CHALLENGES AND REPERCUSSIONS OF GEN AI TOOLS FOR UNIVERSITY STUDENTS

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Abstract
The widespread use of Generative Artificial Intelligence (AI) tools in higher education has significantly transformed the academic experience for university students, offering both benefits and drawbacks. This study explored the challenges and repercussions of AI tools on university students. It was conducted on nine students from multiple disciplines in various universities in Lahore, using a convenience sampling technique. Interviews were carried out with the help of semi-structured, open-ended questions to collect qualitative data. The initial coding of the interviews was performed manually for thematic analysis. Later, NVivo software was used to identify key themes of this qualitative study. The study revealed five major outcomes: AI as a learning and support tool, AI-driven efficiency and productivity, challenges, cognitive impact, and usability/accessibility of AI tools. These findings provide insights into both the benefits and challenges of AI tools usage, as well as their cognitive effects on students in academic settings. The implications suggest the need for balanced educational policies to foster responsible Gen AI tools use while addressing cognitive and ethical concerns. The results offer valuable insights for policymakers and educators seeking to optimize AI's role in academic environments, ensuring equitable access and promoting academic integrity.

INTRODUCTION

The idea of artificial beings with intelligence comes from ancient myths and stories. However, the scientific and systematic study of AI began in the mid-20th century. The concept of artificial intelligence (AI) originated in the 1950s and was pioneered by Alan Turing, John McCarthy, and Marvin Minsky. Alan Turing handled the computation and intelligence side, John McCarthy coined the term "artificial intelligence," and Marvin Minsky contributed foundational research in AI. Overall, these extraordinary contributions laid the foundations for this groundbreaking field (Singh et al., 2024).

AI tools emerged from artificial intelligence and existed in various forms including computer programs or applications in mobile phones or laptops that use artificial intelligence to assist their users in tasks that normally require human intelligence. These tools can range from language translation services to grammar checkers and even personalized language tutors. Moreover, these tools can adapt to individual learning styles and preferences that optimize the learning experience for each user and even provide feedback to

improve overall learning outcomes. (De la Vall & Araya, 2023).

Several AI tools are widely used in academia by both students and educators due to their convenience and efficiency. These AI Tools include Grammarly, ChatGPT, Quillbot, Gemini, Perplexity, and ChatPDF. These AI tools help with academic tasks such as providing automated content generation, summarizing data, refining and proofreading text, analyzing data, generating literature, and assisting with research and publication. Based on their wide applicability in various domains, it would not be wrong to say that AI tools in academia hold the potential to enhance educational outcomes and advance research (Nguyen-Trung et al., 2023).

ChatGPT: A Leading AI Tool in Academia

Since ChatGPT is the most popular one among all the AI tools, it is important to discuss ChatGPT in more detail. ChatGPT is an advanced AI-based language model and a part of large language models (LLMs). ChatGPT was developed by OpenAI in 2018. It was specifically designed to handle natural language processing tasks. The primary goal of ChatGPT was to provide real-time responses by mimicking human-like language comprehension and communication effectively that can perform tasks including answering questions, performing the data analysis, summarizing and paraphrasing text and more (Nazir & Wang, 2023; Rasul et al., 2023; Kasneci et al., 2023). Since it arrived in 2018, multiple series of ChatGPT have been introduced, including GPT-1, GPT-2, GPT-3, GPT-3.5, and now GPT-4. (Nazir & Wang, 2023).

ChatGPT provides personal assistance to students in their studies. It can assist students with assignments and homework, test and exam preparation, brainstorming project ideas, explaining concepts, facilitating discussions, and presenting the pros and cons of various topics (Nah et al., 2023).

ChatGPT aids researchers in their research work by providing comprehensive information on the topic, brainstorming the topic, recommending appropriate methodologies, answering questions related to the topic, and helping in writing. (Nah et al., 2023; Meyer et al., 2023). Overall, the application of AI tools in education supports and enhances educational delivery (Meyer et al., 2023; Kasneci et al., 2023).

Challenges and Disadvantages of AI Tools

The benefits of AI in academia come with the responsibility of fostering a balanced and ethical approach. In the next part, the challenges of AI tools usage are described in detail below.

Harmful or inappropriate content includes the usage of offensive language, the production of violent content, discriminative text, and erotic content. The ability of AI tools to produce such harmful content is called toxicity. The generation of such toxic content is harmful and disrespectful to society (Nah et al., 2023). Such content can significantly impact students' minds, especially when children are exposed to it, disturbing their mental well-being. Harmful content can also shape their attitudes, behaviors, and beliefs in harmful ways.

