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Research Article

Students' Perspectives on Integrating Generative AI Tools into Teaching, Learning, and Assessment in Higher Education: A Case of the Royal University of Bhutan

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Abstract
This study explored students' perspectives on the benefits and challenges of integrating Generative AI (GenAI) tools in teaching, learning, and assessment within five colleges under the Royal University of Bhutan (RUB). The study is timely and relevant as educators and students in Bhutan increasingly adopt GenAI tools, reflecting a broader global trend. The study outlines three primary objectives. First, it seeks students' perspectives regarding the integration of GenAI tools in teaching, learning, and assessment in higher education, highlighting the GenAI tools used, the benefits they offer, and the challenges they may impose. Second, the study aspires to provide practical recommendations for educators and academics in higher education institutions for the effective integration of GenAI tools. Finally, the study aims to provide recommendations to relevant stakeholders and policymakers for the adoption or expansion of AI initiatives within the precincts of RUB colleges. This study employed a qualitative approach as qualitative research allows for a deeper understanding of human behaviour and experiences. A purposive sampling technique was used to ensure that participants were selected based on their potential to provide valuable insights relevant to the research objectives. Data were collected through semi-structured focus group interviews, with each group comprising six members (three male and three female). A total of 180 students participated across 30 focus group interviews conducted in five colleges, with six focus group interviews in each college. The data collected were transcribed, coded, and categorised into themes for analysis. To maintain confidentiality, the researchers used a systematic labelling system for both focus groups and individual students during the data analysis process, enabling a comprehensive and structured interpretation of the findings. The findings revealed key benefits of GenAI, such as providing quick and accessible information, fostering personalised learning, and offering emotional support. However, the findings also revealed challenges in terms of the reliability of AI-generated content, the potential hindrance to creativity and critical thinking, and the risk of social and emotional disconnect between students and their learning communities due to overreliance on GenAI. The study therefore recommends raising awareness and improving understanding of GenAI tools among students and establishing comprehensive policy frameworks to promote their ethical use across RUB colleges while upholding high standards of academic quality.

Keywords: AI Tools, Higher Education, Benefits, Challenges

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1. INTRODUCTION

The integration of generative artificial intelligence (GenAI) tools in higher education has gained significant attention in recent years due to its potential to transform traditional teaching and learning methods. The opportunities for GenAI tools in education are broad, as it promises to provide personalised

learning, offer dynamic assessment techniques, and enhance teaching and learning experiences (Chasokela, 2025; Popenici & Kerr, 2017; Pradhan, 2023; Roll & Wylie, 2016). However, the use of GenAI tools in education also raises significant ethical issues that bring about new risks, such as privacy and security, inappropriate and incorrect output, and providing new ways for students to commit academically dishonest actions (Kumar, 2023; Lubowitz, 2023; Warschauer et al., 2023). Bhutan has consistently demonstrated its commitment to improving pedagogical approaches employed within its classrooms. While the incorporation of technology to enhance learning outcomes was already embraced by many Bhutanese educators, this commitment was drastically accelerated by the COVID-19 pandemic. The pandemic forced educators to adopt innovative technologies, prompting the initiation of various training programmes aimed at enhancing the capacity of Bhutanese educators to effectively incorporate technological tools in their teaching practice (iSherig-2**,** 2019-2023). However, the emergence of a plethora of GenAI tools in recent years presents Bhutanese educators and students with even more innovative opportunities to integrate these tools in their teaching, learning, and assessment. Thus, it is imperative to explore the use of GenAI tools in teaching, learning, and assessment in Bhutanese education institutions in general and higher education institutions in particular.

The rapid emergence and widespread availability of GenAI tools in recent years have attracted considerable global attention. This development has also stimulated growing interest in integrating GenAI into education, as it is increasingly viewed as a transformative technology with the potential to reshape conventional teaching and learning practices (Amdan et al., 2025; Mogavi et al., 2023; Xia et al., 2022). Despite these opportunities, several concerns remain. Research indicates that GenAI systems are not capable of independently verifying the accuracy or credibility of the information they generate, and their outputs may contain inaccuracies or misinformation. Consequently, their use requires careful human oversight (Lubowitz, 2023). Another challenge relates to academic integrity. AI-generated content is often difficult to identify using conventional plagiarism detection tools, which raises concerns regarding the authenticity of students' and authors' work (Peres et al., 2023). These issues highlight the need for further investigation into both the potential benefits and the challenges associated with integrating GenAI tools into teaching, learning, and assessment practices, particularly within higher education institutions in Bhutan.

Today, many Bhutanese educators and students are also actively exploring GenAI tools as they are newly released to the public. This widespread adoption and integration of GenAI tools highlight the importance of effectively leveraging artificial intelligence in education. This emphasis was evident during the Bhutan Echos Festival, 2023, where a panel titled "*AI in Bhutan: Balancing Traditional and Technological Advancemen*t" took centre stage. Professor Toby Walsh, a prominent AI scientist at the University of New South Wales, stressed that AI should be harnessed to enhance the quality of life, with particular focus on its potential benefits in education and healthcare for Bhutan. In addition, the Vice Chancellor of the Royal University of Bhutan (RUB) further emphasised the significance of embracing GenAI's potential benefits. During an address to recent graduates of Samtse College of Education in 2022, the Vice Chancellor encouraged educators to explore innovative teaching and learning strategies through the integration of emerging technologies in the face of the ongoing transformative reconceptualisation of the education system (SCE, 2022). Similarly, Holmes et al. (2022) note that although the Montréal Declaration for Responsible Development of Artificial Intelligence (2018) provides a comprehensive framework based on ten human-centred principles for the responsible use of artificial intelligence in general contexts, an equivalent declaration specifically addressing the challenges of AI in education has not yet been established. They further report that discussions at the International Conference on Artificial Intelligence and Education, organized by UNESCO in Beijing, emphasized several critical concerns related to the use of AI in educational settings. These concerns include issues of equity, ethical responsibility, and the protection of privacy, all of which must be carefully considered when integrating GenAI into educational practices. Similarly, for Bhutan, the need to establish regulations to mitigate potential negative consequences associated with AI, while striking a balance between maximising its advantages and minimising potential risks, was also highlighted (Pradhan, 2023). Thus, emphasising the need for a study to explore the integration of GenAI tools in teaching, learning, and assessment in higher education institutions.

Most importantly, on the importance of embracing new technologies, His Majesty the King in his address to the graduates of the Royal Institute of Management on 9 August, 2019, stressed the importance of making use of *"emerging technological advancements such as Digital Identification, Artificial Intelligence, Blockchain, Internet of Things, Big Data, Quantum Computing, Machine Learning, Virtual Reality and Augmented Reality, etc, which*

present unlimited opportunities for Bhutanese". This signifies the importance of studying the kind of GenAI tools used in teaching, learning, and assessment, as well as their benefits and challenges in higher education institutions in Bhutan, and presenting the status to relevant stakeholders and policymakers. Therefore, this study aimed to explore students' perspectives on the potential benefits and challenges in the integration of GenAI tools in teaching, learning, and assessment in the five colleges under the Royal University of Bhutan (RUB).

1.1. Aim and Objectives

This study aimed to explore students' perspectives on the integration of GenAI in teaching, learning, and assessment within RUB Colleges. With this overarching aim, the study outlines three primary objectives. First, it attempts to seek students' perspectives regarding the integration of GenAI tools in teaching, learning, and assessment in higher education, highlighting the GenAI tools used, the benefits it offers, and the constraints they may impose. Second, the study aspires to provide practical recommendations for educators and academics in higher education institutions for the effective integration of GenAI tools. Finally, the study seeks to offer insightful recommendations to relevant stakeholders and policymakers for the adoption of or expansion of AI initiatives within the precincts of RUB colleges.

1.2. Research questions

1.2.1. Main Question

What are students' perspectives on the potential benefits and challenges of integrating generative AI tools in teaching, learning, and assessment in the colleges under the Royal University of Bhutan?

1.2.2. Sub-Questions

1. What are students' perspectives on potential benefits associated with the integration of generative AI tools in teaching, learning, and assessment in the colleges of the Royal University of Bhutan?
2. What are students' perspectives on the challenges associated with the integration of generative AI tools in teaching, learning, and assessment in the colleges of the Royal University of Bhutan?
3. What are the generative AI tools currently being used in teaching, learning, and assessment in the colleges under the Royal University of Bhutan?

1.3. Literature Review

This literature review presents a summary of past studies that discuss the integration of GenAI tools in education with a focus on themes such as its definition, perceptions, benefits, and challenges.

1.3.1. Generative AI in the Context of this Study

For the intent of this study, GenAI tools can be defined as encompassing a group of tools that use machine learning algorithms with the ability to not only provide human-like responses, but also learn patterns and generate new content such as text, images, sounds, and videos based on natural language processing models (Gozalo-Brizuela & Garrido-Merchan, 2023). Some examples of GenAI tools include the widely popular ChatGPT, GoogleBard, Chatbots, JennieAI, Gamma, and TOME.

