

Digital And AI-Mediated Education, Equity, And Mental Health: Global Evidence And Lessons For Pakistan

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ABSTRACT

Digital and AI-mediated education is fundamentally reshaping instructional practices across primary, secondary, and tertiary levels. Globally, such technologies hold considerable promise for personalised instruction, enhanced learner engagement, and extended access to under-served populations. However, they also carry serious risks pertaining to digital inequity, algorithmic bias, data surveillance, and psychological strain. This article presents a narrative synthesis of recent international scholarship at the intersection of digital and AI-mediated education, equity, and mental health, with dedicated attention to implications for Pakistan. Drawing on systematic reviews, umbrella reviews, empirical studies, and conceptual analyses, it examines patterns of AI adoption across educational levels, equity concerns arising from digital divides and algorithmic decision-making, and emerging evidence on mental health outcomes for both students and educators. The review further incorporates recent studies on AI-enabled emotional assessment, teacher well-being, and self-regulated learning. The article concludes with policy-oriented recommendations for equity-centred, socio-technically informed deployment of AI in education within the Pakistani context, where structural inequalities of region, gender, language, and socio-economic status continue to shape educational opportunity.

Keywords—Artificial intelligence in education; Digital equity; Mental health; Pakistan; Algorithmic fairness; Personalised learning

Introduction

Over the past decade, rapid advances in artificial intelligence and related digital technologies have generated renewed debate about the future of education. Proponents emphasise the capacity of AI-mediated tools to support personalised learning at scale, provide timely formative feedback, assist learners with disabilities, and streamline administrative processes (Bulathwela et al., 2024; Adewale et al., 2024; Peng and Li, 2025). The sector and abilities have attracted substantial investment from governments, international organisations, and the private sector, and have been accompanied by a growing body of empirical and theoretical scholarship on the conditions under which

digital technologies can improve learning outcomes.

At the same time, critical scholars have warned that these developments unfold within deeply unequal educational systems and data ecosystems. There is well-documented concern that AI may reproduce, or even intensify, existing inequalities related to socio-economic status, gender, language, and geography (Viberg et al., 2024; Cotilla Conceição and van der Stappen, 2025; Bearman and Ajjawi, 2025). Questions of algorithmic bias, data sovereignty, and the concentration of AI development in high-income contexts have become prominent in the literature. It is raising concerns about whose interests these systems ultimately serve and whose are marginalised.

Digital and AI-mediated education has also become entangled with a growing mental health crisis among students and educators. Higher workloads, continuous connectivity, and evolving forms of evaluation can heighten anxiety and burnout, even as AI-enabled analytics and psychoeducational interventions are promoted as tools for early detection and support (Zhai et al., 2025; Rojas Vistorte et al., 2024; Delello et al., 2025). Systematic and meta-systematic reviews document a rapid expansion of research in this field across primary, secondary, and tertiary settings, yet consistently highlight persistent gaps in theoretical grounding, ethical analysis, and attention to equity and well-being (Zawacki-Richter et al., 2019; Bond et al., 2024; Fu et al., 2024; Kovalainen et al., 2025).

For countries such as Pakistan, where educational systems are characterised by pronounced regional, gender, and socio-economic disparities, debates about AI-mediated education cannot be separated from questions of access, justice, and psychological well-being. Pakistan's educational landscape is marked by low enrolment and high dropout rates in rural areas, significant gender gaps in secondary and tertiary participation, linguistic diversity, and constrained public investment in both education and mental health services (Ali et al., 2024). Although dedicated empirical work on AI, equity, and well-being in Pakistan remains limited, the global literature offers important insights into how digital and AI-based tools may interact with these existing structural conditions.

This article addresses three overarching questions. First, how are digital and AI-mediated tools being adopted across primary, secondary, and higher education internationally, and what patterns of benefit and exclusion are emerging? Second, what is known about their effects on student and educator mental health, including both opportunities for support and sources of psychological strain? Third, what lessons can be drawn for policy and practice in Pakistan, given its specific infrastructural constraints and social inequalities? To address these questions, the article employs a narrative review methodology, outlined in the section that follows.

