LEARNING BRIEF

How Is AI Upgrading Teachers' Roles in Low- and Middle-Income Countries?

AI Observatory

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About the AI Observatory

EdTech Hub's AI Observatory and Action Lab exists to help drive greater equity in learning outcomes in the age of AI. The AI Observatory scans global trends, uses a hypothesis-driven approach to test practical applications, leads innovative pilots, and distils practical insights to support decision-makers in low-and middle-income countries.

Our goal is to ensure AI is integrated effectively and equitably, improving education systems and learning outcomes for all. EdTech Hub's AI Observatory is made possible with the support of the UK's Foreign, Commonwealth and Development Office.
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Abbreviations and acronyms

AI	Artificial Intelligence
LMIC	Low- and middle-income country
RCT	Randomised controlled trial

Why this matters

Artificial Intelligence (AI) is increasingly being leveraged to support teachers in low- and middle-income countries (LMICs) to address teaching challenges. Teachers in LMICs often face challenges such as overcrowded classrooms, poor teaching conditions, a lack of teacher materials and resources, and poor quality training (↑Amiri, 2025; ↑Amoah-Oppong et al., 2025; ↑Eke, 2024; ↑Henkel et al., 2024; ↑Nyaaba, 2024). AI (including machine learning and predictive and generative AI) can potentially enhance teaching by automating routine tasks, supporting lesson planning and assessment, personalising learning, improving accessibility, and reshaping pedagogy (↑Bozkurt et al., 2024; ↑Ogoke et al., 2025). While AI could help overcome educational barriers in LMICs, concerns include limited teacher professional development, verifying the authenticity of students' work, unreliable or irrelevant AI outputs, loss of professional skills, and potential job displacement (↑Bozkurt et al., 2024).

At a system level, teachers' use of AI is shaped by broader concerns, including limited digital infrastructure and device access, persistent digital divides, absent or unclear policies and governance frameworks, ethical and safeguarding risks, and the rapidly evolving AI landscape, which demands continual adaptation and lifelong learning. While these wider issues are critical, this brief will address them only where they directly intersect with teachers' roles, as each issue could warrant a stand-alone analysis.

In this learning brief series, we're exploring the extent to which AI is upgrading, disrupting, and transforming teachers' roles in LMICs. This topic focuses on the 'empowered teachers' North Star', one of the 'Six North Stars' identified by EdTech Hub's AI Observatory as key leverage points for change to narrow the learning divide in the age of AI (↑Luz et al., 2025). We draw on the Three Horizons Theoretical Framework of EdTech Hub's AI Observatory (↑Luz et al., 2025), using the descriptions of each 'horizon' to envision what upgrading, disrupting, and transforming mean in the context of AI's impact on teachers' roles (see Table 1). Having a systematic view of education and a long-term view of its goals helps us spot the key leverage points for change, so we can shape what we learn, how we teach, and how education systems are run and designed to keep pace with AI's impact on learning and systems.

Table 1. EdTech Hub's Three Horizons Framework for empowering teachers

Three Horizons	What does this mean for empowering teachers?	Use cases
Horizon 1: Current dominant system, where change happens incrementally within existing structures.	**UPGRADE** Early integration of AI into teachers' roles, where some existing tasks and processes become streamlined or enhanced, while new demands emerge around oversight, adaptation, and judgement.	■ **AI for content creation and lesson planning** ■ **AI for administrative tasks** ■ **AI for assessments, grading, and feedback** ■ **AI for professional development and coaching**
Horizon 2: Turbulent space of innovation & experimentation as society shifts from the status quo to a new paradigm.	**DISRUPT** AI use is increasingly formally evaluated and embedded in teaching, addressing some early identified issues and disrupting aspects of teachers' roles in ways that shift their practice or time allocation.	■ **AI-powered digital personalised learning** ■ **AI tutor chatbots** ■ **AI teaching assistants** ■ **AI-powered inclusive education and language accessibility**
Horizon 3: Radical new visions of the future that exist on the fringes today compete to become the dominant system.	**TRANSFORM** The role of teachers is fundamentally changed, with AI being a core facet of the teaching and learning experience in novel ways.	■ **'Teacherless' classrooms** ■ **Teacher-AI complementarity and hybrid intelligence** ■ **Multi-intelligence learning in unbound learning environments**

This learning brief is the first in a series of three on the impact of AI on teachers' roles. It maps the present and emerging visions of AI use in LMICs to understand the extent to which AI can 'upgrade' teachers' roles (Horizon 1). Companion briefs focus on the extent to which AI can 'disrupt' (Horizon 2) and 'transform' (Horizon 3) teachers' roles (↑Adam, 2026; ↑Adam & Lester, 2025). By presenting AI integration in education along these horizons, we hope to make system shifts feel more navigable for educators.

