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## Generative Artificial Intelligence in Education: Opportunities, Challenges, and Its Impact on Students' Learning Outcomes

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| ARTICLE INFO                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ABSTRACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p><b>Received:</b><br/>April 24, 2026</p> <p><b>Revised:</b><br/>May 06, 2026</p> <p><b>Accepted:</b><br/>May 21, 2026</p> <p><b>Available Online:</b><br/>June 10, 2026</p> <p><b>Keywords:</b><br/>Generative Intelligence (GenAI); Higher Education; Student Learning Outcomes; AI in Education; Academic Integrity; AI Literacy</p> <p><b>Corresponding Author:</b><br/>Aqsa Asif Khan<br/><b>Email:</b><br/><a href="mailto:aqsakhan048@gmail.com">aqsakhan048@gmail.com</a></p> | <p>The rapid advancements of Generative Artificial Intelligence (GenAI) have profoundly reshaped the landscape of higher education, offering novel opportunities in the field of teaching, learning, and academic assistance. Student university learners are frequently using tools like ChatGPT, Gemini, Claude and Copilot to aid their academic writing, information retrieval, concept clarification and research assistance. Yet, the introduction of GenAI also takes us to the other side of the coin, emphasizing the challenges of academic honesty, the reliability of information produced by AI, dependency, and how GenAI affects students' thinking abilities. The purpose of this study was to investigate the case of Generative AI in the higher education sector in Pakistan and to shed light on the perceptions of the opportunities, challenges, and impact of the use of Generative AI on learning outcomes from the university students' perspective.</p> <p>This study used a qualitative phenomenological research design and interpretivist paradigm. Data were gathered using semi-structured interviews with 18 university students with prior experience of using Generative AI tools for academic purposes from higher education institutions in Pakistan. The data were collected using semi-structured interviews with 18 university students who have prior experience in using Generative AI tools for learning purposes from Higher Education Institutions in Pakistan. Braun and Clarke's approach to thematic analysis was used to analyze collected data. The results highlighted three key themes: (1) Generative AI as a learning enhancement tool, (2) challenges and concerns of AI adoption, and (3) the impact of Generative AI on student's learning outcomes. Students indicated that GenAI was used for personalized learning, enhancement of academic writing abilities, productivity and independent learning. But it was noted that there were also issues with academic misconduct, incorrect AI-generated data, overreliance and inequity in access to higher-level AI capabilities.</p> <p>The study reaches the conclusion that Generative AI holds tremendous potential to improve the learning experience in Pakistani higher education sector, but it is a matter of responsible use of Generative AI, AI literacy and relevant institutional guidelines and policies. The results highlight the importance of creating comprehensive AI policies, training faculty and students, and fostering critical discussions about AI technologies within the university environment. This research offers qualitative and quantitative analysis of the uptake of Generative AI in Pakistan and implications for educators, policymakers and higher education institutions to responsibly use generative AI in the classroom.</p> <p>The use of generative AI has been taking a significant turn in the recent times. Generative Artificial Intelligence (AI) has been on a major transformative journey recently in the context of Higher Education (HE).</p> |

## **Introduction**

Artificial Intelligence (AI) has revolutionized many industries such as healthcare, business, engineering and education. One of the latest innovations is Generative Artificial Intelligence (GenAI). Generative AI is a category of AI that can create content—text, images, code, voice and more—from prompts. ChatGPT, Google Gemini, Claude, and Microsoft Copilot are all popular AI tools that offer real-time information, create academic content, and facilitate learning processes for students and teachers. As these tools have become more attainable, they have brought the issue to the forefront of conversation for their potential and importance in education around the globe. The recent reviews suggest that GenAI is transforming the nature of teaching and learning by empowering teachers with new tools and capabilities and challenging the ethics and integrity of academic work. (Springer)

Globally, higher education institutions are keen to devise ways to incorporate Generative AI into the learning and teaching experience. The possibilities AI systems open for creative and individual learning processes, immediate feedback, academic writing assistance, and increased student engagement are understood and valued by universities. Generative Artificial Intelligence (GenAI) is one of the latest innovations. Generative AI is an AI generating text, images, code, voice and more from prompts. ChatGPT, Google Gemini, Claude, and Microsoft Copilot are all popular AI tools that offer real-time information, create academic content, and facilitate learning. Studies indicate that GenAI could serve as a virtual learning assistant that can customize itself to the learner's needs and facilitate their self-directed learning. In addition, these technologies have proven to be useful in enhancing students' academic abilities, such as writing, communication, problem-solving, and information literacy. Engaging students and teachers in active learning processes.

The advent of Generative AI has had a profound impact on the Higher Education Sector in Pakistan. In the last few years there has been a digital revolution in Pakistani universities, due to the increasing use of educational technologies and the increasing internet connectivity. The use of ChatGPT and other such tools has become common for students in their assignments, research projects, and studying for tests. Many students are using ChatGPT and similar tools for tasks such as writing assignments, conducting research, preparing for tests, and writing academic papers. AI tools have made it possible for students to receive educational assistance outside of the classroom. Yet, institutional policies on Generative AI usage are still in their early stages, and many institutions are at risk of losing the battle for innovation and academic integrity.

