Understanding the Adoption and Perceptions of Generative AI in Higher Education: Insights from Undergraduate Science Students in FWU, Nepal [1]

Ramesh Prasad Bhatta

Abstract

Artificial intelligence tools, notably LLMs such as ChatGPT, are rapidly transforming higher education around the world. This study explores the perceptions of GenAI awareness, adoption, its perceived benefits, and limitations among undergraduate science students in Far Western University, Nepal. Cross-sectional quantitative research design has been adopted involving 91 undergraduate science students in an online survey using structured questionnaires. Data were analyzed using descriptive analysis and chi-square goodness-of-fit tests. The findings suggest that a relatively high number of participants had adopted GenAI and used ChatGPT most frequently. The respondents mainly used GenAI for educational purposes. However, various limitations have been found, which include affordability, lack of proper connection, worries about the accuracy of information, and use of mobile devices for GenAI tools' access. This study has brought out a major contradiction in GenAI adoption in developing countries in higher education where the level of student participation is high despite the structural and infrastructural constraints. The results are very significant in terms of providing baseline data from a less represented area in the world.

Key words: Generative AI, ChatGPT, higher education, AI adoption, digital divide

Introduction

Using artificial intelligence (AI) is believed to be among the most disruptive innovation trends in technology in the 21st century. One of the many types of AI that

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Ramesh Prasad Bhatta, Assistant Professor, Central Department of CSIT, Far Western University, Nepal, rpb.mcs@gmail.com, https://orcid.org/0009-0005-0554-9072.

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exist can conduct activities that require human intelligence. The most recent type of AI systems and also the fastest growing type of AI is generative artificial intelligence (GenAI). GenAI refers to the form of AI that can automatically generate text, images, sounds, coding languages, etc., based on human language instructions (Dwivedi et al., 2023; Borah et al., 2024). The launch of ChatGPT by OpenAI in November 2022 was revolutionary.

ChatGPT, is revolutionizing the education sector in many ways. In one way, such technology creates new possibilities of improving education through the development of unique human-machine systems. Such technologies can serve as personal digital tutors for students, as well as digital assistants for teachers and digital peers for collaboration. At the same time, advanced functionalities associated with these generative AI technologies create new challenges for educators and policy-makers around the globe. To start with, the emergence of these technologies has led to chaos in universities and schools regarding the creation of regulations regarding these technologies and educating students and teachers on these platforms.

Artificial Intelligence (AI) has been progressing steadily in its development through a number of stages, but one of the most exciting branches in the realm of AI has to be Generative Artificial Intelligence (Generative AI). It entails the employment of computer systems that can produce content such as text and pictures on their own, just like humans do.

For instance, in educational environments, the use of generative AI applications such as ChatGPT is growing to facilitate personalized learning, automatic content generation, intelligent tutoring, and immediate feedback. These tools can increase learners' motivation through customized learning experiences, which facilitate self-directed learning (Kasneci et al., 2023). Additionally, generative AI can help teachers design teaching materials, develop assessments, and perform administrative functions, thus making educational systems more efficient and scalable (Dwivedi et al., 2023).

Conversely, although it has an astonishing transformational potential, when implementing generative AI in education, a number of extremely significant ethical, pedagogical, and technological issues are involved. There are several significant ethical, pedagogical, and technological challenges caused by the application of AI technologies for teaching and learning, such as ethical concerns linked to academic dishonesty, AI bias, personal data privacy, and authenticity of content created by an AI generator, just to

name a few (UNESCO, 2023). In addition, the application of such an innovative technology can adversely affect the growth of students in terms of critical thinking skills.

Artificial Intelligence (AI) is now omnipresent in the developed world, contributing to marketing, design, entertainment, and higher education. Numerous AI tools operate behind the scenes across various facets of modern civilization. A major breakthrough occurred in November 2022 with the release of Chat Generative Pre-trained Transformer (ChatGPT) by San Francisco-based OpenAI. ChatGPT, an NLP-based large language model (LLM), responds to user prompts with human-like intelligence. Its release has significantly impacted education and inspired other generative AI tools. Rapidly adopted, ChatGPT reached 100 million users within two months, becoming the fastest-growing consumer app ever. (Hu, 2023).

