

Enhancing the Capacity Management in Teacher Training at Karachi, Pakistan: A Qualitative Study of AI Collaboration for a Human-Centered Future of Education

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Abstract

The rapid development of Artificial Intelligence (AI) in recent years has begun reshaping various fields, including education. While many discussions focus on AI's disruptive potential, this paper investigates the more nuanced role of AI in capacity building of teacher training and teacher education programs in Karachi, Pakistan, with an emphasis on AI's potential to complement rather than replace educators. AI tools like adaptive learning systems, real-time data analysis, and intelligent tutoring are presented as mechanisms that can enrich human-centered education, particularly in teacher training. Through qualitative methods—primarily semi-structured interviews—this study explores teachers' perceptions of AI's integration into education and uncovers four key themes: the perceived benefits of AI, challenges in its implementation, its impact on teacher autonomy, and the need for a human-centered approach. The findings suggest that while AI can significantly enhance student outcomes, much work is required to align AI integration with existing infrastructural and professional development frameworks in Karachi to ensure that it supports, rather than undermines, the human elements of teaching.

Keywords: AI in education, teacher education, human-centered AI, Karachi, qualitative study, thematic analysis

Introduction

Teachers are the real core of education, which is a foundational element of human development. In ways that no other human can, they are the ones who establish a connection with pupils, foster their curiosity, and ignite the love of learning. However, artificial intelligence (AI) has emerged as a new force in the market. Education is not an exception to how it is changing businesses and igniting discussions everywhere. There is enthusiasm about how AI may support educators by handling repetitive activities, providing pupils with immediate feedback, and customizing instruction (Holmes et al., 2019). Even with AI's strength, teaching is still a very human occupation. It depends on connections, empathy, and understanding—elements that are difficult to program into a machine.

This raises a crucial query: How might AI assist how can AI assist educators without diminishing their special and indispensable role? AI has potential in Pakistan, where schools frequently face issues such a lack of teachers, limited funding, and inadequate facilities (Ameen & Zafar, 2023). However, if AI is to be used in classrooms, it must be implemented carefully to make sure it enhances rather than replaces the excellent work that teachers are already doing. This research closely examines the potential integration of AI into Karachi's teacher training programs.

It explores both the opportunities and challenges, with a focus on a human-centered approach to AI that keeps teachers at the forefront. Through interviews with teachers in Karachi's B.Ed. programs, we delve into how AI can be used to genuinely support teachers in their mission of fostering student growth in ways that fit the unique context and culture of their schools.

Literature Review

Global Perspectives on AI in Education

Across the world, there's no doubt that AI has the potential to change the classroom experience. For teachers, it promises to lighten the load by helping them meet the individual needs of students. For example, adaptive learning platforms allow teachers to personalize lessons in real time, supporting kids with different learning styles and speeds (Holmes et al., 2019). Imagine a scenario: a student is struggling with a

grammar lesson. With AI, the system can quickly notice the student's challenge and guide them to exercises that reinforce the lesson before they move on (Li & Lalani, 2022). It's almost like having an extra set of eyes on every student's progress, helping teachers juggle diverse needs.

But it's not all straightforward. Some worry that AI systems built for well-funded, high-tech classrooms in other parts of the world may not be the best fit for places with different challenges. Critics argue that using data from more privileged settings could make AI systems less effective, or even widen existing inequalities for students in places like Karachi (Selwyn, 2019). And then there's the worry that AI might start to change the teacher's role itself, making them more of a tech supervisor than an active, hands-on educator. This shift raises questions about teacher autonomy and could make the classroom feel less personal, even as it becomes more "advanced" (Williamson & Eynon, 2020).

Challenges in Pakistan's Education System

In Pakistan, the promise of AI is certainly appealing, especially given the real challenges teachers face. Teacher shortages, especially in rural areas, and resource limitations in many schools make it tough to reach every student (Ameen & Zafar, 2023). AI could help bridge some of these gaps by offering scalable, adaptive learning resources that could reach students even in underserved areas.

But introducing AI into Pakistan's education system isn't as simple as it might seem. Khan & Jamil (2019) highlight some of the fundamental barriers, like inconsistent internet access, limited devices, and a lack of tech support, which make it hard to use AI effectively. Many teachers also don't have the training they would need to get the best out of AI tools. Plus, there's the fact that much of the educational content on AI platforms is designed for Western audiences, so it doesn't always resonate with the cultural or practical realities of Pakistani students. This highlights the need for AI solutions that are tailored to the local context, rather than a one-size-fits-all approach.