While there are significant educational benefits to Generative AI, there are many concerns raised with its use. One of the biggest problem is cheating and plagiarism. Students may excessively use content created by AI without critical thinking and without independent learning. Additionally, AI systems can sometimes produce inaccurate or misleading information, known as “hallucinations,” that can have a detrimental impact on the quality of learning. Some other challenges are data privacy, ethical considerations, unequal access to technology and overreliance on AI systems. While GenAI can be a useful tool for learning, its improper use could hinder the development of critical thinking and problem-solving abilities. (arXiv)

The effect of Generative AI on students' learning outcomes is an issue of debate. Advocates believe that artificial intelligence (AI) technology can help to improve the efficiency of learning, boost student motivation, and deliver personalized assistance to boost academic outcomes. However, some critics argue that overuse of AI can diminish students' ability to think, create and solve problems for themselves. The impact of AI on education has been shown to be highly dependent on its implementation and management in educational settings. GenAI can enhance learning when used responsibly, but it can also have negative educational impacts if not regulated and used irresponsibly. (DOI)

In the Pakistani context of Higher education, there has been little empirical studies on students' lived experience of Generative AI. Existing research is largely conceptual or policy oriented, or systematic review, and few studies include qualitative investigations of student perceptions and experiences of AI technologies in their academic lives. Recently, a community review of AI use in Pakistani Higher Education pointed out the lack of empirical studies and the need for further research to explore student experiences and challenges in implementing AI. (PJSSR Journal)

To fill this gap, the present study aims to explore the experiences of university students who actively use Generative AI technologies using a qualitative phenomenological approach. The study intends to find the perceived opportunities, challenges, and impacts on learning outcomes with the help of interviews of 15–20 students from higher education institutions from Pakistan. To create effective policies and teaching methods that harness the potential of AI while mitigating its risks, it is crucial to consider students' viewpoints.

The relevance of this study to the field of education technology in Pakistan is highlighted by the fact that it can be contributed to the body of knowledge in educational technology. The results could help policy makers, university leaders and teachers to develop suitable systems for the ethical and effective use of Generative AI in higher education. In addition, the study could contribute to the Higher Education Commission (HEC) in creating national guidelines for the responsible use of AI while maintaining academic integrity and quality of learning.

## **Research Questions**

1. What is this experience of Pakistani university students regarding the use of Generative AI in learning activities?
2. What do students see as opportunities with Generative AI?
3. What are the difficulties students face when employing Generative AI?
4. What are the impacts of Generative AI on student learning outcomes?

## **Literature Review**

### **Opportunities of Generative AI in Education**

With its revolutionary approach to education, Generative Artificial Intelligence is poised to transform learning in Higher Education. A major benefit is that of personalized learning. AI-based systems can offer personalized explanations, examples, and feedback, which is a contrast to the traditional methods of instruction. Through this personalization, learners can work at their own speed and can be given tailored support where required, when they get stuck (Daniel et al., 2025). The findings showed that AI-based interactions were linked to increased learner autonomy and self-regulated learning, suggesting that personalization is effective. The results have shown that AI-based interactions were associated with greater learner autonomy and self-regulated learning, indicating the effectiveness of personalization. (Wiley Online Library)

A second noteworthy chance is academic writing support. With the rise of tools like ChatGPT, students are increasingly taking advantage of these platforms to create outlines, enhance grammar, streamline arguments, and structure academic content. This help can boost the quality of the writing and hasten the writing of assignments. The studies have shown that GenAI can be utilized by students in improving their communication skills and academic productivity (McGrath et al., 2024). (Springer)

Generative AI also promotes creativity and innovation. AI tools can be used to enrich students' knowledge by giving them several examples and ideas to think about when solving problems, enabling them to explore new solutions.. In higher education, researchers have found creativity enhancement to be an emerging theme in the use of GenAI applications (Qian, 2025). Moreover, AI systems offer real-time feedback and learners can rectify errors and refine their conceptual grasp in an instant. This continuous feedback mechanism helps to boost learning effectiveness and student participation. (DOI)

Another significant advantage is accessibility. Learning assistance is available to students with various educational backgrounds, all from different locations, at any time. AI-based support systems can lower the language proficiency, academic readiness, and educational resource access barriers. Consequently, Generative AI has the potential to promote educational inclusivity and lifelong learning opportunities. (DOI)

### **Challenges of Generative AI in Education**

While the benefits of Generative AI are evident, there remain challenges to be addressed. One of the most common concerns continues to be academic integrity. Generating essays, homework, and exam answers with AI has sparked concerns about originality and authenticity. Currently, there is ongoing research and development of acceptable use of AI in many universities worldwide, and a standard with respect to academic integrity remains to be established by these universities (McDonald et al., 2024). (arXiv)

Misinformation and hallucination are another problem. Generative AI systems sometimes generate false or made-up information and confidently provide it as true. Lack of knowledge regarding the subject may result in misconceptions and less quality of learning for students who depend on AI-generated content to verify their answers. New research highlights the importance of critical evaluation skills in dealing with AI-generated information. (MDPI)