Bias refers to the unfair representation in the text generated by AI tools (Bornstein, 2018). There are different forms of bias exhibited by AI tools, including gender bias, racial bias, cultural bias, or language bias. Such unfair representation happens due to acquiring training data from limited populations, languages, or sources (Zhou et al., 2023). Bias in AI models, if not addressed, can lead to stereotypes and discrimination and inequality (Nah et al., 2023).

Another important issue with AI tools is that they can sometimes provide false information, known as "hallucination." For instance, when it is asked to find the relevant publication reference, ChatGPT provide entirely fictional or irrelevant publication references (Meyer et al., 2023).

Overreliance means trusting the answers of AI tools blindly. The sole dependency on ChatGPT can have a detrimental impact on users, compromising their learning, critical thinking, and creativity and problem solving (Iskender, 2023).

Ensuring data privacy and security is another challenge for AI tools. ChatGPT, among other AI tools is not strong enough to protect against the disclosure of sensitive information. Data security involves protecting user information from corruption, theft, and unauthorized access (Siau & Wang, 2020). There has been report of ChatGPT exposing personal information of individuals publicly due to system errors (Porter, 2023). Given ChatGPT's popularity and widespread use, it contains personal information from a large population, increasing the risk of data disclosure.

Unlike human interaction, such as a teacher engaging students in interactive class discussions, AI tools lack this capability. While AI tools could be a beneficial for teachers to enhance interaction between teachers and students, replacing teachers with AI tools would be a serious mistake. Similarly, solely taking and adopting feedback from these models would be incorrect. It is also against the constructivist theory of learning, which emphasizes human collaboration and interaction as essential for learning. However, adopting feedback with reasoning and human interaction build trust and can ensure the accuracy of the feedback (Rasul et al., 2023).

Maintaining academic integrity is another challenge for academic institutes. If compromised, there would be plagiarism, which is an academic misconduct. To maintain academic integrity, students need to be aware of using these models ethically and need to be informed about the risks if AI tools are not used properly (Rasul et al., 2023).

As mentioned earlier, AI tools cannot assess students' graduate skills such as critical thinking, problem-solving, and innovation, meaning it cannot be used for assessing student outcomes (Rasul et al., 2023). Another issue compromising the assessment of student outcomes is AI tools including ChatGPT's inability to test the authenticity of content provided by students, raising concerns regarding fairness and equity in student assessment.

Some students use AI tools to get new ideas for their assignments, but most rely on it to complete their entire assignments, which could lead to learning distortion. Students with high usage of ChatGPT and other AI tools affect their cognitive functioning. Instead of thinking critically, they overly rely on ChatGPT, which may decrease their learning abilities and affect their critical thinking (Bai et al., 2023).

Rationale
Existing literature primarily discusses the technical aspects and benefits of AI tools, considering it a lifesaver for everyone, while overlooking the negative side of AI tools. Therefore, only limited research is available that discusses the challenges and negative consequences of AI tools usage. A clear research gap is evident in comprehensively exploring the challenges and repercussions of Gen AI tools among university students. This study is one of the first studies to explore the challenges and repercussions associated with Gen AI tools usage, especially in the educational setting. The findings of this study contribute to the existing knowledge of AI tools in education.

Significance
Understanding the challenges faced by university students while using AI tools will provide valuable insights into how to mitigate potential harms and foster positive interactions with this AI technology. By identifying the specific challenges that students face while using AI Tools, such as difficulties in interpreting AI tools responses, over reliance on the tool for critical thinking, or ethical dilemmas related to its use, target areas can be pinpointed. This information will allow for the development of targeted strategies and resources aimed at addressing these challenges effectively.

This research is crucial, especially for those deeply involved in education like educators, government officials, and policymakers. It's essential to inform them about the challenges and negative consequences linked with using AI tools in educational settings.

Objectives
• To explore the challenges university students encounter when using Gen AI tools in their academic work.
• To analyze the cognitive and academic repercussions of Gen AI tool usage on university students.

Methods and materials
The study utilized a qualitative research approach to explore the challenges and repercussions of Gen AI tools usage among university students.

