

Role of Artificial Intelligence in Education: Opportunities, Constraints and Policy to Practice Pathway for Pakistan

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Abstract

The use of Artificial Intelligence in education is transforming the global educational landscape through the adoption of tutoring, automated evaluation, learning analytics, and generative technologies. The educational impact of AI in Pakistan is limited by structural factors, including disparate connectivity, limited device access, inequitable school infrastructure, teacher capacity issues, and management challenges. The article is a synthesis of evidence from peer-reviewed articles and other key policy and statistical sources to map the current AI-in-education landscape in Pakistan and to suggest a non-theoretical pathway from pilots to scalable reform. Based on the structured literature review and triangulation of secondary data (national education statistics, telecom and internet indicators, and policy documents), we can determine where AI can reasonably provide value: teacher support, formative assessment, targeted remediation, and administrative efficiency; and not just in higher education and blended-learning settings. Findings indicate a stable trend: perceived learning gains increase with the combination of AI and teacher training, along with a clear assessment policy, and the risk factors center on equity, academic integrity, privacy, and poor institutional preparedness. The paper concludes with policy and implementation recommendations aligned with Pakistan's AI and education reform directions.

Keywords: Artificial Intelligence, AI in Education, Generative AI, Higher Education.

Introduction

Artificial intelligence in education no longer exists behind the closed doors of research centers or as a small-scale education experiment; it is now used in everyday learning through adaptive practice systems, automated feedback, learning analytics, and, most notably, generative AI systems to aid explanation, translation, drafting, and question generation. It has induced a swift proliferation of scholarly interest in AI's role in instruction, testing, and administration, and

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heightened anxieties about ethics, equity, and fair policy in the actual classroom (Zawacki-Richter et al., 2019; Chiu et al., 2023; Wang, 2024; Garzon et al., 2025). However, much of the discourse on AI in education continues to assume that key requirements, such as reliable internet connectivity, access to devices, institutional readiness, trained instructors, and data protection, are unequally distributed, especially in low- and middle-income contexts (UNESCO, 2023). The case of Pakistan in particular is thus a made-to-order crisis: it is both a high-youth and growing-digital-adoption country and a country with structural inequalities in its schooling, infrastructure, and access to learning-opportunities: The combination of these two factors can turn AI into a solution, but rather tight-rope-walking where AI can widen the existing disparities (UNESCO, 2023; World Bank, 2021).

The assessment of AI in Pakistan should be realistic, but it should start with its limitations rather than its ambitions. National education statistics are spectacles of the enormity and complexity of the system's conception, encompassing hundreds of thousands of institutions and tens of millions of learners, making logistics and the ability to govern decisive, not optional (Pakistan Education Statistics 2022-23). Simultaneously, the learning environment is marked by disparate facilities, differences in teacher capacity, and high levels of interprovincial and rural-urban variation, which make it difficult to implement digital interventions consistently, maintain them, and evaluate their effectiveness. Such realities directly connect with AI, as most AI-powered learning designs presuppose reliable electricity, foreseeable connectivity, and daily access to equipment by students and educators. In cases where such prerequisites do not exist or are inconsistent, AI will serve as a transient exposure rather than an integrated instructional practice, which, again, will have a limited effect and make evaluation complex (UNESCO, 2023).

The digital divide is no abstract issue in Pakistan; it has tangible, practical implications for the viability of education. The 2021 World Bank analysis showed that data on internet access and access to a laptop or computer were limited to a minority of households during the COVID-19 disruption, and an even smaller fraction of households had internet access, indicating that only a small group of individuals can access online learning as well as AI-available support technologies (World Bank, 2021). Although national digital trends show significant changes in the number of internet users, headline penetration rates may mask obstacles to affordability, device sharing, and variations in service quality, particularly in large cities (DataReportal, 2024). The new digital snapshots still record high numbers of users, but the penetration and connectivity quality are still disproportionate, and this confirms the main issue policy dilemma: AI can create opportunities to connected learners and leave those who do not have reliable access behind, and potentially further marginalize them (DataReportal, 2024; DataReportal, 2025/2026).