The distinctions between the two AI systems are quite clear. As mentioned by Laviola et al. (2024), not all AI systems are built equally. The distinctions are identified along the following six dimensions: data source, response type, interactivity level, contextual understanding, task completion, and technical requirements. Firstly, with regard to the data sources used, traditional AI uses data derived from defined data sets and historical information in order to make predictions and decisions, and it usually provides rule-based decisions based on programmed logic (Ng et al., 2024).

GenAI, on the other hand, uses large volumes of data from the internet and elsewhere to provide responses that are human-like, expressed in various forms such as texts, pictures, and even video. In comparison to the responses of traditional AI, GenAI is more interactive in nature; this means that it enables the development of dialogues that result in personalized responses according to the user input. Finally, GenAI demonstrates greater contextual understanding than traditional AI (Samala et al., 2024).

On the side of completing tasks, conventional AI is effective in completing well-defined tasks such as data analysis and automation whereas, on the other hand, Generative AI is effective in problem-solving and providing innovative solutions which have not necessarily been programmed. Finally, the competencies required to develop traditional AI skills include configuring and labeling of data for model training, while those required by generative AI include critical thinking and prompt engineering to tune down the responses of GenAI models. In this regard, generative AI is different from traditional AI since generative AI learns from user input responses (data, prompt) and tunes its response patterns, thus producing human-like responses (Borah et al., 2024).

Literature Review

The academic discourse on Generative Artificial Intelligence (GenAI) in higher education has evolved rapidly, particularly following the public release of ChatGPT in November 2022. In the pre-ChatGPT era, scholarly attention focused on artificial intelligence more broadly, often employing vague, techno-centric language that remained detached from established educational theory. A critical review of leading higher education journals revealed that AI-related discussions were frequently symbolic rather than pedagogically grounded, highlighting the need for more precise and theory-informed conceptualizations (Bearman et al., 2022).

Along the same lines, a systematic review pinpointed personalization and adaptive learning as major opportunities for AI in education. It also revealed that teacher capacity, ethical implementation, and infrastructural constraints remain the major challenges (Xia et al. 2022). As the foundational studies indicated collectively, the effective integration of AI as a tool demanded not only clearer conceptual frameworks but also a stronger focus on the practical implementation of reality, even though it was widely recognized that AI held immense potential (Bearman et al. 2022; Xia et al. 2022).

The public launch of ChatGPT in late 2022 marked a turning point, triggering a substantial increase in scholarly activity. A systematic scoping review mapping global evidence on ChatGPT use in higher education found that educators primarily utilized the tool for professional development and resource generation, while students engaged with it as a personalized tutor, motivated largely by the desire to reduce academic workload (Ansari et al., 2023).

However, this rapid adoption also raised critical concerns, including issues of accuracy, academic integrity, and potential negative impacts on cognitive development (Ansari et al., 2023). In parallel, another systematic review analyzing studies published in 2023 highlighted benefits such as enhanced self-directed learning, improved writing support, and reduced faculty workload, alongside notable drawbacks including over-reliance, misinformation, algorithmic bias, and threats to academic integrity (Abu Safi & Al Qudah, 2023). These studies consistently underscored the need for institutions to develop appropriate assessment strategies and strengthen digital competencies to maximize benefits while mitigating risks (Abu Safi & Al Qudah, 2023; Ansari et al., 2023).

By 2024, literature had become highly developed. The meta-analyses of GenAI deployment were revealing the integration in a more detailed manner. A study analyzing 625 Scopus-indexed literature found that the authors recognized the international rise of those who want to detect AI-generated text, but they still acknowledge a substantial gap in research related to the ways GenAI can be successfully integrated in curriculum design, examination practices, and teaching delivery .Indeed, they were urging additional

interdisciplinary and multidimensional studies to provide the right evidence for the creation of the guidelines and policies (Ogunleye et al. 2024).

