistan's Education Landscape

In Pakistan, AI integration is largely confined to higher education and elite private schools. Positive developments include Khan Academy Pakistan's launch of localized AI tutors (Khanmigo) in partnership with The Citizens Foundation and CARE Foundation (ProPakistani, 2024), AI course rollouts at Federal Directorate of Education schools in Islamabad (Dawn, 2024), and AI-focused workshops hosted by LUMS (2025). Additionally, faculty development initiatives like those conducted by Allama Iqbal Open University in collaboration with the Commonwealth of Learning show promising momentum (COL, 2024).

However, these efforts remain centered around resource-rich or semi-urban educational institutions. The public schools—which serves the majority of Pakistan's children—lags behind due to infrastructure deficits, electricity shortages, poor internet access, and outdated pedagogical frameworks (Bandey, 2023). Studies have further highlighted how digital exclusion perpetuates educational inequities in regions like Sindh and Balochistan, where access to digital technologies among school children remains minimal, limited to mobile-based poor connectivity, mostly used for online socialization and gaming, thereby deepening the rural-urban learning divide (Kasi, et al., 2023). If AI is to act as an equalizer, it must be tailored to reach teachers and students in under-resourced public schools where the need is greatest.

Why AI Workshops Are Necessary in Low-Resource Settings

In low-resource environments, teachers often operate with overcrowded classrooms, little administrative support, and no access to modern teaching aids. Traditional training models do not address these structural constraints. Mobile-based AI workshops offer a pragmatic alternative by utilizing the devices teachers already possess, their smartphones, and guiding them through real-world use cases.

The necessity of such interventions is echoed by findings from Hafeez & Fasih (2018), who observed that even in regions with marginal digital penetration, educators demonstrated openness to learning if tools were contextualized effectively.

Recent field experiments in low-resource countries align with our project model. In Sierra Leone, TheTeacher.AI deployed AI via WhatsApp to assist teachers by providing lesson planning ideas, explanations, and classroom management strategies, successfully operating even in schools with unstable electricity and no internet (Dikoru, 2025). Similarly, in Ghana, an AI chatbot called Rori was delivered through WhatsApp to help students solve math problems, resulting in notable academic gains even with only basic mobile phones and minimal connectivity (Dikoru, 2025).

Inspired by these successful low-resource experiments, our workshop in Pakistan will similarly focus on introducing AI tools accessible through smartphones. Teachers will engage in activities such as generating lesson plans, creating quizzes, simplifying complex topics, and crafting worksheets using mobile-based AI assistants like ChatGPT and Meta AI on WhatsApp — requiring no laptops, projectors, or constant internet access. This approach is specifically designed to fit the limited-resource environment of government schools like GGLSS Malir No.2.

Our workshop represents Pakistan's first structured attempt to bring AI into a public school classroom through teacher empowerment. Unlike isolated tech donations or university-led training for privileged audiences, this intervention was designed with contextual constraints in mind—no internet, limited electricity, minimal English proficiency. Despite these barriers, teachers at GGLSS Malir No. 2 learnt to create lesson plans, generate audio content, and grade assignments using AI—entirely through mobile-first strategies.

As global education systems accelerate toward AI-enhanced learning, Pakistan risks widening its digital divide unless its public sector educators are included in this transformation. This field experiment affirms that public school teachers can adapt and adopt AI meaningfully—provided the training is empathetic, localized, and mobile-first. Bridging the equity gap in AI literacy is not only a technological need—it is a pedagogical imperative.

Material and Methods

This research adopted a qualitative case study method to explore, in depth, the practical challenges and latent opportunities associated with integrating mobile-based Artificial Intelligence (AI) tools in low-resource public schools in Pakistan. The qualitative approach was chosen to allow for better contextual understanding of teacher experiences within a real-world educational setting.

The study was conducted in a series of well-defined and sequential phases to ensure methodological rigour. It began with an extensive review of national and international literature on AI and digital media in education, focusing particularly on its applicability in under-resourced and technologically constrained environments. This was followed by a preliminary field visit to the selected research site—Government Girls Lower Secondary School (GGLSS) in District Malir, Karachi—to assess infrastructural realities, digital literacy levels, and institutional readiness for intervention.

