GENERATIVE AI IN HIGHER EDUCATION: UNIVERSITY FACULTY PERSPECTIVES ON OPPORTUNITIES AND CHALLENGES

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ABSTRACT

This study aims to understand how faculty members at higher education institutions in Pakistan respond to the opportunities and challenges associated with using GAI in teaching and learning. The research employed a phenomenological approach within the qualitative research tradition. Data were collected from 33 university faculty members through semi-structured interviews, which were analyzed thematically. Our analysis identified that ethical issues and overreliance were significant challenges to the use of GAI. Key ethical challenges included data privacy and security and the unethical use of GAI in exams and assessments. Shortcomings in GAI's ability to produce unreliable outputs in instances could lead to potential bias due to over reliance on it. Overreliance may also compromise human values and privacy, replace human critical thinking capabilities, and encourage cheating and plagiarism. The key opportunities associated with the use of GAI included improved learning outcomes and contextual integration of GAI. Using GAI was found to improve knowledge acquisition and research efficiency, offering access to a vast amount of information, entertaining personalized learning needs, and generating course content. Tailored use in specific subjects or learning scenarios was also found to be an opportunity associated with the use of GAI. It was also found beneficial for use in data-intensive processes such as analyzing a long text or summarizing a report. Although there are some shortcomings that need to be addressed, the findings confirm that GAI is a valuable tool for education. It has the potential to transform into an invaluable asset for faculty and students alike, enriching their learning experiences. The introduction of GAI has opened up new opportunities for transforming teaching, learning, and research. However, certain emerging challenges must be addressed. In this context, this study provides first-hand insights by analyzing teachers' responses.

Keywords: Generative AI, education, challenges, higher education, opportunities, university faculty.

INTRODUCTION

The groundbreaking advent of OpenAI's ChatGPT (Generative Pre-trained Transformer) (Brown et al., 2020) as a natural language processing model (Gilson et al., 2023) also termed as generative artificial intelligence (GAI) is another manifestation of the ongoing Fourth Industrial Revolution. Alawi (2023) exclaimed, "The future is here," with profound implications for practitioners and academics alike across all academic disciplines. The most surprising aspect is GAI's capability and the rigorous nature of its replies to the prompts (George et al., 2023). During the week of its launch, the response rate from users reached an amazing 180.5 million user figure (Duarte, 2024). The reaction of the research community has been spontaneous in all academic disciplines, including business, marketing, health, and education (Ali et al., 2023; Alawi, 2023; Bitzenbauer, 2023; Chatterjee & Dethlefs, 2023; Chocarro et al., 2023; Chan & Hu, 2023; Fuchs, 2023; Joksimovic et al., 2023; Mizumoto & Eguchi, 2023; Mohamed, 2023; Ray, 2023; Su et al., 2023). It is instructive to point out that education-related research is conspicuously more preoccupied with the risks or disadvantages of GAI for learning. GAI is regarded as a potential threat to the critical thinking and creativity of students due to the fact that its implementation could facilitate plagiarism and cheating, generate fabricated results, compromise the privacy and security of users, and supplant human instructors (Ajami & Karimi, 2023; Iskender, 2023). As a result, the reservations regarding GAI have even facilitated its prohibition in specific countries (Yang, 2023). Nevertheless, while simultaneously offering personalized learning environments and the ability to access a wealth of knowledge resources in a fraction of the time, it is lauded by many as a tremendous asset to learners (Bitzenbauer, 2023; Chocarro et al., 2023). Despite the considerable discourse surrounding the advantages and disadvantages of utilizing GAI for educational purposes, it may seem illogical to assert that it should be implemented for learning or banned. The full extent of its benefits and threats to learning remains unknown, as it is still in its nascent stages and requires additional time to develop a deeper understanding in this regard.

