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Reimagining Nepal's Future: AI for Human Development and Education

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Abstract

AI can help Nepal build a better future in human development and education. This review paper examines the transformative potential of artificial intelligence (AI) for human development and education in Nepal. Drawing on national policy documents, global reports, and academic studies, the review highlights AI's applications across sectors including education, health, agriculture, finance, and disaster management, and its capacity to drive economic growth, social transformation, and human capital formation. In education, AI supports personalized learning, intelligent tutoring, predictive analytics, and digital assistants, contributing to inclusive and equitable access while advancing Sustainable Development Goal 4 (Quality Education). Despite these opportunities, Nepal faces challenges including policy gaps, limited infrastructure, low AI literacy among teachers, and ethical and data privacy concerns. Lessons from international experiences, notably China's strategic digital investments, underscore the importance of stakeholder collaboration, faculty upskilling, and human-centered AI policies. The review concludes that integrating AI thoughtfully can enhance institutional efficiency, reduce inequalities, and strengthen Nepal's capacity for socio-economic and educational transformation. Future research should explore AI-driven innovations in governance, health, and sustainable development, ensuring alignment with national priorities and global best practices. Integrating AI in Nepal's education system can reduce inequalities and accelerate progress toward sustainable human development.

Keywords: Artificial Intelligence, Human Development, Education, Nepal, Sustainable Development Goals (SDGs)

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1. Introduction

Artificial intelligence (AI) is quickly becoming a powerful driver of change, with the capacity to revolutionize human development and education worldwide. In Nepal, the 2025 Nepal National AI Policy Draft envisions AI applications across a wide array of sectors, including education, health, transportation, tourism, agriculture, finance, disaster management, art, and entertainment, positioning AI as a key driver of long-term economic progress and social transformation (Government of Nepal, 2025). The state has committed to facilitating AI adoption through policy incentives, funding, and capacity-building initiatives, highlighting AI's centrality to human capital development and national competitiveness.

Despite this vision, Nepal faces significant challenges that threaten the effective diffusion of AI. With a medium Human Development Index (HDI) of 0.622 and education inequality at 39.8% (United Nations Development Programme, 2025), structural barriers, limited digital infrastructure, low AI literacy among educators, and gaps in regulatory frameworks hinder equitable and ethical adoption. Globally, universities are integrating AI into curricula, reskilling academic staff, and enhancing students' analytical capabilities, demonstrating that human development and AI readiness are closely intertwined (Stanford University, 2025).

AI's influence in education is particularly significant, offering personalized learning, intelligent tutoring, predictive analytics, and digital assistants that can enhance access, equity, and quality in line with Sustainable Development Goal 4 (Quality Education) (UNESCO & Stanford University, 2025). However, adoption remains constrained by limited teacher training, infrastructural gaps, ethical concerns, and the risk of widening digital divides (Filho et al., 2024; AlSagri & Sohail, 2024). Nepali higher education institutions (HEIs) have begun experimenting with AI applications in assessment, learning analytics, and administrative processes, yet strategic policies, faculty upskilling, and stakeholder engagement remain insufficient (see Crompton & Burke, 2023; Kuleto et al., 2021; Kang & Xu, 2025).

Given this context, there is a critical need to understand the potential of AI to foster human development and educational transformation in Nepal, identify structural and policy barriers, and explore lessons from international experiences to inform contextually appropriate strategies. This study, based on a comprehensive literature review, aims to examine the intersection of AI, human development, and education in Nepal, providing insights into the opportunities, challenges, and policy implications for fostering an inclusive, ethical, and sustainable AI-driven future.

2. Methodology

This study uses literature review and policy analysis, together called document analysis. It assesses the importance of AI in Nepal's human development and education. Document analysis provides a systematic approach for examining existing public policies and assessing their relevance to the research focus (Bowen, 2009; Cardno, 2018). We have reviewed key Nepal's national and international policy documents reviewed in this study. The insights derived from these documents were organized thematically to facilitate a structured presentation of findings and discussion (Bin-Qiang et al., 2024). The outcomes of this document analysis are presented and discussed in the subsequent section.

3. Literature Review

This literature review is structured around three interrelated themes: AI in human development, AI in education, and Nepal's need: AI into Human development and education.