Based on these insights, a context-specific AI intervention was designed in the form of a 90-minute workshop, tailored to the pedagogical needs and digital capacities of local public-school teachers. During the workshop, participants were introduced to accessible, mobile-friendly generative AI tools, including ChatGPT and Meta AI, with demonstrations grounded in everyday classroom scenarios. To support continued engagement and provide

real-time pedagogical assistance post-training, a dedicated WhatsApp group was established, fostering a community of practice among the participating teachers.

To evaluate the effectiveness of the intervention, a follow-up visit was conducted for in-depth data collection. Multiple data sources were employed to ensure both depth and credibility of findings. These included structured questionnaires to gauge adoption rates and perceived benefits, semi-structured face-to-face interviews to capture reflective teacher narratives, direct observational notes from classroom settings, and basic engagement metrics drawn from WhatsApp group interactions.

Data triangulation was employed to enhance the study's validity and reliability by cross-verifying findings across different sources and methods. This dynamic approach allowed the research team to holistically capture the lived realities of public-school teachers experimenting with AI tools, and generate actionable insights for future policy and practice in similar educational contexts.

Convenience Sampling Strategy

We adopted a **convenience sampling** approach, selecting teachers who were available during our preliminary school visit and who expressed interest in exploring AI-based teaching methods. The research focused on Government Girls Lower Secondary School (GGLSS) Malir No. 2 in Karachi—representative of many public schools in Pakistan that operate under significant infrastructural constraints. Out of 25 total teaching staff, 20 teachers (6 primary and 14 secondary) voluntarily participated in this study. The school serves approximately 250 students from diverse socio-economic backgrounds, making any positive shift in teaching practices particularly meaningful. Factors such as high student-teacher ratios, limited digital access, and resource shortages were carefully considered in designing the workshop. A purposive sampling method was adopted, selecting educators who were present during the initial field visit and had expressed interest in adopting AI tools. These teachers were motivated to explore how AI could help them overcome routine challenges such as excessive workload, time-consuming lesson planning, and administrative burdens. Participants represented a realistic cross-section of public sector educators, with age ranges between 27 and 57 years, professional experience from 1.5 to 32 years, and educational qualifications spanning from B.Ed. to M.Sc. and M.Ed.

The research was conducted under the academic supervision of HOD of Media Science, Iqra University and in alignment with university ethics protocols for educational fieldwork.

Table 1
Demographic Profile of Participants

Category	Subcategory	No. of Teachers	Percentage (%)
Age Group	25–30 years	4	20%
	31–40 years	7	35%
	41–50 years	7	35%
	51+ years	2	10%
Teaching Experience	1–3 years	5	25%
	4–10 years	6	30%
	11–20 years	6	30%
	21+ years	3	15%
Educational Background	Bachelor's (BA, BSc, B.Ed.)	9	45%
	Master's (MA, M.Sc., M.Ed., MS, IR, Stats)	11	55%
School Section	Primary	8	40%
	Secondary	12	60%

This table Presents the demographic profile of the 20 participating teachers, categorized by age group, years of experience, and education level. This table highlights a diverse mix of professional backgrounds, with nearly half of the teachers having over 10 years of teaching experience and 55% holding postgraduate qualifications.

This distribution reflects a balanced mix of early-career and highly experienced educators, which helped us assess the accessibility and adaptability of AI tools across a broad professional spectrum.