1.3.2. Perspective on the Use of GenAI tools

The majority of the literature shows a positive correlation between the use of GenAI tools and students' engagement in learning. The study by Chan and Hu (2023) indicated students' positive attitude towards the use of GenAI technologies. Students were of the view that GenAI helped them generate

content without wasting much time and effort. Similarly, the study by Sumakul et al. (2022) found that students held positive perceptions of GenAI tools and reported greater enjoyment in learning, particularly because the tools supported their writing activities. Bonsu and Koduah (2023) also documented students' positive perceptions of ChatGPT, emphasizing its convenience and its ability to produce accurate and useful responses. In a related context, research on the use of chatbots in business education revealed favorable user feedback, with students highlighting enhanced learning experiences resulting from the responsiveness, interactivity, and confidential support provided by chatbot-based systems (Chen et al., 2023). Recent research also indicates that students generally perceive GenAI positively in terms of engagement and motivation, particularly when these tools provide personalised guidance (Sousa & Cardoso, 2025; Nguyen, 2025).

1.3.3. Benefits of integrating GenAI tools in Education

Many research reports benefit from the use of AI in higher education. For example, Essel et al. (2022) investigated the use of a virtual teaching assistant (chatbot) to support student learning in Ghanaian higher education. Their findings revealed that students who engaged with the chatbot achieved higher academic performance than those who interacted directly with the course instructor. Similarly, Subirats et al. (2023) conducted a temporal analysis of academic performance in higher education before, during, and after the COVID-19 confinement period using AI-based techniques. Their study demonstrated the value of employing clustering and regression methods to identify student profiles. Moreover, the results indicated that students' final academic outcomes could be predicted by analyzing learning data collected from the beginning of the semester up to the period immediately preceding the final examination. The findings by Mogavi et al. (2023) suggest that GenAI, such as ChatGPT, can be a transformative tool capable of increasing students' self-efficacy and motivation to learn, particularly for those with special needs or who struggle with traditional learning methods. Further, the integration of GenAI tools has the potential to raise students' motivation (Xia et al., 2022) and interest in learning (Lin & Chang, 2020), leading to improved academic performance (Kim et al., 2022). Similarly, Temper et al. (2025) highlighted that AI tools can enhance learning experiences by offering timely feedback and adaptive support tailored to students' needs.

The reason for students' interest, high motivation, and achievement could be due to the ability of GenAI tools to personalise learning. A study by Kuleto et al. (2022) revealed that GenAI tools enhanced individualised learning in a variety of ways, such as developing students' skills and providing a collaborative learning environment. Other research also highlights the potential of machine learning and GenAI tools to enhance personalised learning practices among students, which is one of the key learning modalities for students in higher education (Al-badi & Khan, 2022; Brown et al., 2020). Chan and Hu (2023) explored students' perspectives on generative AI in higher education, focusing on its perceived benefits and challenges. Their study found that when students encounter difficulties with their assignments, generative AI can effectively serve as a virtual tutor. It provides personalised learning support tailored to individual needs and promptly addresses students' questions, enhancing their understanding and facilitating a more efficient learning process. The study highlights the potential of generative AI to improve academic performance by offering immediate, customised assistance and fostering a more supportive learning environment. Francis et al. (2025) also emphasised that GenAI can support diverse learners by adapting instruction to different learning styles and academic abilities, thus promoting equity in higher education.

In the same line, Yin et al. (2024) found that participants felt more understood and connected when responses were generated by AI rather than humans, suggesting that AI can significantly enhance feelings of being heard. The study shows that the source of responses influences this feeling, highlighting AI's potential to teach humans how to provide better emotional support. By fostering feelings of being heard, AI can aid in developing more meaningful relationships and help bridge understanding gaps among individuals from diverse backgrounds, strengthening intergroup relations. Shin et al. (2022) explored the effects of AI-assisted emotional support processes in an online mental health community. Their study reported that the support system helped users become aware of their emotions and circumstances and assisted in converting their thoughts into writing. Similarly, Huang and Rust (2018) emphasised that AI can provide a safe space for users to express their emotions, thus reducing the stigma associated with seeking mental health.

Further, previous research, such as the study by Ho et al. (2018), demonstrated that AI significantly enhances individuals' feelings of being heard and understood. In addition, Yin et al. (2024) underscored the role of AI in providing a safe and non-judgmental environment for users to express their emotions freely. Other studies have further highlighted the potential of human–AI relationships, noting that AI offers unique opportunities for personalised social interactions. Unlike human-to-human friendships, these AI relationships are often more focused on the user's needs and interests, as emphasised by Brandtzaeg et al. (2022), Huang and Rust (2018), and Young et al. (2024). These researchers also found that generative AI can effectively facilitate support-giving conversations, assisting individuals in emotionally charged interactions. Taken together, these indicate that generative AI is increasingly playing a vital role in providing emotional support to users, marking its growing significance in the realm of personalised, empathetic communication.

Conversely, Freitas et al. (2024) investigated the effectiveness of AI companions in mitigating loneliness. Their findings indicate that interactions with AI companions can reduce feelings of loneliness to a level comparable to engaging with another person and more effectively than alternative activities, such as watching YouTube videos. Furthermore, an additional robustness analysis confirmed the consistent benefits of AI companion support in alleviating loneliness. Another study, Khawaja and Bélisle-Pipon (2023), found that users are often more willing to disclose personal information to AI systems compared to human therapists due to the perceived lack of judgment and anonymity offered by these platforms. These findings demonstrate the significance of AI as a valuable aid in providing emotional support. Further, studies such as Brandtzaeg et al. (2022) and Pelau et al. (2024) reported that participants described their human–AI friendship as offering greater opportunities for personalised socialising, as the relationship focused more on the users' needs and interests compared to human-to-human friendships. Some participants also highlighted the autonomy, power, and decision-making capability they had over the AI friend, describing how they could manipulate or customise the interaction and, consequently, the friendship. Young et al. (2024) studied the role of AI in peer support for young people, specifically examining preferences for human- and AI-generated responses. The study found that participants reacted positively to AI-generated responses, suggesting that generative AI can effectively assist individuals in support-giving conversations. This is contingent on the AI responses maintaining characteristics identified by participants as helpful, empathetic, constructive, and non-judgmental. In conclusion, the literature on the benefits of AI in teaching and learning consistently highlights its transformative potential in enhancing educational experiences.

1.3.4. Challenges of Integrating GenAI tools in Education

The integration of AI into higher education offers numerous potential advantages; however, it also introduces several challenges that may influence educational quality, student experiences, and institutional effectiveness (Firat, 2023; Kumar, 2023; Lim et al., 2023; Warschauer et al., 2023). Chan and Hu (2023) reported that students commonly express concerns about AI use in education, particularly regarding reduced human interaction and the risk of data leakage. Other issues associated with GenAI include the absence of emotional connection in learning interactions (Chen et al., 2023), potential ethical violations (Gillissen et al., 2022), and fears that AI may limit future employment opportunities (Ghotbi et al., 2022). Similarly, Kumar's (2023) analysis of AI-generated responses to academic writing prompts indicates that, although the produced texts were generally original and relevant to the assigned topics, they sometimes contained inaccurate or inappropriate references and lacked personal viewpoints—an aspect that AI systems are typically unable to provide.

Studies also demonstrate that GenAI tools are not able to assess the validity of content and determine whether the output generated includes falsehoods or misinformation, thus their use requires human oversight (Lubowitz, 2023). For instance, Floridi and Chiriatti (2020) explored the ethical and philosophical implications of AI, particularly focusing on the capabilities and limitations of generative AI systems. They examined how these systems interact with human users and raised concerns about the boundaries between human-like understanding and the purely computational nature of AI. Their work emphasised the need for clarity in understanding what AI can genuinely accomplish, especially in terms of decision-making, creativity, and emotional interaction, cautioning against overstating AI's capabilities or confusing its outputs with human-like cognition. This indicates that while GenAI can perform complex tasks and simulate aspects

of creativity and emotional interaction, its findings emphasise the need for a cautious and clear approach to evaluating AI's true capabilities.

Another challenge concerns verifying the authenticity of authors' work, as outputs generated by artificial intelligence are often not detectable by conventional plagiarism detection systems (Peres et al., 2023). As noted by Holmes et al. (2022), although the Montréal Declaration for Responsible Development of Artificial Intelligence (2018) outlines a comprehensive framework based on ten human-centered principles for the responsible use of AI in general, there is currently no equivalent declaration specifically addressing the ethical and practical challenges posed by AI in educational contexts. Similarly, for Bhutan, the need to establish regulations to mitigate potential negative consequences associated with AI, while striking a balance between maximising its advantages and minimising potential risks, was also highlighted (Pradhan, 2023). Recent literature further emphasises the need for comprehensive AI governance frameworks, ethical guidelines, and institutional policies in higher education to ensure responsible use of AI while preserving educational integrity (Temper et al., 2025; Nguyen, 2025; Francis et al., 2025).