The purpose of this study encompasses three distinct aspects. First, there is limited research on GAI's educational use in general and acceptance because it is still in its infancy in education (Chen et al., 2020; Chocarro et al., 2023), as compared to other sectors like health and health education (Alawi, 2023; Johnson, 2023; Miao et al., 2023), business, and finance (Ajami & Karimi, 2023). For instance, ChatGPT's introduction was also accompanied by doubt (Wang & Guo, 2023). Second, there is a heated debate concerning the drawbacks of GAI as a threat to learning (Iskender, 2023). While these assumptions may appear rational to some extent, the lack of scientific data to support them renders such claims more dubious and unwarranted. Further understanding is necessary to make these claims rational or otherwise necessitate additional empirical evidence. Third, the available research is already concerned with the digital inequalities within communities across the globe (Johnson, 2023; Wang, 2013). Any differences in national or organizational responses may inadvertently further deepen the digital divide between those who have banned GAI and those who have not. More is explored in the context of developed and advanced societies (Dabis and Csaki, 2024), such as Turkiye, Sweden, Canada, and Australia (Firat, 2023) than the least developed societies from Africa (Nyaaba & Zhai, 2024) and Asia (Jaffar et al., 2024) in relation to a range of opportunities and challenges that GAI offers for education. Also, recent research is primarily concerned about the use of GAI by students in their learning and assessment (Johnston et al., 2024) or subjects like English (Liu and Ma, 2023; Mohamed, 2023) and Physics (Bitzenbauer, 2023). There is a need to understand GAI in multiple contexts, in both developed and least developed societies. Furthermore, a comprehensive cross-disciplinary approach can identify a broader array of challenges and opportunities for the collective good of GAI as an effective and relevant learning. As argued by Firat (2023), we need to further explore the implications of GAI for education to make it more productive, so educational institutions can best prepare for its integration. Al Murshidi et al. (2024) also found that understanding the limitations and risks of using GAI can encourage its use. Considering all these three key dimensions, this study is of significant importance in illuminating research, policy, and practices through communicating the responses of faculty members from higher education institutes (HEIs) in Pakistan. The study has the following research question:

- What opportunities and challenges do university faculty in Pakistan associate with the use of GAI in teaching and learning?

LITERATURE REVIEW

GAI has been found to offer numerous advancements over traditional bots or voice assistants currently available in the market such as understanding context from conversations, which enables it to respond more accurately than most existing solutions (George et al., 2023). GAI, like other forms of AI (artificial intelligence), has undeniably presented several prospects for knowledge acquisition. There exists a body of research that examines the utilization of GAI and its advantages and disadvantages in the context of education, including several areas like assessment, curriculum, and teachers' professional development (Cotton et al., 2023; Dabis and Csaki, 2024; Dawson et al., 2023; DuBose & Marshall, 2023; Eke, 2023; Finn, 2023; Firat, 2023; Goldman, 2023; Heimans et al., 2023; Liu et al., 2023; Lund et al., 2023; Ray, 2023; Whalen & Mouza, 2023). Research has found its use equally beneficial for both teachers and students. Teachers can use GAI to increase efficiency and provide support to supplement their instructional practices. Araya and Marber (2023) argued that GAI is increasingly woven into all stages of learning and education, including course design, one-on-one tutoring, note-taking, and task automation. While students, according to Cotton et al. (2023), can find GAI capable of offering benefits, such as increased engagement, collaboration, and accessibility in higher education. The most prominent learning facet of GAI, according to Chocarro et al. (2023), is its capability to address students' learning needs in a personalized way and on demand. According to Li et al. (2023), it has a huge capacity to produce high-quality reflections, even outperforming student written reflections in all assessment criteria. The authors argued that human evaluators could not accurately differentiate GAI-generated reflections from students' original work, highlighting the need for effective approaches to distinguish between the two.

There is a similar mix of responses encompassing the pros and cons of GAI use in learning. According to Bitzenbauer (2023), GAI integration had a positive effect on fostering critical thinking skills at the school level. However, they suggest its use with caution to avoid the associated limitations and biases. The aspect of bias is still crucial, in particular when students are using GAI according to their own priorities and judgments and without the guidance of the teachers. It is doubtful that they can avoid bias when using such a powerful tool. In this regard, Heimans et al. (2023) consider teachers' responses to promote subjectification as a remedy to empower students to think critically and independently, make informed decisions, and take meaningful advantage of using GAI.

Students can also use GAI as an illegal means to cheat in exams (Huh, 2003). The most pertinent arguments to combat this misuse of GAI involve prohibiting copying and pasting questions (Miao et al., 2023). In this regard, Dawson et al. (2023) also propose moving away from the traditional exams and considering a more nuanced approach to assessment.

There is also a range of other ethical issues (Blackshaw, 2023; Kumar, 2023), such as the ability of GAI to produce academic papers owned by learners and researchers as their own (Sardana et al., 2023), which constitutes outright plagiarism. (Eke, 2023). Likewise, GAI's capability to generate highly realistic synthetic text or speech that could be used to impersonate or deceive others is a violation of the user's privacy (Lund & Wang, 2023). In this regard, researchers call for transparency in the design, training, and deployment of GAI, including the data used to train the model, so that any potential biases or errors can be identified and addressed. This very suggestion remains relevant but is currently at the back of developers' minds. At the same time, a proper response to this challenge is still expected from the educational system. Cotton et al. (2023) suggest that universities should develop policies and procedures to ensure ethical and responsible use of GAI and other AI tools in higher education. These policies can work as institutional support to facilitate the integration of GAI (Nyaaba & Zhai, 2024). These are the initial responses to overcome the limitations of GAI and we need to be both cautious and optimistic about more sophisticated measures and procedures of the future (DuBose & Marshall, 2023). Sardana et al. (2023) rightly suggest continuity in research to reach meaningful use of GAI in learning.