Convenient sampling was employed to collect the data from the desired participants. the sample size of this study consisted of nine university students from multiple disciplines of various universities in Lahore, including three doctoral students, three postgraduate students, and three graduate students. Participants who regularly and frequently use Gen AI tools for academic purposes were included in the study. Data was collected from the participants through semi-structured interviews. For the interview, self-administered questionnaire was used whose validity and reliability were assessed prior. The interviews were

audio-recorded with participants' consent. Demographic information was also taken from the participants including age, gender, area of residence, level of education, and field of study.

For data analysis, thematic analysis was employed, as it is widely recognized in the literature as one of the most effective approaches for exploring open-ended and qualitative data (Larkin et al., 2023). In thematic analysis, patterns and themes are identified from the responses of participants to understand the topic. The audio recorded interviews were written down knows as data transcription. After transcription, the written responses were systematically analyzed using NVivo software, where major themes, subordinate themes and subthemes emerged from the data. NVivo software is an excellent qualitative research analysis tool for a comprehensive examination of the themes (Lochmiller, 2021).

Table 1: Questions used to collect data through interviews with the participants

	Questionnaire
Q1	What do you think about Gen AI tools and what can possibly be done with the help of these tools?
Q2	How have Gen AI tools affected students' intellectual abilities so far?
Q3	What do you think are the benefits of Gen AI tools?
Q4	Are there any disadvantages to using Gen AI tools?
Q5	Do you think we are getting overly dependent on Gen AI tools for every single academic task? Explain reasons.
Q6	Why do you think students use Gen AI tools frequently nowadays?
Q7	What is your motivation behind using Gen AI tools?
Q8	For what purposes do you use Gen AI tools?

Results

The demographic information of the participants is provided in Table 2. The findings of the study included word cloud and thematic analysis that was performed using NVivo software, which is further explained in detail below.

Table 2: Socio-demographics

Participant	Age	Gender	Education level	Field	No. of Years using AI tools	Residence
P1	24	Female	PhD	MBA	3	Lahore
P2	27	Male	PhD	TQM	2	Lahore
P3	35	Male	PhD	HRM	4	Lahore
P4	23	Male	BS	Accounting & finance	3	Gujranwala
P5	25	Male	BS	Mechanical Engineering	3	Lahore
P6	22	Male	BS	Artificial intelligence	4	Sargodha
P7	24	Female	Masters	TQM	2	Lahore
P8	25	Female	Masters	MBA	3	Lahore
P9	24	Female	Masters	MBA	3	Lahore

Word Cloud Analysis

Word cloud analysis is a visual representation that helps in analyzing unstructured text data. It is commonly used in qualitative research design to display the frequency and prominence of words within a dataset. In word cloud analysis, words with higher occurrence frequencies are displayed in a larger font, demonstrating their importance, while less frequent words are shown in smaller fonts. Figure 2 presents the results of the word cloud analysis from this study, highlighting the most frequently occurring words. This analysis provides a quick overview of the

most important words and ideas within the qualitative data. However, word cloud analysis has limitations, as it cannot capture the context, meaning, or relationships between words.

Figure 1: Word Cloud

Thematic Analysis

Thematic analysis was performed with the help of a software Nvivo that is one of the best software to conduct qualitative studies. In NVivo software, initial coding was performed manually. The themes identified in the initial coding were merged with the help of the software. As a result, five major themes emerged, including challenges of Gen AI tools, cognitive repercussions, and academic repercussions of Gen AI tools. These themes are explained in detail below in table 3 and 4. Transcribed interviews of the participants are attached in Appendix C.

Table 3: Thematic Analysis: Challenges and Cognitive Repercussions of Gen AI Tools

Master themes	Subordinate themes	Sub-themes
Challenges of Gen AI tools	Over dependency	AI reliance for basics Reduced problem-solving initiative
	Decline in cognitive abilities	Memory retention issues Diminished problem-solving capacity
	Unemployment risks	AI replacing jobs Competitive job anxiety
	Loss of confidence	Doubting personal skills Relying on AI feedback
	Induced laziness	Procrastination due to AI Avoiding manual effort
	Concerns for future	Uncertain career prospects Irrelevance of human skills
	Lack of transparency	Confusion about AI decisions Lack of AI system understanding
	Ethical consideration	Biased AI algorithms Privacy and data concerns
	AI detection	Hard to detect AI Plagiarism detection worries