Data Collection Tools and Instruments

- **Recce Questionnaire**: A structured survey tool administered during the school visit to assess teachers' familiarity with AI, existing pedagogical methods, language proficiency, and access to technology.
- **Field Observations**: Detailed notes documented the school's physical setting—e.g., lack of stable electricity, limited water supply, minimal digital equipment—and teaching environment, including multi-grade classrooms and high student-to-teacher ratios.
- **Workshop Engagement Logs**: We conducted a hands-on, 90-minute workshop that covered prompt engineering, AI lesson planning, AI grading, and AI-powered Urdu audio story creation using ChatGPT, Meta AI, and Copilot. Printed handouts were used due to lack of projector support.
- **Training Manuals**: Each activity was supported with tailored printed handouts in both Urdu and English, providing structured walkthroughs and reusable templates for classroom use.
- **WhatsApp Group Analytics**: A follow-up group was formed with all 20 teachers, through which daily prompts, tutorial videos, and trainer interactions were logged and reviewed to gauge ongoing engagement.
- **Post-Workshop Feedback Forms**: We developed a comprehensive form combining Likert-scale items, open-ended questions, and multiple-choice responses to evaluate the perceived usefulness, tool adoption, and shifts in confidence and pedagogy.

Audio-Visual Documentation

To build a vivid archive of the intervention, all phases of the project including the recce, workshop, and teacher follow-up were recorded using DSLR cameras and smartphones. A short documentary was produced, combining clips from classroom sessions, teacher interviews. These visual records are valuable for communicating the feasibility and emotional resonance of such pilot interventions to broader audiences including policymakers and educational institutions.

This methodology, built on both academic rigor and field pragmatism, ensured that the voices of teachers were authentically captured while validating the scalability of AI integration in similarly under-resourced environments.

Ethics and Consent

This field experiment was conducted with strict adherence to ethical research practices. All participating teachers were informed in advance about the nature and purpose of the workshop, the follow-up study, and their voluntary participation. Prior to engaging in any data collection activities—including surveys, interviews, and feedback forms—participants were provided with a **informed consent statement**, ensuring their autonomy, rights, and understanding of the study's intent.

Confidentiality and Data Privacy:

All personal information collected during the study was kept strictly confidential. No teacher names, contact details, or identifiable classroom footage were shared publicly without written permission. Demographic and feedback data were anonymized and used solely for research and educational reporting purposes.

Media Use and Documentary Filming:

Participants were notified that select moments from the workshop, recce, and follow-up visits would be recorded for the purpose of an educational documentary. Explicit **media consent** was obtained from all featured teachers prior to filming. The final footage showcases the AI training process while maintaining the dignity and privacy of all individuals involved.

Results and Discussion

Preliminary School Visit

During our initial visit to GGLSS Malir No. 2, several critical insights were observed that shaped the workshop design. All participating teachers owned smartphones and demonstrated Basic English proficiency, yet their awareness and understanding of Artificial Intelligence (AI) were minimal. The school operated under severe infrastructural constraints — including unreliable electricity supply, lack of water (often purchased privately by staff), personal mobile data usage for internet access, and insufficient furniture for classrooms. Teaching conditions were further strained by the presence of multi-grade classrooms, high student-to-teacher ratios, frequent student absenteeism, and limited parental involvement. Despite these challenges, the teachers showed a remarkable eagerness to learn and explore AI tools that could support lesson planning, enhance students' engagement, and reduce their administrative burden.

AI Tool Adaptation in Low-Resource Settings

Despite infrastructural limitations such as erratic electricity, weak connectivity, and lack of digital resources, 98% of teachers adopted AI tools after attending the workshop. Tools like ChatGPT (OpenAI conversational assistant), Meta AI (Facebook's multilingual AI), Copilot (Microsoft's AI assistant that supports text, image, and story generation), and Gemini (Google's AI platform for multilingual educational content) were assessed through smartphones, and supported by printed handouts. The low-tech environment was addressed through mobile-first solutions, which teachers found intuitive and practical. Significantly, 80% of participants reported improved comprehension of how AI could assist in lesson planning, content creation, and classroom engagement.

Overall Workshop Experience (%)

Good
20%

Very Good
80%

■ Good ■ Very Good

Figure 1. Teacher Satisfaction Ratings from the AI Workshop

Figure 1 shows a pie chart illustrating the overall satisfaction levels from the workshop. As reflected in the data, 80% of the teachers rated the experience as *very good*, and the remaining 20% rated it as *good*, indicating a unanimously positive response to the training session.