It is at this point that AI discourse frequently goes too far. The prevailing story holds that AI is a direct way to increase access and personalize learning at scale. Practically, access is mediated by infrastructure and institutional preparedness; with the same technology, it can make the difference between lowering or raising the barriers lower or higher to certain learners as it gets enshrined in assessment, homework expectation, or school-to-home learning practices that presuppose connection and the ability to own the device (UNESCO, 2023). The global review of technology in education conducted by UNESCO warns that education systems often consider technologies on their terms, not the learners, and that evidence-based decisions based on the principles of equity, scalability, and equity are necessary, all of which are particularly important in the environment of heterogeneous schooling that defines Pakistan (UNESCO, 2023). and, to put it differently, the question is not whether AI is the future; it is whether Pakistan can embrace AI in a way that enhances learning without institutionalizing new forms of stratification.

At the policy level, Pakistan has shown growing interest in developing AI capacity. The National AI Policy by the Ministry of IT and Telecom fosters an understanding of AI development grounded in human capital, research and innovation, governance, and the ethical use of AI as a national agenda, not a peripheral technology agenda. In higher education, an institutional shift in computing education toward the potential of modern AI and labor-market requirements has taken the form of emerging curricula that explicitly include AI-related content and learning outcomes, as mandated by the Higher Education Commission (HEC). This kind of policy and curriculum shift is significant because it creates a pipeline of educators, curriculum designers, and institutional managers who can responsibly adopt AI. Nevertheless, they also run the risk of putting AI capability into the hands of the elite in case political parallels are not made in terms of teacher training, infrastructure, and governance in the broader system of state education (UNESCO, 2023; Pakistan Education Statistics 2022-23; Ahmed et al., 2024).

Most importantly, classroom benefit is not necessarily the result of policy ambition. Implementation capacity: Teacher professional development, curriculum integration, assessment reform, procurement and maintenance, and privacy and academic integrity safeguards all determine whether AI will become a service provider or a disruptive, mistrust-generating tool. This is a common finding among the international evidence base: systematic reviews prove that AI in education cuts across various functions (learning support, teaching support, assessment, administration), though the results are heavily reliant on circumstances and the quality of its integration and ethical governance (Zawacki-Richter et al., 2019; Chiu et al., 2023; Wang, 2024; Garzon et al., 2025). Variability in infrastructure further intensifies implementation constraints in Pakistan, whereas the daily realities of school capacity are. Macro-indicators of connectivity and broadband development should not be viewed as indicators of learning capacity; household costs, the quality of school infrastructure, teacher readiness, and language access are constraining factors (World Bank, 2021; DataReportal, 2024; UNESCO, 2023).

Generative AI has also complicated the educational environment by changing how students compose assignments, learn, and seek clarification. Generative tools are shown to influence learning perceptions and outcomes globally, with these effects varying according to guidance, task design, and assessment structure (Wang, 2024). In the case of education systems, it is not just whether students use AI, but also how the institution redefines acceptable evidence of learning, what it considers original work, what constitutes proper help, and how to create assessment methods that gauge knowledge rather than access to the tool. The governance-driven framing by UNESCO applies to the case at hand: the lack of sound policies and educator proficiency leads institutions to a tendency to enforce rather than implement (UNESCO, 2023). This is especially relevant to Pakistan, where the unfair distribution of available tools and connections may trigger a fairness crisis if AI-assisted work gains acceptance in the evaluation process, and many students cannot afford to access identical devices (World Bank, 2021; DataReportal, 2024).

It is for these reasons that this article is grounded and feasibility-sensitive in its approach to analyzing the role of AI in Pakistan's education sector. Instead of viewing AI as a monolithic intervention, we view various tool families, with their prerequisites, advantages and disadvantages: (a) adaptive tutoring, automated feedback; (b) predictive analytics and early warning systems; (c) automated and assisted assessment; (d) generative AI as a drafting, explanation, and practice; and (e) administrative automation. This breakdown demonstrates how the academic literature typifies AI for educational functions and helps prevent what Liu (2020) identifies as the one-size-fits-all claims that break down when applied to fundamentally different technologies (Zawacki-Richter et al., 2019; Chiu et al., 2023; Wang, 2024). It also brings more policy reasons into focus: Pakistan

would actually have, in the short term, an opportunity that is not of fully automated classrooms, but of teacher-facing and institution-facing augmentation to lighten teacher loads, refine feedback loops, and focus on remediation, particularly in areas with harsh teacher-to-student ratios and training bottlenecks. On the other hand, high-stakes automated grading and surveillance-like analytics involve greater risks in contexts with less developed governance capacity, due to the inability, in practice and in audit, to ensure that such responses protect fairness, transparency, or privacy (UNESCO, 2023).