3.1 AI in Human Development

AI is increasingly recognized as a transformative force shaping human development and civilizational progress. The 2025 Nepal National AI Policy Draft highlights AI's potential applications across diverse sectors, including education, health, transportation, tourism, agriculture, finance, disaster management, art, and entertainment (Government of Nepal, 2025). The draft further mentions that in the long run, AI is expected to drive both economic progress and social transformation. The state commits to supporting AI development through facilitation, funding, and policy incentives. AI integration is anticipated to reshape learning systems and educational practices, thereby influencing human capital formation (Government of Nepal, 2025). According to the United Nations Development Programme (2025), AI is not merely a technological advancement but represents a broader civilizational transformation (United Nations Development Programme [UNDP], 2025). Nepal's Human Development Index (HDI) stands at 0.622, placing it in the medium human development group, with education inequality at 39.8%, signaling the urgency for inclusive and equitable educational and developmental policies (UNDP, 2025). The report emphasizes three priority actions for human development in the AI era: creating a complementarity economy where AI works alongside people rather than replacing them; fostering intentional innovation so that human opportunities are embedded in AI design and use; and strengthening vital human capabilities to enable individuals to thrive in an AI-driven future (UNDP, 2025, p. 6).

The 16th Periodic Plan (2024/25–2028/29) envisions good governance, social justice, and national prosperity, emphasizing the identification and elimination of structural

barriers to development across sectors and aiming to boost production, productivity, and competitiveness (Nepal National Planning Commission, 2024, p. 12). Globally, universities are formulating AI-related strategies including introducing AI-based courses into academic programs, enhancing students' digital and analytical skills, and training and reskilling academic staff (Stanford University, 2025). Stanford University further added that the future of human progress is inseparably linked to AI, with expansion largely dependent on each nation's readiness and access to AI resources. Policymakers are urged to prioritize investment and regulation to enable smooth AI adoption (Stanford University, 2025).

3.2 AI in Education

AI's influence in education has grown rapidly, shaping pedagogy, curriculum design, and learning assessment. UNESCO and Stanford University (2025) emphasize the reinterpretation of SDG 4 (Quality Education) in light of AI's growing influence, recommending the leveraging of AI tools to guarantee that all individuals can access quality education by 2030 (UNESCO & Stanford University, 2025, p. 380). The 2015–2030 SDG framework originally framed SDG 4 as ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all, but did not anticipate the rapid development of AI, which has since reshaped development strategies through AI-driven digital technologies and data-based policy and planning mechanisms (Nepal National Planning Commission, 2017, p. 28). AI enables personalized educational content tailored to learners' needs, assists students from varied linguistic and cultural groups, reduces learning disparities caused by gender, socio-economic conditions, and geography, and strengthens individualized learning while preparing students for labor market demands (Lainjo, 2024). Filho et al. (2024) note that AI applications in higher education support the realization of SDGs, promote environmentally sustainable development through predictive analytics, enhance interaction and community building via chatbots and digital assistants, improve teaching and learning quality through intelligent tutoring, and contribute to more efficient university operations, though limited digital infrastructure and IT training restrict widespread adoption.

United Nations Educational, Scientific and Cultural Organization [UNESCO] (2019a) underscores the necessity of skill development for teachers to transition from AI users to active contributors, while highlighting challenges in preparing educators and AI systems to adapt to educational contexts, limited public dialogue, and the need for a global policy framework to ensure human-centered AI development (UNESCO, 2019a). AI's rapid evolution is described as "racing ahead at lightning speed" (UNDP, 2025, p. v). Arini and Nursa'ban (2024) show AI's applications in automatic assessment, curriculum design, and virtual tutoring, positively contributing to SDG 4 but risking deepened digital divides and overdependence on technology. Academic institutions are reorganizing priorities to include AI adoption, integrating AI-enhanced curricula across

disciplines, and emphasizing expansion of AI competencies in post-secondary education and specialized training programs (UNESCO, 2019b). Regulatory systems are necessary for ethical and accountable AI implementation (Jungwirth & Haluza, 2023). AI supports disadvantaged groups through virtual simulations, addressing economic and geographic barriers, and fosters social, economic, and environmental development, yet requires stronger investments in infrastructure and teacher training (AlSagri & Sohail, 2024). AI redefines learning methods, encourages pedagogical innovation, supports research-driven education, strengthens institutional efficiency, and plays a crucial role in advancing SDG 4 by improving access to education (UNESCO, 2024). Challenges in academic integrity and responsible AI application must be addressed to ensure sustainable and ethical education (Artyukhov et al., 2024). Savec and Jedrinović (2025) note AI's role in achieving SDGs through digital literacy and innovation, while highlighting persistent challenges in data protection, accessibility, and the need for regulatory frameworks and ethical codes.