In addition to ethical and privacy issues. The use of AI tools can pose challenges of confidentiality, surveillance and responsible data management, the use of user data to improve performance. Additionally, opacity of algorithms and accountability mechanisms make it challenging to achieve ethical governance in education (Yusuf et al., 2024). (DOI)

Dependency constitutes another major concern. AI can be used to assist learning, but overreliance could decrease students' motivation to think and solve problems independently. Qualitative research shows that students value the ease with which these tools can be used, but still understand the potential for students becoming increasingly reliant on AI. (Reddit)

The digital divide adds to the challenges, especially in developing countries. Internet access and high-quality AI tools and literacy are not evenly distributed. There is a risk that students in disadvantaged backgrounds won't reap similar benefits from AI-powered learning environments. The problem is particularly significant in Pakistan, where the gaps in infrastructure persist affecting the uptake of educational technology. (Financial Times)

## **The impact of a Generative AI on students' learning outcome**

Learning outcomes can be cognitive, affective and behavioural in nature and are the outcomes of learning experiences. New research indicates that Generative AI may have a positive impact on students' academic outcomes, enabling greater productivity, real-time feedback, and personalized learning. Pupils often claim greater knowledge of difficult ideas and better productivity. (Wiley Online Library)

One good thing about generative AI is that it is associated with an increase in learner engagement. Interactive AI systems can engage students to ask questions, discuss, and explore concepts, and engage students in self-directed learning activities.. Such interactions can help to increase students' motivation and involvement in learning activities. Studies have shown that the use of AI in the learning process can enhance SLL skills and learner confidence. (DOI)

But, there are worries about critical thinking development. There are concerns that relying too heavily on AI-generated answers could limit opportunities for critical thinking and deep learning. There are worries that relying on AI-generated responses could restrict chances for analytical thinking and reflective learning. The use of AI-generated content without critical analysis could lead to a reduction in deeper cognitive engagement. Uncontrolled use of AI is argued to have the potential to deflate the acquisition of higher-order thinking skills required for academic and professional success. (The Guardian)

The effect of Generative AI on learning outcomes thus seems to be complex and context dependent. The better the chances of positive outcomes, the more AI is used as an aid to learning and not a replacement for intellectual work. For educational integration to take place, four areas of focus are needed: clear policies, building AI literacy, and pedagogical approaches that foster critical engagement with AI-generated content. (MDPI)

## **Research Gap**

The opportunities, challenges, and implications of Generative AI on education have been explored in the international literature but there are few empirical studies in Pakistan. The existing Pakistani studies are mostly review and conceptual studies with less qualitative studies to investigate the lived experiences of students. Moreover, there has been limited research that has used a phenomenological perspective to examine university students' experiences of the impact of Generative AI on their learning experiences in their own higher education contexts. This gap demands the current study that aims to provide context specific evidence by applying in-depth interviews with the Pakistani university students.

## **Methodology**

### **Research Paradigm**

This research is based on the research paradigm that is interpretive, which means that the reality is socially constructed and is better understood from the experiences and interpretations of individuals. Because the interpretivist approach focuses on the understanding of the participants' sense making of their experiences in particular social and cultural contexts, this perspective is well suited for exploring educational phenomena. The present study aims to consider the lived experiences of university learners and how they experience the use of Generative Artificial Intelligence (GenAI) in their learning experiences, therefore an interpretivist approach is appropriate to gain better insights into how university learners experience the use of this new technology and the meanings and interpretations they give to this new technology. Interpretivist and phenomenological research approaches have also been used in recent investigations of the adaptation of AI in higher education, trying to reflect the complexity of the participants' experiences. (ERIC)

### **Research Design**

A qualitative phenomenological research design was used for the study. Phenomenology is an approach that seeks to understand and describe the essence of participants' lived experiences as they relate to a specific phenomenon. The phenomenon studied in this research is the use of Generative AI tools (Gemini, Claude, ChatGPT, Microsoft Copilot) in the higher education learning environment.

The study does not attempt to measure the frequency of AI use or to test causal relationships, so it was decided that Phenomenology would be used. Rather, it seeks to examine students' experiences, perceptions, and interpretations of opportunities, challenges, and outcomes of using Generative AI. Earlier research in AI-in-education has effectively applied phenomenological methodologies to explore students' and teachers' experiences with the new generation of AI tools. (ERIC)

### **Research Setting**

The selected public and private universities of Pakistan were used for the study. The participants were selected from undergraduate and post-graduate courses where students are regularly using digital technologies and online learning platforms.

The higher education scenario in Pakistan serves as the right backdrop for such a discussion on the adoption of GenAI, as universities are gathering momentum in the adoption of digital learning tools alongside dealing with issues of academic integrity, digital literacy, and technology accessibility. This context becomes even more significant in light of the increasing prevalence of AI in students' lives and its educational consequences. (Financial Times)

### **Participants**

The subjects were 15-20 students studying undergraduate and postgraduate courses at the university. Eligibility criteria included:

- Admission to Pakistani Universities.
- Academic use of at least one Generative AI tool regularly.
- Interest in an extensive interview.
- Excellent knowledge of English or Urdu.

The participants came from various disciplines such as Education, Social Sciences, Management Sciences, Computer Science, Health Sciences and so on. Students from various fields brought their diverse viewpoints and enriched the discussions on the use of AI in learning.