Teaching Practices and Confidence Gains

The workshop led to a substantial transformation in instructive confidence. Approximately 98% of the teachers expressed strong confidence in using AI tools post-training. Teaching styles shifted for 70% of the teachers, with reported benefits such as reduced workload, enhanced student engagement through AI-generated Urdu stories, and greater collaborative planning. Teachers also highlighted that time spent on administrative tasks like grading decreased significantly.

Popular Tools and Activities

Among the activities, the most appreciated was generating Urdu story audio content (90%); followed by AI-supported lesson planning (80%), prompt creation (70%), AI grading (50%), and exploration of tools like MagicSchool and Canva (60%). Teachers noted that audio storytelling was especially impactful in primary classes, improving reading and listening skills. Lesson planning became more structured and accessible, while AI-based grading saved time and provided new perspectives on student work.

Most Helpful Workshop Activities
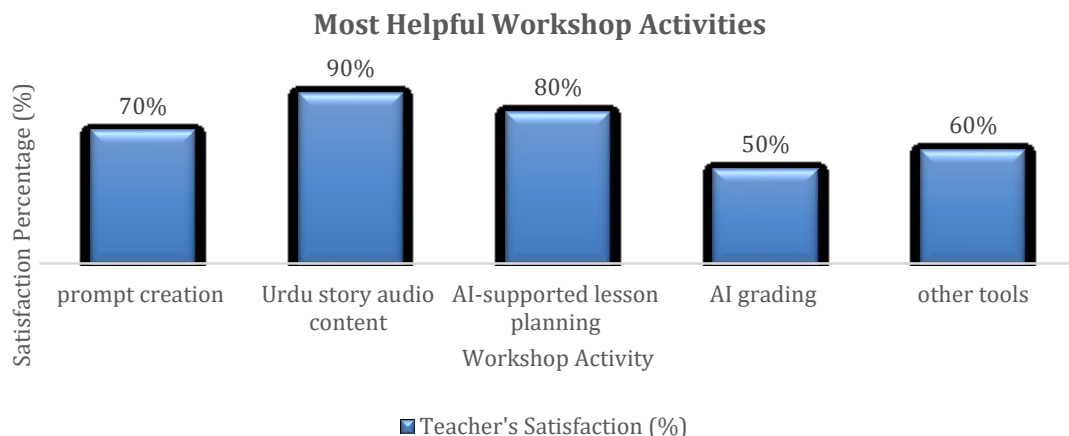
■ Teacher's Satisfaction (%)

Figure 2. Most Helpful Activities as Rated by Teachers

Figure 2 shows which workshop activities teachers found most useful. Urdu audio storytelling (90%) was rated highest, followed by AI lesson planning (80%), prompt creation (70%), and other tools like Canva and MagicSchool (60%).

Utility and Impact of WhatsApp Support Group

While 70% of teachers found the WhatsApp group actively helpful in applying what they learnt, 75% expressed interest in its continuation for sustained AI learning. The group offered:

- Daily prompt ideas (used by 60%)
- Video tutorials and AI tool demonstrations (50%)
- Personalized assistance from trainers Zeenat and Naaz (70%)

Qualitative comments suggested the group improved morale and served as a peer-learning space. However, some teachers requested faster responses, additional group-based activities, and voice note archives.
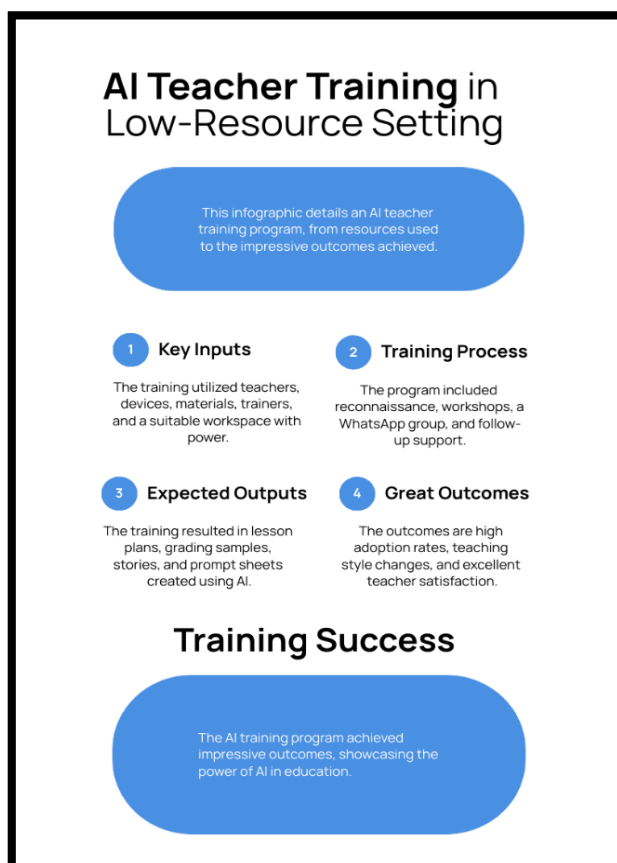
Qualitative Impact: Teacher Reflections