Cognitive repercussions of Gen AI tools	Impact on creativity	Limited original ideas
		Relying on AI suggestions
	Impact on cognitive thinking	Shallow thinking habits
		Instant AI solutions
	Reduction in learning capacity	Lower learning motivation
		Limited knowledge growth
	Impact on communication	Weak interpersonal skills
		AI-generated responses overused
	Impact on decision making	Indecisive without AI
		Difficulty in critical thinking

Table 4: Thematic Analysis: Academic Repercussions of Gen AI Tools

Master theme	Subordinate themes	Sub-themes
Academic Repercussions of Gen AI tools	AI as a Learning and Support Tool	Solve problems
		Assist with academic tasks
		Learning tool
		Writing & work support
		One platform for all information
		Drafting documents
		Brainstorming ideas
		Instant information retrieval
		Broader access to information
		Simplifying complex topics
		Error detection
		Reduce human need & effort
	AI driven efficiency and productivity	Timesaving
		Quick results
		On-time task completion
		Increased productivity
		Step-by-step solution provision
		Time management
	Usability and accessibility of AI tools	Ease and convenience
		Accuracy
		Helpful and user-friendly tool
		Enhanced efficiency & transformative nature
		A tool for everyone (inclusive)
		Provides comfort zone for users

Challenges of Gen AI tool

The domain 'Challenges of Gen AI tool' had nine major themes: over-dependency, decline cognitive abilities, unemployment risks, loss of confidence, induce laziness, concern for future, lack of transparency, ethical consideration, and AI detection. *Over-dependency.* A recurring theme in the interviews was the over-reliance on AI tools. Several respondents, particularly PhD and master's students, highlighted that AI tools have become an essential part of their academic routine. One respondent explicitly mentioned,

"We are getting overly dependent on AI tools" stressing that students prefer using AI for tasks like generating content, proofreading, and solving assignments, without putting in their effort. Another interviewee supported this by stating,

"Students are overly dependent because they think someone else can do it for them."

Decline cognitive abilities. The other major issue, which was mentioned by most of the interviewees, was a notable decline in cognitive abilities. Over-dependency on AI tools can affect creativity and critical thinking among students. As a respondent mentioned,

"AI tools have the power to paralyze our cognitive abilities."

Many of the respondents commented on the issue with how AI tools prevent students from independent thinking and creativity. They admitted that AI tools are no doubt convenient for performing any task, but at the same time, overuse of AI tools can damage our problem-solving and analytical skills. Another interviewee added,

"You name the task, and AI will do it for you, but it does that at the cost of damaging your problem-solving and analytical skills."

Unemployment Risks. Several participants raised concerns over unemployment risks due to the increased application of AI tools in the workplace. One respondent noted,

"Unemployment is the main disadvantage of AI tools."

Loss of Confidence. Another important theme is the loss of confidence because of dependency on Al. as one respondent said,

"People have become less confident in themselves"

in explaining how over-reliance on AI for tasks such as writing emails or reports has diminished individuals' confidence in their ability to do them manually.

Induced Laziness. Using AI tools for every single task induces laziness. Participants admitted that they use AI tools to avoid hard work. One respondent noted,

"Students use AI tools so that they don't have to work hard including me. As I can do my academic tasks with AI tools, I became lazier."

Concerns for the Future. AI tools can have a significant impact on future generations. One participant shared his worry,

"I'm concerned about how AI tools could potentially negatively affect our coming generations."

Lack of Transparency and Ethical Considerations. The participants also identified the lack of transparency in AI-generated content. One interviewee mentioned "Lack of transparency" as a significant issue, particularly in how AI handles data. Additionally, ethical concerns emerged, especially regarding plagiarism detection and the use of AI to generate content without proper acknowledgement.

AI Detection. Some respondents mentioned AI detection as another challenge for them to prevent their work from detection. However, respondents discussed tactics to avoid AI detection in academic tasks by humanizing their work generated by AI tools.

Cognitive Repercussions of Gen AI tool

The domain 'Cognitive Repercussions of Gen AI tool' has five major themes: affect creativity, affect cognitive thinking, reduce learning capacity, affect communication, and affect decision making that are explained in detail below.

Impact on Creativity. The impact of AI tools on creativity of students was highlighted by most of the participants. One respondent mentioned,

"Creativity toh ab us trha se rahi nhi" (creativity isn't the same anymore).

This reflects that now students no longer brainstorm or think creatively because AI tools can generate ideas instantly for them.