Human-Centered AI: Enhancing Educators' Roles

One of the biggest conversations about AI in education is whether it will help or hinder teachers. Supporters say AI can take over some of the more tedious tasks—like administrative work and data analysis—freeing teachers to focus on the parts of

their job that require creativity, patience, and human connection (Greene et al., 2020). Human-centered AI is built on this idea: that AI should support teachers, not replace them.

In this model, AI is there as a helpful assistant, not a replacement. It can point out trends in student performance, like which students need extra support, but the teacher still decides how best to respond. This approach keeps the teacher in the driver's seat, making sure that AI enhances, rather than disrupts, their role in the classroom (Seldon & Abidoye, 2019). By working this way, AI can help create a collaborative learning environment where the teacher's expertise and personal touch remain at the core of every lesson.

Methodology

This study uses a qualitative research design, focusing on semi-structured interviews with 15 teachers from B.Ed. programs in Karachi. The participants, both men and women with a variety of teaching backgrounds, were chosen through purposive sampling to capture a diverse range of insights. Each interview lasted around 45 minutes and focused on the teachers' experiences with AI, the challenges they face in using it, and how they feel it affects their role as educators.

Thematic Analysis

The interview data was analyzed using thematic analysis, following the framework by Braun and Clarke (2006). This process included getting familiar with the data, coding it, identifying themes, and refining these themes to paint a clear picture of teachers' collective experiences in Karachi. The analysis brings forward patterns that help us understand the role AI currently plays in education here and offers valuable insights into what might need to change to make AI integration a genuine asset for teachers and students alike.

Results

1. Benefits of AI in the Classroom

Many teachers expressed appreciation for AI's ability to tailor learning experiences to each student's needs. For example, Miss Saba shared how AI helped her monitor students' progress more closely: "AI allows me to keep track of each student's pace,

something that would be difficult without it.” Such sentiments align with existing literature, which underscores the role of adaptive learning in making classrooms more inclusive (Li & Lalani, 2022).

Teachers also valued AI’s capacity to manage administrative work, freeing them to focus on teaching. This is crucial in under-resourced schools, where teachers often juggle numerous administrative responsibilities.

2. Challenges in Implementing AI

A recurring theme in interviews was the lack of infrastructure to support AI. Teachers often work in schools without access to the necessary technology, such as reliable internet and updated devices. Miss Tabasum noted, “Our school doesn’t have the technology to support AI, and many students lack access to computers.” These barriers are widespread in Pakistani schools, particularly in low-income areas, where the digital divide limits AI’s reach (Ameen & Zafar, 2023).

Teachers also mentioned that most AI platforms lack culturally relevant content, reducing their effectiveness. Miss Aisha commented, “Much of the AI content doesn’t relate to our students’ lives—it’s not practical for our classroom context.”

3. Concerns Around Teacher Autonomy

Many teachers expressed concern about AI’s impact on their professional independence. While some appreciated its role in personalizing learning, others worried that AI might make them feel more like overseers than active participants. As Miss Aisha Bano put it, “Sometimes it feels like AI is here to replace me, not assist me.” This aligns with concerns that excessive reliance on AI could devalue teachers’ role (Selwyn, 2019).

4. The Need for Human-Centered AI

Despite concerns, many educators emphasized the importance of AI that complements their expertise, rather than overshadowing it. Dr. Farah Naz argued, “AI should be my tool, not my boss. It should respect my experience and judgment as a teacher.” Human-centered AI, which respects and enhances teachers’ unique roles, is increasingly recognized as the ideal approach (Seldon & Abidoye, 2019). This approach ensures that AI acts as a support system for teachers, not a substitute.

Discussion

This study highlights the potential and challenges of integrating AI into teacher education. AI can make classrooms more inclusive and manageable, especially when teachers are overburdened. Teachers like Miss Saba felt that AI helped them meet diverse student needs more effectively. However, without adequate training and infrastructure, the benefits of AI are limited. Teachers need support to use these tools effectively, and a one-size-fits-all approach won't work in Pakistan. Moreover, if AI is to play a meaningful role in education, it must be carefully integrated, respecting teachers' autonomy and cultural context. Successful AI integration will require not just technology but investment in professional development, localized content, and a commitment to keeping teachers at the heart of education.

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