Theoritical Framework

GAI, with the capability of responding to human queries (George et al., 2023) has generated an extensive debate on the pros and cons of its capabilities for education (Eke, 2023; Lund & Wang, 2023). The need for further clarity for its use by teachers has been highly emphasized. Teachers make the decision to use GAI based on their understanding of its functionality (Roger, 2014). Teachers' awareness of the benefits and shortcomings could be central to GAI's educational use. Teachers' response in this regard is highly significant. According to Lai (2017), a person's acceptance to use a new technology is also linked to how they perceive its potential to improve their performance. The fast technological development and constant incorporation of new devices and information systems continue to motivate research (Scherer et al., 2019) on factors that condition the acceptance of technology among educational users and contribute to the transformation of the teaching-learning process (Gros, 2016). In this regard, the technology acceptance model (TAM) rises as the dominant model in the educational context (Davis et al., 1989; Scherer et al., 2019). In the context of this study, TAM (Davis et al., 1989) is acknowledged as an important tool for understanding users' responses to new technology. TAM explains the users' behavioral intentions using two factors, namely the perceived usefulness of the new technology and its perceived ease of use. Perceived usefulness refers to the degree to which people believe that using a particular system would enhance their job performance (Davis et al., 1989). Perceived ease of use refers to the degree to which potential users believe that using a particular system would be free of effort or non-challenging (Davis et al., 1989).

One of the important aspects of TAM is that it is highly generalizable and allows easy transfer and application to different contexts (Venkatesh, 2000) through understanding users' intentions to implement a particular technology. It is highly relevant to understand one's intentions prior to implementing an educational innovation (Baloch et al., 2022). TAM also suggests that intention is directly related to actual behavior (Davis et al., 1989). Recent research on how people accept AI technology shows that people who think AI is easy to use, useful, innovative, and have a positive view of its usefulness are more likely to interact with chatbots and use them (Liu & Ma, 2022). Teachers' understanding of AI as an opportunity increases its acceptance and efficiency as they promote it as an instructional support tool. This study takes this perspective into account by using the theoretical lens of TAM to elucidate university faculty understanding in relation to the opportunities that GAI offers or the perceived usefulness and ease of GAI use (Davis et al., 1989). We perceive the faculty's ease of use in the context of associated challenges and the opportunities that GAI offers (Figure 1). According to Al Murshidi et al. (2024), these challenges and opportunities are related aspects and are often excluded from current technology acceptance models such as TAM.

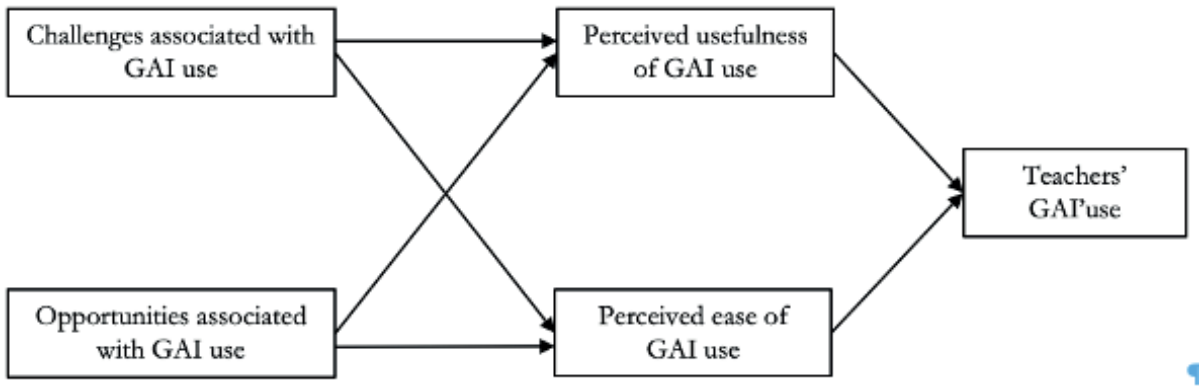

Figure 1. Study Framework (Adapted from Davis, 2003).

METHOD

This is a qualitative phenomenological study within the interpretivist paradigm of qualitative research (Miles et al., 2014). Phenomenology refers to a phenomenon that the researchers aim to understand through their respondents' perspectives (Neuman, 2014). In this study, opportunities and challenges associated with the use of GAI in teaching and learning were the phenomena that the authors aimed to explore using the

responses of the university teachers. The purpose of using a phenomenological approach is to generate insights and experiences that the participants hold about the pros and cons of GAI in teaching and learning (Grbich, 2013) by interacting with them in the actual setting (Patton, 2002). Thus, the purpose of this qualitative research is to illuminate the areas of GAI use in teaching and learning by exploring the voices of university teachers.

