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Original Article

The Empowerment of AI in Private School Teachers in Karachi

Uzma Anjum* & Dr. Aziz-Un-Nisa

Department of Karachi, University of Karachi, Karachi, Pakistan

Abstract

The research is about the contribution of artificial intelligence (AI) to empowering teachers in private schools in Karachi. It also examines the influence of the AI-powered tools on mentorship processes, professional growth, and instruction processes. Using a mixed-methods approach, including surveys, interviews, and focus groups with trainee, in-service, and volunteer teachers, the study identifies both opportunities and challenges in AI implementation. It enables the researcher to identify the opportunities and barriers in the implementation process of AI in education. The results show that trainee teachers are more likely to be digitally ready and positively perceive AI than in-service teachers. This is because of a greater exposure to technology-based training. The application of AI was identified to be useful in lesson planning, customized instructions and reducing the workload. Furthermore, when it comes to suggesting feedback mentorship platforms as TeachBoost and CoachHub have not been used extensively. This is due to the rising challenges that the system is encountering. These key challenges are the low digital literacy, inadequate infrastructure, lack of institutional support and ethical issues. The research supports the conclusion that AI literacy programs must be considered as the resources necessary to close the gap of its adoption. This will enable them to get all the benefits of AI in teacher training and professional development in Karachi.

Keywords: *Artificial Intelligence (AI), Teacher Empowerment, AI Tools, Digital Literacy, AI Implementation, Challenges in Education*

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INTRODUCTION

Artificial intelligence (AI) is a game-changing technology with enormous potential to enhance education globally (Abdullah, 2025). AI-powered tutoring programs and adaptive learning platforms are just two examples of how their applications are changing the way students interact with material and how teachers present instruction (Rathore et al., 2023). AI in education is being tested and adapted worldwide, particularly in underdeveloped countries where the demands are frequently the most pressing (Dai, 2024; Duan, 2024). It is no longer limited to wealthy nations or prestigious institutions (Filk, 2025). The potential of AI is particularly pertinent in Pakistan, as the country's educational system faces numerous significant challenges.

Due in large part to government directives aimed at increasing access to education and a burgeoning youth population, Pakistan has seen a notable increase in student enrolment at all levels. According to Iqbal et al., (2025), the number of students at public institutions has increased by 70% over the past decade. Yet, the number of professors has only increased by 11% (El Asmar, 2022). Nevertheless, proportionate investments in teacher recruitment and training have not kept pace with this expansion. As a result, there is a severe teacher shortage (Hong, 2025). There are approximately 50,000 fewer teachers in public secondary schools than in higher education, where certain institutions have high professor-to-student ratios (Iqbal et al., 2025). These ratios show a system under extreme stress and are far higher than global averages.

This article examines how AI can be utilized to enhance teacher preparation and youth upskilling across Pakistan, with a particular focus on the Karachi teaching system. This study examines the Ai in a wide context of education. It examines how various technologies would be

*Corresponding Author: Uzma Anjum | Department of Karachi, University of Karachi, Karachi, Pakistan
uzma.azhar.551@gmail.com

able to address the existing hurdles and latter transforming the education sector. This research will be providing a comprehensive examination of the AI in education. This study will enhance the use of AI in Pakistan and examine various interventions.

Justification for the study

The application of AI in learning program is still not exhausted (Kaul, 2024). Despite the increasing adoption of AI tools in education sector there are various places where it is still not well studied. Pakistan education is still evolving and struggling to keep up with AI in the current world. The incorporation of primary schools is still not well studied, for that reason Karachi in Pakistan was chosen for this study. The use of AI in Karachi, teachers are able to tailor the learning experience thus making education more effective and engaging.

Significance of the study

Education integrating AI will facilitate the individual learning among the students. This will be effective to students and learners as well. Therefore, with this approach it is easy to progress and easily engage with activities of Karachi with students learning styles (Jang, 2022). When using AI it becomes easy for Karachi educators to become adaptive and thus enhance their learning and teaching experiences.