In conclusion, the literature on the use of GenAI in general, and higher education in particular, emphasises its potential to transform the learning experience, enhance institutional efficiency, and improve student outcomes. As technology continues to advance, the role of GenAI in shaping the future of higher education is likely to become increasingly pivotal. Recognizing the potential advantages of integrating GenAI in education, there exists a compelling imperative to delve into the strategies for effectively incorporating GenAI into higher education while addressing the associated challenges.

2. METHODS

2.1. Research Design

Qualitative research is a research methodological approach that seeks to explore and understand human behaviour, experiences, and phenomena in depth. It focuses on gathering non-numerical data, often through techniques like interviews and observations, to explore subjective experiences, perspectives, and interpretations, allowing researchers to construct comprehensive narratives and theories (Creswell & Creswell, 2018; Denzin & Lincoln, 2018). Further, Qualitative research is particularly well-suited for understanding subjective realities, beliefs, attitudes, and perceptions of individuals or groups. It aims to capture the richness and complexity of human experiences (Merriam, 2009). Thus, with the insights of qualitative methods as a valuable approach, this research, which aimed to explore the potential benefits and challenges of integrating GenAI tools in teaching, learning, and assessment in the five colleges under the Royal University of Bhutan, used the qualitative research approach.

2.2. Participants

2.2.1. Research Site

The research site for this study was the five colleges under the Royal University of Bhutan (RUB). The selection of the five colleges was deliberate and purposeful to ensure a range of programmes. Given the wide range of programmes offered across these five participating colleges, the researchers believe they serve as accurate representatives of the programmes offered within the colleges of the Royal University of Bhutan.

2.2.2. Sample and Sampling Procedures

This research used purposive sampling to select the participants. Purposive sampling, sometimes referred to as judgmental or selective sampling, involves intentionally choosing participants who meet particular characteristics aligned with the objectives of the study. It was categorized as a non-probability sampling method because selection depended on the researcher's informed judgment rather than random procedures. The purpose of purposive sampling is to deliberately select participants who are most likely to provide relevant and meaningful information for the research (Cohen et al., 2018; Denzin & Lincoln, 2018).

Further, this can be particularly useful when the researcher aims to gain in-depth insights from specific subgroups for understanding the phenomenon under investigation (Creswell & Creswell, 2018; Yin,2011).

Thus, as this study intended to explore students' perspectives on the potential benefits and challenges of the integration of GenAI in teaching, learning, and assessment, the sample was selected using purposive sampling. The study was conducted during the first semester of the 2025 academic year. The sample for the study (Focus Group Interview (FGI)) was about 180 students (36 students from each college). The 36 students were carefully chosen from each participating college to strike a balance between ensuring sufficient data for our research while preventing data saturation. This meticulous selection process aimed to maintain the optimal data integrity.

The selection of the 12 students from each year was based on purposive criteria. Students were selected based on their active engagement in academic activities, prior exposure to or experience with GenAI tools in learning or assessment, and willingness to participate in the study. Both male and female students were included to ensure gender representation, and students who had no exposure to GenAI tools were excluded to maintain relevance to the research focus.

The 36 students consisted of 12 students from year two, 12 from year three, and 12 from year four. The 12 students of each year were subdivided into two distinct focus groups, each consisting of 6 members (3 girls and 3 boys) for the interview. These groups were interviewed separately, at different times. The reason for having two separate focus groups from the same level was to get diverse perspectives, experiences, and opinions. This was done to ensure a more comprehensive understanding of the topic under discussion, and also to strengthen the validity and reliability of the findings. Each focus group interview lasted approximately 45–60 minutes, allowing for in-depth discussion and detailed responses from participants. In each college, the researchers sought assistance from the programme leaders and the subject coordinators in purposely selecting the students for the focus group interviews.

2.3. Research Instruments

The data was collected through focus group interviews. A focus group interview is a qualitative research method generally composed of 6 to 10 people, although the groups range from as small as 4 to as large as 12. Its purpose is to elicit shared understanding on a specific topic or issue from several individuals (Creswell & Creswell, 2018; Yin, 2011). For this study, the purpose of the focus group interview was to gain respondents' attitudes, feelings, beliefs, experiences, and reactions on the integration of GenAI tools in the teaching, learning, and assessment processes in the five colleges of the Royal University of Bhutan. In that context, 6 focus group interviews (2 in each year) were conducted in each of the five research sites. Each group consisted of 6 members, consisting of 3 males and 3 females. The researchers used semi-structured guiding questions (see Appendix A) for the focus group interviews. Each focus group interview lasted for about an hour in length. To maintain the validity of the tool, a pilot test was conducted with two focus group interviews, and the tools refined based on the results of the pilot test. The data was collected without causing any inconveniences to the students or the respective colleges.

2.4. Data Analysis

The data were analysed using the qualitative data analysis and interpretation procedure of Creswell & Creswell (2018). The audio-recorded data gathered from the focus group interviews were compiled, transcribed, coded, and categorised into themes using description for interpretation of the findings. To protect the identity of the participant, and also to provide understanding and easy referencing of the data materials, the 25-focus groups are labelled as FGI 1, FGI 2 to FGI 25. And to further specify the students in each focus group, the students are labelled as S1 to S6. For example, FGI 1 S1 would stand for student 1 from focus group 1. Similarly, FGI 24S5 would mean student 5 of Focus group 24.

2.4.1. Reliability and Validity

Reliability and validity are concepts for evaluating research quality. Reliability is about the consistency of a measure, and validity is about the accuracy of a measure (Creswell & Creswell, 2018). In order to ensure

reliability and validity, this study incorporated strategies such as member-check, pilot test, and cross-check codes.

2.4.2. Pilot Test

A pilot test serves as a preliminary rehearsal of the research process, enabling researchers to examine the feasibility of the research design with a small group of participants before conducting the main study (Creswell & Creswell, 2018). In this study, to ensure reliability and validity of the methodology, the survey questionnaire as well as the interview questions were pilot tested. The pilot test was considered necessary to establish the effectiveness of the tools in terms of both the content and process of administration. The pilot test enabled the data collection tools to be refined, resulting in the development of methodologically reliable and valid data collection tools.

2.4.3. Member Check

Member checking, also referred to as participant or respondent validation, is a strategy commonly used in qualitative research to enhance the credibility and trustworthiness of the data (Creswell & Creswell, 2018). This procedure involves returning the collected data or preliminary findings to participants to verify whether the interpretations accurately reflect their perspectives and experiences. In this study, the audio recordings from the focus group interviews were first transcribed, after which the summarized transcripts were shared with the participants. This step allowed participants to review the accuracy of the transcriptions and provided them with the opportunity to confirm, clarify, challenge, or suggest revisions to the recorded information.

2.4.4. Cross-Check Codes (Intercoder Agreement)

During data analysis, as it was a team research, the researchers divided the transcripts for coding and listing the themes. To check the reliability of the coding and the emergent themes, the researchers met at regular intervals to share and confirm coding, themes, and the findings.

3. RESULTS AND DISCUSSION

The integration of artificial intelligence (AI) into teaching, learning, and assessment has generated growing interest and discussion among both educators and students (Nguyen et al., 2025). In this context, the present study examined students' perspectives on the benefits and challenges of using AI in educational practices. The investigation focused on students from five colleges of the Royal University of Bhutan to gain insight into how AI is perceived in relation to teaching, learning, and assessment processes. By analysing the data gathered from focus group interviews, we provide a detailed understanding of how students perceive the integration of AI in teaching, learning, and assessment under four major themes: *Understanding the Concepts of AI; AI tools used; Benefits and Challenges*. These four major themes, supported with sub-themes, are discussed with relevant literature in the ensuing paragraphs.

3.1. Concepts of AI

One of the findings that emerged from students' responses from the focus group interviews is students' perception of GenAI as a smart generative machine having the ability to create new content. For example, participants of the focus group interview (FGI 22; 23; 24; 6; 2;1;3;13;14:17) unanimously reported that GenAI is a tool that quickly generates new content based on a variety of users' input. For instance, FGI23 S2 reported, *"generative AI is a type of artificial intelligence that creates new content like text, images, or even music based on the data we provide"*. Similarly, AI tools are something that …*helps us in creating more ideas (*FGI24 S2), tools that *help in creating new content for various concepts* (FGI17 S3). Further, it is also seen as a tool that can create criteria for projects (FGI8, S2) and upload photos, images, PDFs, and generate summaries of what is fed (FGI 4S2).

This demonstrates students' understanding of GenAI tools as tools that can be used to create new content. The finding resonates with Ooi et al. (2023), who report that generative AI utilises machine learning, neural networks, and other techniques to generate new content (e.g., text, images, music) by analysing patterns and information from the training data. The finding also aligns with Bonde's (2024) report of the GenAI tool as a content creator that is straightforward and easy to understand, comparable to content produced by humans.