What we're learning

This section outlines the primary use case categories of AI for 'upgrading' teachers' roles and their ability to teach in LMICs. The use cases chosen for the 'upgrade' horizon aim to automate and improve existing activities that teachers already undertake in current education systems, without currently extending or fundamentally changing their roles.

For each use case, we describe:

- The contextual challenges that teachers experience before AI use.
- The value AI can provide to address their challenges and / or provide them with additional support.
- Examples or evidence available to illustrate the current or potential value.
- The complications, risks, or concerns that may arise from such use.

While examples from LMICs are prioritised, we also draw on examples from other countries, where relevant.

AI for content creation and lesson planning

Contextual challenge

Teachers in LMICs often face time constraints and struggle to access resources such as lesson plans, workbooks, assessments, and instructional materials. While Open Educational Resources aim to address the issue of access to materials, adapting and contextualising such resources often takes time and skills that teachers in under-resourced schools do not have (↑Hodgkinson-Williams et al., 2017).

Potential value of AI

AI tools are assisting teachers in developing high-quality, curriculum-aligned lesson plans and creating engaging educational materials, such as quizzes, question banks, worksheets, and exercises, even in low-resource settings. Materials can be adapted by AI to make them more locally, culturally, and linguistically relevant, as well as tailored to students' unique needs (e.g., differentiated reading excerpts adjusted to students' reading levels). Furthermore, AI can support more dynamic lesson planning, adapting the learning journey to be more inquiry-driven,

based on learners' interests and current affairs. AI can generate games, simulations, and classroom activities that can make lessons more engaging and relevant.

Examples and evidence

The following examples illustrate where content creation and lesson planning were the primary focus of the programme or product.[1]

In Nigeria, the Teachers Registration Council is planning to roll out AI-generated lesson plans nationwide, along with training sessions for all teachers, to reduce teachers' preparation time. This initiative aims to ease the burden of lesson planning by providing contextualised, curriculum-aligned content generated by AI. The platform is tailored to Nigeria's unique needs, providing offline-ready formats and showcasing Nigerian history and culture in lessons (↑NM Partners, 2025; ↑Tolu-Kolawole, 2025).

In England, a randomised controlled trial (RCT) found that science teachers using ChatGPT for lesson and resource planning, along with a guide, cut their planning time by about 31% (↑Roy et al., 2024), although ChatGPT usage decreased as the trial progressed. Similarly, another RCT is being conducted on Aila, a free, AI-powered lesson assistant developed by Oak National Academy[2] under the guidance of UK curriculum experts (↑EEF, 2025).

In South Korea, a USD 70 million initiative to deploy AI-powered digital textbooks faltered amid low uptake and strong opposition (↑Asim et al., 2024; ↑Sheffey, 2025). Although the plan aimed to reach all schools by 2025, fewer than 30% adopted the tools. Teachers and parents complained of insufficient training, increased workloads, and rushed implementation. A survey found 87.4% of teachers felt unprepared and demanded greater input and choice. The episode illustrates that without a grounding in teacher needs, agency, and adequate professional development, AI reforms struggle to stick.

[1] Where lesson planning is one feature among others, it is captured in the professional development and coaching use case below, and / or under the AI teaching assistants use case (see learning brief on how AI is disrupting teachers' roles (↑Adam & Lester, 2025).

[2] See https://www.thenational.academy/. Retrieved 15 November 2025.

Content creation and lesson planning: AI use case summary

The early insights outlined above show that using AI for content creation and lesson planning can support teachers, though how it is used can impact its effectiveness. In LMICs, the approach, whereby a national body contextualises and curates lesson planning (e.g., in Nigeria), can ease teachers' workloads, though it may remove some of their agency and autonomy. AI lesson planning platforms designed for the country context (e.g., curriculum-aligned) — rather than directly using Large Language Models (LLMs) — can simplify the task of alignment and ensure guardrails are in place. While the direct use of ChatGPT for lesson planning was found to be effective in England, certain prerequisites, such as critical digital literacy and teacher professional development (TPD) in the use of AI, must be in place to ensure all teachers can benefit equitably. Crucially, as illustrated in the example from South Korea, teacher buy-in and co-design are essential for effective use by teachers.