At the same time, a meta-systematic assessment of 66 systematic reviews discovered that the research was mostly done on adaptive systems and personalization, but at the same time, the reviews pointed to significant gaps in ethical, methodological, and contextual rigor (Bond et al. 2024). In 2025 thematic specialization significantly increased and a concentration on specific application domains and stakeholder perspectives became quite strong, the literature was showing. The combination of empirical studies investigating the effects of GenAI on teaching, learning and institutional practices pointed to the fact that a great number of higher education institutions are still developing policies and are very careful in how they integrate innovation with ethical responsibility (Kamudyariwa et al. 2025).

Besides that, the paper laid down a roadmap for the top management in the process of GenAI adoption (Kamudyariwa et al. 2025). In an even narrower field, a systematic review of 65 peer-reviewed scholarly papers on generative AI art applications For example, DALLE and Midjourney showed that these tools can help people come up with more ideas, communicate with different modes at the same time and learn from different disciplines However, the prohibition of faculty training, unclear evaluation standards and fears about fair access were the main difficulties even if some major ones had been highlighted. The authors have built a theoretical framework of AI generated art integration that highlights responsible creative as well as inclusive educational practices (Wang et al. 2025).

New studies in early 2026 are gradually exploring the dimensions of equity and human-AI interaction that have not been sufficiently addressed in the past. For instance, a scoping review regarding the Global South disclosed that although GenAI has the capacity to radically change both personalized learning and support in research, its use is still mainly subject to infrastructural challenges, human capital gaps, ethical issues, and lack of adequate policy frameworks (Nguyen & Perkins, 2026).

Surprisingly, equity issues, despite their fundamental importance, are still scarcely reflected in the literature (Nguyen & Perkins, 2026). In agreement with this, a systematic review of human-GenAI interaction patterns has unveiled a serious paradox: on the one hand, meta-analytic evidence showed large performance gains (Hedges' g = 0.867), yet on the other hand, unbridled use resulted in "metacognitive laziness, " meaning that improvements in performance were only superficial and there was little transfer of knowledge, as well as higher dependence and procrastination. These results strongly indicated that successful use of GenAI calls for well-designed prompts, explicit scaffolding, and instructor-led intervention. Besides that, inequality in access strongly

impacts minority groups and geographically disadvantaged learners, such as those from the Global South, thereby possibly widening the gap of existing inequalities (Roy, 2026).

In general, studies sketch a developmental trajectory. Initially, general AI issues were discussed during the earliest days of research, and after ChatGPT, a rapid increase took place which was eventually balanced with a consolidation of the literature through comprehensive reviews, highlight of thematic areas, and greater attention to fairness and human-AI interaction design. The conclusion drawn at each point was the same: just having technology is not enough. On top of that, teaching support, ethical oversight, and implementation adapted to local conditions are essential if GenAI is really to transform higher education.

Problem statement

The sudden advent of the Generative Artificial Intelligence (GenAI) tools, especially chatbots like ChatGPT, has changed the face of higher education through automation of content creation, individualization, and provision of more academic assistance. However, despite the numerous benefits that such technologies bring to the educational process, there are some pressing issues related to academic integrity and misuse of AI-assisted products, and decline of critical skills.

Though there is an increasing global interest in the implementation of GenAI, the use of such tools in developing nations, especially in Nepal, is not sufficiently studied. Far Western University, for instance, does not have any regulations or studies in relation to GenAI. The use of GenAI by undergraduates of this university has not been adequately investigated yet; there is no knowledge about students' awareness of GenAI, its frequency of use, purposes of adoption, and problems related to its utilization.

The lack of such information can become an impediment to further improvement of the situation, because teachers and policymakers need empirical evidence for formulating guidelines and strategies for GenAI. Thus, this research paper is aimed at addressing the problem and exploring adoption and use of AI in academic context.