Conversely, the findings also indicated that some participants considered general ICT tools as AI tools. For instance, FGI15 S2 expressed *"I believe generative artificial intelligence is like teaching tools used in learning and teaching, such as projectors, computers, and mobile phones"*. Additionally, another said that "*a projector is an AI tool because it's projecting its output for the input we've given* (FGI10 S1). Similarly, students also shared LATEX (FGI5 S2), edX courses (FGI5 S5), Capcut, and Mentimeter (FGI3 S3) as other examples of GenAI tools. Further, FGI5 S4 highlighted Nearpod, quizzes, and polls as examples of GenAI tools.

This finding showed that while some participants understand GenAI tools, others do not necessarily understand the concept of GenAI tools. This indicates that there is a need to increase awareness and understanding of generative AI among students. Equipping students with a deeper understanding of these tools will not only enhance students' knowledge but also equip them to better utilise these tools.

3.2. AI Tools Used in Teaching, Learning, and Assessment

Integration of AI Tools

The analysis of the data across the five research sites revealed significant insights into how participants distinguish between generative and non-generative AI tools, particularly in their use for academic purposes. The discussions highlight distinct use cases for different types of GenAI tools, reflecting their unique functions and contributions to the participants' learning.

3.2.1. Use of Generative AI Tools

Chat GPT

The analysis of data reveals a preference for generative AI tools, particularly ChatGPT, which stands out as the most prominently used tool across all participants. For instance, in FGI 6, S1 noted, "*I normally use ChatGPT for most of my assignments because it provides comprehensive and well-crafted information*." This was echoed by S1 in FGI 2, who explained, "*I think that mostly students use ChatGPT because it is freely accessible and provides the information we want*." These responses were consistent across numerous focus groups, indicating ChatGPT's dominance in academic activities. These consistent data highlight ChatGPT's dominance amongst other generative AI tools and align with recent research that emphasises ChatGPT's growing role in academic contexts. For instance, studies by Chan and Hu (2023) and Bonsu and Koduah (2023) highlight the preference for ChatGPT in educational settings due to its ability to offer a comprehensive and well-organised response. Additionally, Sullivan, Kelly, and McLaughlan (2023) found that ChatGPT enhances student learning by simplifying complex concepts and offering clear outlines for assignments. Furthermore, Kumar and McGray's (2024) quantitative study of global trends in the adoption of generative AI in postsecondary students reported that among GenAI tools, ChatGPT is also reported as the most popular tool, utilised by 73.1% of students for academic work in 2022–2023. Similarly, Iorliam and Ingio (2024) found that ChatGPT is the most popular tool amongst students, further emphasising its dominance in academic settings. As the higher education landscape continues to evolve, students' prominent use of ChatGPT suggests a growing reliance on GenAI tools for academic support.

Gemini AI

While ChatGPT is the most commonly used AI tool among participants, findings also highlight other generative AI tools, such as Google Bard (Gemini), which are also popular for specific tasks (FGI 20, 22, 7, 12, 9, 22, 23, 1, 5, 2). For instance, individual participants from other focus group interviews, FGI 8 S2 mentioned, "*For manual tasks and maybe understanding to authenticate facts and figures, I use Gemini because it has up-*

to-date information. ChatGPT is only current until 2022." Further, another student, FGI 3 S2, remarked, relying on multiple tools, *"If I don't get more information from ChatGPT, I go to Google Bard and vice versa*." These observations underscore that participants employ generative AI tools such as Gemini to address various academic tasks that may not be fully supported by ChatGPT alone. Additionally, the ability of Gemini to provide personalised content is emphasised by another participant, who stated, *"I commonly use Gemini AI because it also gives personal information... it directly generates an essay on personal information*" (FGI 23 S4) This observation aligns with recent studies in educational technology, such as Iorliam and Ingio (2024) which highlights Google Bard (Gemini)'s key strength to be its more updated information and the ability to generate personalised content. Similarly, participants also highlighted the preference for Gemini due to its alignment with classroom strategies such as the flipped classroom. For instance, FGI 7 S1 highlighted the utility of Gemini, saying, "*Ever since our college adopted a new teaching strategy called a flipped class, I have been using Gemini*." This observation aligns with studies that highlighted the effectiveness of GenAI tools in supporting flipped classroom models (Ray & Sikdar, 2024; Kong et al., 2022).

Snapchat

The findings also highlight Snapchat AI as another commonly used tool, noted for its simplicity and ease of use, with several focus group interviews reporting its use (FGI 20, 21, 7, 25, 22, 9, 11, 5, 6, 2, 14, 17). A participant in FGI 9 stated, "*I always use Snapchat AI because I feel more comfortable using it*" (S1). This preference for Snapchat AI is further supported by S1 and S4 in FGI 22, with S4 noting, "*I commonly prefer the AI on Snapchat because it is reliable and the sentences are so simple that we can understand*." Additionally, FGI 20 S6 shared, "*I use the AI in Telegram to ask questions and AI in Snapchat to share my feelings, and it helps me in replicating my feelings*." Participants in these discussions noted their preference for Snapchat AI since it is easy to use and provides more general information. These findings illustrate that Snapchat AI's user-friendly interface and conversational capabilities make it a popular choice among the participants.

The findings also demonstrate the use of other generative AI tools to varying degrees, including Perplexity (FGI 3, 5, 7, 8, 10, 13, 15, 21), TOME (FGI 8 and 14), blackbox (FGI 9, 12, 10), and slideAI (FGI 8 and 9). These findings demonstrate that the participants use a diverse set of GenAI tools depending on their academic needs. The findings reveal that students are increasingly relying on a range of generative AI tools, with ChatGPT, Gemini, and Snapchat AI emerging as the most widely used to support their academic work.

3.2.2. Use of Non-Generative AI

The analysis of the data highlighted that non-generative AI tools also play a significant role in supporting participants' academic writing and technical tasks, complementing the use of generative AI tools.

Grammarly

One notable finding that emerged from the study is the role of non-generative AI tools in supporting participants in writing and completing academic tasks. Analysis of the focus group interview shows that non-generative tools such as Grammarly (FGI 19, 12, 4, 3) and Quillbot (FGI 12, 2, 3, 1, 17) are extensively used for grammar checking and paraphrasing by the participants. One participant observed, *"I use Grammarly alternately. First, I write my assignments using ChatGPT, which takes care of the content. After finishing the assignment, I then upload it to Grammarly to check for grammar and also to paraphrase some of my sentences*" (FGI 3, S4). Similarly, another participant reported, "*I sometimes think that my concept and the concept from ChatGPT can be paraphrased to make it better. So, I use Grammarly*" (FGI 3, S3). This statement describes how participants use ChatGPT and Grammarly together, effectively leveraging the strengths of each tool. Another participant emphasised the added value of Grammarly in providing explanations for errors: "*I hardly use ChatGPT, but I do use Grammarly because when there's a mistake in our document, it also gives us explanations as to where I went wrong"* (FGI 4, S5). This finding shows how students can easily use AI tools to refine their writing.

Quillbot

The analysis of the focus group interviews also showed that participants' use of Quillbot is also prominent (FGI 3, 4, 5, 7, 9, 10, 20, 21). For instance, S3 in FGI 9 stated, "*For academic purposes and to paraphrase the text that we have, we use Quillbot AI.*" Additionally, in FGI 13, S6 also mentioned, "*I just read a paragraph, and if I think that's something that can be related to the assignment, I copy that and paste it into Quillbot, and it will directly paraphrase.*" Additionally, as noted by S3 in FGI 4, "*I use Grammarly to check my grammar after completing my assignments and also use a paraphrasing tool to rephrase my work to avoid plagiarism.*" This finding highlights Quillbot's role in supporting academic writing by providing effective paraphrasing solutions that help maintain originality and enhance the quality of written work.

3.2.3. Integrated Use of both GenAI and Non-GenAI Tools

Students also integrate both generative and non-generative AI tools to optimise their academic tasks. For example, while generative AI tools such as ChatGPT and Google Bard are used for drafting and idea generation, non-generative AI tools such as Grammarly and Quillbot are employed for refining the content. An S5 from FGI3 noted, "*Frequently for assignments, I use Quillbot and Google Scholar*," indicating a balanced approach to utilising both types of AI tools to enhance the overall quality of the academic work. Similarly, S2 from FGI 3 remarked, "*If I don't get more information from ChatGPT, I go to Google Bard and vice versa*". Additionally, students use generative AI for multimedia content creation and non-generative AI for design and organisation. For instance, a student stated, "*I just bring a copy and paste information from Chat GPT and place it in the Canva app," showing the use of both GenAI and non-generative AI tools in completing tasks (FGI 6, S1).* This integrated approach demonstrates how participants leverage the strengths of both generative and non-generative AI tools to maximise efficiency and quality in their academic tasks.

The findings reveal a clear distinction in the application of generative and non-generative AI tools among participants. Generative AI is primarily used for content creation and initial drafting, and enhancing productivity, particularly under time constraints. In contrast, non-generative AI is essential for refining, validating, and ensuring the quality of the content while offering specialised support for subject-specific tasks. Overall, the findings highlight that participants often integrate the use of both types of AI tools to effectively fulfil their academic needs, showcasing the complementary strengths of generative and non-generative AI technologies.