Risks and concerns regarding AI use

AI tools for this use case may have limited ability to adapt to local cultures, languages, and contexts in non-superficial ways, as the nuances of these realities are not always explicitly or digitally captured. The pedagogical diversity of outputs depends on effective prompting (e.g., when it might be better pedagogically to use a summative test to evaluate learning or have an interactive debate to engage learners in diverse perspectives), requiring teachers' awareness of pedagogical possibilities and TPD in prompting for the best outputs. Moreover, content produced by untailored LLMs (e.g., directly from ChatGPT) may not align with national curricula, assessment standards, and national exams, especially when AI-generated content draws on materials from high-income contexts and their curricular frameworks. AI-generated lesson plans and content require critical professional discernment from teachers to ensure alignment and avoid bias.

AI for administrative tasks, classroom management, and data-driven insights

Contextual challenge

Teachers in LMICs spend substantial time on non-teaching duties, such as taking attendance, compiling reports, scheduling classes, communicating with parents, and managing resources. These add to teachers' workload pressures, especially in under-resourced schools with teacher shortages and large classroom sizes that make management difficult. Digitally enabled solutions, such as EdTrac[3] and Tangerine:Teach,[4] have used low-tech solutions for over a decade to track teacher and pupil attendance, curriculum progress, and infrastructure status, among other features (↑UNICEF Uganda, 2025).

Potential value of AI

AI-enabled tools can streamline and automate routine administrative functions such as attendance tracking, timetable scheduling, parent communication, data entry, and report generation. By reducing the need for manual input, these tools can help alleviate the administrative burden on teachers, enabling them to focus more on pedagogical and relational aspects of their work. Data-driven insights[5] can help monitor attendance, reduce absenteeism, and support at-risk learners and schools. In LMICs, where teachers often manage large class sizes, classroom management tools and data-driven insights can help teachers organise more efficient learning environments.

Examples and evidence

Little evidence is available on the uptake and effectiveness of AI-enabled tools, and platforms are vague about exactly how their features leverage AI (beyond conventional digital tools). The following examples illustrate some

[3] See https://www.unicef.org/uganda/what-we-do/edutrac. Retrieved 21 November 2025.

[4] See https://www.tangerinecentral.org/tangerineteach. Retrieved 21 November 2025.

[5] The term 'data-driven insights' is used for administrative, non-pedagogical use of data. In other parts of this report, 'learning analytics' is used to refer to data on monitoring student's progress.

uses of AI for administrative tasks, classroom management, and data-driven insights.

ClassDojo,[6] **used in over 180 countries**, helps teachers, students, and families communicate, build classroom culture, share photos / videos of classroom activities, support social and emotional learning, and create student portfolios. ClassDojo's Sidekick[7] AI assistants can generate draft messages, report card comments, or story posts, in addition to other pedagogical uses. The ClassDojo for Districts platform offers AI enhancements to help unify communication, streamline oversight, and manage messaging at scale, including automated translations, message targeting, and behaviour management tools designed to save teachers time (↑EWA, 2025).

TeacherKit,[8] available in seven languages, helps teachers manage their classroom by tracking attendance and behaviour, recording grades, and organising seating charts. It simplifies administrative tasks, allowing teachers to focus more on instruction. TeacherKit leverages AI to analyse student data, manage classroom supplies, and support timetable scheduling (↑Chris, 2024).

In Assam, India, the government introduced the **Shiksha Setu Axom**[9] app as an AI-powered tool to streamline school administration[10] by using facial recognition for student and teacher attendance. Serving over 5 million users, it enabled real-time monitoring, eliminated more than 300,000 duplicate ('ghost') student records, curbed unauthorised teacher leave, and reportedly saved over INR 100 crore[11] annually (↑Kalita, 2025). However, teachers and schools reported dissatisfaction due to poor performance in low light, weak group scanning, which resulted in teachers spending additional time scanning each individual learner, and difficulties with use in

[6] See https://www.classdojo.com/. Retrieved 21 November 2025.

[7] See https://ai.classdojo.com/. Retrieved 21 November 2025.

[8] See https://www.teacherkit.net/. Retrieved 21 November 2025.

[9] See https://play.google.com/store/apps/details?id=com.ssa.axom&hl=en_CA. Retrieved 21 November 2025.