Research gap

Though the use of Generative Artificial Intelligence (GenAI) technologies like ChatGPT has rapidly spread worldwide, prior research mainly concentrates on highly developed nations, which makes little use of data from less-developed countries. Research related to GenAI primarily concentrates on concept-related discussions, technical aspects, and pedagogical implications, rather than adopting specific contextual insights regarding GenAI usage. In particular, as far as Nepal is concerned, along with

Far Western University, empirical studies about undergraduates' use of GenAI tools are noticeably scarce. Prior research in this regard either uses theoretical approaches for analyzing GenAI or employs small-scale exploratory analysis. Thus, there is not much data regarding undergraduates' usage patterns, awareness, advantages of its use, and problems.

Additionally, there is very little data about the role socio-economic conditions, digital literacy, and institutional support play in using GenAI technologies in higher education institutes in developing nations. This may be due to the fact that each nation has different circumstances; hence, GenAI implementation can have different opportunities and challenges for each. This research aims to contribute to the literature regarding undergraduates' use of GenAI technologies, especially in the context of developing countries.

Research objectives

The main purpose of conducting this research will be to find out how generative artificial intelligence is perceived and used by B.Sc. undergraduates enrolled in higher education institutions. To achieve this goal, the following objectives will be pursued: to measure the extent of knowledge that undergraduate B.Sc. students have about generative artificial intelligence; to understand how often and for what reason GenAI is used by students during their academic work; to assess the opinions of students about the benefits that can be gained from using GenAI in studying and obtaining academic achievements; and to find out the difficulties and problems that exists with GenAI in higher education.

Need for generative AI in education

The fusion of Generative Artificial Intelligence (GenAI) into educational spaces is turning out to be a necessity not only for overcoming the drawbacks of conventional teaching methods but also for fulfilling the changing roles of learners in the digital age. The main points below emphasize why GenAI is such a crucial element in today's education systems:

Personalization

Personalization is a core need in education today because different learners have different competencies, interests, and rates of learning. GenAI can produce on-the-fly personalized learning resources, tests, and feedbacks based on individual student profiles. It has been shown that learner performance was greatly improved in AI-enabled

personalized learning settings due to alignment of instruction and learner needs (Zawacki-Richter et al. 2019; Holmes et al. 2022).

Engagement and interactivity

The use of traditional classroom lectures is the main reason why most students drop out due to boredom or finally take alternative routes to learning. GenAI is the product of the current tech era, providing tools that can turn the learners from passive listeners to active participants in the learning process. Studies reveal that interactive AI systems drastically increase student engagement and greatly improve their level of understanding in various subject matters (Luckin et al. 2016; Dwivedi et al. 2023). They should therefore look into GenAI technology that can learn from users and customize the teaching process to the individual student. Such a tool, as per Holmes and others (2022), will allow for differentiated teaching and will be capable of providing the learner with the just right challenge level and support. It is a great supporter of students with disabilities by providing the latter through, among others, multilingual help, assistive technologies, and inclusive learning materials. Equitable education targets can hardly be achieved without such powerful education delivery mechanisms (UNESCO, 2023; Zawacki-Richter et al. 2019). Students for instance, might use GenAI to collaborate in content production; teachers however can come up with instructional materials that are not only more attractive but also more creative. This mirrors the newly increased importance of, among others, the three pillars of a 21st-century skill set - critical thinking, creativity, and innovation (Dwivedi et al. 2023).

Data-driven decision making

Another critical need for GenAI is its ability to analyze large-scale educational data and generate actionable insights. These insights help educators identify learning gaps, monitor student progress, and refine instructional strategies. Data-driven approaches enhance the overall quality and effectiveness of education systems (Holmes et al., 2022).

Scalability of education

With increasing global demand for education and limited teaching resources, scalability has become a major challenge. GenAI provides scalable solutions by delivering personalized and high-quality learning experiences to large numbers of students simultaneously. This is particularly beneficial in developing regions where access to quality education is constrained (UNESCO, 2023).