3.3. Benefits of integration of generative AI tools in Teaching, Learning, and Assessment

The study revealed several benefits of integrating generative AI tools in teaching, learning, and assessment. These include enhanced time efficiency, a quick and accessible source of information, personalised learning, and fostering an emotionally supportive environment.

3.3.1. Time Efficiency

One notable benefit that emerged from the data is the time efficiency provided by GenAI tools in writing assignments and conducting research. Participants consistently expressed that GenAI supports time efficiency, particularly when they had limited time to complete assignments. For example, focus group interviews (FGI 12; FGI 20; FGI 19; FGI 1; FGI 5; FGI 2; FGI 8; FGI 14) unanimously reported that GenAI significantly reduces the time required to complete the assignment.

Additionally, individual participants from other focus group interviews also shared the same perspective. For example, FGI18 S1 remarked, "*We can do the assignments without consuming much time". Similarly,* FGI15 S6, *it not only saves our time…. it gives us in no time.* Another adds, "it *helps us to take less time because it directly gives us the answer, so it takes less time to complete our assignment*" (FGI 23S3).

Furthermore, participants also highlighted that GenAI tools make the research process quicker by providing direct answers to their questions, thereby avoiding time wasted on manual searches. A student (FGI 17 S2) stated, "*…we usually tend to waste a lot of time doing research. Instead of that, we can directly ask the question to AI tools and get the exact answers." FGI 21S3 and FGI19S3 both noted* that using GenAI consumes less time for research. FGI 8 S2 highlighted the reduction in manual work: "*It has reduced a lot of manual duty, as in you don't have to spend hours typing your research; you can just prompt it and then just edit wherever you feel."*

The finding highlights that one potential benefit of using GenAI (Generative AI) tools across various academic programmes is their ability to enhance time efficiency for students, particularly in writing assignments and conducting research, especially under tight deadlines. The widespread acknowledgment from various participants highlights the significant impact of GenAI on academic tasks.

The study's findings regarding the time efficiency benefits of GenAI tools align with contemporary literature that emphasises the advantages of AI in reducing the time required for writing assignments and conducting research. Recent research supports the notion that GenAI tools significantly reduce the time required for writing assignments and conducting research, thereby offering substantial benefits to students. These observations are consistent with findings by Li et al. (2022), who noted that AI-assisted writing tools can automate the drafting process, thereby saving considerable time for students. Similarly, a study by Kumar et al. (2022) found that AI tools help students overcome writer's block and reduce the cognitive load associated with writing, further contributing to time efficiency. The ability of GenAI tools to streamline the research process is further supported by Liew Xiu Jie and Kamrozzaman (2024), who found that AI can automate repetitive tasks such as data extraction and analysis, allowing researchers to focus on higher-order cognitive tasks. This not only improves the efficiency of the research process but also enhances the overall quality and depth of academic inquiry.

These collective observations suggest that the integration of GenAI tools in academic settings not only enhances time efficiency but also contributes to improved quality and depth in scholarly work, reinforcing the transformative potential of AI in education and research.

3.3.2. Personalised Learning

One of the benefits that emerged from the study was the capacity of AI to promote personalised learning in students. For instance, several focus group interviews (FGI 6, 7, 10, 12, 13) highlight personalised learning experiences as a significant benefit of integrating AI into teaching, learning, and assessment. Participants in these discussions noted that AI technologies can tailor educational content and activities to meet the unique needs and learning paces of individual students. Further, a student from FGI1 articulates, "*We can learn through our laptops at our own pace...it really helps us learn. It personalizes learning at our own pace and at our own time*" (S5). Additionally, a participant from FGI 8, S4 states:

> *I believe the use of GenAI very positively so like they serve as a innovative way to do the teaching learning and assessment and like when it comes to personalization as well, AI tool, they can understand different perceptions and they can adapt to individual preferences and like they can really understand what you are trying to say and put it into words, so that's make it very easy for us sir.*

The findings demonstrate that AI significantly enhances personalised learning. This highlights AI's transformative potential to tailor learning experiences to each student's unique needs, preferences, and abilities. Furthermore, AI-facilitated personalised learning not only maximises individual student potential but also fosters a more inclusive and equitable education system, ensuring every student can thrive according to their distinct capabilities. Consequently, this indicates a transformative shift in teaching, learning, and assessment.

The study's findings support the growing body of literature advocating for the integration of AI in personalised learning. The finding aligns with the findings of previous studies (Holmes et al. 2019; Kuleto et al., 2022; Slimi & Carballido, 2023) that AI can support self-paced learning, allowing students to progress through material as they master it. This finding also echoes the work of Chen et al. (2020), who found that AI tools can provide adaptive feedback and personalised learning pathways, enhancing student engagement and understanding. Chan and Hu (2023) reported that when students face challenges with their assignments, GenAI can serve as a virtual tutor, offering personalised learning support and promptly addressing their questions.

AI's capacity to customise educational experiences to individual needs shows promise for enhancing student engagement, learning outcomes, and overall educational effectiveness. As AI technologies advance, their potential to revolutionise education through personalised learning will likely increase, presenting both new opportunities and challenges for educators and students.

3.3.3. Quick Source of Information

Another notable benefit that emerged from the study was the role of AI as a quick source of information. Participants expressed that AI systems can swiftly process and analyse vast amounts of data, giving them quick access to a wealth of knowledge (FGI 2; 5; 6;17; 18; 22;23; 24; 25). Participants from FGI 18 reiterated the convenience of AI tools in providing prompt information. "*We get the information promptly, which makes the work easier for us*". Another added, "*It is a tool where information is easily accessible. We have to just ask the question and it will provide all the information we require.*" Similarly, a participant from FG1 17 S5 mentioned, "*Before, I was googling the stuff while writing my assignment, but now through the use of AI, I can directly ask the question and get the answers and need not have to scroll through reading long articles. Now I can directly get the materials that I want.*" This emphasises how AI helps to ease the workload by providing information quickly, eliminating the need to read through lengthy documents. And also, the ease of accessibility, where users only need to ask questions to receive all the required information. Further insights from FGIs 13, 14, and 15 stressed the benefits of AI as a source of information. A participant from FGI 13 described AI as:

> *a kind of library that we carry in our pocket where we can find various information regarding anything that we are being assigned, and not only the assigned things, but the extra knowledge as well. And for the teachers, it could be a source of information for teaching/learning.*

This statement highlights how AI offers a wide range of information on any subject, making it a valuable resource for both students and teachers. In addition, a participant from FGI 14 noted, "*When we are not able to get the full information, we can seek help from the artificial intelligence so that we can get some information on the topic.*" Further, FGI 17 S2 emphasised "*The people who benefit from AI are students, as AI is linked to the data that is already available on the web. So, when we are doing our assignments or projects, we need that data. We can generate this data instantly, with the help of AI*". These statements highlight how AI provides answers instantly, unlike other sources that may not offer information on particular topics. Further, the following excerpt beautifully sums up AI as a quick source of information: "*I too feel that AI is a very rich source of information for us. All the information that we need to find, we all get from AI. It has become a common tool for all of us. Because it is the source of information"* (FGI 24 S3). "*For me, using AI tools, there are some advantages as well as disadvantages. First of all, the advantages are that it helps us in finding information, and it answers the questions we ask them*" (FGI 25S2). "*They are the fastest means to search for anything, unlike others that do not give information about the particular topic*" (FGI 15 S6).

This finding highlights how students can easily access information by typing their queries into an AI tool, avoiding the need to search through books or visit a library. AI tools provide quick, precise, and easily accessible information, making them invaluable for both students and teachers. And accentuates the substantial benefits of AI in educational settings. The finding supports previous studies on AI producing text and information quickly, emphasising their role in accelerating various knowledge-intensive tasks and capabilities of generating human-like text rapidly, providing a foundation for the efficiency claims of these models (Brown et al., 2020). Further, the study also confirms Floridi and Chiriatti's (2020) findings of how AI technologies can make knowledge more accessible to the general public and Hao et al.'s (2021) findings that report AI-powered tools are transforming education and research by making information more readily available to students and researchers alike.