[10] In India, where attendance of learners and teachers is low, the purpose of these systems is more about improving cost-efficiency in government spending, than reducing teacher workload.

[11] One crore = 10 million.

low-connectivity areas (↑NE NOW NEWS, 2025). Similarly, in the state of Karnataka, plans to use mobile facial recognition for attendance and welfare tracking are facing backlash from teachers, parents, and civil groups over risks of biometric data misuse and child exploitation (↑Express News Service, 2025; ↑Sarkar, 2025).

In Australia, there was low uptake of facial recognition software to automate roll-call at the beginning of a lesson; this was despite the products being self-contained, with no stored images to address privacy concerns (↑Selwyn, 2022). Stakeholders viewed the use of facial recognition for roll-call as an excessive solution to a relatively minor problem. Furthermore, teachers discussed the relational benefits of roll-call, such as a welcoming commencement activity to formally start the lesson, a way to learn students' names and interact with them, and a way for students to learn each other's names and offer care / concern for absent students (↑Selwyn, 2022).

Administrative tasks, classroom management, and data-driven insights: AI use case summary

Thus far, the limited evidence on AI's ability to alleviate administrative tasks in LMICs is inconclusive. Except for the above-mentioned examples from India, there are few AI tools designed to support teachers in LMICs with administrative tasks. The design and features of generic AI tools for administrative tasks, such as emailing parents, are often not as relevant in low-resource contexts. Such tools also assume a digitally savvy teacher who has access to a device. Furthermore, the specific use case of facial recognition in schools for basic tasks, such as attendance tracking, has received pushback from various stakeholders, highlighting potential risks and the need to prioritise student safety and privacy over efficiency gains.

Risks and concerns using AI

While products using AI for administrative tasks often claim to eliminate human error and save time, AI systems are also prone to making errors due to faulty data, algorithmic biases, or software glitches (↑Selwyn, 2022). These inaccuracies necessitate additional time from teachers to ensure the quality of outputs, thereby undermining the anticipated efficiency gains (↑Selwyn et al., 2025). Furthermore, the loss of human

oversight in these processes can reduce accountability, leaving teachers less able to manage administrative tasks manually if the systems fail. Tasks often deemed educationally unproductive, such as tracking attendance, are frequently intertwined with social and pedagogical roles (↑Selwyn, 2022). Automating these tasks may overlook their broader educational value.

Regarding the use of facial recognition technology, the above-mentioned examples raise significant privacy concerns, illustrate low teacher buy-in, and can inadvertently increase teacher workload (↑Selwyn, 2022). Such solutions can be overly excessive responses to address the problems at hand. Furthermore, studies such as ↑Niculescu et al. (2025) are experimenting with the use of AI for performance and behavioural measures for teaching and classroom management, without considering privacy rights, ethical risks, and surveillance issues. While these systems can be used to support learners "at risk", they can also be misused to mark learners as "a risk" (↑Qurashi, 2018).

AI for assessments, grading, and feedback

Contextual challenge

A significant hurdle in LMICs is the combination of large student populations and time constraints, which often results in superficial grading and inconsistent standards, further exacerbated by minimal teacher training in test construction and assessment. These challenges have been noted in Nigerian schools (↑Yakubu et al., 2024).

Potential value of AI

AI tools can offer efficient and insightful ways to assess student understanding and provide timely feedback. They can automate the generation and scoring of assessments, from multiple-choice questions to long-form essays, including handwritten and verbal formats. Additionally, such tools can provide faster feedback to students. AI can also analyse student performance data to identify learning gaps.

Examples and evidence

From basic education to higher education, there is a range of examples on using AI for assessments, grading, and feedback, and many studies are emerging to evaluate effectiveness.

In India, an Oral Reading Fluency (ORF)[12] tool ('Vaachan Samiksha' in Hindi) listens to students read aloud and automatically transcribes their speech. The AI tool detects mispronunciations, skipped or misread words, and calculates an overall fluency score. It significantly accelerates the assessment process and helps capture digital reading records for each learner. It uses advanced Automatic Speech Recognition models, fine-tuned for Indic languages and student voices. As of March 2025, the tool has been used to conduct over 3.6 million oral-read assessments across 33,000 schools in Gujarat, in partnership with the state government.