Methodology

This study adopts a narrative review design, drawing on established approaches to systematic and meta-systematic synthesis in educational technology (Zawacki-Richter et al., 2019; Bond et al., 2024; Fu et al., 2024). The aim is conceptual integration rather than exhaustive bibliometric coverage. A narrative approach is appropriate given the heterogeneity of research designs, disciplinary traditions, and conceptual frameworks across the relevant literature, and given the need to relate international findings to the

Online ISSN

3007-3197

Print ISSN

3007-3189

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specific context of Pakistan.

The review was structured using the PCC framework, including Participants, Concept, and Context, consistent with contemporary applications of PRISMA-ScR in education and health-sciences reviews (Bond et al., 2024; Adewale et al., 2024; Kovalainen et al., 2025). Participants included students and educators in formal primary, secondary, and tertiary education settings. The core concept covered digital and AI-mediated education with explicit or implicit connections to equity (including access, inclusion, and algorithmic fairness) and/or mental health (including well-being, stress, emotional states, and psychological resilience). Contexts included educational settings worldwide, with particular attention to low- and middle-income regions.

Recent systematic reviews, umbrella reviews, and scoping meta-reviews served as primary entry points into the literature (Zawacki-Richter et al., 2019; Bond et al., 2024; Fu et al., 2024; Kovalainen et al., 2025; Adewale et al., 2024; Aravantinos et al., 2024; Peng and Li, 2025; Lan and Zhou, 2025). These were complemented by empirical and conceptual articles focusing on AI-enabled differentiated learning, self-regulated learning, emotional assessment, teacher and student mental health, fairness frameworks, and inclusivity (Babatunde et al., 2025; Rojas Vistorte et al., 2024; Mangal and Pardos, 2024; Cotilla Conceição and van der Stappen, 2025; Delello et al., 2025; Zhai et al., 2025; Bearman and Ajjaw, 2025; Daher, 2025; Zhang, 2025; Ali et al., 2024).

Three analytic phases structured the synthesis, including i) a descriptive mapping phase identified educational levels, geographic regions, and the principal AI applications documented in the literature, including profiling and prediction, adaptive and personalised systems, intelligent tutoring, automated assessment, emotional analysis, and administrative decision support (Zawacki-Richter et al., 2019; Bond et al., 2024; Fu et al., 2024). ii) a thematic analysis grouped findings into two overarching domains, that is a) equity, encompassing the digital divide, inclusivity, and algorithmic fairness, and b) mental health and well-being, encompassing student outcomes, educator experiences, and AI-enabled support mechanisms. iii), an interpretive phase related these themes to Pakistan's educational landscape, drawing on global equity and mental health debates and, where available, regional evidence.

Study Limitations

The review acknowledges limitations inherent in narrative syntheses, including reliance on published English-language sources and the heterogeneous quality of primary studies. However, by anchoring the analysis in high-quality secondary research across multiple databases and disciplinary traditions, the article seeks to provide a robust, theoretically grounded account of how digital and AI-mediated education intersects with equity and mental health, and how these insights may inform policy and practice in Pakistan.

Conceptual Framework: Equity, Mental Health, and the Socio-Technical Nature of AI in Education

Educational equity, as employed in this review, refers to fair opportunities for meaningful participation and achievement, accounting for learners' diverse needs,