### **Sampling Technique**

A purposive sampling method was used to recruit the participants who have first-hand experience with the use of Generative AI technologies. In the phenomenological research, purposive sampling is very popular because it allows to select information-rich subjects who can give significant information about the phenomenon studied.

The potential participants were recruited from universities and through social media groups and academic connections. The interviews were continued with the aim of achieving data saturation, that is, when little or no new themes appeared from further interviews.

### **Data Collection Procedure**

Semi-structured interviews were used for data collection, which were carried out in person or online via Zoom and Google Meet.

Interviews were approximately 30-45 minutes long and were audio recorded with the interviewees' consent. The researcher chose semi-structured interviews because it provides for flexibility and consistency for the participant in how they report their experiences across interviews.

The interviews concentrated on gaining insight into:

- Students' experiences using Generative AI.
- Perceived educational benefits.
- Challenges and concerns encountered.
- The impact of AI on schooling and learning.
- Ethical issues surrounding the use of AI.

Opportunities, challenges, and educational outcomes related to GenAI were explored, and interview questions were created based on the existing literature. (ScienceDirect)

### **Interview Protocol**

The following guiding questions were used:

1. What are some examples of how you have used Generative AI tools in your academic work?
2. Why did you start incorporating Generative AI?
3. How have you seen these tools help you?
4. What challenges or difficulties have you encountered?
5. What impact has Generative AI had on your learning?

6. Does AI have any impact on your critical thinking or ability to learn independently? If yes, how?
7. What are your worries about the use of AI in Higher Education?
8. In your opinion, how should universities deal with the use of Generative AI?
9. What recommendations would you provide for students using AI tools?
10. What are your expectations for the future use of AI in education?

To further elicit responses and give them examples of their academic experiences, probing questions were used.

### **Data Analysis**

Braun and Clarke's (2006) Thematic Analysis Framework was used for the analysis of the collected data in qualitative research.

Analysis was done in 6 stages:

#### **Phase 1: Familiarization**

Interviews were tape-recorded and transcribed word for word and analyzed to become familiar with the data.

#### **Phase 2: Initial Coding**

Themes related to students' experiences were found and initial codes were given.

#### **Phase 3: Theme Development**

All related codes were aggregated into larger categories and possible themes.

#### **Phase 4: Theme Review**

Themes were analyzed to see if they were of the same level and relevance to the data set.

#### **Phase 5: Theme Definition**

Final themes and subthemes were worked out and became well formulated.

#### **Phase 6: Report Writing**

Findings were structured and summarized with the help of the participants' own words which were used to highlight main themes.

The analysis was anticipated to result in three themes:

1. The opportunities of Generative AI are vast. The opportunities that Generative AI has are enormous.
2. Applications of Generative AI
3. Effect on Learning Outcomes

Themes correspond to AI-in-education literature and past qualitative studies. (arXiv)

### **The trustworthiness of the Study**

For rigour and trustworthiness, the study used the criteria suggested by Lincoln and Guba (1985).

#### **Credibility**

Member checking was used to ensure that the data from the interviews were accurate by providing participants with a summary of their interviews.

#### **Transferability**

Thick descriptions of participants, setting and findings were furnished to allow readers to judge applicability to other settings.

#### **Dependability**

A research audit trail was maintained that included evidence of decisions made in research, coding procedures, and analytical processes.

### **Confirmability**

Reflexive journaling and explicit recording of analytical choices helped to limit researcher bias.

### **Ethical Considerations**

The research was conducted in accordance with ethical guidelines.

- A document of informed consent was provided prior to participation.
- Participation was voluntary.
- Participants were allowed to drop out at any time without penalty.
- Confidentiality and anonymity was assured with pseudonyms.
- Audio recordings and transcripts were securely stored.
- Only for academic purposes, data were used.

The study was carried out in accordance with the ethics and standards of conducting research with human participants accepted in the world.

### **Conceptual Framework**

Include a conceptual framework figure before Findings in an HEC-Y category paper:

The use of Generative AI (ChatGPT, Gemini, Claude, Copilot)

### **Opportunities**

- Personalized Learning
- Academic Writing Support
- Creativity Enhancement
- Immediate Feedback

### **Challenges**

- Academic Integrity
- Hallucinations
- Privacy Concerns
- Dependency
- Students' Learning Outcomes
- Academic Performance
- Engagement
- Critical Thinking
- Self-Regulated Learning
- Motivation

This framework is based on two theories, Constructivist Learning Theory and the Technology Acceptance Model (TAM). (Scholars Crossing)

Bilkul. Aap ki baat durust hai. Pichla format quantitative style ki taraf chala gaya tha (demographic table, details about frequency of AI tools etc.). This is a qualitative phenomenological study (15-20 student interviews) for the HEC Y category journal and should be presented as themes, sub-themes, in the format of coding process, and with participant quotations.