Participants

Purposefully selected university faculty from across the country participated in the research (Neuman, 2014). The aim was to recruit university faculty members who have engaged with GAI, thereby providing a valuable source of information (Patton, 1990) and facilitating a deeper and more pertinent understanding of the phenomenon. Initially, faculty members from various university disciplines were contacted via phone to gather information regarding their use of GAI and ascertain their willingness to participate. Their use of GAI was considered either for personal learning or instructional purposes. The communication yielded 33 respondents (R01 to R33) from across Pakistan, with a proportion of 17 males and 16 females. The sample size of the study was mostly attributed to the recruitment criteria, which specifically targeted individuals with prior experience using GAI. Given the current circumstances, one could argue that the sample provided is the most representative available, especially considering the limited application of GAI in education throughout Pakistan, as noted during the participant recruitment process. Out of the 139 participants we contacted, only 47 had knowledge of GAI, and 33 agreed to take part in the study. The use of open-ended interview questions facilitated the acquisition of a substantial amount of data (Ogden & Cornwell, 2010), enhancing the relevance and appropriateness of the sample size. The participants were made acquainted with the purpose of the study; voluntary participation consents were collected prior to data collection.

In this study, gender and other factors, like qualifications and experience, were not analyzed. Table 1 shows that faculty members represent almost all the faculties, including engineering, social sciences, humanities, and natural sciences. The majority of the participants (49%) held a PhD, while 51% held an MPhil or MSc. Their teaching experience falls in the range of 3–23 years.

Table 1. Participants' Demographics

S. No	Participant ID	Gender	Qualification	Experience (in years)
1	R01	Male	PhD	17
2	R02	Female	PhD	14
3	R03	Female	MPhil	10
4	R04	Male	PhD	13
5	R05	Male	PhD	19
6	R06	Male	PhD	21
7	R07	Female	MS	10
8	R08	Male	MS	11
9	R09	Male	MS	13
10	R10	Female	PhD	15
11	R11	Male	PhD	22
12	R12	Female	PhD	18
13	R13	Female	PhD	19
14	R14	Female	MS	11
15	R15	Female	MPhil	10
16	R16	Male	MPhil	16

17	R17	Male	MS	7
18	R18	Male	PhD	11
19	R19	Female	MPhil	3
20	R20	Male	PhD	14
21	R21	Female	PhD	11
22	R22	Female	MPhil	6
23	R23	Female	MPhil	4
24	R24	Male	PhD	10
25	R25	Male	MPhil	9
26	R26	Male	PhD	13
27	R27	Female	MS	5
28	R28	Male	MS	12
29	R29	Female	MPhil	5
30	R30	Female	MPhil	4
31	R31	Male	PhD	9
32	R32	Male	PhD	11
33	R33	Female	MPhil	3

Data Collection and Analysis

We conducted interviews both online via Zoom and in person. Each interview lasted between 35 and 40 minutes. We transcribed the interviews verbatim to ensure that they captured the nuances and richness of participants' responses. Interviews were translated from Urdu to English, considering the genuineness of the data (Halai, 2007; Khilji & Jogezai, 2024). A co-researcher, an expert in bilingual data translation, conducted reverse translation (Brislin, 1970) for each transcript. This process involved translating the transcripts that had been converted to English back into Urdu to validate the accuracy of the initial translation. The sampled interview questions included: What is your initial response to GAI as an instructional tool? What challenges do you find associated with GAI use in teaching and learning? And what opportunities do you find associated with GAI use in teaching and learning? The literature (e.g., Ajami and Karimi, 2023; Chan et al., 2023; Cotton et al., 2023; Fuchs, 2023; Ray, 2023) guided the development of the interview questions. Data analysis in qualitative research is a critical phase. It involves a systematic search and arrangement of information gathered from non-numerical sources, including interviews, observations, and textual analysis (Creswell, 2006). It illustrates the data in detail and deals with diverse subjects via interpretations (Boyatzis, 1998). This study employed Braun and Clarke's (2006) thematic analysis framework for data analysis. The steps for thematic analysis consisted of 1) getting familiar with the data, 2) generating codes, 3) generating themes, 4) reviewing themes, 5) defining and naming themes, and 6) locating examples.