Online ISSN

3007-3197

Print ISSN

3007-3189

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identities, and starting points rather than merely uniform inputs (Viberg et al., 2024; Cotilla Conceição and van der Stappen, 2025). This conception moves beyond formal equality towards substantive equity, which recognises that structurally disadvantaged learners require differentiated resources and pedagogical approaches. AI-mediated tools can, in principle, advance equity through differentiated instruction, assistive technologies, and timely support for struggling students. Yet they can equally reproduce long-standing inequalities if questions of access, data representation, and governance remain unaddressed (Bulathwela et al., 2024; Mangal and Pardos, 2024). Mental health, in the context of this review, encompasses emotional well-being, the capacity to cope with academic stressors, and the ability to build and sustain constructive relationships in learning communities (Zhai et al., 2025; Delello et al., 2025). Digital and AI-mediated education affects mental health both directly, through analytics and interventions designed to monitor or support students' psychological states, and indirectly, by reshaping workloads, performance expectations, assessment regimes, and social interaction (Rojas Vistorte et al., 2024; Lan and Zhou, 2025). The relationship between AI use and mental health is thus bidirectional: technology may serve as either a source of burden or a resource for support, depending on how it is designed, implemented, and embedded in institutional cultures.

A socio-technical perspective foregrounds how AI systems are embedded within institutional practices, power relations, and cultural norms (Viberg et al., 2024; Bulathwela et al., 2024; Bearman and Ajjawi, 2025). From this standpoint, the effects of AI in education cannot be reduced to algorithmic performance metrics, but must be understood in terms of design choices, data governance regimes, pedagogical logics, and broader socio-economic structures. A socio-technical lens is particularly consequential for contexts such as Pakistan, where educational AI will interact with pre-existing hierarchies of gender, class, language, and geography in ways that require deliberate policy attention.

AI-Mediated Education Across Educational Levels

Primary and Elementary Education

Systematic work on AI in primary education documents a growing research field centred on intelligent tutoring systems, adaptive practice platforms, and game-based learning environments for children roughly aged four to twelve (Aravantinos et al., 2024). Studies span STEM and STEAM disciplines, early language learning, mathematics, and other subjects, often drawing on constructivist and experiential pedagogical frameworks. A systematic review covering 90 peer-reviewed publications between 2013 and 2023 identifies a concentration of research in high-income countries, with limited evidence from South Asian or Sub-Saharan African contexts, underscoring the geographic skew in current knowledge (Aravantinos et al., 2024).

A focused review of AI-enhanced differentiated learning in elementary STEM suggests that adaptive and gamified tools can reduce learning-related anxiety, increase engagement, and strengthen self-efficacy and psychological resilience, particularly for neurodiverse and under-served learners when accompanied by appropriate teacher support (Babatunde et al., 2025). However, the same review identifies a substantial teacher 'readiness gap', such as many educators lack the professional preparation to

deploy these tools in ways that serve equity and support well-being, and unguided implementation risks exacerbating the very inequalities such tools purport to address (Babatunde et al., 2025). This finding underscores the imperative of sustained, contextually grounded professional development as a precondition for equitable AI integration at the primary level.

Secondary Education

Secondary education has been somewhat less commonly isolated as a distinct focus in the AI-in-education literature. Yet it emerges prominently in reviews that span school and higher education settings. Systematic and scoping meta-reviews identify widespread application of AI for student profiling and at-risk prediction, adaptive content delivery, and automated assessment, with the stated aim of identifying struggling students, personalising content, and supporting overloaded teachers (Zawacki-Richter et al., 2019; Fu et al., 2024; Adewale et al., 2024). Evidence suggests gains in prediction accuracy and measurable improvements in learning outcomes. On the other hand, there is comparatively little critical engagement with the psychological consequences of predictive profiling for adolescents, or with the ethical questions of consent, transparency.

Ali et al. (2024) draw attention to the challenges facing secondary educators in adopting AI tools, noting significant variation in digital literacy, access to reliable hardware, and institutional support. In contexts marked by inadequate infrastructure, across many secondary schools in Pakistan, is the gap between AI's potential and its realised benefits likely to be especially wide. The literature strongly suggests that secondary-level AI adoption must be preceded by foundational investments in connectivity and device access. It also needs to be accompanied by ethical frameworks that protect students from opaque algorithmic surveillance.