Based on this, the article answers three guiding questions. To start with, what the credible literature suggests about the roles and effects of AI in education, how do the findings apply to the institutional and infrastructural situation in Pakistan? Second, what does the Pakistan-relevant scholarship imply regarding the educator and student use of new AI-based assistants and assistive systems, in particular generative assistants, and what are the dissonances related to one or another aspect of quality and integrity of learning? Third, what viable high-leverage use cases exist, and what conditions of governance and capacity are required to prevent harm and inequity based on the limitations of Pakistan? Trying to place these questions in the context of the global evidence syntheses and the specific readiness conditions of Pakistan in the presence of which the implementation of the mentioned measures is possible, the article serves to advance the discussion beyond the general promises and offer the elements of the discussed issue to be carried out in the form of the specific, responsible decision (Pakistan Education Statistics 2022-23; World Bank, 2021; DataReportal, 2024; UNESCO, 2023).

Literature Review

Global Evidence on AI in Education

Modern research on artificial intelligence in education (AIED) takes a moderate stance: AI may enhance the effectiveness of learning and instruction, but its implications depend heavily on pedagogy, governance, and context. Extensive syntheses indicate that AIED can be utilized in a wide range of educational contexts, such as tutoring and feedback, assessment support, learning analytics, content recommendation, as well as administrative mechanisms, but the research evidence base is still disproportionate in different contexts and does not consistently reflect classroom realities and the practical needs of educators (Zawacki-Richter et al., 2019; Chiu et al., 2023). An example is Chiu et al. (2023), who identify multiple functional uses of AI but, once again, note that issues such as bias, privacy and data control, interpretability, educator readiness, and challenges to research quality and generalizability remain difficult. On a related note, the evidence presented in this paper, through a higher-education-centered review, indicates a technology-oriented research orientation that frequently relies on tools and prototypes, beyond the maintenance of sustainability in instructional integration, and raises doubts about real-world application and extended learning effects (Zawacki-Richter et al., 2019).

The second strand of world literature is that they should not discuss AI in education as one intervention. However, different AI families (adaptive tutoring, analytics, automated feedback, and generative tools) depend on different inputs and have different risk profiles. This is important because a tool that enhances low-stakes formative practice might be unsuitable or damaging in higher-stakes grading or monitoring-like surveillance situations (Chiu et al., 2023). The recent systematic literature also focuses on the point that the effect of learning can largely depend on the way AI is integrated into tasks: in the case of using AI to scaffold the explanation, practice, and incremental enhancement, the results can be favorable, whereas when it is applied as a shortcut or a substitute to thinking, the interrelationship with the quality of learning pins down (Wang, 2024).

This conditionality is supported by assessments oriented toward global governance. The Global Education Monitoring Report on technology by UNESCO assumes that the technology is often implemented without enough evidence that it is effective, equitable, scalable, and sustainable, and cautions that a technology that is not well regulated can push effective pedagogy aside, replicate inequality, and add transparency to decision-making in a system with no accountability structures (UNESCO, 2023). Simultaneously, the EdTech overview of the World Bank defines success as contingent on three facilitating "infrastructures" (digital infrastructure (connectivity/devices/software), human infrastructure (teacher capacity, learners' skills, parental support), and logistical/administrative systems (deployment, maintenance, procurement, and operational support). This framework especially applies to AIED, since even the highest-quality tools may falter when any of the intermediary layers is faulty — this is especially prone to happen in a low-resource environment, where the barrier to deployment and maintenance may compromise regular use.

Pakistan's Readiness Context

The education system in Pakistan offers a large potential beneficiary base, but also high structural barriers. Official education statistics show the size of institutions and enrolment rates, as well as a large higher education sector — handy for determining the first area AI implementation could scale within realistic limits (Pakistan Education Statistics 2022-23). Nevertheless, macro scale does not mean an equal level of preparedness. The main limitations in Pakistan, such as uneven school facilities, differences between provinces and rural versus urban areas, and access disparities, directly affect the practicality of AI-based educational ideas, which usually presuppose constant electricity, high-quality connectivity, and regular device availability.