In South Africa, EGRA-AI[13] automates and scales foundational reading assessments in Sepedi and isiXhosa. This innovation aims to reduce the costs and resource demands of traditional one-on-one evaluations while improving accessibility and accuracy. The AI model for isiXhosa achieved ~95% item-level accuracy for items where all three human annotators agreed (↑AI-for-Education, 2025). Technical issues included background noise, difficulty deciphering short utterances, and lower performance with letters than with words.

In Morocco, following the introduction and use of an intervention guide, English as a Foreign Language (EFL) teachers showed enhanced performance in designing prompts for ChatGPT to generate formal assessments, demonstrating improved understanding of test construction principles and effective prompt design techniques (↑Maryam & Jamaa, 2025). This intervention is an example of improved teacher skills in leveraging the AI tool.

In Germany, a study compared LLM-based scoring of multidimensional essays with teacher scoring and found that GPT-3.5, GPT-4, and o1 achieved moderate to good reliability (↑Seßler et al., 2025). However, some models consistently gave higher scores than human tutors, suggesting a tendency to overrate. GPT-4, in particular, placed greater weight on features such as spelling, punctuation, and verbal imagery, raising concerns that LLMs may

[12] See https://www.wadhwaniai.org/. Retrieved 21 November 2025.

[13] See https://ai-for-education.org/lbd-egra-ai /. Retrieved 21 November 2025.

prioritise form over deeper content analysis. Another study in Saudi Arabia, however, found that AI tools consistently graded lower than humans while providing more robust feedback (↑Almegren et al., 2024). A third study from the USA found that GPT-4 and humans scored similarly, while AI grading tended to be more generous towards lower-performing students and harsher towards higher-performing students, indicating proportional bias (↑Wetzler et al., 2024).

Assessments, grading, and feedback: AI use case summary

Different assessment types entail different considerations when evaluating effectiveness. For reading assessment, as in the India and South Africa examples, the evidence emerging is that AI can be quite effective at assessing fluency, has adapted well to local languages (after training), and, with further training, could address the areas where AI does not yet perform well. For assessing essays directly with LLMs, the results are mixed and depend heavily on the prompts and rubrics provided to the LLM, as well as the training data it uses to benchmark quality. Importantly, teachers need training to understand assessment construction and effective prompting techniques to make effective and reliable use of AI for assessment.

Risks and concerns using AI

The integration of AI in assessment, grading, and feedback raises multiple ethical, technical, and pedagogical concerns. Data privacy and security pose significant risks, including potential leaks, breaches, and misuse of sensitive student data (↑Stefanus et al., 2025). AI grading tools may provide incorrect or misleading feedback, undermining trustworthiness (↑Egara & Mosimege, 2024), and struggle with nuanced writing or children's voices, limiting effectiveness (↑Verma et al., 2025). Additionally, essays that do not follow AI conventions may be downgraded, and teachers worry about the lack of transparency in AI decision-making and the potential for the perpetuation of bias (↑Akanzire et al., 2023). Algorithmic bias is a serious concern, as AI models trained on biased datasets can reinforce socioeconomic disparities or produce discriminatory outcomes (↑Ogbu Eke, 2024). Mitigating these issues often requires teachers to provide rubrics and annotated training data, which increases their workload and requires advanced AI skills. From a relational perspective, students have also

exhibited mistrust of AI-only feedback, preferring personalised responses that include empathy and pedagogical insight (↑Nazaretsky et al., 2024; ↑Zhang et al., 2025). Moreover, overreliance on AI may encourage formulaic essay writing aimed at satisfying algorithms, narrowing learning, and limiting creativity and critical thinking.

AI use in professional development and coaching

Contextual challenge

In LMICs, teacher professional development (TPD) is often limited to occasional workshops rather than incorporating sustained, practice-based training. Factors such as teacher shortages, weak leadership, and policy misalignment, alongside scarce resources, unreliable infrastructure, and limited funding, further limit effectiveness (↑Hennessy et al., 2022; ↑Nyaaba, 2024; ↑Popova et al., 2018). Additional barriers include a lack of skilled coaches, heavy workloads, mistrust of coaching perceived as evaluative, and weak pre-service preparation, leaving many teachers with low pedagogical or subject knowledge (↑Hennessy et al., 2022; ↑ Kraft et al., 2018; ↑Westbrook et al., 2013). To address these issues, technology-mediated solutions have been piloted or scaled: asynchronous online courses and video tools allow teachers to access training on their own schedule; mobile learning apps deliver localised professional development (PD) modules even in low-connectivity areas; blended coaching models combine in-person and remote mentoring; peer communities of practice via messaging or video conferencing reduce isolation; and platforms with adaptive content and feedback support differentiated learning for teachers (↑Hennessy et al., 2022).