If you have qualitative paper mein tables/figures, then it will be Tarah honge:

## Findings

This study aimed to understand the experiences of university students with the application of Generative Artificial Intelligence (GenAI) in Higher Education. Thematic analysis approach as suggested by Braun and Clarke (2006) was used in analyzing the data obtained from 18 university students in the semi-structured interview technique. The analysis resulted in three overarching themes:

1. Engage with 1. Generative AI as a Learning Enhancement Tool.Discuss 1. Generative AI as a Learning Enhancement Tool.
2. There are challenges and ethical concerns related to Generative AI.There are challenges and ethical concerns related to Generative AI.
3. How Generative AI affects Students' Learning Outcomes

Table 1 shows the themes and sub-themes which have emerged from the interview data.

**Table 1: Themes and Sub-Themes Emerging from Interview Analysis**

| Main Themes                                           | Sub-Themes                        | Description                                                                        |
|-------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------|
| Theme 1: Generative AI as a Learning Enhancement Tool | Personalized Support              | Learning AI provided customized explanations according to students' learning needs |
|                                                       | Academic Assistance               | Writing AI supported writing, grammar improvement, and research organization       |
|                                                       | Time Efficiency                   | AI reduced time required for academic tasks                                        |
| Theme 2: Challenges and Ethical Concerns              | Academic Integrity Issues         | Concerns regarding plagiarism and misuse of AI-generated content                   |
|                                                       | Accuracy and Reliability Problems | Students experienced incorrect or fabricated AI responses                          |
|                                                       | Dependency on AI Tools            | Fear of reduced independent thinking and creativity                                |
| Theme 3: Impact on Learning Outcomes                  | Improved Understanding            | AI enhanced conceptual clarity and knowledge acquisition                           |
|                                                       | Increased Engagement              | AI encouraged interactive and self-directed learning                               |
|                                                       | Critical Thinking Development     | AI created both opportunities and risks for analytical skills                      |

**Figure 1: Thematic Map of Students' Experiences with Generative AI**

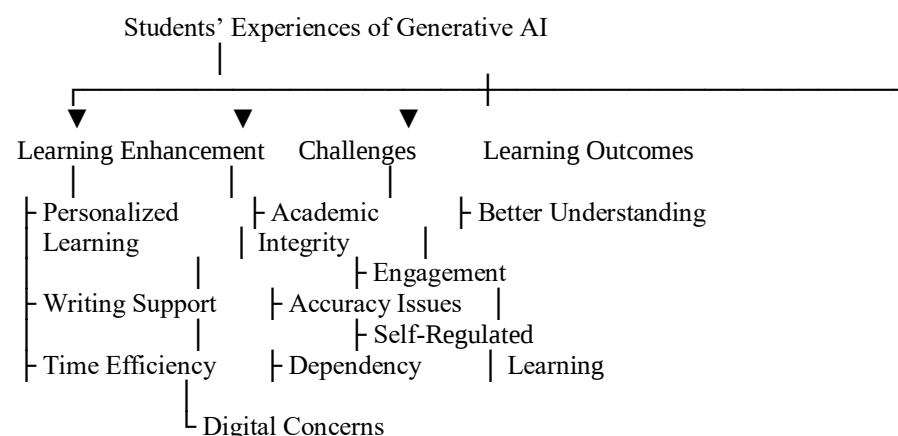


Figure 1. Thematic structure developed from students' interview data.

### **Theme 1: Generative AI as a Learning Enhancement Tool**

Overall, participants saw Generative AI as an assistive technology for education that enhanced their educational journeys. Students reported that AI can be a convenient learning assistant that enables them to comprehend difficult concepts, enhance their academic writing, and manage educational tasks effectively.

#### **Sub-theme 1: Personalized Learning Support**

One key outcome was the value placed on personalized assistance from AI tools by students. The participants described that AI enabled them to ask questions over and over and get explanations based on their comprehension.

One participant stated:

“When I do not understand a topic, I ask ChatGPT to explain it in simple words. It helps me learn according to my own pace.” (Participant 4)

Another participant shared:

“The biggest advantage is that AI is available anytime. I do not have to wait for a teacher or class discussion.” (Participant 9)

These experiences demonstrate that students perceived Generative AI as a flexible learning resource that supports independent learning.

#### **Sub-theme 2: Academic Writing and Research Assistance**

Participants frequently highlighted the role of AI in supporting academic writing activities. Students reported using AI for generating ideas, improving sentence structure, understanding research concepts, and organizing assignments.

A participant explained:

“I use AI when I have difficulty starting a research paper. It helps me develop ideas and create a proper structure.” (Participant 7)

Another student stated:

“AI improves my English writing because it suggests better ways to express my ideas.” (Participant 12)

The findings indicate that students consider AI a valuable writing assistant, particularly in contexts where students face language and academic writing challenges.

**Table 2: Illustrative Quotes Supporting Theme 1**

| <b>Sub-theme</b>      | <b>Representative Quote</b>                                                |
|-----------------------|----------------------------------------------------------------------------|
| Personalized Learning | “AI explains difficult concepts according to my understanding level.” (P4) |
| Writing Assistance    | “It helps me organize my research ideas and improve my writing.” (P7)      |
| Time Efficiency       | “Tasks that required hours can now be completed more efficiently.” (P2)    |

### **Theme 2: Challenges and Ethical Concerns Associated with Generative AI**

Although students acknowledged the benefits of AI, they also identified several concerns regarding its educational use.