Teachers shared powerful personal reflections on how AI changed their professional routines. Many described how AI helped reduce pressure by automating tasks like paper checking and worksheet creation. One teacher mentioned, "After the workshop, I use AI to generate stories for my kindergarten class—it made learning Urdu alphabets fun and engaging." Another shared that AI "secured time" and allowed her to deliver lessons with more energy and creativity. Another shared that "Urdu story telling helped her teaching students of secondary classes' physics in Urdu, as she had faced issues in linguistics." In collaborative activities, teachers created reading competitions and co-designed assessments using AI tools. Some commented that while their entire teaching style did not changed but lesson planning and content generation became more efficient, accurate, and aligned with curriculum standards. A few teachers' proposed future workshops be held in shaded outdoor areas or under trees due to heat and power issues, suggesting that environmental conditions also influence learning outcomes. Overall, both the quantitative and qualitative findings show that AI training, even over a short span, can have measurable and meaningful impacts when thoughtfully localized and implemented with empathy.

Discussion

This research highlights the transformative potential of AI-driven teacher training programs, particularly in under-resourced government schools where systemic reform is slow and teacher support mechanisms are scarce. By providing hands-on exposure to AI tools tailored for real classroom challenges like grading, lesson planning, and storytelling, this initiative demonstrated that even teachers with minimal digital literacy can adopt and benefit from technology when it is made accessible and relevant. The enthusiastic participation and follow-up engagement from teachers at GGLSS Malir No. 2 validate this approach.

AI Teacher Training in Low-Resource Setting

This infographic details an AI teacher training program, from resources used to the impressive outcomes achieved.

1 Key Inputs

The training utilized teachers, devices, materials, trainers, and a suitable workspace with power.

2 Training Process

The program included reconnaissance, workshops, a WhatsApp group, and follow-up support.

3 Expected Outputs

The training resulted in lesson plans, grading samples, stories, and prompt sheets created using AI.

4 Great Outcomes

The outcomes are high adoption rates, teaching style changes, and excellent teacher satisfaction.

Training Success

The AI training program achieved impressive outcomes, showcasing the power of AI in education.

Figure 3. AI Workshop Implementation Process

The results also reinforce findings from international case studies. In Sierra Leone, TheTeacher.AI enabled teachers to receive AI-generated pedagogical support through WhatsApp despite having no internet in schools (Dikoru, 2025). In Ghana, the Rori chatbot helped students solve math problems using basic phones (Dikoru, 2025). Similarly, our use of mobile-first strategies in Pakistan showcased how AI could be scaled without infrastructure-heavy dependencies. The localized handouts, offline-friendly tools, and WhatsApp community allowed for sustained learning even after the training.

Figure 3 summarizes the full field experiment process—from literature review and school recce to workshop delivery, WhatsApp support, and follow-up evaluation—highlighting the structured, mobile-first design of the intervention.

Moreover, this case study exposes the widening gap between Pakistan's elite private schools, where AI tools are increasingly being piloted and the vast public education sector, which remains largely excluded from the digital transformation (Faiz Ullah, 2024) (Bandey, 2023). While universities like LUMS and initiatives like Khanmigo (propakistani, 2024) have introduced AI in classrooms, such efforts have not trickled down to the majority of schools in low-income areas. This workshop was one of the first attempts to address that disparity.