LITERATURE REVIEW

AI integration in schooling has progressed from a specialized field of study to a strategic necessity for numerous nations (KÜÇÜKUNCULAR & ERTUGAN, 2025). More advanced adaptive learning platforms, such as Duolingo and Coursera, were made possible by early programs like spell checkers and search engines (Ottenbreit et al., 2023). AI is now capable of performing more complex educational tasks, such as writing essays, solving problems, providing individualized feedback, and mentoring, due to the development of machine learning models, particularly GPT-3, GPT-4, and the recently released agent-based frameworks (Jiang, 2022; Jong, 2022). Although integrating AI into education is a gradual process, positive attitudes and awareness are expanding (Salla, 2024).

People believe that AI offers a new approach to educational activities, and for experienced teachers, the opportunities are simply enormous. It is often related to mentorship (Tomaskinova & Tomaskin, 2024). AI systems can connect individuals with experienced mentors within a short time, efficiently meeting their needs and helping them achieve their career goals (TRIPATHI et al., 2025). AI systems are capable of matching new teachers with those who are experienced and skilled, as well as those who are inexperienced, by aligning their professional requirements and goals. It can also assist mentors in providing better advice by means of providing data-driven information (Huang, 2024). It is also able to determine the specific needs, skills, and weaknesses of each mentee to design a unique learning journey tailored to their individual requirements, enabling them to achieve their ultimate objectives. The efficacy of mentorship can be evaluated by AI, which analyzes contacts, enabling the mentor to develop and improve over time to effectively assist novice teachers. With the help of data-driven approach, the practice of mentorship can be improved and become more efficient and pertinent.

AI is able to build the partnership between educators and resources. Baru, Wamicha and Gitau (2025) highlighted that AI systems can support the development of collaborations between educators, as they can offer teacher networks that welcome the exchange of best practice, despite geographical constraints. In the case of the professional growth of teachers, AI technology can provide innovative solutions to the more traditional problems (Almansoori and Abouassar, 2024). The field of AI technology, in particular, could offer the innovative solutions to the existing issues in the sphere of teacher professional development. Besides enhancing access to education, the generative AI technologies are also effective to improve teaching (Zha, 2025). AI will offer flexible learning environments by offering timely feedback and recommendations and motivates instructors to conduct personal reflections (Duan & Zhao, 2024). Since, as it has been stated before, teachers are key players in the classroom processes, their mastery of AI technology is key to high-quality learning (Wang & Han, 2025). It proves that AI-based platforms can, actually, be tailored to the individual needs of a teacher; therefore, it is vital to eliminate all potential loopholes that might exist. Instructors have now been trained to pay attention to the utilization of technology to enhance the understanding of the students to the traditional contents (Lee et al., 2021). In case AI is used during teacher training, students might learn more about the information taught in the classroom and gain the relevant knowledge of the modern world..

METHODOLOGY

Research Design

In light of Pakistan's impending teacher shortage, this study employed a mixed-methods approach to investigate how AI has complemented human mentorship in teacher preparation. For example, the quantitative data made it possible for us to look at trends and/or patterns about the respondents [teacher trainees and ongoing teachers] who think AI has enhanced supervision and their skills while promoting professional growth (Purba et al., 2025). Qualitative information gathered from focus groups and interviews enabled the identification and discussion of topics that support on-demand feedback and aid in lesson planning, such as the use of AI as a customized teacher.

The Participants

Teachers from Karachi, including volunteer teachers, in-service teachers, and teacher candidates, participated in this study. Using an internet connection and a snowball sampling technique, in which each participant shared the link with their peers, data were gathered from teacher candidates and in-service educators through questionnaires. Convenient sampling was also used for the focus group discussions and interviews with volunteer teacher educators, trainees, in-service teachers, and cooperating teachers. Ten educators, five in-service teachers, and twenty-five teacher candidates participated in this study. The sample consisted of both men and women. Based on their years of experience working with in-service teachers and teacher candidates during the teaching practicum, the educators in this study were chosen. Improving participant representation was one of the study's shortcomings, especially given the limited number of practicum and in-service supervisors. This restricted the scope of the study to capture a wider array of opinion of experienced teachers especially with regards to providing a more in-depth answer as to how AI technologies aid in professional development and mentoring amongst the trainee and in services teachers. Nevertheless, the research can provide valuable, situational data regarding the educational and management implication of incorporating AI tools into pedagogical training curriculum.