Higher Education

Research on AI in higher education is both the most extensive and the most internally varied strand of the literature. A meta-systematic review of 66 individual reviews of AI in higher education reports a concentration of work on general AI applications and on profiling and prediction systems. It is accompanied by prevalent adaptive and personalised tools but often weakly theorised and evaluated against narrow outcome metrics (Bond et al., 2024). Quantitative methods dominate, and ethical, contextual, and equity-oriented analyses remain comparatively underdeveloped (Bond et al., 2024). A scoping meta-review of 126 systematic reviews across educational levels similarly identifies three broad themes, such as teaching, learning, and administration, and highlights under-explored areas including affective outcomes, equity, and cross-cultural perspectives (Fu et al., 2024).

Umbrella reviews in health-sciences higher education describe growth across robotics, machine learning, immersive technologies, and natural-language processing applications, while emphasising the absence of robust ethical frameworks and rigorous longitudinal evaluation (Kovalainen et al., 2025). A qualitative systematic review on AI-empowered self-regulated learning in higher education identifies emerging evidence. According to these studies, AI tools can scaffold metacognitive strategies,

Online ISSN

3007-3197

Print ISSN

3007-3189

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help-seeking behaviours, and learning goal-setting, though the review notes that benefits depend heavily on the quality of pedagogical scaffolding and on students' pre-existing digital competencies (Lan and Zhou, 2025).

Experimental and survey research provide further nuance. A randomised study of large language model integration finds that pedagogically guided use can enhance academic writing, strengthen engagement, and modestly improve mental health indicators, whereas unguided use produces weaker and more uneven effects across student subgroups (Zhang, 2025). A large-scale survey of educators across institutional levels reports high familiarity with AI tools and perceptions of efficiency gains, but also significant concern about student dependency, diminished interpersonal interaction, social isolation, and a perceived lack of institutional policies to govern responsible AI use (Delello et al., 2025). Taken together, these findings suggest that the benefits of AI in higher education are contingent on intentional design, pedagogical integration, and policy support rather than on technology deployment alone.

Equity, Digital Divides, and Algorithmic Fairness

Access to digital infrastructure is a necessary precondition for any discussion of AI-mediated education. A systematic review of AI deployment in open and distance learning highlights the centrality of reliable connectivity, personal devices, and institutional technical support for realising the benefits of AI tools. In their absence, such tools functionally privilege students who are already advantaged by existing infrastructure and resources (Adewale et al., 2024). This infrastructural conditionality is particularly relevant in contexts where internet penetration is uneven, where household device ownership is stratified by income, and where rural communities remain beyond the reach of reliable networks. These above stated conditions describe significant portions of Pakistan's population.

A rapid review of AI and inclusivity in higher education concludes that many AI initiatives are primarily driven by institutional efficiency objectives and competitive positioning rather than by deliberate commitments to inclusion (Cotilla Conceição and van der Stappen, 2025). Comparatively few AI deployments are designed specifically to support under-represented or structurally disadvantaged student groups. Alos, institutional rhetoric about digital inclusion frequently outstrips evidence of impact. From a conceptual perspective, Bulathwela and colleagues argue forcefully that AI on its own will not democratise education and may in fact deepen inequality and misallocate resources when embedded within techno-solutionist narratives that neglect socio-economic realities and the political choices that determine resource distribution (Bulathwela et al., 2024). They ask for human-centred, open, transparent, and collaboratively governed AI ecosystems aligned with inclusive pedagogies and open educational resources.

At the algorithmic level, work on fairness frameworks demonstrates both the risks and the possibilities inherent in AI-enabled decision-support systems. A practitioner-oriented guide shows that intersectionality-aware metrics and adversarial debiasing techniques can reduce disparities in grade prediction and resource allocation across race-gender and race-income categories (Mangal and Pardos, 2024). Critically, however, the same work emphasises that technical adjustments cannot substitute for

broader institutional commitments to equity. Fairness-aware algorithms must be embedded within governance structures, stakeholder accountability mechanisms, and explicit policy commitments to address the root causes of educational disadvantage. Editorial work on AI-powered educational decision-support systems reinforces this point, stressing that equity requires asking not only whether an algorithm is technically accurate, but which decisions AI is used to support, for what institutional purposes, and whose interests are prioritised in its design (Viberg et al., 2024).