Future-ready skills development

The growing influence of AI in various sectors necessitates the development of AI literacy and digital competencies among students. Integrating GenAI into education not only enhances learning processes but also prepares students for future workforce demands. It equips learners with the skills required to interact with and leverage AI technologies effectively (Dwivedi et al., 2023).

Methodology

Sample of the Study The sampling population comprised all the students enrolled in all four components for undergraduate Science during B.Sc. General (First Year) and B.Sc. According to the data available in the records of the department, the total population (N) in both the programs would be 130 where 82 were in B.Sc. General (First Year) and 48 in B.Sc. CSIT (Fifth Semester) respectively. A purposeful convenient sampling approach was followed since it is an exploratory and descriptive study and there will be some limitations while conducting a study in the distant higher education institutions. The study involved the collection of data from 91 respondents through an online-administered questionnaire. The questionnaire was made up of closed questions that addressed the main aspects under investigation.

These aspects include access to the internet in one's primary residence place, how often and for how long Generative AI is used, what tools have been used (such as ChatGPT, Google Gemini, and GitHub Copilot), reasons for using Generative AI, perceived benefits, difficulties in its use, and perception about the ability of Generative AI to minimize the disparities in education between urban and rural settings.

Results

The results of the study are presented below after analyzing data gathered from 91 undergraduate science students from FWU. More precisely, descriptive statistics, chi-squared tests, and correlations were conducted to examine several factors concerning students' knowledge, application, and perception of Generative Artificial Intelligence as well as the associated ethical questions. A total of 91 undergraduate science students participated in the survey about Generative AI tool utilization.

Gender distribution

The distribution shows that 70.3% of the respondents were males and 29.7% of the respondents were females. Therefore, the data collection was mostly from male participants. This is shown in Table 1 below.

Table 1

Gender Distribution

Gender	Frequency	Percentage
Male	64	70.3%
Female	27	29.7%
Total	91	100%

Internet connectivity

The majority of the respondents had fast Wi-Fi or fiber connection to the internet (68.1%), and some had good mobile data services (22%). However, few respondents reported unstable connectivity to the internet. This is shown in Table 2 below.

Table 2

Internet Connectivity

Type of Connectivity	Frequency	Percentage
High-speed Wi-Fi	62	68.1%
Mobile Data (Reliable)	20	22.0%
Mobile Data (Unreliable)	7	6.6%
No Internet	2	3.3%

Primary device for accessing AI tools

The majority of the respondents used smartphone/mobiles as their main devices (63.7%), followed by laptops (35.2%), showing heavy reliance on mobile devices, as shown in Table 3 below.

Table 3

Primary Device Usage

Devices	Frequency	Percentage
Smartphone/Mobile	58	63.7%
Laptop	32	35.2%
Desktop	1	1.1%
Computer Lab	0	0%

Infrastructural barriers

The majority of the respondents had fast Wi-Fi or fiber connection to the internet (68.1%), and some had good mobile data services (22%). However, few respondents reported unstable connectivity to the internet. The majority of the respondents used smartphone/mobiles as their main devices (63.7%), followed by laptops (35.2%),

showing heavy reliance on mobile devices, as shown in Table 4 and Figure 4 below. The most prominent challenges cited by the respondents include slow internet speed (41.8%), electricity problems (24.2%), insufficient devices (16.5%), and other obstacles (17.5%), as shown in Table 4 below.

Table 4

Infrastructural Barriers

Barrier	Frequency	Percentage
Slow internet speed	38	41.8%
Electricity load-shedding	22	24.2%
No barriers	22	24.2%
High cost of data	18	19.8%
Lack of devices	15	16.5%
Language barrier	11	12.1%

Use of generative AI tools

ChatGPT emerged to be the most popular AI tool in terms of usage by respondents (86.8%), whereas Google Gemini came second (50.5%), while other applications like Microsoft Copilot and Claude had lower popularity rates.