Data analysis and data collection

Data were collected using questionnaires, focus groups and interviews. Questionnaires were developed and mailed via an internet connection to the teachers candidates and in-service teachers. The focus groups and interviews allowed conducting profound online and face-to-face conversations regarding the views, challenges, and experiences of the respondents of using AI to develop and mentor in relation to their professional growth. All the participants in the study provided their informed consent and they were informed of the fact that they could withdraw at any given time. The data of the research was analyzed using descriptive statistics, inferential statistical methods and codes and themes. The data collected based on the questionnaires in the quantitative type analysis was analyzed using descriptive methods to discuss the perceived role of AI in the development of professional growth and mentorship, the barriers, and the opportunities.

FINDINGS

The survey's demographics revealed that the college-level training and in-service teachers who participated were diverse in terms of their age groups, study programs, and year groups. The bulk of the respondents (56.7%) are between the ages of 17 and 25, but a sizable portion (30%) are students and in-service educators between the ages of 26 and 35.

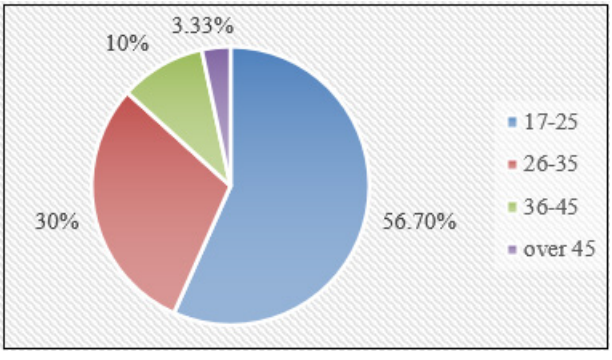

Fig. 1. Distribution by age of Trainee and in service teachers.

Participants aged 45 and above, as well as those in the 36–45 age group, are underrepresented.

One of the in-service teachers was older than forty-five. Although there are older participants, especially those with teaching experience, the distribution indicates that the participants are mostly young. Of the participants, 30% were men and 70% were female trainees and current teachers.

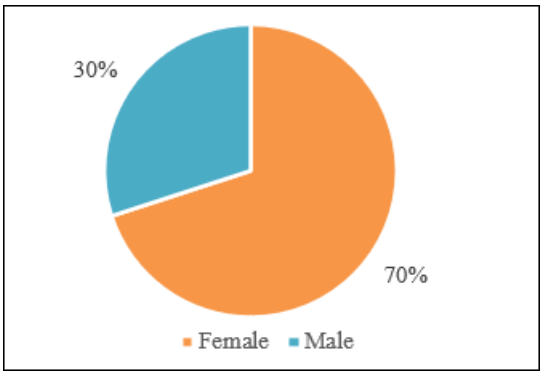

Fig. 2. Trainees and in service teacher

RESULTS

Perception of AI in teachers

AI can completely transform education by supporting educators and administrators through professional development and mentoring. Additionally, Mentorly (6.67%), CoachHub (6.67%), and TeachBoost (6.67%) were among the AI-driven mentorship platforms that were adopted; nevertheless, despite this growth, trainee instructors did not fully utilize these platforms. These platforms were used by four trainee teachers: TeachBoost, a professional learning network; CoachHub, which offered individualized coaching and career advancement opportunities; and Mentorly, which provided virtual mentorship services.