3.3.4. AI as an Emotional Support Friend

An interesting finding that emerged from the study is the participants' view of AI as an emotional support friend (FGI 20;12;5;19;23;24;17;6;11;2;15). The specific excerpts that elaborate on the participants' perspectives on AI as an emotional support friend. For instance, "…*sort of like my friends who give answers whenever I ask the questions* "(FGI20S1). "*We can use AI for almost everything, not just academics. It helps track health, manage workout sessions, and sometimes even provides emotional support."* (FGI15S3). Further, FGI 11 S6 shared, "*I agree. AI acts as both my personal assistant and mentor. I can delegate tasks to it and learn from it simultaneously."* FGI 20S3 "*I'm getting more help, and it is becoming like a friendly teacher who is always teaching me something when I ask for help…it is very beneficial for all of us."* FGI 11S3 "*For me, GenAI is almost like a personal assistant for receiving tips, it is much more user-friendly and makes our teaching and learning easier".* FGI 12S2, "*For me, generative artificial intelligence is basically the system that helps like a friend, where it solves our problem.*"

In addition, FGI5S3:

> *Using AI is friendly because, as students, we feel very reluctant to ask questions to a tutor. As a student, I directly depend on AI because it is friendlier than some of the tutors. So, in terms of whether I'm asking questions to some tutors or they might say that they don't have time to answer my questions, most of the students in colleges depend on AI because they find AI friendlier. So, if I were going to ask a question to AI, be it a very pathetic question or anything, any question. AI, I never reply in a hard manner. I mean, they speak in a good manner. So, it does help maintain relationships between teachers and students because, at times, students end up getting scolded by tutors.*

Further, a participant from FGI 23 shares:

> *…for students I think artificial intelligence it is like as I already mentioned earlier it is a student's best friend students usually hesitate to ask questions their doubts to teachers but they can freely ask and they can freely type in these AI bots Genibots and all types of this artificial intelligence and they can give us the answer like as a friend they can give us all the solutions.*

The excerpts highlight the multifaceted role of AI as an emotional support friend. Participants agree that AI acts like a friendly teacher, personal assistant, and mentor, providing emotional support and simplifying complex information. This indicates that AI's friendly and approachable nature makes it an invaluable tool in both academic and everyday life. It also demonstrates that AI companionship helps users overcome the reluctance to ask questions, providing a safe space for learning without fear of judgment or scolding, thus fostering a positive student-teacher dynamic. This is in line with the previous studies, which show AI's significantly enhanced feelings of being heard (Ho et al.,2018). Further, Yin et al.(2024) emphasised that AI can provide a safe space for users to express their emotions. Studies also report human–AI friendship as offering greater opportunities for personalised socialising, as the relationship focuses more on the users' needs and interests compared to human-to-human friendships (Brandtzaeg et al. 2022; Huang and Rust (2018), and Young et al. (2024) research that generative AI can effectively assist individuals in support-giving conversations. This finding concludes that GenAI has begun to play a significant role in providing emotional support to individual users.

3.4. Challenges of Integration of Generative AI Tools in Teaching, Learning, and Assessment

The findings revealed four primary concerns associated with the integration of AI in teaching, learning, and assessment. These include reliability of information, detrimental effects on learning, promotion of indolent behaviour, and the absence of human connection.

3.4.1. Reliability of Information

One of the primary challenges that emerged from the study is the reliability of the information generated by the GenAI tools. For instance, focus group interviews (FGI 1; 3; 5; 9; 11; 16; 19; 21; 24) informed that GenAI provided unreliable and limited information for academic purposes. As mentioned by (FGI 6 S3), "*Challenges of using GenAI tools for academic purposes would be ensuring the authenticity and credibility of generated content, especially in academic settings where accuracy is crucial.*" The participants expressed their reservations regarding the authenticity, credibility, and comprehensiveness of the information generated by AI, since the outputs generated by AI seemed to be wrong and unreliable. For instance, FGI 12 S 1 shared, "…*I use an AI black box to get my codes, but at the same time it doesn't always give the correct code*…." However, the findings also indicated that the quality of prompts determines the accuracy of the output generated by AI. As put by FGI 8 S2 aptly,

> *You need to write the prompt in a way that it understands what you need and all the requirements. We have been talking about the inaccuracies that ChatGPT gives, but it's mainly because, how the language model is not able to understand our requirements.*

The participants also shared their reluctance to use the outputs produced by GenAI for academic consumption directly, as they experienced instances of their work being rejected for plagiarism. As stated by FGI 8 S1, "*When we do an assignment, we use ChatGPT, and then the tutors check for plagiarism, and sometimes they find out that the text is AI-generated. So, they say, it's not acceptable.*" Realising these challenges, the participants

shared that they resorted to verifying the above-mentioned outputs from a variety of authentic sources, such as published materials and their tutors. For example, one of the participants (FGI 15 S4) stated, "*I mostly use e-books for that, sir, to ensure the correctness of the answers got from the AI*". The same participant also stated that, "*I also rely on the expertise of our lecturers*".

These findings support the concerns expressed by contemporary literature on the validity and reliability of the outputs generated by GenAI. For instance, Chan and Hu (2023) state, "*Currently, GenAI can promptly provide fluent and human-sounding responses, but their accuracy cannot always be guaranteed.*" Perhaps, this is one of the reasons why the use of GenAI tools for educational purposes is questioned by critics, because of the reliability and authenticity of the information.

Lubowitz (2023) states that GenAI tools lack the capacity to authenticate and validate their output, which ultimately requires human intervention. It is this lack of reliability factor that creates a sense of apprehension, resulting in verification from authentic sources. All these require students' intervention after all, making the process of assessing and verifying accurate information cumbersome, complex, and challenging. The absence of a reliability factor in GenAI tools results in a trust deficit among the students. As put by Polyportis (2024), "*...if the AI system provides, for instance, vague or incorrect responses or exhibits inconsistent performance or reduced functionalities for students, trust may decline (p.2).*" The findings from the above excerpts also reveal a strong trust deficit among the participants in using the outputs generated by AI.

The significant potential fallout of the unreliable outputs generated by AI, when consumed directly, may prove to be fatal, as it not only penalises the students for breaching the university's academic standards, but can have a detrimental impact on students' learning in the long run. Hence, the outputs generated by the AI must be authenticated and validated from credible sources before using them. Thus, the reliability of outputs generated by AI is one of the challenges encountered by participants of this study. The possible reason resulting in limited, skewed, and wrong information, questioning the reliability of output generated by AI tools, could be attributed to participants' inability to write correct prompts and their limited understanding of GenAI tools. Some of the participants did agree of their limited exposure to the functionality of GenAI tools and their limited skills in prompting the GenAI tools for optimum outputs. The participants further expressed the need for training or a workshop to help them navigate effectively and optimally use GenAI tools.

3.4.2. Detrimental Effect on Learning

Another notable concern about the use of GenAI tools that emerged from the data is the adverse impact of the use of GenAI tools on students' learning, such as a lack of creativity and critical thinking skills, reduced reading habits and communication skills, weak writing abilities, and the generation of authentic learning outputs. For example, focus group interviews (FGI 1; 5; 8; 11; 17; 20; 22; 25) unanimously reported that the use of GenAI tools adversely impacted their critical thinking skills and the level of creativity in the learning process, due to their heavy reliance on GenAI tools. One of the participants (FGI 16 S4) stated that,

> *From my experience, whenever a teacher assigns some tasks, almost 99% of the students will put their hands down and type in AI. It basically restricts the critical and creative thinking of the students.*

Similarly, FGI 16 S5 shared, "*We become so dependent on AI that we just don't think of the answers, we just think about using Chat GPT. So, I think that using AI will make people dull. I sometimes feel frustrated, because I'm not able to think.*"

The ability of GenAI to provide automated responses discourages students from engaging in the cognitive struggle necessary for meaningful learning. According to Kirschner & Hendrick (2020), this struggle is often vital for developing cognitive level and transferable knowledge among the learners.

Another learning domain adversely impacted by GenAI is reduced reading and writing abilities among the participants. For instance, FGI 20 S2 shared, "……. *Before I was also a reader since the AI was introduced to us when we first reached college, I'm reading less and using more AIs to save my time and paraphrase my English.*" Another participant (FGI 25 S3) stated, "…*we lack in speaking and also in writing sentences because the students mainly depend on artificial intelligence even to write one single sentence.*"

Participants also shared that the charm of learning through heightened curiosity, investigation, and fun has diminished significantly with the increasing use of GenAI tools. For instance, FGI 13 S2 shared, "*Maybe one challenge could be it makes learning not interesting and fun because in the back of our mind, we know that Chat GPT is there, if we simply type the question, we will get the answer.*" Similarly, another participant (FGI 20 S3) shared,

> *For me, I think it has greatly reduced my capacity for learning new things. Before I was introduced to AI, I used to love searching for answers to the questions that I didn't know. I used to go to the library, but now I use Chat GPT because it's easy to find answers. So it's affecting my curiosity.*

The excerpts highlight the participant's apprehension regarding the use of GenAI tools in the learning process, decapitating the fundamental aspects of learning. On one hand, GenAI tools offer tremendous opportunities in scaling up students' learning, but on the other hand, the very essence of authentic learning, such as creativity, critical thinking, and generating authentic learning outputs, is weakened through increased use of GenAI tools for academic purposes.

This finding aligns with the previous studies on the challenges of GenAI tools adversely impacting students' learning. For instance, Chan and Tsi (2023) study, there is a particular concern towards holistic competency development, such as creativity and critical thinking. Similarly, a study by Baidoo et al. (2024) conducted in Ghanaian Higher Education students on the use of Chat GPT indicates the concerns regarding the use of Chat GPT, such as impeding critical thinking skills among the students and duplication of assignments, apart from other challenges on the use of Chat GPT and other GenAI tools.