Potential value of AI

AI can expand opportunities for ongoing TPD and instructional coaching through technology-mediated solutions. AI can create personalised learning paths for teachers by analysing their skills, subject knowledge, and classroom needs to recommend relevant PD modules (↑Nye, 2025). AI can provide advice and automated feedback on teachers' lesson plans, classroom recordings, or student assessments, supporting real-time diagnostic reasoning and enhancing pedagogical skills (↑Cukurova et al., 2024; ↑Demszky et al., 2023). Scalable coaching via AI-powered chatbots or virtual mentors provides guidance when human coaches are scarce. By

aggregating performance and engagement data, AI can identify knowledge gaps and suggest targeted interventions. Interactive simulations or scenario-based exercises allow teachers to practice classroom management, differentiated instruction, and culturally responsive teaching (↑Cukurova et al., 2024). Overall, AI can make TPD more adaptive, targeted, and practical, which is particularly valuable in LMIC contexts with limited resources and access to expert coaching.

Examples and evidence

Despite its potential, there are remarkably few examples of AI-enhanced TPD in LMICs. The majority of discussions on TPD focus on the new AI skills and competencies teachers require, rather than on how the quality or efficiency of TPD can be improved with AI. A few notable examples are listed below.

TheTeacher.AI[14] is an AI-powered chatbot deployed via WhatsApp to support teachers in Sierra Leone with subject knowledge clarification, lesson planning, and on-demand professional development support through chatting. A pilot study involving 195 teachers across 55 schools in Port Loko explored the impact of varying support levels — from basic access to in-school coaching — on usage patterns and teacher outcomes. Early findings show most queries are related to content clarification (48%) and lesson planning (21%) (↑Fabdata.io, 2025; ↑Mansaray et al., 2025). In addition, ↑Björkegren et al. (2025) evaluated the use of TheTeacher.AI chatbot in Sierra Leone, in its ability to assist teachers with professional development and instruction. Teachers reported preferring the Teacher.AI over web search for multiple reasons, including that it gives a useful answer right away (85%), it is more concise (78%), it is perceived as more trustworthy (72%), and it creates content that cannot be found on the web (66%), such as localised stories with specific characters and morals tailored to Sierra Leone. The chatbot was remarkably cost-effective, being 87% less expensive than web search, primarily due to lower mobile data transfer requirements (↑Björkegren et al., 2025). Some teachers struggled to craft queries that the chatbot could usefully answer, highlighting the need for training (↑Björkegren et al., 2025).

[14] See https://theteacher.ai/. Retrieved on 21 November 2025.

In Andhra Pradesh, India, ConveGenius TPD Bot,[15] has launched a scalable, mobile-first platform designed to enhance teacher training. Developed in collaboration with the state administration, the TPD Bot delivers curriculum-aligned courses, teaching resources, lesson plans, certifications, and real-time insights through a chat-based interface, making TPD more accessible and continuous. In partnership with Cambridge University, it provides globally accredited content tailored to local contexts, benefiting over 33,000 teachers across 12 districts.

Regarding TPD on the use of AI, 6000 secondary school teachers were trained on the integration of AI into their teaching in Nigeria (↑Ojoko, 2025). Similarly, in Rwanda, 150 master teachers were trained to equip educators with the tools to incorporate AI into their existing ICT curriculum, preparing students not only to use AI but to think critically and ethically about AI's role in society (↑Williams, 2025). There are similar AI teacher training programmes in Zimbabwe (↑Herald, 2025), Namibia (↑Xinhua, 2025), and across Africa (↑Daily Guide Network, 2025).

Regarding pre-service teacher training, a study in Germany evaluated the impact of AI-adaptive feedback (as opposed to expert human feedback) on 178 trainee teachers who assessed simulated pupils. Findings revealed that adaptive feedback improved the quality of justifications, but not diagnostic accuracy (↑Sailer et al., 2023). Other use cases for pre-service teachers include AI-based classroom simulators such as GPTeach and Mursion, which allow trainees to rehearse teaching strategies, practice classroom discourse, and iterate on responses in risk-free, scalable settings, thereby improving competence and confidence (↑Cohen et al., 2020; ↑Markel et al., 2023). A recent study by ↑Guan et al. (2025), however, found that trainee teachers need a greater understanding of AI fundamentals and ethics, and more support in leveraging dynamic, collaborative AI-integrated education.