For the first step, the authors reviewed all the interview transcripts and finalized them after several deliberations. The authors then generated codes to assign descriptive labels to the data with the aim of helping researchers develop their theories and hypotheses (Auerbach & Silverstein, 2003). Codes were generated deductively by creating a code manual that included two main categories: challenges and opportunities. After coding the data, preliminary themes were formed through the categorization of codes that shared common meanings. Subsequently, preliminary themes were assessed in relation to both the coded data and the entire dataset. This procedure was carried out to guarantee that codes corresponded to themes accurately and that themes adequately guided the interpretation of the dataset with respect to the research inquiry. Themes underwent a process of revision and refinement. The themes were designated with names that encapsulated their meaning. The culminating task involved composing a thematic analysis report, which entailed choosing data extracts that encapsulated the fundamental concepts of each theme.

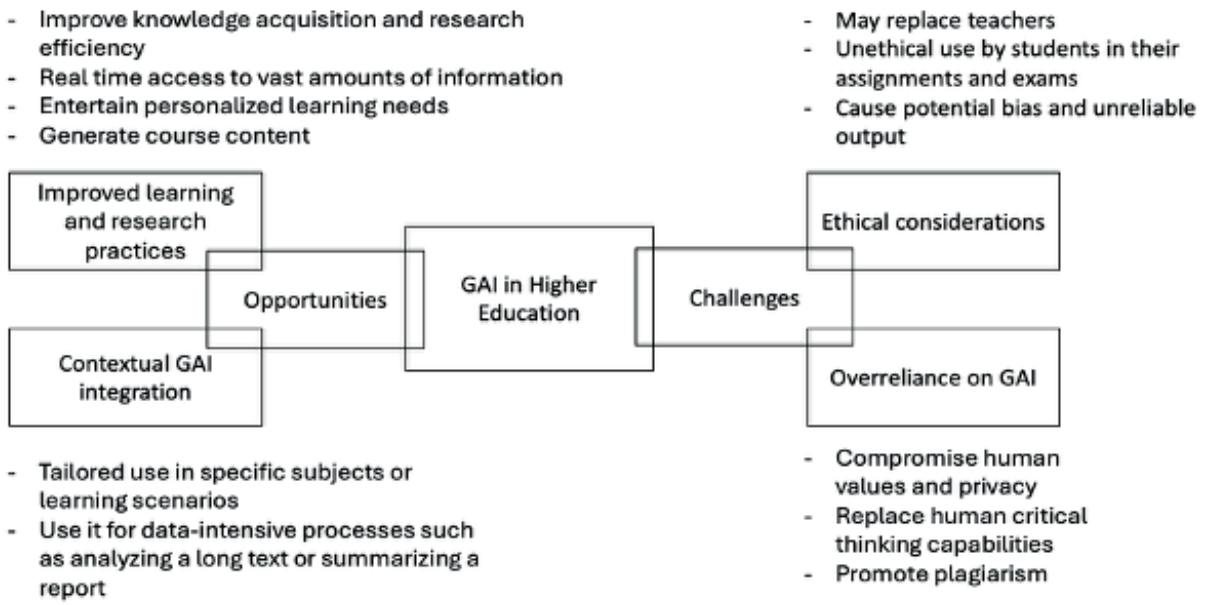

Figure 2. Visual Presentation of the Results (Source: Authors).

RESULTS

This section presents the results of the study.

Challenges

Overreliacne on GAI

Respondents viewed overreliance on GAI is a significant challenge. This excessive reliance refers to an overdependence on its capabilities without considering its limitations or potential drawbacks. For the majority of the participants, such a reliance led to the replacement of humans. In this regard, one participant stated:

> *"I fear that these AI [GAI] will eventually replace us [teachers] and take over the role of teaching students. Additionally, I believe that learners will increasingly depend on them [GAIs], as they provide more than we do. It is more intriguing and fun for learners and consumes less time." (R12).*

The primary concern for the participants was the use of GAI by students for their assignments and exams. They were particularly worried about losing control over the assessment of students' work, regardless of whether it was produced by the students themselves or generated by GAI. One respondent expressed the view:

> *"This is more technical [banning GAI], which I have no idea about. What I know is that it should not be allowed for students, whether in their assignments or exams. Because it will really make them dependent and overly dependent on it [GAI]." (R07)*

The majority of the respondents shared their past experiences, noting that their students had already begun using other AIs for their assignments. One respondent observed a concerning level of improvement in the quality of students' work, despite believing that the students themselves lacked the necessary intelligence and capability to achieve such results independently. Likewise, they considered themselves incapable of making such modifications and would be over reliant on the use of these tools.

One of the primary challenges our results highlighted was the overreliance of learners on GAI. The respondent noted that addressing this overreliance posed a significant problem that individuals could not manage alone, indicating the need for a coordinated, system-wide response. According to them, the ultimate solution was to stop using GAI in the learning process.