The study by Chan and Hu (2023) also points out the adverse impact of GenAI on an individual's growth, skills, and intellectual development over time due to over-reliance on AI. Similarly, Marzuki et al. (2023) argue that GenAI has the potential to adversely impact an individual's capacity for critical thinking. Promoting critical thinking and creativity among the students is the primary focus of higher education in the country. This challenge posed by GenAI in the higher education context cannot be underestimated. Other findings that emerge from the study are the diminishing writing ability of the students. The study by Warschauer et al. (2023) also highlights compromising the writing abilities of the students due to overreliance on GenAI tools.

The emergence of these challenges can largely be attributed to a change in the behavioural patterns of learners being overly dependent on GenAI tools. Another factor could be due to students' inability to use a plethora of GenAI tools effectively for academic purposes. However, cognitive engagement and struggle, such as analytical and critical thinking, are vital to meaningful learning. GenAI can be a powerful tool for deeper cognitive engagement and an enriching learning experience if employed effectively.

3.4.3. Promotes Indolent Behaviour/Attitude

The finding also revealed students' concerning behavioural changes, mainly due to being overly dependent on GenAI tools, adversely impacting learning. The participants consistently shared their growing indolent behavioural issues in the learning process, such as laziness and addiction due to overindulgence with GenAI tools. For instance, focus group participants (FGI 3; 5;6;12;17; 20; 21; 23; 24) unanimously reported a concerning behavioural change towards learning by the participants. For example, FGI 16 S1 shared, "*These days we have become so reliant on AI tools that before thinking or comprehending the question, we directly type and search for answers in the AI tools.*" The ease and convenience offered by AI tools may inadvertently foster a culture of intellectual laziness and over-dependence on technology. For instance, one participant (FGI S2) adds, "*I am addicted to this AI, and now I cannot do assignments without it.*" Similarly, FGI 21 S1 shared, "*I feel like it doesn't help me to achieve 21st century skills because, to be frank. It has made me lazier than before.*"

The findings revealed that participants overindulge with GenAI tools, leading to alarming behavioural issues such as laziness and addiction, which render them cognitively impotent. As put by FGI 5 S1, "*students using them (GenAI) are limited to only that answer, and they don't explore beyond the answer. So, I think that restricts the creativity and curiosity to learn within the students.*" The findings bring forth an increasingly concerning behavioural dynamics resulting from the overindulgence with GenAI tools by the students, such as laziness, passive learning, and addiction to GenAI for automated response, adversely impacting the principles of higher education, such as active learning, self-directed learning, and knowledge construction.

The finding aligns with the contemporary literature highlighting the behavioural concerns among the students in the higher education context. For example, a study by Sevnarayan and Potter(2024) indicates complacency among the students in using AI in education. They further add that the "*complacency"* on the part of the students largely stems from over-reliance on GenAI to complete all academic tasks. Similarly, a study by Yang and Bai (2020) mentions that in a traditional teaching-learning context, students are accustomed to indoctrination, and the students often lack the habit of independent and active learning and intelligent teaching. Perhaps, it is also an opportunity for the colleges to advocate the mindful, responsible, and effective use of GenAI tools for academic purposes. It might also require more effort to deepen the concepts of "*independent learning*" among the students, promote "*active learning*" and "*intelligent teaching*" in the colleges of the Royal University of Bhutan (RUB). Another deduction from the findings resulting in indolent behaviour among the students could be attributed to the construct of the assignments, tasks, and assessment system, which enables the students to easily retrieve the solutions to the tasks and assignments from GenAI tools, which do not require critical thinking, collaboration, and creative outputs. As put by Popenici et al. (2023),

> *If you reduce learning to assessment and the assessment can be outsourced by students to just write a sentence and think a bit about the text, you have no motivation. Why would I do that? Why would I learn anything? Because I can just give it this AI solution. The kind of implications for universities are massive.* (p.324).

Similarly, Sevnarayan and Potter (2024) question the use of GenAI in empowering students to articulate their thoughts effectively. Perhaps, it largely questions the design and construction of the task, assignment, and assessment practices in higher education. Do the tasks and assignments in different modules across the programmes in various RUB colleges negate the challenges posed by increasing students' dependence on GenAI? Or are the tasks and assignments robust enough to ensure the outputs generated by the students are authentic and indigenous? Perhaps, it may require the colleges to restructure and re-position the tasks and assignments, which deepen the academic engagement and rigour, leading to knowledge construction among the students. This finding concludes that GenAI does promote indolent behaviour among the students, adversely impacting their learning.

3.4.4. Absence of Human Connection

Another significant challenge that emerges from using GenAI in teaching and learning processes is the lack of human connection, such as empathy, humane connection, and emotional intelligence, which are critical components of the quality learning process. Participants across the research sites shared their reservations about authentic learning in an era of increasing interface with a variety of GenAI tools. For instance, the participants (FGI 4; 6; 10; 14; 20; 24) shared their strong learning preference through a human teacher, rather than through the GenAI, as they encountered multiple problems, such as a sense of isolation, despair, and disconnection, during the learning process. As shared by one of the participants (FGI 4 S2),

> *For example, if you want to improve your communication skills, you need to do it practically with your friends and peers. But I don't think GenAI helps us. Of course, it might help us with grammatical errors……you know…. I did get ideas, but not with the improvement of communication skills and other skills in those aspects.*

The findings revealed a lesser student-tutor interaction, as the students depend heavily on GenAI tools for the information, leading to an increasing disconnect of the students from the learning community. As put by one of the participants (FGI 6 S1),

> *So the main challenges of GenAI tools in the classroom, I think, it leads to limited interaction between the teacher and students. So whenever they are assigned a classroom activity, the students directly take out their phones, use AI, and get the answer. So what I've seen in high school is that when our teacher gives us class activities, we used to share our thoughts, and used to provide opinions, and used to gather our opinions, and share them with our tutors.*

Participants shared their increasing social and emotional disconnect with the growing use of GenAI in the learning process. For instance, FGI 14 S6 shared, "*Like, I think that AI really cannot understand the emotions and behaviour of the other person. So, like a human being, the human will only understand more about other people.*" Another participant (FGI 20 S4) shared, "*So I think that Chat GPT misunderstands the question and it cannot fully understand what our emotion is asking for, so it can be a challenge*."

The findings reveal a need for human connection as a result of the increasing use of GenAI in the learning and teaching community, such as collaboration, empathy, and emotional intelligence. It also brings forth the importance and relevance of tutor-student interaction and peer relationships in the learning process. The findings align with the previous studies on the lack of human feeling and connection while using GenAI systems (Yang, 2021) and the need for the coexistence of human cognitive ability and AI in the learning process (Bates et al., 2020). With growing use of GenAI tools in higher education, such as intelligent tutoring and automated assessment, the risk of underrating the role of "humane connection" in the learning process runs high. As put by Bates et al.(2020), "*learning can be seen as a complex activity where only a relatively minor part of the process can be effectively automated, while at a personal level it is an intensely human activity that benefits from relationships and social interaction" (p.7).* Mogavi et al. (2023) in their study indicate that over-reliance on GenAI adversely impacts the psychological traits, such as social skills, communication abilities, and promotes superficial learning among the students. Relationships, social interactions, and collaboration are critical components in higher education. These aspects may be threatened by the growing use of GenAI in learning spaces. What is more important and, of course, challenging is the need to strike a balance between AI and human tutoring. As put by Chen (2022), "……. *humans in the loop and teaching as leadership can solve the problem that AI cannot cope with complex and dynamic teaching tasks in open situations, as well as the limits of intelligence for AI (p.14).*" GenAI tools may intelligently tutor and assess the learners, but the holistic development of the students may require softer components such as relationships, social interactions, and engagement- a more human connection. Perhaps, humane connection must coexist with artificial intelligence in higher education in an era of increasing automation.

3.5. Emergent Themes

In addition to the findings from the predetermined themes, the data analysis revealed the necessity for policy development and training on the use of generative AI tools. Similar to the predetermined themes, these emerging themes are also discussed in the following paragraphs, supported by relevant literature.

3.5.1. The Necessity of a Comprehensive AI Policy Framework

The participants (FGI 2, 5, 13, 15, 19, 20) stressed the necessity of having clear guidelines for how students can use AI. For instance," … *the advice or recommendation that I would make is firstly, creating very strong and clear guidelines* (S). Another (FGI 19S4) adds, 'policy should be implemented.' FGI 20S2 elaborates:

> *I think the university should set a limit on the use of AI. Since there is no limit in our College, we are becoming too dependent on that. I feel like colleges should come with policies to limit the use of AIs so it does not take over humanity and our thinking level capacity.*

Further. "*There should be a policy, like the rule of academic law or wheel of academic law, which would restrict the use of AI tools strictly, so that the students are scared to directly copy and paste from AI*"(S1 of FGI 17).