Professional development and coaching: AI use case summary

The above examples and evidence show great promise for AI to support both in-service and pre-service teachers. Features that appear to improve the quality of AI TPD offerings include: tailoring tools to the

[15] See https://convegenius.com/cambridge-university-partners.html. Retrieved on 21 November 2025.

context and the curriculum, keeping data costs low or designing offline compatible solutions, using platforms that teachers are already familiar with (e.g., WhatsApp in the case of TheTeacher.AI),[16] and supporting teachers with developing AI literacy skills such as prompting to use the AI-powered TPD tools more effectively. Thus, the introduction of AI-powered TPD tools and programmes needs to be coupled with training on how to use AI in professional development. While AI-powered TPD chatbots can provide polished answers and teachers appreciate this over the labour of web searching, such answers may not be accurate (although they may be perceived as such). Indeed, they may reduce opportunities for teachers to exercise their professional judgement. Chat-based and visually simulated learning environments appear to have potential for supporting teachers in developing their skills. However, interventions and studies of this approach have not been conducted in LMICs nor tailored to low-resource contexts. Given the shortage of coaches and the infrequency of coaching opportunities for teachers in LMICs, the above examples have shown that AI can provide real-time coaching. However, further long-term research is needed on the quality and effectiveness of this coaching model, particularly in light of studies that demonstrate reduced impact of remote coaching over time due to reduced accountability and support (↑Cilliers et al., 2022). AI use in TPD and coaching can provide an effective supplement to TPD needs, particularly in its ability to offer real-time, cost-effective support. Still, caution should be taken before substituting in-person TPD with AI in totality, as many characteristics of effective TPD depend on relational aspects such as mentorship and peer-to-peer learning (↑Allier-Gagneur et al., 2020).

Risks and concerns using AI

The use of AI in TPD in LMICs has not addressed many of the basic challenges that tech-mediated TPD has faced. Limited internet connectivity, unreliable electricity, lack of devices, and low digital literacy can reinforce inequities, privileging teachers with access while excluding others (↑Amoah-Oppong et al., 2025). Teachers may distrust AI tools, fearing government surveillance or perceiving them as evaluative rather than supportive, which can reduce engagement. AI outputs can be biased, inaccurate, or contextually irrelevant, requiring teachers to

[16] See http://TheTeacher.AI. Retrieved 21 November 2025.

perform hidden labour to review and adapt materials (↑Björkegren et al., 2025). High costs and sustainability challenges, digital fatigue, burnout, and insufficient incentives further undermine effectiveness (↑Duan & Zhao, 2024; ↑Teacher Task Force, 2025). Generative AI may inadvertently shift focus from critical thinking to verifying AI outputs, potentially reducing the diversity of ideas (↑Nyaaba, 2024; ↑Doshi & Hauser, 2024). It is crucial that AI for TPD does not transfer decision-making power from teachers and teacher trainers to AI system designers and developers (↑Teacher Task Force, 2025).

Navigating what's ahead

As AI is increasingly introduced into teaching and learning, we must ensure its integration is not only effective but also equitable, sustainable, and human-centred, enhancing learning opportunities for all. The following recommendations offer ways forward for using AI to upgrade teachers' roles.

1. Conduct further research on AI that can upgrade teachers' roles.

In the four use cases highlighted in this brief, there are many gaps and opportunities for further investigation.

AI for content creation and lesson planning

- Investigate the contextual adaptations and professional development required across different LMICs to support teachers in effectively using AI-enhanced content creation and lesson-planning tools.
- Investigate the approach in which national bodies contextualise and curate lesson planning using AI tools rather than teachers, and evaluate the benefits and drawbacks.
- Quantify the efficiency gains in using AI-enhanced content creation and lesson planning tools over time, as well as the risks and harms to teachers over time (e.g., loss of agency or professional discernment).

AI for administrative tasks, classroom management, and data-driven insights

- Investigate the administrative needs of teachers in LMICs and how AI can support streamlining them.
- Quantify the efficiency gains in using AI for administrative tasks, classroom management, and data-driven insights over time, as well as the risks and harms to teachers and learners over time (e.g., privacy rights, ethical risks and surveillance issues, loss of engagement opportunities with learners).
- Critically evaluate the benefits and harms of facial recognition tools in school settings and the long-term risks to students.