In Pakistan, the feasibility of AI in education is characterized by the household digital divide, which primarily affects non-mega cities. Analysis by the World Bank throughout the COVID-19 pandemic found that only about half of households had internet access, and even fewer had a computer. There was also a gendered disparity in access circumstances, the latter of which has restrained the home-based remote learning method and artificial intelligence-oriented supplementary learning mechanisms. Although the number of internet users nationally can increase, at the classroom level, indicators of aggregate penetration may obscure issues such as bandwidth quality, device sharing, and affordability, which determine how AI can be implemented regularly rather than sporadically (DataReportal, 2024). Pakistan is not just facing a challenge of connecting more people, but making sure there is learning-ready access and those conditions of operation that make consistent use of education possible, an emphasis that meshes with the expanded readiness framing of the World Bank that emphasizes enabling factors and system capacity.

Pakistan Policy and Institutional Signals

Under the impact of structural restrictions, a greater focus on the ability to build AI capability is noted in Pakistan's policies and institutional environment. The materials of the national AI policy focus on human capital development, research and innovation, and governance, indicating a shift in perceptions of AI from a niche technical field to a strategic capability for the country. The policy environment (as mentioned here) includes references to (National AI Policy materials). Within the context of higher education, the presence of an updated curriculum that clearly addresses AI-associated skills reflects the institutional interest and focus in developing AI skill streams as well as formalizing learning outcomes in tandem with modern areas of computing (Shah et al., 2024).

The education ecosystem in Pakistan has also been exposed to international agencies' efforts in AI-related conversations and specific initiatives, which have identified both perceived opportunities and perceived capacity needs. The UNESCO technology governance position is especially applicable: the organization has consistently argued that the evidence-based, equitable, and accountable application of technology should be prioritized over novelty, a principle that applies to Pakistan, where uneven levels of readiness predominate (UNESCO, 2023).

Pakistan-Specific Empirical Studies on AI Tools

An emerging body of evidence relevant to Pakistan concerns the use of generative AI in higher education. Empirical studies in Pakistani university settings have documented that students perceive benefits from ChatGPT-like applications, which often help with conceptualization, metrical writing, and structuring, and with study support, but express concern about overuse, ethics, and academic misconduct (Alghazo, 2025). A leading study published in a scientific report investigated behavioral intentions among Pakistani university students to use ChatGPT and reported a correlation between relationships and indicators of academic performance, and that a displayed pattern of use and motivation has an impact on education (Ashraf et al., 2025).

Notably, the wider literature on generative AI emphasizes that effects do not entirely have a positive manifestation. The current research on the use of generative AI by university students demonstrates that both advantages and disadvantages can be present, counterbalancing the tasks, organization, student behavior, and institutional learning culture (Abbas et al., 2024). This aligns with growing worldwide evidence that learning effects depend on whether AI is used to facilitate thinking and revision rather than on effort and reflection (Wang, 2024). In Pakistan, this conflict is even stronger, as disparate access implies that the application of AI-assisted productivity raises fairness concerns, in which evaluation systems inadvertently favor the presence of tools over their proficiency.

Other work in this area focuses on educators' acceptance and perceptions of AI tools beyond student-focused studies. According to survey results, Pakistani teachers have begun to adopt ChatGPT and other modern artificial intelligence assistants in their pedagogical practice, although the extent of their use and the confidence in its effectiveness depend on their training and access to support (Ahmed, 2024). Other recent studies in K-12 settings note similar findings of a sense of optimism, though, in that case, requiring sufficient training and equitable access conditions to be re-evaluated, having teachers note readiness to adopt AI upon re-evaluation of both questions, raising implementation capacity as the limiting factor (AI in Pakistani Schools, 2025).

Studies that focus on Pakistan also overlap with learning analytics and institutional decision-making. Although learning analytics is not synonymous with generative AI, it is a substantial AI-related direction in which education systems apply AI to their prediction, personalization, and retention techniques. The learning analytics adoption work in Pakistan supports the notion of the importance of institutional barriers and challenges to implementation by emphasizing the fact that the potential of the tool tends to outpace governance and operational capacity (Ali, 2025; Khan et al., 2024; Riaz et al., 2024).

Synthesis: What the Literature Implies for Pakistan

Across global syntheses and Pakistan-relevant evidence, three implications are most robust:

(i) *AI benefits are conditional, not automatic*: Systematic reviews emphasize that AIED can improve feedback cycles and support learning, but only when integrated into pedagogy, supported by educator capacity, and governed ethically (Chiu et al., 2023; Zawacki-Richter et al., 2019;

UNESCO, 2023). Pakistan-specific evidence on generative AI similarly suggests benefits coexist with integrity and overreliance risks, making guidance and assessment design central to outcomes (Ashraf et al., 2025; Alghazo, 2025; Abbas et al., 2024).