Ethical Considerations

The participants raised concerns regarding GAI's potential effects on personal values and privacy, along with its ability to supplant human cognitive functions. They considered GAI to have the capability of generating content that may influence or shape personal values and beliefs. According to one participant, GAI was a threat to their religious ideology and cultural values. A respondent asserted:

> *"I am very concerned about our young generation being empowered to use GAI without any guidance. They may interact with it without taking into account cultural and religious values, as GAI provides information without any filtering." (R20)*

The ethical aspect also included taking others' material and claiming it as their own. The respondents considered it cheating and an illegal means of knowledge acquisition, while some termed it knowledge stealing. The participants acknowledged instances of faculty members committing plagiarism by utilizing other AIs to paraphrase existing work and subsequently publishing it under their own names. One participant commented:

> *"I am sure that we [the faculty] will use it for publication—maybe not everyone, but most of us, I believe. I need publications for my career mobility, and I may consider this [GAI] a blessing in this regard. It is a rather bitter truth that we do not allow our students to plagiarize, but we have proven cases of plagiarism, and I see more to come, which is also an ethical dilemma." (R32)*

The respondents expressed concerns about the ethical implications, yet they lacked viable solutions. They primarily hoped for positive outcomes and regarded human integrity as essential for addressing the ethical challenges related to the GAI. Additionally, the processes for ensuring validity and reliability in data collection and analysis should be adequately detailed.

Opportunities

Improved Learning and Research Practices

The respondents were optimistic about the potential benefits of AI in education, including enhanced knowledge acquisition and greater research efficiency. They believed that GAI has the capability to provide real-time access to vast amounts of information and offers learners a diverse range of resources and perspectives to enhance their understanding of various subjects. More importantly, it offered learners greater opportunities to address their personalized learning needs at their own pace. A respondent argued:

> *"It's great, and we must admit that it helps students learn what they want, how they want, and when they want. It can truly function as a personalized tutor, adapting content to individual learning styles and paces, thereby optimizing the learning process for each student." (R03).*

The respondents also emphasized that GAI could potentially replace providers of short courses or customized programs for students and professionals. They expressed concerns that the future of some online courses with limited content may become obsolete due to the advancements brought by GAI. One respondent stated:

> *"I guess they [those offering short courses] will remain valid as they offer certificates, but I guess soon AI may be allowed to grant certificates, and such organizations may be in trouble. It is better for them to take GAI as a friend and use it for their programs rather than competing with it." (R11).*

The respondents viewed GAI as playing a significant role in their professional development, as it may assist them in generating content for their courses and creating engaging assessment tasks for their students. Some saw this as an opportunity to compete with researchers who are native English speakers. In this context, one participant shared the following opinion:

> *"How well did I write? I wasn't perfect, and nearly all the comments on my paper pointed out that I was a nonnative speaker in terms of my writing abilities. I've noticed significant differences in the reviewers' feedback about my English since I began using AI editing tools. I view GAI as an opportunity for nonnative speakers when we use it wisely to enhance our English writing." (R31).*

The participants' responses position GAI as a valuable resource for both students and faculty, creating opportunities for learning and facilitating ease of use regarding the pace and intensity of information. Additionally, faculty members' recognition of GAI as a supportive tool for their own publications enhances its value for them.

Contextual GAI Integration

The respondents advocated for the selective use of GAI in education, emphasizing the importance of tailoring its implementation to specific subjects or learning scenarios. This strategy aims to harness GAI's strengths where they are most effective while remaining aware of its limitations in other contexts. A participant explained this integration of GAI by stating:

> *"We need to understand the specific needs of the subject before using GAI. For instance, GAI is likely to be more beneficial for data-intensive tasks, such as analyzing lengthy texts or summarizing reports. This advantage makes it particularly relevant in fields like English language editing. Additionally, it could be especially beneficial for engineers, as they frequently need to manage extensive documents and large sets of data." (R06).*

Likewise, the participants considered teachers from computer science, engineering, and English language departments to have an edge and relevance to using GAI. Such contextual GAI integration opportunities involve customizing its implementation to match the specific skills, needs, and requirements of the subject or learning situation. One of the respondents highlighted an intriguing point by adding that GAI-generated content may lack creativity or emotional intelligence, which are vital aspects of some educational experiences. Respect for privacy and the need to avoid perpetuating biases were highlighted as important areas in which the use of GAI should be limited. The respondents also stressed the importance of tailoring and aligning GAI with particular contextual needs, which was a vital component of its integration in this setting.

DISCUSSIONS

The study's findings aim to address three primary objectives by exploring the perspectives of university faculty members. The objectives included expanding the empirical foundation for the use of GAI in education. Specifically, there is a lack of research examining whether the ongoing debate about the drawbacks of GAI justifies its prohibition in learning (Iskender, 2023; Yang, 2023) and whether such a restriction might worsen the existing digital divide among communities worldwide (Jogezai et al., 2021). The results offer an explanation for the significant observations regarding the educational use of GAI.