AI for assessments, grading, and feedback

- Investigate the effectiveness of AI for reading assessments in various local languages, and how the tools can be improved to address current limitations.
- Conduct a systematic review or meta-analysis on the many studies emerging regarding using AI to assess long-form essays, evaluating the factors that lead to more reliable and high-quality assessment and feedback, including limiting bias.
- Investigate the impact of AI assessment on the creativity and divergent thinking represented in students' essays, as well as students' preferences regarding human or AI graders.

AI use in professional development and coaching

- Investigate the impact of AI-powered TPD chatbots versus traditional (and tech-supported) TPD and coaching on students' learning outcomes, as well as cost-effectiveness comparisons.
- Investigate how chat-based and visually simulated learning environments can be contextually designed to support pre-service and in-service teachers in LMICs.
- Investigate the impact of increased use of AI by teachers (whether for AI-enhanced TPD or TPD on the use of AI), considering impacts such as digital fatigue, burnout, infrastructural challenges, and the demands of continual adaptation and lifelong learning.

2. Co-design and test with teachers

Given the rapid evolution of AI, longitudinal studies, RCTs, and meta-analyses, while essential, should be complemented with rapid, iterative evaluation methods from implementation science to contextualise findings and identify effective implementation conditions. User participation — including districts, teachers, learners, and parents — in research and AI design processes is critical to ensure contextual relevance and adoption. Testbeds and national initiatives, such as the EdTech Hub's teacher-in-the-lead sandboxes,[17] Global EdTech Testbed Network,[18] WISE

[17] See https://edtechhub.org/2025/10/03/teachers-shaping-the-role-of-ai-in-education/. Retrieved 21 November 2025.

[18] See https://globaledtech.org/. Retrieved 21 November 2025.

EdTech Testbeds,[19] and TIDE[20] (Teaching Improvement Through Data and Evaluation) programmes, offer promising models for structured, context-sensitive evaluation (↑Plaut, 2025; ↑Vanbecelaere et al., 2023). Prioritising low-tech, high-impact, cost-effective solutions alongside timely research will help optimise AI's benefits while mitigating risks and inequities. While co-designing with teachers is key to supporting teacher agency, teachers' time must be remunerated, and caution should be taken to not overburden them.

3. Design use cases which prevent deepening the digital divide

In many LMIC contexts, access to reliable internet, electricity, and digital devices is inconsistent, while educators' and students' digital literacy is uneven, limiting the effective use of AI tools in classrooms. Financial constraints exacerbate these inequities. Developers, researchers, and teachers can mitigate these disparities by advocating for and intentionally designing culturally and contextually appropriate, low-cost, low-bandwidth AI tools with offline capabilities and multi-language resources.

4. Invest in teacher professional development

To ensure the effective and ethical integration of AI in education, substantial investment in robust TPD programmes for teachers in LMICs is essential (↑Major et al., 2021; ↑Jatileni et al., 2023; ↑Sun et al., 2024). In addition to basic TPD needs, these programmes should equip educators with the knowledge and skills to teach AI concepts, integrate AI into curricula, and utilise AI tools for pedagogical tasks, including prompt design, test construction, and adaptive instruction (↑Nyaaba, 2024). Holistic AI competency frameworks, such as UNESCO's AI Competency Framework for Teachers and the European Commission's DigCompEdu, emphasise understanding AI strengths, limitations, biases, and socio-ethical implications, enabling teachers to critically evaluate AI outputs and maintain professional judgment (↑Teacher Task Force, 2025).

PD initiatives should prioritise ethical reflection, teacher autonomy, and critical engagement, empowering educators to decide whether AI aligns

[19] See https://www.wise-qatar.org/edtech-testbed/. Retrieved 21 November 2025.

[20] See https://niot.org.uk/research-projects/teacher_improvement_through_data_evaluation_tide. Retrieved 21 November 2025.

with educational goals and when it should be resisted (↑Teacher Task Force, 2025). Evidence shows that adoption depends not only on the quality of AI tools but also on manageable workloads, confidence, supportive infrastructure, and teacher ownership of AI integration (↑Cukurova et al., 2023). Training must address the hidden labour involved in reviewing, adapting, or correcting AI-generated content, ensuring teachers' pedagogical expertise is not eroded over time (↑Felix & Webb, 2025; ↑Selwyn et al., 2025).

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