The above finding emphasises the importance of implementing policies to avoid excessive reliance on AI and also to ensure a balance between human and machine tasks. The participants also reported that tutors should establish strong guidelines and clearly communicate any restrictions before assignments are submitted to ensure proper AI usage. The finding concludes that integration of AI in higher education holds essential potential to transform teaching, learning, and assessment. However, this potential can only be met through the development and implementation of comprehensive policies that address practical challenges associated with AI use. The establishment of clear policy guidelines can harness the power of AI to enhance learning outcomes while safeguarding the rights and interests of the students as well as the tutors.

The literature also highlights the need for policies that enforce transparency and accountability in AI decision-making to ensure fair and equitable treatment for all students. As AI technologies rapidly advance, it is crucial to develop a policy on the use of AI in education. Recent studies stress the importance of flexible policy frameworks that can keep pace with technological progress (Williamson et al., 2023). Thus, this finding aligns with Floridi et al.'s (2018) study of implementing policies that limit AI use and the incorporation of AI detection tools to help educators maintain academic integrity and encourage students to develop their own ideas rather than relying on AI-generated content. Further, the finding is also similar

to previous studies (Atlas, 2023; Baido-Ann & Ansah, 2023; Chang & Hu, 2023), which propose a Policy Framework to address the diverse impacts of AI integration in university teaching and learning.

3.5.2. Need for Training in AI Usage

Participants (FGI 6, 8, 10,11, 16, 22) underscored the importance of comprehensive training for students on the responsible use of AI tools in educational settings. For example, FGI 8S3 pointed out, "*We use AI, but many of us don't fully understand its capabilities. Training would help us avoid just copying and pasting, which isn't real learning.*" Similarly, FGI 11S2 stated, "*There should be workshops before we are asked to use AI in assignments. These should cover not just the technical aspects, but also the ethical implications involved.*"

FGI 6S1 elaborated further, explaining that "*without proper instruction, students can either misuse AI or fail to tap into its potential. It's essential for both students and tutors to receive guidance on its functionalities*." Another participant, FGI 16S2, echoed this concern, saying, "*Our college lacks structured training on how to effectively incorporate AI in learning. This gap leaves students confused and leads to misunderstandings about how to use the technology in a beneficial way.*" S1 from FGI 10 opines, *"When it comes to AI tools, I feel like I've very little knowledge about them."*

FGI 22S3 emphasised the need for sustained learning support: "*Ongoing guidance throughout the course is essential, as a single introduction to AI isn't enough to ensure responsible use. We need continuous training to understand how to apply it to different academic tasks.*"

This finding emphasises the necessity of implementing comprehensive AI training programs in higher education to ensure that students and tutors can effectively integrate these tools into teaching, learning, and assessment. This is supported by research highlighting the importance of AI literacy. For instance, Ifenthaler et al. (2024) argued that any integration of GenAI tools in the education system should be accompanied by extensive training and support for both teachers and students, a sentiment echoed by Akinwalere and Ivanov (2022), who called for more robust training frameworks in university settings. Chang and Hu (2023) also proposed that AI-related training should not just be technical but should include discussions on the broader ethical and societal implications of GenAI use in academic and professional contexts.

4. CONCLUSION, RECOMMENDATIONS, AND LIMITATIONS

The study revealed the significant benefits of using generative AI as a quick and accessible source of information. Participants acknowledged that AI systems can efficiently process and analyse vast amounts of data, providing immediate access to a wealth of knowledge. This ease of accessibility allows students to obtain information by simply typing queries into an AI tool, eliminating the need to go through lengthy documents or visit libraries. This ease of accessibility and speed make AI a valuable resource in education, allowing students to obtain information efficiently.

However, the findings also reveal concerns about the reliability of AI-generated information. Participants expressed reservations regarding the authenticity, credibility, and accuracy of AI outputs, citing instances where the information provided was incorrect or potentially plagiarized. The findings suggest AI outputs are not always reliable, which can lead to problems such as students facing academic penalties and having a poor learning experience. There is also a lack of trust in AI, so it is important to check AI-generated information against reliable sources before using it.

The study, therefore, recommends implementing thorough training programmes and workshops to enhance the effective use of GenAI tools. For educators and institutional leaders, such initiatives are essential for improving users' skills, enabling them to craft more precise prompts, and gaining a deeper understanding of GenAI functionalities, which will lead to more dependable and accurate results. Additionally, the study also recommends that it is crucial to establish robust protocols for verifying AI-generated information against reputable sources to ensure its reliability and authenticity before its use in academic contexts. For policymakers and institutional leaders, developing clear guidelines will address issues related to plagiarism and accuracy while safeguarding academic integrity. Furthermore, raising awareness

about the limitations of AI tools will encourage a more critical evaluation of GenAI-generated content among students and educators.

The study reveals one of the significant benefits of GenAI integration in teaching, learning, and assessment is its ability to promote personalised learning. Participants identified this as a benefit, noting that AI can tailor educational content and activities to suit the individual needs and learning paces of students. The findings affirm AI's transformative potential in customising learning experiences based on each student's unique needs, preferences, and abilities. This personalization not only enhances individual student potential but also fosters a more inclusive and equitable education system, ensuring that all students can thrive according to their distinct capabilities.

However, participants also expressed concerns regarding the negative impact of generative AI (GenAI) tools on students' creativity, critical thinking, reading, writing, and overall engagement in authentic learning experiences. The heavy reliance on GenAI was seen to diminish these essential skills, indicating a need to balance AI's benefits with strategies that encourage meaningful cognitive engagement.

Therefore, the study recommends the implementation of strategies that mitigate the potential negative impacts on creativity, critical thinking, and other key skills. For educators, this includes providing guidance on how to leverage AI for deeper cognitive engagement and problem-solving, ensuring that AI serves as a catalyst for learning rather than a crutch. For institutional leaders, it involves supporting curriculum redesign and professional development initiatives that integrate AI responsibly. This would ensure students not only receive tailored support but also develop the essential skills needed for their overall growth and success.

An interesting finding that emerged from the study is the participants' view of AI as an emotional support friend. The excerpts from the data highlight the multifaceted role of AI as an emotional support friend. Participants agree that AI acts like a friendly teacher, personal assistant, and mentor, providing emotional support and simplifying complex information. This indicates that AI's friendly and approachable nature makes it an invaluable tool in both academic and everyday life. It also demonstrates that AI companionship helps users overcome the reluctance to ask questions, providing a safe space for learning without fear of judgment or scolding, thus fostering a positive student-teacher dynamic. This finding concludes that Generative AI has begun to play a significant role in providing emotional support to individual users.

However, participants across the research sites shared their reservations about authentic learning in an era of increasing interface with a variety of GenAI tools. The findings reveal less student-tutor interaction, as students depend heavily on GenAI tools for information, leading to an increasing disconnect from the learning community. Participants shared their increasing social and emotional disconnect with the growing use of GenAI in the learning process. The findings reveal a need for human connection as a result of the increasing use of GenAI in learning and teaching.

Therefore, the study recommends the need for educational policies to guide the responsible use of AI, ensuring it serves as a supportive tool that enhances learning without undermining the value of authentic human relationships in education. For policymakers and institutional leaders, this calls for the development of ethical frameworks that balance technological innovation with the preservation of meaningful human interaction in academic settings.

The study also highlighted the urgent need for a clear AI policy framework in higher education to ensure responsible use and prevent over-reliance on AI. Robust guidelines will help integrate AI tools while maintaining academic integrity. Additionally, participants stressed the need for in-depth training programs that cover both technical and ethical aspects, ensuring students understand AI's capabilities and limitations. Therefore, the study recommends prioritising the development of clear AI usage policies and implementing comprehensive training programs to ensure responsible and effective use of AI tools. For researchers, these findings indicate the need for further empirical investigation into the long-term cognitive, social, and emotional impacts of GenAI integration in higher education. These measures will not only help maximise the benefits of integrating GenAI tools but also address challenges related to accuracy, over-reliance, academic integrity, and ethical concerns.

5. LIMITATIONS

This study explored students' perspectives on potential benefits and challenges of the integration of generative AI tools in teaching, learning, and assessment in the five RUB Colleges. Therefore, this study's findings may not be generalizable to other colleges or student populations, as this study only focused on five colleges. The specific characteristics and context of the colleges and participants of this study may not be representative of the entire colleges of the Royal University of Bhutan. The participants of this study consist of 180 students. Therefore, the findings are limited to this specific context and can only be generalized to the use of GenAI tools that share similar situations and contexts.

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Research Ethics. Ethical approval was obtained from all relevant stakeholders, including the presidents of the participant colleges. Consent was secured from all participants, and participation was voluntary, with assurance that they could withdraw at any time. Before the focus group interviews, the purpose of the research was clearly explained, and participants were encouraged to ask questions and clarify any doubts. Consent was also obtained to audio-record the interviews. Measures were taken to ensure confidentiality and anonymity in the transcript files and in any excerpts quoted in this report. All ethical procedures were carefully maintained throughout the research.

Data Availability Statement. The data collected and analyzed in this study are not publicly available due to ethical considerations and confidentiality agreements with the participating colleges. Anonymized data may be provided upon reasonable request to the corresponding author, in line with the ethical guidelines of Samtse College of Education and The Royal University of Bhutan.

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