#### **Sub-theme 1: Academic Integrity Concerns**

Participants expressed concerns that unrestricted AI use could encourage academic dishonesty. Students observed that some learners submit AI-generated assignments without proper understanding.

One participant stated:

“Some students use AI only to complete assignments instead of learning. They copy answers without checking them.” (Participant 6)

Another participant explained:

“Universities need clear rules because students are confused about what type of AI use is acceptable.” (Participant 13)

### Sub-theme 2: Accuracy and Reliability Issues

Students also highlighted concerns regarding incorrect information generated by AI systems.

A participant mentioned:

“Sometimes AI gives confident answers that are not correct, so verification is necessary.” (Participant 10)

This finding indicates the importance of developing AI literacy among university students.

**Table 3: Summary of Challenges Identified by Participants**

| Challenge             | Students' Perception                               |
|-----------------------|----------------------------------------------------|
| Academic Misconduct   | AI may encourage plagiarism and unfair practices   |
| Incorrect Information | AI responses require verification                  |
| Dependency            | Excessive use may reduce independent thinking      |
| Digital Inequality    | Not all students have equal access to AI resources |

### Theme 3: Influence of Generative AI on Students' Learning Outcomes

The final theme explored how students perceived the influence of Generative AI on their learning outcomes.

#### Sub-theme 1: Improved Understanding and Knowledge Development

Participants reported that AI improved their understanding of difficult academic concepts.

“AI provides examples that make difficult topics easier to understand.” (Participant 12)

#### Sub-theme 2: Enhanced Engagement and Self-Learning

Students explained that AI encouraged them to explore topics beyond classroom boundaries.

“I can learn new things independently because AI guides me whenever I need support.” (Participant 15)

#### Sub-theme 3: Effect on Critical Thinking

Participants presented mixed views regarding critical thinking. Some believed AI enhanced analytical abilities, while others feared dependency.

“AI gives different perspectives, but students must think themselves before accepting answers.” (Participant 8)

**Table 4: Overall Findings Matrix**

| Research Question                     | Major Findings                                                                        |
|---------------------------------------|---------------------------------------------------------------------------------------|
| How do students experience GenAI?     | Students experience AI as a learning assistant and academic support tool              |
| What opportunities exist?             | Personalized learning, writing support, productivity improvement                      |
| What challenges exist?                | Integrity issues, inaccurate information, dependency                                  |
| How does AI affect learning outcomes? | Improved understanding, engagement, and self-learning with risks to critical thinking |

### Discussion

This study aimed to bring into focus the current lived experiences of university students as they use Generative Artificial Intelligence (GenAI) in HEIs in Pakistan. The study used a phenomenological approach to identify the three main dimensions of students' experiences: (1) The use of Generative AI as an enhancement tool in learning, (2) challenges and ethical concerns arising from the use of Generative AI, and (3) the impact of Generative AI on students' learning outcomes. The results revealed that students view GenAI as an educational technology that holds the potential to revolutionize learning and offer valuable academic support, but also with regard to ethical concerns, reliability, and dependence.

### **Generative AI as a Learning Enhancement Tool**

The results showed that one of the main conceptions that students had was that Generative AI is a learning assistant that is readily available and enriches learning. The participants highlighted the benefits of AI tools in offering personalized explanations, real-time responses, and academic support based on each participant's learning needs. The result aligns with previous studies that indicate that Generative AI might be useful to support personal learning by adjusting explanations, examples and feedback to the learner's needs (Kasneci et al., 2023).

In the light of Constructivist Learning Theory, learning is a process whereby students build knowledge while interacting with learning resources and learning experiences. Through the participants' experiences, it is evident that GenAI can be an interactive learning tool that helps students develop their own understanding and pose questions. Students did not see AI as a replacement for traditional teaching methods but rather as a complement to enhance their learning.

It also discovered that students would write academic tasks with Generative AI and complete research related tasks as well. The participants stated that they used the AI tools for their brainstorming research ideas, improving the quality of the language, organizing the academic content and learning complex academic concepts. The results are important in the context of higher education in Pakistan where students encounter difficulties with academic writing skills, English language skills and research support. The use of AI tools for writing has been demonstrated to enhance students' communication skills and improve their academic productivity, while also being used responsibly (Tlili et al., 2023).

But the results indicate that students rather see AI as a tool to assist them than substitute for their thinking. The difference is important because human critical engagement, reflection, and involvement is crucial to effective AI integration.

### **Students will explore ethical dilemmas and issues associated with implementing generative AI**

While there were several benefits identified by the participants in using Generative AI, there were also concerns about the potential negative impact of this technology. Academic honesty was cited as one of the greatest concerns. Students understood that AI can be used inappropriately to create assignments, to complete assessments, and to present written information without genuine work.

The results align with previous studies showing that Generative AI has disrupted the conventional methods of assessment and academic evaluation in higher education (Cotton et al., 2024). AI has raised questions about plagiarism, authorship, and ethical liability when producing academic writing. In Pakistan, where many universities struggle to have AI policies in place, these issues need to be addressed by the institutions.