Table 5

Generative AI Tools Usage

Tool	Frequency	Percentage
ChatGPT	79	86.8%
Google Gemini	46	50.5%
Copilot	9	9.9%
Claude	9	9.9%
DeepSeek	11	12.1%
Others	<5	<6%

Purpose of using generative AI

The most common purpose of using AI tools among the respondents was gaining knowledge about complex concepts (85.7%), idea generation (44.0%), coding support (30.8%), and other reasons (x%). This can be seen from Table 6.

Table 6

Purpose of Use (Multiple Response)

Purpose	Frequency	Percentage

Understanding concepts	78	85.7%
Idea generation	40	44.0%
Coding assistance	28	30.8%
Language translation	21	23.1%
Data analysis	12	13.2%
Presentations	15	16.5%

Challenges in using generative AI

The most commonly experienced problem with AI tools was the cost of premium versions (57.1%), inaccurate information provided by the tool (36.3%), and lack of context (22.0%), as depicted in Table 7 below."

Table 7

Challenges Faced

Challenge	**Frequency**	**Percentage**
High cost	52	57.1%
Inaccurate information	33	36.3%
Lack of context	20	22.0%
Over-reliance	16	17.6%
Technical issues	13	14.3%
Ethical concerns	10	11.0%

Chi-Square doodness-of-fit tests: AI tool usage, challenges, and device preferences

Three chi-square goodness-of-fit tests were conducted to examine whether observed frequencies differed significantly from equal distribution across AI tool usage, challenges faced by students and device usage. Effect sizes were estimated using Cramér's V, and all analyses were performed at $\alpha = .05$.

Table 8

Chi-Square Goodness-of-Fit Test for AI Tool Usage (N = 154)

AI Tool	f	*fe*	$(f - fe)^2/fe$	p
ChatGPT	79	30.80	51.29	<.001
Gemini	46	30.80	7.49	<.001
Copilot	9	30.80	15.43	<.001
Claude	9	30.80	15.43	<.001
DeepSeek	11	30.80	13.35	<.001

f = observed frequency; fe = expected frequency under equal distribution; $(f - fe)^2/fe$ = cell contribution to χ^2. $\chi^2(4, N = 154) = 126.52$, $p < .001$. Cramér's V = .45, indicating a large effect.

A chi-square goodness-of-fit test revealed that AI tool usage was not equally distributed across the five platforms, $\chi^2(4, N = 154) = 126.52$, $p < .001$, Cramér's V = .45. ChatGPT was the most frequently used tool (f = 79), followed by Gemini (f = 46), while Copilot and Claude were least used (f = 9 each)

Table 9

Chi-Square Goodness-of-Fit Test for Reported Challenges in AI Use (N = 144)

Challenge	f	*fe*	$(f - fe)^2/fe$	p
High cost	52	24.00	32.67	<.001
Inaccurate information	33	24.00	3.38	<.001
Lack of context	20	24.00	0.67	<.001
Over-reliance	16	24.00	2.67	<.001
Technical issues	13	24.00	5.04	<.001
Ethical concerns	10	24.00	8.17	<.001

f = observed frequency; fe = expected frequency under equal distribution; $(f - fe)^2/fe$ = cell contribution to χ^2. $\chi^2(5, N = 144) = 52.58$, $p < .001$. Cramér's V = .27, indicating a medium effect.

A chi-square goodness-of-fit test indicated that challenges were not uniformly distributed, $\chi^2(5, N = 144) = 52.58$, $p < .001$, Cramér's V = .27. High cost was the most frequently reported challenge (f = 52), followed by inaccurate information (f = 33) and lack of context (f = 20). Ethical concerns were the least reported (f = 10). The medium effect size reflects moderate unevenness across challenge categories (Table 9).