(ii) *Equity is the core constraint, not a side concern*: Household access constraints and device scarcity documented during the COVID-era disruption imply that AI-driven learning can widen gaps if it assumes universal access (World Bank, 2021). Aggregate internet growth indicators do not resolve affordability, sharing, and quality barriers at the classroom level (DataReportal, 2024). UNESCO's governance framing reinforces the idea that technology must be evaluated on the terms on which it operates, particularly for disadvantaged learners (UNESCO, 2023).

(iii) *Higher education is the most plausible early scaling frontier, while school adoption should be low-bandwidth and teacher-centered*: Universities are more likely to have connectivity, devices, and formal AI curricula, making them natural early adopters; meanwhile, school-sector strategies should prioritize teacher assistive tools, offline/low-bandwidth designs, and capacity-building rather than high-stakes automation (Zawacki-Richter et al., 2019; World Bank EdTech overview; Ahmed, 2024; AI in Pakistani Schools, 2025; Ehtisham et al., 2024).

Methodology

This paper adopts a mixed, feasibility-based approach to examine how artificial intelligence is informing education in Pakistan and where it can deliver real value. Rather than treating AI as a single thing, the study divides it into functional categories: adaptive tutoring and feedback, learning analytics, AI-assisted assessment, generative AI for writing and explanation, and administrative automation, since each category requires different infrastructure, skills, and governance.

The design is based on three interconnected steps. First, an organized document review was conducted to develop a conceptual map of the roles and risks of AI in the educational process. The review focused on peer-reviewed articles, policy-oriented publications, and institutional literature on education and digital transformation. This was not intended to gather success stories, but patterns: where AI is likely to be beneficial, what continues to go wrong, and what facilitating conditions there seem to be that cannot be negotiated.

Second, the study utilizes contextual triangulation. The educational realities in Pakistan differ drastically across provinces, rural-urban environments, school types, and students' socioeconomic statuses; hence, the analysis compares assertions with actual limitations: device accessibility, overall internet accessibility, teacher readiness, and an institution's ability. This move does not allow the paper to doubt that what works in well-resourced places will necessarily work in other parts of the country. It also suggests a best-fit logic: the study prioritizes AI applications that align with Pakistan's current capabilities and do not rely on weak assumptions.

Third, the study uses a thematic synthesis technique. Codes are assigned to evidence and observations under four clusters, including (1) educational opportunities (learning support, personalization, efficiency), (2) implementation enablers (infrastructure, training, curriculum alignment, maintenance), (3) risks (equity gaps, integrity issues, privacy, bias, overdependence), and (4) governance requirements (rules, accountability, data safeguards, assessment redesign). The themes are then overlapped with the institutional landscape of Pakistan to develop a realistic framework for where AI can be implemented immediately, where it would require gradual investment, and where it should be approached with care.

Since this is not a field study, it fails to make any causal claims. Rather, it includes a grounded evaluation of probability: which measures are feasible, which are unsafe, and which are too early

before significant reforms. The outcome is the policy-to-practice model, which aims at education leaders, universities, schools, and policymakers who are likely to have to make decisions that are constrained but not ideal.

Results

The results reveal an evident trend: AI is making its way into the Pakistani educational environment unevenly, and its impact hinges more on context and integration than on the instrument's advanced nature. Four results stand out.

1) AI adoption is concentrated in Higher Education and Urban Settings

The most widespread use of AI can be found in universities and professionally oriented institutes, where the likelihood of finding a connection and access to a device is higher, and students are already using digital equipment for their coursework. Generative AI assistants in these settings are used for drafting, summarizing, language, brainstorming, and exam preparation. The adoption among the faculty is found to be inconsistent and sporadic: some educators use AI to plan lessons, create rubrics, or develop practice questions, whereas others view AI as a threat to academic integrity, inappropriate information, and academic degradation.

On the other hand, those at the school level are limited and scattered. In schools where AI tools are deployed, they are often disconnected from commercial platforms or informal student use, rather than institutionalized deployment. The most limiting factors are the most foreseeable: infrastructure disparities, device scarcity, untrustworthy internet, instructor workload, and limited preparation.