Bearman and Ajjawi (2025), writing specifically about AI and gender equity in health professional education, argue for an integrated approach in which gender analysis is embedded from the earliest stages of AI tool design rather than retrofitted as a post-hoc compliance exercise. This argument is readily generalisable. In Pakistan, where gender gaps in educational participation and attainment remain pronounced, particularly at secondary and tertiary levels, any AI application designed to support student progression must explicitly model gender, alongside region, language, and socio-economic status, as intersecting dimensions of educational disadvantage.

AI, Emotions, and Mental Health in Educational Settings

AI-Based Emotional Assessment

AI-based emotional assessment has become a significant and rapidly expanding subfield within educational technology research. A systematic review of 41 empirical studies documents diverse applications of machine learning, facial recognition, physiological sensing, and affective computing techniques to infer students' emotional states during learning activities (Rojas Vistorte et al., 2024). Studies are organised around four themes: i) emotion recognition during instruction, ii) associations between inferred emotional states and learning outcomes, iii) applications in special education, and iv) methodological advances in affective computing. These approaches hold genuine promise for more responsive pedagogies and for supporting socio-emotional learning at scale. Yet they raise unresolved and pressing questions about accuracy. (particularly across racial, ethnic, and cultural groups), privacy, the potential for covert surveillance, and the cultural validity of emotion categories derived predominantly from Western psychological traditions (Rojas Vistorte et al., 2024).

The ethical stakes of emotion recognition in educational settings are heightened when the technology is deployed with children or in contexts where students have limited agency over their data. Algorithmic misclassification of emotional states, for example, interpreting cultural behavioural norms as disengagement or distress, can lead to harmful educational interventions or stigmatisation. These concerns are very much relevant for any proposed application in Pakistan, where emotional expression norms are shaped by distinct cultural and gendered expectations that may not be adequately represented in training datasets derived from the western populations.

AI-Enabled Mental Health Support

Beyond emotional assessment, AI-enabled mental health support systems are attracting increasing attention in higher education contexts. A cross-sectional survey involving students, faculty, technologists, and mental health professionals reports strong stakeholder support for integrating AI-based diagnosis and prediction of mental health

difficulties with structured psychoeducation and supportive institutional policies, which are framed as a strategy for building psychologically healthier academic communities (Zhai et al., 2025). Scoping and umbrella reviews document a growing array of AI-based tools for mental health screening, longitudinal monitoring, and self-help applications. Nonetheless, consistently cautioning that robust evidence on long-term outcomes, equity effects across student subgroups, and unforeseen harms remains limited (Fu et al., 2024; Kovalainen et al., 2025).

The experimental study by Zhang (2025) offers one of the more rigorously designed contributions to this literature, demonstrating through a randomised design that structured integration of large language models in higher education settings can modestly improve indicators of academic self-efficacy and reduce anxiety compared to unguided AI use. The study's finding that pedagogical scaffolding matters substantially for mental health outcomes reinforces the broader literature's emphasis on implementation quality over technological provision. This is an important message for resource-constrained settings (like Pakistan) where the temptation to adopt widely available AI tools without sufficient implementation planning may be particularly strong.

Educator Mental Health and Professional Identity

The mental health of educators represents a dimension of the AI-in-education literature that receives less attention than student well-being but is no less significant. Survey evidence from Delello et al. (2025) reports that while many teachers mention reduced administrative burden through AI-enabled automation of routine tasks, substantial proportions experience heightened anxiety about academic integrity violations, uncertainty about their evolving professional roles, concerns about student social isolation, and discomfort with the pace of technological change. Perceived institutional abandonment in the face of rapid technological change is itself a documented source of occupational stress and burnout among educators.