AI's integration in curricula has generated both opportunities and risks. Many students misuse AI for direct copying, fostering unethical research practices and diminishing critical thinking, while overdependence may suppress originality (Khatri & Karki, 2023). Embedding AI in curricula, as at the University of Florida, prepares skilled and market-oriented graduates, and AI literacy is crucial for workforce readiness (Southworth et al., 2023). Absence of clear policies, weak infrastructure, and limited strategic vision slow AI adoption in academic institutions (Mahat et al., 2025). Global initiatives highlight the creation of AI frameworks, regulations, and ethical standards, which Nepal could adapt to its local context (Center for Social Innovation and Foreign Policy, 2025). Traditional resistance to change, institutional inertia, subscription costs, ethics, fairness, and biases in generative AI present additional challenges (Akinwalere & Ivanov, 2022; Samadi et al., 2024; Perera & Lankathilaka, 2023). Responsible AI use requires balancing human creativity and efficiency, proper guidance, mentorship, and development of AI literacy among students and teachers (Saaida, 2023; Paudel & Ghimire, 2021; Zamir et al., 2023; Gurung & KC, 2023). Generative AI tools support independent learning, lesson planning, grading, and data-driven insights, although privacy, collaboration, pedagogy integration, and sustained learner engagement remain concerns (Chapagai & Adhikari, 2024). Policies are essential for AI adoption to mitigate plagiarism, cybersecurity issues, and low digital literacy (Dempere et al., 2023).

3.3 Nepal's Need: AI into Human Development and Education

Nepal faces unique challenges in AI adoption due to policy gaps, infrastructure limitations, and human resource constraints. AI adoption in Nepal is slow due to low policy prioritization, necessitating legal guidelines to align initiatives with national goals (Silwal, 2022). Teachers require AI-related digital literacy to effectively guide learners, and there is ongoing debate about optimal integration methods (Neuman, 2023). Addressing AI challenges requires collaboration among policymakers,

innovators, academics, and students, alongside integrated frameworks to manage data privacy and security concerns (Raghuvanshi et al., 2024; Lawaju et al., 2024). AI cannot be ignored in university curricula, research, or teaching, with successful implementation dependent on teachers' technological proficiency (Rahiman & Kodikal, 2024). Even in Europe, advanced AI frameworks struggle to foster public engagement, illustrating a global challenge (Tubella et al., 2024). Contrasting perspectives suggest AI should be mainstreamed for global educational value, while cautioning against undermining teachers and shifting decision-making to machines (Bearman et al., 2023).

AI can deliver instant instruction, feedback, and guidance, improving intelligent tutoring, and higher education institutions must embed AI in teaching, learning, and policy to support creativity, ethics, and digital literacy (Crompton & Burke, 2023; Chan & Hu, 2023). University academics in Nepal increasingly show awareness and enthusiasm for AI adoption, yet urgent policy development is needed to regulate and encourage its responsible use, thereby strengthening teaching and learning quality (Obenza et al., 2023; Karki & Karki, 2025). Tools like ChatGPT enhance productivity, support independent research, and provide access to diverse learning resources (Ranabhat et al., 2024). China's experience shows that strategic investment in digital technologies drives human resource development and economic growth, offering a model for Nepal (Krishna et al., 2025; Rêgo et al., 2024). AI contributes to knowledge creation but also risks reinforcing inequalities and declining critical thinking, particularly affecting learners with limited access (Ruano-Borbalan, 2025).

AI applications in HEIs include assessment, predictive analytics, AI assistants, intelligent tutoring systems, and management of student learning, while addressing financial and enrollment challenges through affordable digital support and virtual assistants (Crompton & Burke, 2023; Kuleto et al., 2021). Nepali scholars emphasize AI ethics, active learning, and intelligent tutoring, but institutions often lack adequate training, structured adaptation to evolving learner and industry needs, and systems to harness AI's rapid progress (Deroncele-Acosta et al., 2024; Lee et al., 2024). While AI promotes technology-driven, interactive learning, risks include academic dishonesty, reduced critical skills, and limited access for marginalized learners, necessitating inclusive, stakeholder-informed policies and regulatory frameworks to ensure enhanced learning outcomes (O'Donnell et al., 2024; Vieriu & Petrea, 2025; Ocen et al., 2025). Digital transformation in HEIs progresses through stages of resource digitization, digitalization of teaching, and integration with intelligence, with faculty mindset and upskilling crucial for improving student intake and international reputation (Kang & Xu, 2025; Koseda et al., 2025).