2) The Biggest Immediate Gains are “Teacher-Facing,” not “Student-Replacing”

The least negative implications become the most feasible when AI has teachers as its allies rather than its competitors. Examples of high-potential teacher-facing applications are:

- Generating differentiated worksheets and practice questions for mixed-ability classrooms
- Producing simplified explanations and examples at multiple difficulty levels
- Creating quick formative quizzes and feedback templates
- Helping teachers plan lessons and align activities with learning outcomes
- Supporting administrative tasks such as drafting notices, organizing records, and responding to routine queries

The importance of these gains lies in their role in alleviating time pressure and increasing a teacher's capacity to deliver feedback, which, in most cases, is the first thing to be sacrificed in overcrowded classrooms. The findings hint that the most useful role of AI in Pakistan is not a glamorous robot classroom but silent productivity that enhances teaching consistency.

3) Generative AI Produces a Learning Productivity Boost but Also an Integrity Shock

Generative AI use by students is linked to faster assignment completion and increased confidence in writing and comprehension assignments, particularly in English-medium settings. Various learners describe AI as an instructor-like friend who explains concepts and provides practice when needed, without judgment. For students with a poor command of academic language, AI may serve as a transition, helping them fit their poorly thought-out answers into organized responses.

Nonetheless, this very strength provokes a system-level jolt: it is not easy to determine whether an assignment is a test of student knowledge or a neoliberal product. Educational establishments that rely on generic assignments and take-home essays are struggling with credibility issues. The

findings reveal a new assessment crisis: instructors are under pressure to police AI implementation, students are unsure what is permitted, and universities risk falling into a disjointed implementation. An important point emerging in this context is that prohibiting AI is not the solution; it only drives its use underground. The more reasonable answer seems to be to revamp the assessments, to make them more of a reward for reasoning, process, and evidence of learning than for polished final text.

4) Risks Cluster Around Equity, Quality, and Governance

The findings indicate the three related areas of risk:

Equity risk: The benefits of AI accrue to students who are more connected, possess their own devices, and are more proficient in the English language. If AI is accepted as a normal part of academic benefit, this lack of equality can translate into lower grades and fewer opportunities, widening the current education gap.

Quality risk: AI can be sure that the results are wrong, culturally wrong, or superficial. Students can blindly follow AI-generated work without guidance. In the long run, this will lead to less independent problem-solving and the development of so-called surface learning, where students produce correct-looking answers without understanding the content.

Governance risk: There are few concrete regulations concerning the acceptable use of AI, data privacy, and educational responsibility within many institutions. Without institutional policies, the decision-making process will be uneven: a teacher may permit AI-assisted drafting, whereas another may consider it misconduct. Such a discrepancy creates distrust and misunderstanding, undermining the validity of the assessment.

The findings prepared across settings indicate that AI can provide value when it is (a) teacher-directed, (b) curriculum aligned, (c) applied in formative education and teacher-assistance, and (d) supported by clear institutional regulations. It is dangerous or disorganized when presented as a quick fix, a check-the-box approach, or an alternative to an educational endeavor in areas that lack infrastructure and governance.

Discussion

The findings are used to advance one major argument: the use of AI in Pakistan's education system can be seen as a stress test. It reveals what the system can support and where it is weak. This is why what seems transformational in one university classroom and irrelevant or even dangerous in a rural school setting will seem like the same tool.

AI is not a “Solution”; it is an Amplifier.

An enduring fallacy in the technology reform is the notion that tools are solutions without institutions. AI enhances something that exists. In matters of classroom structure, assessment integrity, and teacher training, AI can accelerate evolution. In situations where resources are allocated poorly to teaching and assessments are poorly constructed, AI is more likely to exacerbate shortcuts, inequality, and confusion.

It directly affects Pakistan: unless the country includes capacity-building in its AI-in-education strategy, it is likely to fail. The correct sequence would be relevant. Add-ons are not governance, teacher development, and infrastructure. These are the processes by which AI becomes learning and not just digital.

The Most Strategic Target is the Teacher, not the Students.

Teacher augmentation is the most geared-up route. In Pakistan, classes have too many students per teacher, and there is no time to provide individual feedback. Artificial intelligence can assist

teachers in generating more practice resources, generating more comprehensible explanations, and standardizing formative feedback. It is not a small productivity increase but a change in the frequency of guidance to students, which is a fair predictor of enhanced learning.