Table 10

Chi-Square Goodness-of-Fit Test for Device Usage Among AI Users (N = 91)

Device	f	*fe*	$(f - fe)^2/fe$	p
Smartphone/Mobile	58	22.75	54.63	<.001
Laptop	32	22.75	3.75	<.001
Desktop	1	22.75	20.80	<.001
Computer Lab	0	22.75	22.75	<.001

f = observed frequency; fe = expected frequency under equal distribution; $(f - fe)^2/fe$ = cell contribution to χ^2. Computer Lab had zero responses (fe = 22.75). $\chi^2(3, N = 91) = 101.92$, $p < .001$. Cramér's V = .61, indicating a large effect.

A chi-square goodness-of-fit test showed that device usage differed significantly from equal distribution, $\chi^2(3, N = 91) = 101.92$, $p < .001$, Cramér's V = .61. Smartphone/mobile was the dominant device (f = 58), followed by laptop (f = 32).

Desktop use was minimal (f = 1), and no respondents reported using a computer lab. The large effect size reflects a strong concentration of AI use on mobile devices.

Discussion

In this research, the study explored the adoption and attitudes developed through GenAI use among the participants. The results illustrate a complex scenario: even though GenAI applications notably ChatGPT have deeply permeated this student segment, their full effectiveness is hampered by the enduring infrastructural, economic, and institutional shortages that are the hallmark of higher education in developing countries.

High adoption rates and tool dominance

The widespread adoption of ChatGPT (86.8%) is a testament to its global dominance and also reflects the results of systematic review studies that have reported the rapidly diffusion of the tool in higher education institutions around the world (Ansari et al. 2023; Kamudyariwa et al. 2025). Secondary prominence of Google Gemini (50.5%) highlights the diversification of GenAI ecosystem while the very low adoption of mainly specialized tools such as Microsoft Copilot and Claude (both 9.9%) confirm that students mostly pick their AI tools based on hands-on availability, price and their own familiarity with a certain brand rather than on the different capabilities of tools. This finding confirms the pattern of earlier research where free-tier of availability was found as main driver for AI tools adoption among student populations (Dwivedi et al. 2023; Bond et al. 2024). Interestingly, DeepSeek - a fairly new player in the China GenAI market - had already got some users (12.1%) by the time of data collection, which shows that students in Nepal seem to be quite at home with tracking global AI developments. This finding calls for a follow-up over time to see if, in the future, the cost-effective new models become serious competitors to ChatGPT in low-resource settings.

Purposes of use: Cognitive support over content generation

Majority of the respondents identifying concept clarification (85.7%) and idea generation (44.0%) as their main uses of GenAI indicate that they are mostly engaged with these tools at the level of cognitive scaffolding to support their thinking and not simply as passive content generating tools, this behavior is epistemologically very important: it indicates that students may be using GenAI in a way that supports higher-order thinking rather than bypasses it. However, this notion is seriously challenged because self-reported use hardly ever represents actual use behavior accurately - that is a methodological limitation of survey research. Another significantly high proportion of

coding assist (30.8%) use that matches the predominantly science composition of the sample and also goes hand in hand with the increasing role of tools like GitHub Copilot in STEM education (Ng et al. 2024). Language translation (23.1%) is an equity-related discovery: Considering Nepal, a multilingual, post-colonial academic environment, students struggling with English-medium instruction while their thoughts are in Nepali or other native languages, the translation features of GenAI could, in effect, lessen the language barriers to academic involvement. This facet of GenAI's utility has not been sufficiently discussed in the literature and it calls for further studies.