3.4 Discussion: Diffusing AI into Nepal's Development and Education

AI is being recognized more and more as a powerful catalyst with significant impacts on human development and the advancement of civilization. The 2025 Nepal National AI

Policy Draft emphasizes AI's potential applications across sectors such as education, health, transportation, tourism, agriculture, finance, disaster management, art, and entertainment, projecting long-term economic progress and social transformation. State facilitation, funding, and policy incentives are intended to support AI integration, which is anticipated to reshape learning systems and influence human capital formation (Governement of Nepal, 2025). The draft was approved by the Government of Nepal in August 2025, aiming to provide a technology-driven and prosperous future for Nepali citizens (Prasain, 2025).The United Nations Development Programme (2025) highlights Nepal's medium HDI of 0.622 and education inequality at 39.8%, signaling the urgency of policies that ensure equitable access and human-centered AI development. Priority actions include fostering a complementarity economy, embedding human opportunities into AI design, and strengthening human capabilities to thrive in an AI-driven future (UNDP, 2025, p. 6). Globally, universities are embedding AI into academic programs, enhancing students' digital and analytical skills, and reskilling academic staff, reflecting the inseparable link between human progress and AI readiness (Stanford University, 2025). Nepal's 16th Periodic Plan (2024/25–2028/29) further underscores the need to remove structural barriers and boost production, productivity, and competitiveness, reinforcing the role of AI as a driver of national development (Nepal National Planning Commission, 2024, p. 12).

AI's impact on education is particularly significant, reshaping pedagogy, curriculum design, and assessment methods. UNESCO and Stanford University (2025) emphasize the reinterpretation of SDG 4 (Quality Education) through AI, advocating for the use of AI tools to ensure inclusive access to education by 2030. AI enables personalized learning, reduces disparities caused by socio-economic, linguistic, and geographic factors, and strengthens preparedness for labor market demands (Lainjo, 2024). AI also supports SDG achievement through intelligent tutoring, predictive analytics, and digital assistants that foster sustainable development and enhance teaching quality, though gaps in infrastructure and training limit widespread adoption (Filho et al., 2024; AlSagri & Sohail, 2024). UNESCO (2019a, 2024) stresses the need for teachers to evolve from AI users to active contributors, ensuring ethical and accountable AI implementation while fostering research-driven education and institutional efficiency. Challenges such as academic integrity, data privacy, and digital inequities highlight the need for robust regulatory frameworks and ethical codes to maximize AI's benefits while mitigating risks (Artyukhov et al., 2024; Savec & Jedrinović, 2025; Jungwirth & Haluza, 2023).

Despite AI's potential, Nepal faces unique challenges in adoption due to policy gaps, limited infrastructure, and human resource constraints. Low prioritization and insufficient legal guidelines slow integration, while teachers' limited AI literacy constrains effective use in classrooms (Silwal, 2022; Neuman, 2023). Addressing these challenges requires collaboration among policymakers, innovators, academics, and students, along with integrated frameworks to manage data privacy and security (Raghuvanshi et al., 2024; Lawaju et al., 2024). AI applications in Nepali higher

education institutions (HEIs) can enhance assessment, learning analytics, tutoring, and administrative efficiency, while fostering knowledge creation, digital literacy, and global competitiveness (Crompton & Burke, 2023; Kuleto et al., 2021; Kang & Xu, 2025). Lessons from China demonstrate that strategic investments in digital technologies drive human capital development and economic growth, providing a potential model for Nepal (Krishna et al., 2025; Rêgo et al., 2025). Effective policy, stakeholder-informed strategies, and faculty upskilling are essential to ensure AI promotes interactive, inclusive, and ethical education, reduces inequities, and strengthens Nepal's capacity to benefit from AI-driven development (O'Donnell et al., 2024; Vieriu & Petrea, 2025; Koseda et al., 2025).

In summary, AI holds transformative potential for human development and education, offering opportunities to enhance learning quality, equity, and human capital formation. While global experiences demonstrate its benefits, Nepal faces structural, policy, and capacity-related challenges that must be addressed through strategic investment, faculty development, and ethical, inclusive frameworks to fully leverage AI for national development and sustainable progress.

4. Conclusion and Future Implications

AI possesses the capacity to transform human development and education in Nepal, providing opportunities to boost economic growth, promote social inclusion, and ensure fair access to learning. Incorporating AI into Nepal's national development plans and higher education system can help overcome structural challenges, promote educational equity, and enhance human capital to keep pace with the fast-changing global economy. However, successful adoption requires robust policies, ethical and accountable regulatory frameworks, faculty upskilling, and investment in digital infrastructure to ensure inclusive access and minimize risks such as academic dishonesty and digital inequities. Future research and policy efforts should focus on designing human-centered AI systems, fostering AI literacy across all levels of education, and exploring innovative applications in governance, health, and sustainable development. The implications extend beyond academia, as strategic AI integration can empower citizens, enhance institutional efficiency, and position Nepal as a resilient and competitive participant in the global AI-driven development landscape.

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