Some limitations included the short duration of the workshop, logistical hurdles (e.g., power and connectivity issues), and limited time for feedback during activities. Teachers also requested future sessions to be more personalized differentiating between beginner and advanced levels and to allow for more extended Q&A discussions. Despite these, the overwhelming positive response and measurable improvement in confidence and usage indicate that the model is scalable and sustainable with minor adjustments.

Conclusion

The AI Assistant workshop at GGLSS Malir No. 2 confirmed that AI can empower government school teachers in Pakistan to transform their classrooms, even in the face of infrastructural limitations. Teachers left the workshop with practical tools, new educational strategies, and a supportive community. Their confidence in using AI grew significantly, with over 98% applying the tools in their teaching. Beyond tool adoption, the real success was a shift in mindset, teachers no longer saw AI as distant or intimidating but as an assistant available at their fingertips.

This pilot project bridges a long-standing gap between public and private digital education. Its relevance lies not only in the adoption of tools but in its context-specific design, community-led support model, and proof of adaptability. Going forward, such initiatives should be recognized not just as supplementary, but as essential components of educational reform. With modest investment and strong intent, AI can be the equalizer Pakistan's public education system urgently needs.

Limitations

Short-Term Follow-Up Window

While the workshop showed immediate positive outcomes—98% tool adoption and 70% reported changes in teaching styles—these insights are based on a follow-up conducted only three weeks after the intervention. This short duration captures only the

initial enthusiasm and experimentation phase. To assess the sustained impact, a longitudinal evaluation is recommended. This could include follow-ups at 3 months, 6 months, and one year to track long-term changes in teaching practices, curriculum alignment, student outcomes, and ongoing AI tool usage. Such tracking would offer deeper insights into habit formation, continued barriers, and the scalability of mobile-based AI adoption in public sector schools.

Self-Reporting Bias

Much of the data collected was self-reported through feedback forms and group discussions. While rich in insight, this format may lead to over reporting of success due to excitement, social desirability, or limited critical reflection. Future assessments should include in-class observations, student feedback, or lesson audits to triangulate and validate findings.

Environmental and Technical Barriers

Power outages, poor ventilation, and limited internet during the session affected the workshop experience. While the mobile-first design helped mitigate these challenges, the physical and technical limitations point to the need for logistical improvements in future iterations—such as shaded open-air venues, fans.

Recommendations

Expand Workshop Duration and Depth

The single 90-minute session proved impactful but limited. Extending the workshop to 200 minutes or two shorter sessions would allow for deeper engagement, more hands-on activities, and differentiated instruction for teachers at varying skill levels. Teachers also requested more time for Q&A, discussions, and reflections, which longer sessions would facilitate.

Distribute Urdu Instructional Guides

Printed Urdu guides for all AI tools—such as ChatGPT, Meta AI, MagicSchool, Canva, and Copilot—should be provided. These guides can offer step-by-step usage instructions, sample prompts, and troubleshooting tips, enabling independent post-workshop learning, especially for teachers with lower digital fluency.

Continue and Strengthen the WhatsApp Support Group

The WhatsApp group served as a valuable follow-up tool, with 75% of teachers expressing the desire for it to continue. We recommend extending this support for at least three months post-workshop, including daily AI prompts, weekly video tutorials, and a rotating schedule of peer-led discussions. This digital micro-community offers ongoing reinforcement in a low-resource, mobile-first format.

Scale the Model Across Public Schools

Given the overwhelming positive response—100% of participants recommending the training for other schools—this model should be expanded to additional government schools across Karachi and other districts. Since the model is mobile-first, low-cost, and adaptable to classrooms without electricity or internet, it is especially suitable for widespread deployment.

Build a Network of AI Teacher Ambassadors

Identify confident and enthusiastic teachers from each school to undergo additional training and become "AI Ambassadors" within their clusters. These local champions can provide peer support, sustain momentum, and act as resource persons, making AI integration sustainable without external trainers.

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