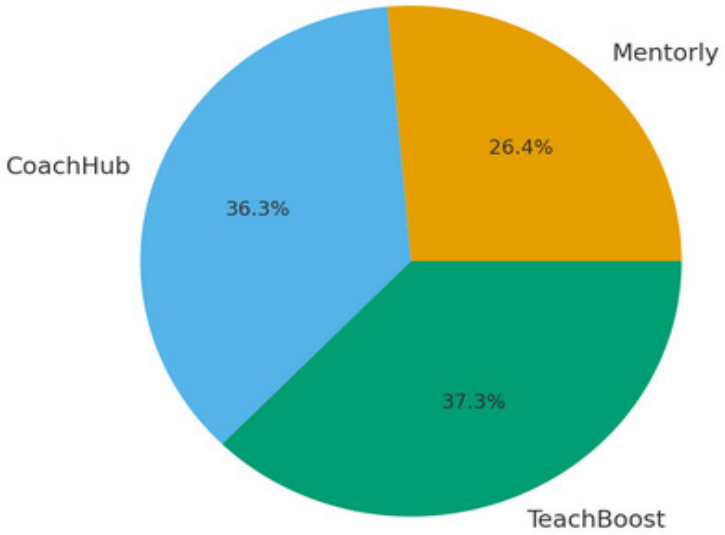

Fig. 3. Adoption rate of AI driven Mentorship Platform

The low adoption of these platforms suggests that the majority of trainee instructors have limited knowledge of them and that receiving human mentoring is more important than relying on AI technologies for mentorship. The participant did not utilize other AI-powered teaching support tools, such as TeachFX (3.33%) and Copilot for Education (Microsoft) (6.7%), which also aid in involvement monitoring. Because traditional training approaches were no longer enough to support mentorship and growth as professionals in this dynamic terrain [digital age], the trainee instructors made a wise decision. This poor acceptance rates might, however, mean that the [trainee] instructors are not conversant with these tools, and that they can use the tools to its full.

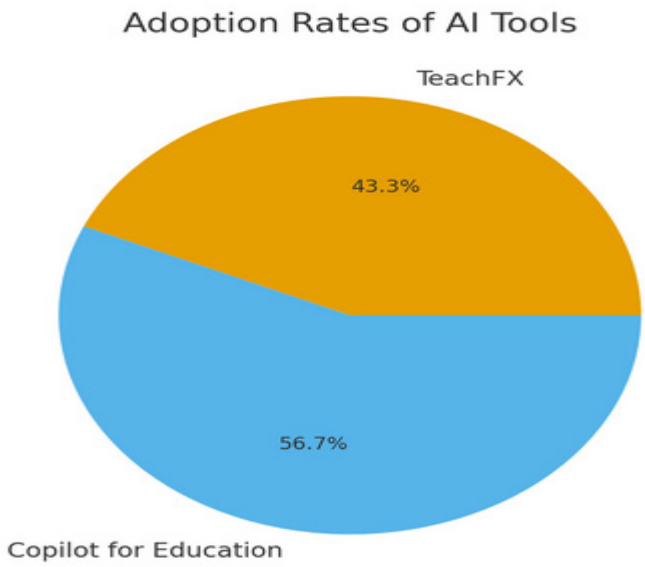

Fig. 4. Adoption rate of AI tools

Major issues of implementing AI

With the further development of AI, teacher training programs can be successfully integrated immediately in AI-driven mentoring tools and educational AI tools. Nevertheless, in spite of all the benefits, such as real-time evaluation of performance and individual learning facilities of the in-service and trainee teachers, there are drawbacks related to the facilitation of its flawless implementation. The identification of the key challenges is essential in order to understand the key barriers, which should be avoided to allow AI to make the teacher training process more efficient. The participants stated the principal challenges they met during placing the professional development resources and AI-based mentoring in the teacher training practicum. A minority of those that were involved (10 percent) two in-service teachers and one trainee teacher had reported that their not so much knowledge on the internet as well as the availability of training opportunity rendered the integration of the tools extremely hard. They have yet to take full advantage of the educational resources, yet the trainee teachers have reported that, they are more digitally literate, particularly when they are exposed to digital services when they are taking courses pertaining to educational technologies. This has allowed them to use AI tools in their instruction. The instructors at the study had indicated that they experienced a similar phenomenon during the practicum, especially in relation to other students and the ones with low technological knowledge. These teachers emphasized that this seems to have been occasioned by the fact that there is no professional development, in particular through providing systematic training courses in teacher training institutions. This can be attributed to the fact that technologies and AI tools are yet to be incorporated in the curriculum to improve teacher confidence.