The results highlight both the drawbacks and benefits of GAI in educational contexts, which have been well-documented in prior research. The study identified several key challenges associated with the use of GAI in learning, including uncertainties and limitations, overreliance, and ethical considerations. Ethical concerns encompassed the potential impact of GAI on personal values and privacy, along with the significant issue of plagiarism. The respondents also expressed worries about overreliance on GAI, particularly regarding the possible replacement of teachers and the authenticity of assessments. These findings match what other studies have said about the risks of using GAI in education. However, the results of this study emphasize that there must be human validation of knowledge produced by GAI to ensure its reliability and effectiveness. This reliability will help minimize the excessive overreliance on GAI and other AI tools and overcome the fear of GAI replacing teachers (Chan & Tsi, 2024). This approach emphasizes the importance of thoroughly understanding GAI as an innovation and the overall system to make necessary adjustments. For example, GAI's capability of editing English texts for nonnative English speakers can be a tremendous support for their research endeavors and teaching English as a second language. Likewise, GAI can significantly support the development of assessment tools to evaluate students' work. Our results support the notion that incorporating GAI into the educational system yields advantages, such as enhanced research and learning efficiency, personalized tutoring, and adapting material to the unique learning styles and pace of learners. It may substitute for specific short courses and assist non-native researchers in enhancing their academic rigor and writing. This all can happen if teachers are able to understand the benefits and shortcomings of GAI use. We, therefore, support Al Murshid et al. (2024), who found that awareness of the potential benefits is related

to the intention to use GAI because awareness of limitations and the intention to use GAI are positively related. Constraints of new technologies, therefore, may not always act as a barrier to their use.

Additionally, it is crucial to develop a systemwide capability that accommodates the strengths and shortcomings of GAI. The study found GAI to be a threat when education's system-wide characteristics are prone to its negative effects. A memory-based examination and assessment, for example, required reforms at the end of the education system rather than only blaming GAI for promoting cheating and illegal means. While Cotton et al. (2023) are right to think about how to improve education, Huh (2023) and Dawson et al. (2023) say that the assessment system, for example, needs to move beyond its traditional memory-based learning and an assessment mindset of closed versus open book exams and instead think about changing exams in a way that includes various different task modalities, such as graphs and figures that GAI and language models may have trouble with. According to Sardana et al. (2023) and Eke (2023), the education system will only be able to resolve issues of plagiarization and academic integrity at that point. The education system, therefore, needs to look beyond students' assessments, consider GAI within the broader context of its benefits for learners, and overcome the fear that we associate with the use of GAI in learning by making structural reforms and promoting the understanding of GAI through staff capacity building. This study agrees with Lund and Wang (2023) on the importance of being open about how GAI is designed, trained, and used, including the data used to train the model, so we can spot and fix any possible biases or mistakes. We also need to empower students to think critically (Bitzenbauer, 2023) and independently, make informed decisions, and take the meaningful option of using GAI, as argued by Heimans et al. (2023).

It is obvious from the results of this study that we cannot simply reject and ban an innovation, such as GAI. We need to be cautious and mindful of the continuous evolution of innovations and modifications of the education system to meet new realities and needs. Wang and Guo (2023) have rightly argued that the emergence of new educational technology is always accompanied by doubt, vigilance, and rejection from the traditional community. Research, therefore, needs to be abreast of the innovative and productive use of GAI by addressing the associated worries and concerns. The arguments of DuBose and Marshall (2023) are very relevant, and this study also supports their idea that we need to be optimistic about more sophisticated measures and procedures surfacing with the passage of time. We need to take GAI and other AI models as valuable tools, and they should be used as aids rather than replacements for human intelligence and decision-making. An intriguing and significant discovery pertains to the prioritization of contextual preferences and preparedness for utilizing GAI. Context is understood in terms of subject areas and areas of expertise, as the results of this study indicated. Data collection from a diverse group in terms of subject expertise supplements the literature by making the findings more applicable to diverse contexts. Therefore, it is necessary to align GAI with diverse learning requirements while remaining cognizant of its limitations and loopholes within the education system. Only then can we expect that GAI and other AIs will be increasingly and meaningfully woven into all stages of learning and education, including course and curriculum design (Finn, 2023), one-on-one tutoring, note-taking, and task automation (Araya & Marber, 2023).

Without taking on a balanced approach, considering the pros and cons of innovation and education, we should not jump to the conclusion that an innovation, such as GAI, is either a threat or a blessing to learning. Such an approach can overcome digital inequalities, which, in the case of bans, may further strengthen the digital divide. We need to address the challenges and shortcomings associated with its use with more responsibility and rigor. As Ray (2023) suggests, teachers, students, and researchers can responsibly use GAI to advance human knowledge and understanding. The discussions emphasize the value of responsible AI use and the need for further research and collaboration to address these issues effectively. We also need to distinguish machines from living beings and be confident that our lives take precedence over the "lives" of machines (Blackshaw, 2023).