Critical work on AI literacy in teacher education argues for pre-service and in-service programmes that integrate technical understanding of AI systems with ethics, equity analysis, and socio-political critique (Daher, 2025; Bearman and Ajjawi, 2025). Without such critical framing, teachers who lack confidence in using AI tools or who hold concerns about their implications risk experiencing technostress and professional marginalisation. In Pakistan, where initial teacher education is frequently under-resourced and where ongoing professional development is irregular and often unfunded, the cultivation of critical AI literacy among educators represents a foundational challenge for any national AI-in-education strategy.

Lessons and Implications for Pakistan

Although empirical studies addressing AI, equity, and mental health specifically within Pakistani educational contexts remain nascent, the international literature reviewed here offers several substantive implications that are directly relevant to Pakistan's educational policy and practice.

First, and most fundamentally, the centrality of digital infrastructure in shaping who benefits from AI applications demands that Pakistan's substantial disparities in

Online ISSN

3007-3197

Print ISSN

3007-3189

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connectivity, device access, and electricity reliability between urban and rural areas, and across socio-economic and gender lines, be positioned as the primary challenge for any AI-related educational reform (Adewale et al., 2024; Bulathwela et al., 2024). In the absence of universal or near-universal access to reliable internet and personal devices, AI tools are likely to function as resources for the already advantaged, widening rather than narrowing existing educational inequalities. Therefore, national investment in broadband infrastructure, subsidised device programmes targeting low-income households, and community digital access hubs in rural areas are prerequisites for equitable AI-in-education deployment.

Second, evidence that many AI deployments internationally prioritise institutional efficiency and predictive accuracy over inclusion points out to the need for national and institutional strategies in Pakistan that articulate equity and mental health objectives as explicit criteria for AI selection, procurement, and evaluation (Cotilla Conceição and van der Stappen, 2025; Viberg et al., 2024). Pakistan's recently developed National Artificial Intelligence Policy and associated educational technology initiatives offer a potential framework for embedding equity standards. Yet their implementation will require independent monitoring mechanisms, participatory design processes involving marginalised communities, and sustained political commitment beyond electoral cycles. Fairness frameworks that explicitly model gender, region, language, and income as intersecting categories in predictive analytics, admissions, and scholarship allocation (Mangal and Pardos, 2024) should inform technical specifications for any AI tools adopted at scale.

Third, findings on AI-enabled emotional assessment and mental health support highlight both opportunities and significant risks. Adapted and culturally validated digital psychoeducation tools, embedded within clear privacy protection regimes and linked to human-delivered clinical support, may extend reach for basic mental health awareness and low-intensity self-help interventions (Rojas Vistorte et al., 2024; Zhai et al., 2025). However, deploying emotion recognition technologies or AI-based diagnostic tools without culturally appropriate validation, without informed consent frameworks suited to Pakistani legal and institutional contexts, and without adequate human oversight, risks entrenching new forms of surveillance, misclassification, and stigmatisation. These could be the outcomes that would compound rather than alleviate the mental health burden already experienced by Pakistani students.

Fourth, the literature's emphasis on educator agency and preparedness as determinants of equitable AI integration carries particular weight for Pakistan. Investing in teacher education and ongoing professional development that integrates critical AI literacy, ethical reasoning, equity analysis, and mental health awareness is likely to be central to any sustainable and socially just integration of AI into Pakistani schooling and higher education (Delello et al., 2025; Daher, 2025; Bearman and Ajjaw, 2025). This investment must extend beyond one-time training workshops to include career-long professional learning communities, adequate release time, and structural recognition of teachers as experts whose pedagogical judgement should remain central even as AI tools are introduced into classrooms.

Fifth, Pakistan's linguistic diversity is worth consideration. With Urdu as the national language, English as the primary medium of higher education, and numerous regional

Online ISSN

3007-3197

Print ISSN

3007-3189

<http://amresearchreview.com/index.php/Journal/about>

languages spoken by significant populations, poses specific challenges for AI-mediated education that the predominantly English-language international literature rarely addresses. Many AI tools for language learning, intelligent tutoring, and natural-language processing are developed and validated in English, and their effectiveness and cultural appropriateness in multilingual Pakistani classrooms cannot be assumed. Investment in developing, or locally adapting, AI tools in Urdu and major regional languages would be an important step toward culturally inclusive AI deployment.