The issue of inaccurate and misleading AI-generated content was also addressed. Students noted that AI systems sometimes give inaccurate explanations and/or unreliable references. This result aligns with the previous studies showing that Generative AI models can generate inaccurate information, or AI hallucinations (Dwivedi et al., 2023). This restriction is reflected in the awareness that the participants demonstrated in this study, which emphasizes the need to increase the awareness of the students around the university regarding AI.

AI literacy goes beyond mere usage; it also demands an awareness of the limitations of AI tools, an ability to assess the information provided by AI tools, and an ethical approach for understanding what information is appropriate and what is not. Therefore, universities in the Pakistani context need to go beyond mere warnings about using AI tools and encourage the responsible use of AI by students and faculty.

Another key discovery is around students' worries about reliance on AI. There were concerns from some participants that overuse of AI might have a detrimental effect on creativity, problem-solving skills and independent thinking. This has been noted in similar research around the world, with authors suggesting that relying on AI without critical examination might lead to a decrease in students' participation with higher-order thinking skills (Lo, 2023).

The results indicate that the educational value of Generative AI can be influenced by how students interact with the technology. AI should be used as a cognitive aid and support students' thinking process, not the other way around.

### **The influence of Generative AI on the learning outcomes of students**

The third key finding revealed that students saw Generative AI positively impacting a range of learning outcomes, such as conceptual understanding, academic engagement and self-directed learning. AI tools were found to aid in grasping complex ideas, providing instant explanations, and delving into subjects that were not covered in the classroom.

The results are in line with the latest research indicating that AI-enriched learning settings can boost student engagement and encourage independent learning practices (Chan & Hu, 2025). The use of AI tools can help students to have more autonomy in their learning processes by providing support when they need it.

The results also validate the two principles of the Technology Acceptance Model (TAM) that were proposed by Davis (1989): People are more likely to use technology when they believe it is useful and easy to use. Students' attitudes towards in this study demonstrated positive attitudes toward GenAI, due to their experiences of direct benefits, such as efficiency and understanding.

But, the effects of AI on critical thinking were mixed. Some students felt that AI promoted analytical thinking by offering various viewpoints and potential explanations. However, some others voiced worries that students might simply rely on the outputs generated by AI without verifying the correctness.

This discovery presented an interesting educational conundrum. GenAI is a tool that can aid in higher order thinking when appropriately used in the classroom with instructional guidance, and students' ability to critically assess AI-generated content. Accordingly, educators need to develop activities for their students in which they can analyze, criticize and reflect on the AI-generated product instead of simply copying.

### **Implications for the Pakistani Higher Education**

This research has some implications for the Pakistani higher education institutions. First, universities should not limit their understanding of Generative AI to just being a threat, but consider it an emerging tool in education. AI can be used to improve the accessibility of learning, support, and engagement.

Secondly, universities need to establish guidelines for the use of AI, setting boundaries and clear benchmarks for acceptable and unacceptable uses. Such policies should target responsible use, not ban use. Students need to be aware of the expectations and rules for assessment, as well as issues relating to AI-assisted writing and citations.

Third, faculty trainings should be established to improve teachers' knowledge of AI technologies. Professional development is essential for educators to be able to effectively use AI to enhance their teaching to meet academic standards.

In conclusion, institutions need to raise AI awareness among students. It is important to train students on time and effective development, verification of AI-generated information, ethical considerations, and critical evaluation. In Pakistan, where variations in access to digital technologies and technological awareness can affect students' access to the advantages of AI technologies, such initiatives are especially significant.

The Study Contributed 6.5% to the total research.

Therefore, this research is an empirical contribution to the expanding body of research on the use of Generative AI in education, offering a unique perspective on the experiences of Pakistani university students. This research had the advantage of providing a deep understanding of the students' perceptions and experiences of the use of AI in their educational journey, in contrast to the theoretical discussions or quantitative measurements that were often the focus of previous studies.

The phenomenological approach enabled the study to reflect students' attitude, worries and expectations towards a new technology that is rapidly changing the face of higher education. The results offer useful recommendations for policymakers, teachers, and institutional leaders aiming to create effective policies and strategies for responsible use of AI in Pakistan.

### **Conclusion**

The impact of Generative Artificial Intelligence on modern higher education is significant, opening up new opportunities and challenges for students and institutions. This phenomenological study examined the experiences of the university students in Pakistan with GenAI and found that the students feel AI is an opportunity and a concern for them.

This study confirmed the advantages that students can gain from Generative AI in the area of personalized learning support, academic writing, productivity, and better access to educational resources. Students found AI tools beneficial in grasping complex topics and for self-directed study. But academic integrity, inaccurate information, dependency and unequal access to technology were also noted as challenges.

The study concludes that Generative AI can not be substituted with traditional education approaches but can be used as a complementary learning tool. It is effective when used responsibly, with the guidance of institutions, and if AI literacy is promoted among students and teachers.

The adoption of Generative AI in higher education institutions in Pakistan must be done with a balance between innovation and upholding academic integrity. Developing an ethical AI policy, offering training sessions, and encouraging critical reflection on AI technologies are all priorities for universities.