This is achieved only when teachers have confidence in the tools and feel capable of using them. In the absence of training, AI is perceived as intimidating, and educators are hesitant to embrace it or apply it in a feeble manner that is counterproductive. It is important that teacher development should not be based on how to operate an app, but rather on instructional design: where AI can be useful, where it can negatively affect students, and how to design tasks so students do not copy but think.

Assessment Redesign is the Unavoidable Reform

Generative AI raises the question of whether modernizing assessment in education systems is worth the risk of losing validity. When schools and universities continue to assign tasks that could be generated with minimal effort by AI, grades would become meaningless. A detector arms race should not be the answer, since detectors are unreliable and, at times, identify honest students while failing to detect advanced malpractice.

Rather, the institutions in Pakistan can tilt towards visible learning: problem-solving in the classroom, verbal explanations, project milestones, drafting papers with a reflection, and local context-related evidence-based tasks. Such designs render AI less of a device for cheating and more of an assistant in learning, because they still require knowledge.

Equity must be engineered, not assumed.

This is not the hypothetical equity risk. If AI becomes a common expectation, even when they are told to use it to improve their essay, students without access will be left behind by default. Pakistan should thus adopt an equity-first policy: preference should be given to low-bandwidth tools, offline options when possible, shared-access points in institutions, and a multilingual service that does not favor English-fluent learners to the exclusion of others.

Equity also includes gender. Any AI plan that does not factor in gendered access to the devices and the internet will continue to replicate unequal learning results. Policy should also clearly outline the pathways to affordability and access, rather than a narrative of innovation.

Privacy and Governance will Decide Trust.

AI in education may involve data on student performance trends, action logs, and tool use. Weaknesses in the governance system make data capture and surveillance the default. Trust is lost when students and families are afraid of being monitored or abused. Institutions in Pakistan should have definitive policies: what information is gathered, the purposes for gathering, how long it is held, and to whom it should be accessible. The lack of this clarity can lead to the threat of social and legal backlash against AI, even in cases where the educational purpose would be good.

A Realistic National Pathway

The discussion suggests a phased national pathway:

1. *Higher education as a capability hub*: Universities can lead AI literacy, responsible use guidelines, assessment redesign, and teacher training models.
2. *Targeted school-sector pilots*: Focus on teacher tools and formative support in settings with minimum readiness, then expand only when evidence supports it.

3. *Institutional governance frameworks*: Standard rules on acceptable use, integrity, privacy, and procurement should be established to ensure consistent practice.
4. *Infrastructure and access investment*: Without improvements to devices and connectivity, AI will remain an elite advantage rather than a national reform.

In short, AI can help Pakistan's education system, but only if Pakistan treats AI as a governance and capacity project, not a product rollout.

Conclusion

AI is not yet a fantasy in Pakistan's education sector, but it is already real, unequal, and highly contextualized. Findings of this paper show that the most feasible returns are those offered by teachers, formative learning provisions, and administrative support, especially in post-secondary institutions and digitally prepared settings. AI, in such environments, can reduce workload, enhance feedback mechanisms, and support student learning through on-demand explanations and practice.

Meanwhile, there is a critical integrity issue with generative AI. Outdated forms of assessment--in particular, generic take-home writing assignments--are becoming less capable of distinguishing between learning and pedagogical product. Institutions in Pakistan then face a strategic dilemma: they can redesign their assessments to compensate for good evaluations with logic and action, or concede that grades will diminish as indicators of knowledge. Bans and detection tools are the least long-lasting answers, but more transparent institutional rules and assessment designs that render learning transparent.

The characteristic limitation is equity. Students who have access to devices, connectivity, and language support will benefit from AI, while others will be left behind without planning to help them. Unequal opportunities can soon follow unequal access, on the assumption that AI has become part of expectations. Low-bandwidth solutions, teacher-based implementation, shared access pathways, and all plans sensitive to affordability, particularly for rural and disadvantaged communities, should therefore have low priority in any national strategy.

Lastly, governance will determine the level of trust among the populace. It should have privacy protection, open data policies, and standardized academic integrity policies. In Pakistan, education can be enhanced through AI when combined with teacher development, curriculum adjustments, and responsible regulations. However, when implemented as a bypass or a replacement for institutional capacity, it is likely to accelerate inequality and undermine educational performance. Phased, evidence-based adoption is the most reasonable approach, considering AI as an educational reform tool rather than a technological wizard.

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