Conclusion

Digital and AI-mediated education is reconfiguring learning environments across all levels of formal schooling and across diverse national contexts. The international evidence reviewed here points to significant potential for more personalised, responsive, and accessible education, including promising early developments in AI-supported mental health screening and psychoeducation. It also documents meaningful gains in learning outcomes under conditions of thoughtful pedagogical integration, robust institutional support, and equitable access to the necessary digital infrastructure. At the same time, the literature issues consistent and empirically grounded warnings: without explicit, proactive attention to equity, ethics, and psychological well-being, AI-mediated systems are likely to widen digital divides, embed and amplify existing social biases, generate new forms of academic stress and surveillance, and produce benefits that are unevenly distributed in favour of already-advantaged populations.

For Pakistan, like for other societies marked by structural educational inequalities, the challenge is not whether to engage with AI-mediated education, but how to engage with it in ways that serve the goals of educational justice, digital equity, and mental health promotion. This requires situating AI within broader policy agendas that i) prioritise investment in physical and digital infrastructure, ii) culturally grounded and critically literate teacher education, iii) participatory governance of educational technology, and iv) robust protections for students' data rights and psychological well-being.

Future research should prioritise empirical studies conducted within Pakistani and comparable South Asian educational contexts, including mixed-methods designs capable of capturing both quantitative outcome data and the qualitative experiences of students and educators navigating AI-mediated environments. Longitudinal research on the mental health effects of AI integration is particularly warranted for both students and teachers. Theoretical development is also needed. Frameworks adequate to the socio-technical complexity of AI in education in low- and middle-income countries must move beyond efficiency-centred paradigms to engage seriously with questions of power, representation, and transformative educational change.

References

- Adewale, M. D., Azeta, A., Abayomi-Alli, A., & Sambo-Magaji, A. (2024). Impact of artificial intelligence adoption on students' academic performance in open and distance learning: A systematic literature review. *Heliyon*, 10(4), e26183. <https://doi.org/10.1016/j.heliyon.2024.e26183>
- Ali, O., Murray, P. A., Momin, M., Dwivedi, Y. K., & Malik, T. (2024). The effects of artificial intelligence applications in educational settings: Challenges and strategies.