Infrastructural barriers and the digital divide

This research mainly aims to highlight the detailed infrastructural set-ups in a developing country higher education system where GenAI adoption is happening. Even though 68.1% of the respondents mentioned that they have access to high-speed Wi-Fi and 63.7% accessed AI tools through their phones. This means an unexpectedly good connectivity for far-western Nepali institution, the fact that slow internet speeds (41.8%) and electricity load-shedding (24.2%) are still considered as top barriers clearly shows the unstable nature of this infrastructure. Quite a few are still depending on smartphones (63.7%) as their major means rather than using laptop or desktop, which will definitely have some pedagogical consequences. Mobile platforms would not only restrict quite complex GenAI engagements such as multi-turn prompting, document analysis, and code debugging but also make the whole student -AI interaction at a superficial level. This particular aspect of device-use has been completely under the radar in any of the GenAI adoption literature available today which is largely based on high-income-country settings where everyone accesses laptops. Students' complaining about the high price (57.1%) ties in well with a more systemic worry about turning AI-enhanced education into a commodity. Since premium-tier GenAI solutions keep out-performing their free alternatives, institutions working with financially challenged students might end up falling further behind when it comes to AI-enabled learning quality - a chain of events that can worsen existing educational inequalities not only within Nepal but also across Global South institutions more widely (Roy, 2026).

Information accuracy, critical literacy, and academic integrity

That over one-third of respondents (36.3%) pointed to wrong information as a major challenge shows a serious pedagogical risk. Students without the right AI critical literacy skills may take GenAI hallucinations as the truth, which may have serious

consequences for their scientific learning and academic quality. Besides, this is in line with meta-analytic evidence which shows that use of GenAI without limits might lead only to superficial performance gains while at the same time it can negatively affect metacognitive skills and knowledge transfer (Roy, 2026). The relatively small number of respondents reporting over-reliance as a concern (17.6%) might be a sign that most are not adequately aware of themselves at that this risk, which yet again points to the need for the structured AI literacy teaching in undergraduate courses. Only 11.0% of the surveyed students were worried about the issues of academic integrity - a very small number actually considering the heavy focus on AI-assisted plagiarism in global higher education (Susnjak, 2022; Duah & McGivern, 2024). This difference could be due to: (a) real variations in the disciplinary norms regarding academic integrity in sciences; (b) very limited/inexistent discussions at the institutional level about AI-related academic misconduct at FWU; or (c) self-reporting bias connected to social desirability. As per the problem statement, the lack of the formal institutional GenAI policy at FWU is most likely a contributing factor to student's low awareness of the ethical boundaries of AI usage and a policy gap that FWU must address.

Gender disparity in AI access and participation

The significantly male-biased sample (70.3% male) mirrors the broader gender disparities in technology access and STEM participation, which are well documented in South Asian higher education (UNESCO, 2023). Although this study cannot establish whether such a disparity is due to differential enrollment, differential survey participation, or differential GenAI adoption, it does raise critical equity issues. If female students are not only less able to use GenAI tools but are also benefiting less whether due to device access, social norms, confidence, or institutional barriers. It would be important for future studies to segment GenAI adoption and achievement data by gender in order to empirically evaluate this risk.

Conclusion

The paper provides insights into one of the first empirical studies on GenAI uptake by science undergraduate students at FWU Nepal. GenAI rapidly becomes an important part of the learning process for the students, with ChatGPT occupying the first place. Specifically, the primary functions performed by the technology for the benefit of the students include concept clarification, idea generation, programming help, and translation of languages. At the same time, despite its high popularity, several obstacles

remain which hinder effective usage of GenAI, for instance, high subscription fees, poor Internet connections, electricity shortages, and overreliance on phones. Consequently, this indicates that in the context of developing countries, GenAI is affected by digital and economic inequalities existing in universities, thus limiting the capacity of students to explore AI to the fullest. Moreover, the results of statistical analysis showed that preferences toward using certain tools, perception of challenges, and use of devices varied statistically significantly. The high gender discrepancy among students surveyed calls into question their equal opportunities in using AI for learning purposes.

Finally, what emerges from this study is the fact that, notwithstanding the enormous potential of the application of GenAI in promoting education and tackling some issues in academia, the implementation of GenAI in education will depend on addressing certain infrastructure, financial, and equality-based barriers.

However, there are several limitations regarding this study. These include the cross-sectional design of the research, the use of self-reporting in the data collection process, as well as the fact that the analysis in this case was limited to one organization. Future research may try to include longitudinal analysis to understand the progress made in GenAI utilization and analyze how different variables influence GenAI adoption.

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