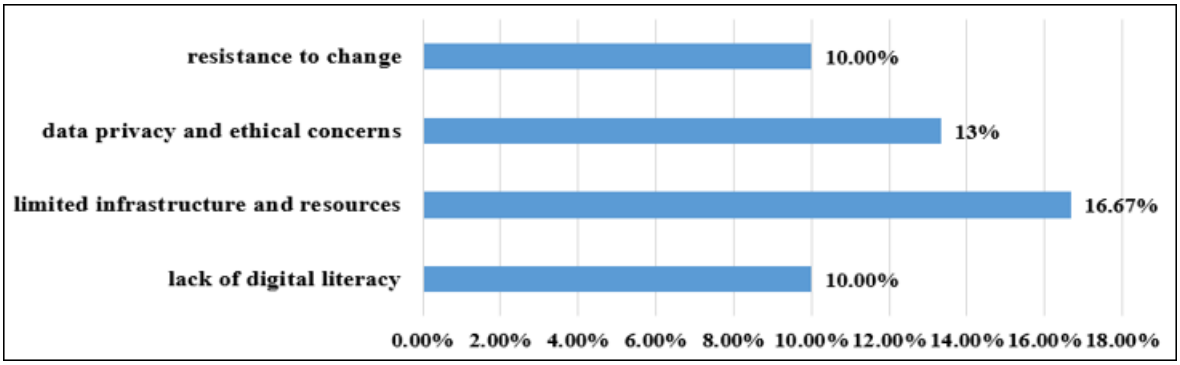

Fig. 3. The main issues affecting integration of AI in teacher training.

Respondents said that despite the useful ideas and practice suggested by AI technologies, there is still a core question to be answered. These teachers need to build the mental skills that will allow them to make sound judgment concerning the lesson planning. Specifically, despite the

help of AI, trainees and in-service teachers have the simplest issue with the comprehension of how to utilize such activities, when it is possible, and why these activities are timely. Prior to the proliferation of AI tools among these teachers, basic skills in planning were required, and that is a problem to this day as well with 16.67% of the respondents proving that it is hard to integrate the solutions because there are no resources and infrastructure. This sample consisted of three trainee teachers along with two in-service teachers who were either at remote places or their schools were considered inferior by other people. The main problem, as these teachers cite, is that Internet connectivity is not even across the board especially among teachers who are one of the highest consumers of the internet in schools. Under institutional support, one teacher claimed that an incomplete institutional support is also another significant challenge which greatly affects their capability to implement and acquire the required skills required to use AI in classroom. To these educators, the process of acquiring the hardware needed: laptops, smart classrooms, and AI-powered learning management systems (LMS), and the class size, becomes one of the major barriers.

Key opportunities of AI

It is important to learn the main opportunities supporting the development of AI-based coaching and professional development tools in teaching during the process of teacher training to facilitate the process of personalization of learning by teachers, their skills improvement, and career advancement. AI solutions are used in personalized learning in different professions in response to teaching whereby real-time feedback and professionally trained development programs are used.With 53.33% of participants—1 in-service teacher and 15 trainee teachers—having this opportunity, educators can acquire immediate, data-driven insights into how well they are teaching, allowing for self-reflection and focused improvement in their areas of weakness.

Figure 4: The opportunities of using AI in professional raining

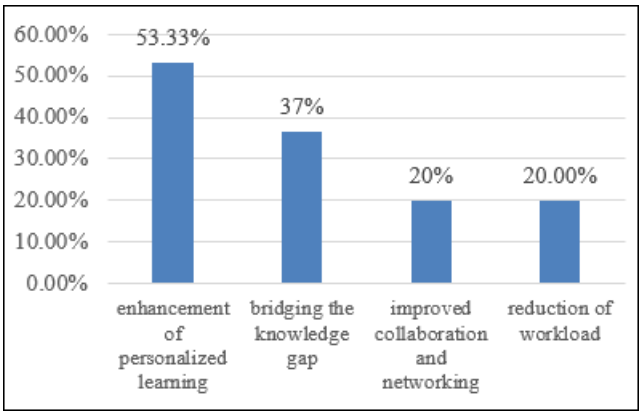

Fig. 4. Key opportunities to integrate AI-driven mentorship and professional development tools in teacher training)

Twenty percent of the participants (six trainee instructors) reported that AI tools have greatly improved networking and collaboration, supporting teacher support and professional development across geographical boundaries. They have stated that although they find the technologies useful for networking and cooperation, they are somewhat constrained by their lack of regular instruction and a lack of confidence in their ability to use them successfully. They continued by saying that they must first have enough experience with these technologies so that they may participate in multidisciplinary learning, ask seasoned mentors for advice, and share best practices. Part-service teachers adopt AI tools for networking and collaboration more slowly than trainee instructors, in part because they are unfamiliar with the technology, which makes them more hesitant. However, 20% of the participants—one in-service teacher and five trainee teachers—reported that AI technologies have reduced their workload by assisting with lesson planning, administrative duties, and assessments. They have benefited from professional development and been able to make sure their classroom obligations are handled thanks to AI tools. However, teachers' excessive reliance on AI tools has raised serious concerns for educators.