In conclusion, the use of Generative AI in education in Pakistan offers a promising avenue for enhancing learning experiences, but its effectiveness will depend on careful implementation, ongoing monitoring, and collaborative efforts between students, educators, educational institutions, and policymakers.

## **Recommendations**

Based on the phenomenological findings, some recommendations are made for the responsible and effective use of Generative Artificial Intelligence (GenAI) in Pakistani Higher Education Institutions (HEIs), educational institutions, and students.

### **To develop institutional policies for AI use. To create institutional policies on the use of AI**

HEIs need to establish in depth policies on the ethical use of Generative AI. In the current scenario, a lot of universities in Pakistan do not have any rules that define what is acceptable and what is not on AI usage in academic work. Issues of AI-assisted assignment, research writing, examinations, authorship and citation should be clearly defined in institutional policies.

Universities should not prohibit outright use of AI tools but instead provide a balanced approach that promotes deliberate and ethical applications of AI that uphold academic integrity. It will minimize the confusion between students and faculty on the appropriate use of AI.

### **To foster AI Literacy amongst students**

The results showed that students are aware of the positive and negative aspects of Generative AI and need additional training on the proper and ethical use of AI.

AI Literacy should be implemented in Universities with emphasis on the following:

- A range of high-quality prompt development skills
- When deriving information from AI, the verification of the information generated is required.
- Determine the boundaries of AI's capabilities. Find out what AI is not able to do.
- Discuss ethical issues in academic work.
- Adjusting to the use of AI writing tools responsibly
- AI literacy will help students utilize Generative AI tools in their learning, rather than as tools to replace them.

### **Faculty Training and Professional Development**

Teachers are a key player in the successful implementation of AI. Thus, faculty professional development programs should be offered at the University to increase faculty members' understanding of Generative AI technologies.

The goal of training should be for teachers to be able to:

- Know some of the strengths and limitations of AI.
- Create teaching methods and approaches that involve AI. Plan pedagogical approaches and techniques that incorporate AI.
- Identify ways of evaluating the concepts and technologies of the AI era.
- Educate students on ethical use of AI
- Utilize AI tools for improving teaching effectiveness
- AI literacy among faculty will enable them to better guide students to productive engagement with AI.

### **Redesign of Assessment Practices**

With the rise of Generative AI and its utility, universities need to rethink traditional assessment approaches. If the assignments are solely dependent on written answers, they can be susceptible to being completed by AI.

Institutions should consider:

- Project-based assessments

- Oral presentations
- Reflective assignments
- Practical demonstrations
- Critical analysis tasks

These can foster a deeper learning experience and mitigate the risk of academic dishonesty.

### **Promoting the Use of AI for Critical Thinking Skills**

While using AI tools to find answers may be fast and convenient, it's important for students to consider the content carefully and critically when using the information provided by AI. Teachers should plan activities in which students compare AI-generated answers with academic sources for accuracy and correct any mistakes.

Such methods could replace the use of AI as an "answer generator" with analytical and reflective thinking skills development.

### **Improving Digital Accessibility**

The findings showed that there was concern about inequities in advanced AI technologies. Digital inequalities should be addressed by enhancing:

- Internet accessibility
- Digital infrastructure
- The access to the educational technology resources.
- Student training opportunities

Ensuring equal access will make sure that AI benefits are accessible to the diverse socioeconomic backgrounds of students.

### **Limitations to the Study**

This research has valuable insights into the students' experiences with Generative AI, but there are some limitations that need to be recognized.

The study has a qualitative phenomenological design with relatively small number of participants which is 18 students from University. This was a suitable sample size for exploring lived experiences, but not representative of all Pakistani university students.

Secondly, participants were selected by purposive sampling, which could have resulted in a selection bias due to the fact that students who had prior experience in AI were more likely to be selected.

Thirdly, data was self-reported data, gathered by interviews. Personal opinions, social desirability, or lack of knowledge about AI technologies may have shaped the responses of the participants.

Fourth, the study centered mostly on students' views and excluded faculty, university administrators and policy makers. The participation of several stakeholders might give a more holistic perspective on the use of AI in higher education.

Last but not least, Generative AI technologies are constantly changing. The experiences and perceptions highlighted in this research are likely to evolve as AI systems are improved and institutional policies evolve.

### **Future Research Directions**

Future research should build on this study by exploring the adoption of Generative AI with multiple voices, such as teachers, administrators and policy makers.

The following additional studies could be conducted:

#### **Mixed-Methods Research**

Moving forward, the study could use both qualitative and quantitative methods to explore the links between AI usage and quantifiable learning outcomes like academic achievement, motivation, and engagement.

### **Longitudinal Studies**

There is a need for longitudinal research to determine the impact of long-term interaction with AI over the lifespan of students regarding cognitive functioning, creativity and independent learning.

### **Cross-Institutional Studies**

A comparative study involving several universities from different regions of Pakistan could give more insights into the difference in adopting AI as it may be related to the resources available within the institutions and their access to digital facilities.

### **Faculty Perspectives**

Future research should explore teachers' experiences, concerns, and readiness regarding AI integration in teaching and assessment practices.

### **AI Policy Research**

Further studies should examine how Pakistani higher education policies can be developed to promote responsible AI innovation while maintaining academic quality and ethical standards.

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