IMPLICATIONS

This study revealed opportunities for improved learning and research, as well as the importance of contextual GAI integration. It is crucial to understand that not all educational contexts may benefit equally from GAI. This contextual nature of GAI integration has implications for a cross-context understanding of GAI (Johnson, 2023). We can gain insights from the successful, ineffective, or potentially harmful effects of GAI

in one context and apply them to another. Here, "context" encompasses not just geographical factors but also broader educational systems, including various pedagogical approaches such as reflective, participatory, and passive learning. These approaches will significantly influence the impact of GAI. The context also includes subjects like English and physics, which are open to using GAI, so it is important to understand it in all areas of study.

A significant implication is the need to consider how the education system is evolving, with pedagogies becoming more democratic and liberal, and teachers transitioning into roles as facilitators and learners rather than merely being sources of information. DuBose and Marshall (2023) suggest that GAI will develop and change our society or the education system in this context. There is also a lack of understanding of GAI, especially regarding its technical modalities and how they relate to teaching and learning. The very implication for educators, administrators, and policymakers is to proactively seek to educate themselves and their students on how to use GAI and other AI not only morally and ethically (Whalen & Mouza, 2023) but also for developing curricula and pedagogies. The moral and ethical dimensions are obvious, but we also need to be aware of the fact that the implications of GAI and ethics are to intertwine and evolve together (Kumar, 2023). It is human value judgment that, for example, must draw implications from machine-made and data-driven decisions (Brantley, 2023). It is recommended that GAI be used in conjunction with human decision-making rather than replacing it entirely to ensure that the decisions made are ethical and responsible (Ray, 2023).

The integrity-related dimension is yet another concern with the integration of GAI. Within the realm of education and scholarly investigation, the utilization of GAI necessitates the establishment of policies and protocols that facilitate its ethical and principled application. Regrettably, the present state of affairs lacks dependable AI tools capable of discerning the authorship of a given text as either human or machine-generated (Heimans et al., 2023). This problem is a prominent grievance for academia and research and must be considered in future research.

CONCLUSION

The integration of GAI in education presents opportunities and challenges. Acknowledging the uncertainty surrounding AI's limitations calls for continuous evaluation and refinement. By taking a responsible and cautious approach to GAI integration, we can make it beneficial for education and learning while mitigating potential risks and challenges. By safeguarding personal information, promoting transparency, and recognizing the limitations of GAI, we can ensure that GAI applications enhance human experiences while respecting individual rights and values. Addressing ethical considerations is critical for guaranteeing responsible GAI deployment and safeguarding personal values, privacy, and individual rights. GAI can be a valuable tool to enhance the learning process, but it should not replace human teachers or hinder critical thinking, or creativity in students. By maintaining a balanced approach, we can overcome the limitations of GAI and the shortcomings of the education system. This approach will help to conduct a critical analysis of the pros and cons of the GAI for learning while at the same time considering the negative effects of the innovation. With a human-centric focus, education can harness the benefits of GAI while preserving the unique qualities that only human educators can provide. By considering these principles, we can harness GAI's potential while respecting its limitations. We conclude that a balanced approach is needed to avoid excessive reliance on AI and preserve human-centric learning experiences.

LIMITATIONS AND FUTURE RESEARCH RECOMMENDATIONS

Prior to interpreting the results of this study, it is important to acknowledge and consider two limitations. This study employed a qualitative research design and was conducted within a specific geographical area, utilizing a limited sample size. As a result, caution should be exercised when attempting to extrapolate the findings to broader contexts. Furthermore, the current study did not investigate how GAI could be used in the real world to help people learn. This is because GAI is still new, and its uses and educational implications are not well known, especially among participants from less developed countries such as where this study was conducted. To overcome these limitations, future research endeavors should consider the utilization

of larger and more diverse samples. Employing longitudinal and cross-sectional designs would enable the tracking of changes in faculty perceptions of GAI over an extended period of time. This approach would also facilitate exploration of the integration of such technologies within the context of higher education. It is imperative to investigate the relationship between the utilization of generative AI and its impact on learning outcomes. It is also recommended that future research endeavors focus on investigating university faculty with varying academic histories and demographics, including age, gender, and cultural settings, in relation to their proficiency in and attitudes to GAI.

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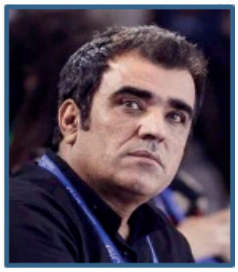

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