Discussions

There has been a contracting opinion about AI from educators both new ones and existing one. This study provides a neutral valuable

insight about AI in education program. It was discovered that trainee teachers largely expressed a more positive attitude to the use of AI tools in education programs than in-service teachers. Throughout the research the new instructors articulated that their knowledge of these technologies were the primary reasons of the differences in their attitudes. Ten percent of the new instructors mentioned that due to the computerization they can easily assess and evaluate pupils. This to some extent reduce their workload in administration. Nonetheless, all the teachers were reluctant to apply AI technologies to professional development. This is because they were worried about their impacts on the development of skills and mentoring. Though the uptake of such programs as Mentorly, CoachHub, and TeachBoost is low, the research found out that a significant proportion of educators took advantage of AI-based mentoring. The further examination of the AI approach to professional development and mentoring showed that 63.3% thought of AI as a personal mentor in the case of AI tools. These were not tutor-specific mentoring equipment, but instead lesson planning tools and on-demand and personalized guidance. The use of AI tools during active learning strategies and classroom management suggests that the integration of AI tools into the pedagogical strategies is not well-researched. The survey also showed that educators are getting worried about the ethical aspect of AI more with the implication. Many educators feel that AI should be used in a responsible manner (Dai et al., 2024). Moreover, due to the lack of in-person training courses, educators can use the professional learning tools that AI provides to a significant extent.

The article demonstrates that applying new learning experiences with scalable and adaptable methods of learning is a promising alternative to teaching. Teachers in their digital pedagogical skills and capitalizing on the transformational benefits of AI tools had a positive implication on teacher education programs. Also, since self-paced learning opportunities of AI-driven applications are possible, teachers can use virtual coaching, on-demand learning courses and automated assessments that are customized. Moreover, as AI is here to remain, there will be further revolution in education systems (Jeong & Ma, 2022). Educational establishments and policymakers will have to actively explore how to carefully implement AI will allow every educator, irrespective of their experience in the relevant field, to succeed in the present digital environment of educational. This AI plays a key role in delivery by empowering them and making them confident in their abilities.

CONCLUSION

The findings show that trainee teachers were optimistic and reluctant to use AI tools among the in-service teachers. It implies the technological distance between prevailing and new hired teachers which should be bridged as soon as possible. Based on the research, mentorship, lesson personalisation with the support of AI, and curriculum development were highly rated as advantages or improvement by those teachers that teach in-service and trainee teachers. The study findings were such that both curriculum preparation and customisation of lessons with the help of AI were regarded as the most beneficial. 63.3% of respondents indicated that they used AI technologies to design lessons and improve creativity. Consequently, they managed to work less, in particular, concerning the administrative duties, and the conceptual knowledge of students was enhanced. The least beneficial aspects in applying AI tools, in their turn, were critical thinking, finding solutions, and managing a classroom, which suggests that there are the areas of concern that need to be covered by giving teachers more experience and training. Besides, there are some tools for education sucha s gramarly are widely used by (46.7%). This tool is widely applied to lesson writing and encourages professional development. It plays a vital role in helping teacher training through AI-based mentorship, immediately after ChatGPT (70%). The career advancement is preferred by teachers, which was demonstrated by the weak introduction of Coursera and LinkedIn Learning AI to suggestions of AI courses.

Among the significant problems distinguished by the study were infrastructure limitations, privacy of the data, and ethical concern, lack of knowledge regarding technology which primarily caused the skepticism of in-service [experienced] instructors, and lack of sufficient instructional resources and tools. These issues can be addressed, as the results indicated that it is necessary to focus on the institutional support provision, intuitive AI tools, and structured AI-based training programs to resolve them. Moreover, AI tools and literacy classes can be included in the teacher training programs to eliminate the digital divide and fully utilize AI. A creation of AI infrastructure and a development of a peer learning program between students and existing educators through mentorship is another possible area in which they can create

public-private alliances and engagement in peer learning.

Recommendation

Teacher training institutes must develop structured AI literacy programs, which allow individuals to train the trainees, in-service educators and certified educators with the required professional and ethical skills and competencies needed to use AI tools. Additionally, legislators and educational institutions must secure funding for professional development and mentoring to improve infrastructure and ensure fair access to AI-powered platforms.

Competing Interests

The authors did not declare any competing interest.

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