Online ISSN

3007-3197

Print ISSN

3007-3189

<http://amresearchreview.com/index.php/Journal/about>

- Technological Forecasting and Social Change, 198, 122980. <https://doi.org/10.1016/j.techfore.2023.122980>
- Aravantinos, S., Lavidas, K., Voulgari, I., Papadakis, S., Karalis, T., & Komis, V. (2024). Educational approaches with AI in primary school settings: A systematic review of the literature available in Scopus. *Education Sciences*, 14(7), 701. <https://doi.org/10.3390/educsci14070701>
- Babatunde, O., Alo, O. M., Okeoma, J. C., Onuoha, C. I., Adeyemi, R. O., & Ajila, E. C. (2025). AI-enhanced differentiated learning in elementary STEM: Promoting mental health, psychological resilience and equity. *World Journal of Advanced Research and Reviews*, 18(1), 1–20. <https://doi.org/10.30574/wjarr.2025.18.1.0001>
- Bearman, M., & Ajjawi, R. (2025). Artificial intelligence and gender equity: An integrated approach for health professional education. *Medical Education*, 59(3), 345–353. <https://doi.org/10.1111/medu.15599>
- Bond, M., Khosravi, H., de Laat, M., Bergdahl, N., Negrea, V., Oxley, E., Pham, P., Chong, S. W., & Siemens, G. (2024). A meta systematic review of artificial intelligence in higher education: A call for increased ethics, collaboration, and rigour. *International Journal of Educational Technology in Higher Education*, 21(1), 2. <https://doi.org/10.1186/s41239-023-00436-z>
- Bulathwela, S., Pérez-Ortiz, M., Holloway, C., Cukurova, M., & Shawe-Taylor, J. (2024). Artificial intelligence alone will not democratise education: On educational inequality, techno-solutionism and inclusive tools. *Sustainability*, 16(2), 745. <https://doi.org/10.3390/su16020745>
- Cotilla Conceição, J. M., & van der Stappen, E. (2025). The impact of AI on inclusivity in higher education: A rapid review. *Education Sciences*, 15(9), 920. <https://doi.org/10.3390/educsci15090920>
- Daher, R. (2025). Integrating AI literacy into teacher education: A critical perspective paper. *Discover Artificial Intelligence*, 5, 28. <https://doi.org/10.1007/s44163-025-00228-z>
- Delello, J., Sung, W., Mokhtari, K., Hebert, J., Bronson, A., & De Giuseppe, T. (2025). AI in the classroom: Insights from educators on usage, challenges, and mental health. *Education Sciences*, 15(1), 45. <https://doi.org/10.3390/educsci15010045>
- Fu, Y., Weng, Z., & Wang, J. (2024). Examining AI use in educational contexts: A scoping meta-review and bibliometric analysis. *International Journal of Artificial Intelligence in Education*, 35, 112–148. <https://doi.org/10.1007/s40593-024-00409-z>
- Kovalainen, T., Pramila-Savukoski, S., Kuivila, H., Juntunen, J., Jarva, E., Rasi, M., & Mikkonen, K. (2025). Utilising artificial intelligence in developing education of health sciences higher education: An umbrella review of reviews. *Nurse Education Today*, 136, 106996. <https://doi.org/10.1016/j.nedt.2024.106996>
- Lan, M., & Zhou, X. (2025). A qualitative systematic review on AI-empowered self-regulated learning in higher education. *NPJ Science of Learning*, 10, 15. <https://doi.org/10.1038/s41539-025-00298-0>
- Mangal, M., & Pardos, Z. (2024). Implementing equitable and intersectionality-aware ML in education: A practical guide. *British Journal of Educational Technology*, 55(4), 1298–1318. <https://doi.org/10.1111/bjet.13421>
- Peng, J., & Li, Y. (2025). Frontiers of artificial intelligence for personalized learning in

Online ISSN

3007-3197

Print ISSN

3007-3189

<http://amresearchreview.com/index.php/Journal/about>

higher education: A systematic review of leading articles. *Applied Sciences*, 15(9), 4567. <https://doi.org/10.3390/app15094567>

Rojas Vistorte, A. O., Deroncele-Acosta, A., Martín Ayala, J. L., Barrasa, A., López-Granero, C., & Martí-González, M. (2024). Integrating artificial intelligence to assess emotions in learning environments: A systematic literature review. *Frontiers in Psychology*, 15, 1405673. <https://doi.org/10.3389/fpsyg.2024.1405673>

Viberg, O., Kizilcec, R. F., Wise, A. F., Jivet, I., & Nixon, N. (2024). Advancing equity and inclusion in educational practices with AI-powered educational decision support systems (AI-EDSS). *British Journal of Educational Technology*, 55(7), 2215–2223. <https://doi.org/10.1111/bjet.13506>

Zhai, S., Zhang, S., Rong, Y., & Rong, G. (2025). Technology-driven support: Exploring the impact of artificial intelligence on mental health in higher education. *Education and Information Technologies*, 30(1), 123–146. <https://doi.org/10.1007/s10639-024-12817-4>

Zhang, M. (2025). Optimizing academic engagement and mental health through AI: An experimental study on LLM integration in higher education. *Frontiers in Psychology*, 16, 1504321. <https://doi.org/10.3389/fpsyg.2025.1504321>

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education — Where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 39. <https://doi.org/10.1186/s41239-019-0171-0>