Impact on Cognitive Thinking and Learning Capacity. Students' cognitive thinking and learning abilities are negatively influenced using AI tools. Over-reliance on AI tools impairs our ability to think critically and independently, according to one participant,

"AI tools are damaging our cognitive skills."

Additionally, one respondent stated,

"AI tools affect learning capacity"

because students are avoiding the conventional process of gathering and synthesizing information.

Impact on Communication and Decision-Making. Responses from the participants revealed that AI tools impair the communication skills and decision-making ability of students. One interviewee remarked,

"They are affecting our communication skills because I'm even using AI tools for writing messages and emails",

This highlights how the overuse of AI for drafting messages and emails is diminishing students' capacity to communicate effectively in both professional and academic environments. Another interviewee highlighted that AI hinders decision-making, as

students no longer engage in the cognitive processes necessary for making informed choices.

Academic Repercussions of Gen AI Tools

The domain 'Academic Repercussions of Gen AI tool' had three major themes alongside subthemes; AI as a Learning and Support Tool: Solve problems, assist with academic tasks, learning tool, writing support, one platform for all information, drafting documents, brainstorm ideas, work support, instant information retrieval, broader access to information, simply complex topics, error detection, reduce human need; AI-driven efficiency and productivity: Time-saving, quick results, on time task completion, productive, step by step solution provision, time management and increase efficiency; Usability and accessibility of AI tools: Ease and convenience, accuracy, helpful tool, user-friendly, transformative nature, a tool for everyone, and provide comfort zone provided in Table 4.

AI as a Learning and Support Tool. The responses from the participants consistently highlighted the versatility of AI tools as an essential learning and support tool for students. Many respondents supported AI tools for assisting in solving problems, completing academic tasks, and refining writing. one interviewee noted,

"AI tools are very helpful for students in completing academic tasks like generating ideas, refining writing, and solving questions."

Several participants also mentioned that AI offers a one-stop platform for information retrieval, which minimize the need to go to multiple sources. As one respondent said,

"Now you don't need to go to different sites to collect data; you just type a question and get the exact answer."

This easy accessibility of information reduces effort and enhances efficiency.

Another respondent mentioned,

"AI tools are helpful for me for brainstorming ideas and writing."

Another important feature of AI tools is to refine the text and provide correction for mistakes that improve the quality of academic writing, as one respondent stated,

"AI tools provide an efficient refinement to my text and remove all grammatical errors in my writeup."

AI-Driven Efficiency and Productivity

Another major theme that emerged from the interviews was the effective role of AI in enhancing efficiency and productivity. Many respondents praised the time-saving feature of AI tools as they provided responses in seconds saving a lot of time. One respondent stated,

"AI tools are very time saving... tasks that take hours for me to complete can be done in minutes or even seconds with the help of AI tools."

Another respondent highlighted,

"Timesaving is a huge benefit of using AI tools, especially when we have so much to manage alongside studies."

Another benefit of AI tools is not just providing the answer to the problem rather they provide a complete step-by-step solution that aids in improving the understanding of students of complex problems. As one participant mentioned,

"AI tools don't just give the final answer but provide a step-by-step solution, which helps students understand better."

Usability and Accessibility of AI Tools. The usability and accessibility of AI tools are also among the major factors why because AI tools are widely used by students. Respondents were pleased with the fact that using AI tools is very easy for them and anyone with a basic understanding can learn using AI tools due to user user-friendly nature of these tools. One participant explained,

"AI tools are user-friendly and easy to use."

AI tools are also widely accessible, with free or basic versions available for most students. A respondent shared,

"AI tools are easy to access, and mostly AI tools are free which makes them convenient for students to use."

Other participants mentioned,

"AI tools make life easier. They provide accurate responses which save us from searching across multiple sources."

Students also appreciate the comfort that AI tools provide them so that they can easily work from their comfort zone. One participant mentioned,

"With AI tools, I can work from my comfort zone."

Discussion

The study findings identified several potential challenges that students face. Alongside these challenges, the study findings also shed light on the positive and negative sides of AI tool usage in terms of academic and cognitive repercussions. On the positive side, findings indicate that AI tools are highly beneficial for learning and support, efficiency and productivity, and usability and accessibility. On the negative side, AI tools have a negative influence on the cognitive abilities of students. Several key challenges that students face while using AI tools were identified in the findings. These challenges included over-dependency, decline in cognitive abilities, unemployment risks, loss of confidence, induced laziness, concerns for the future, lack of transparency, ethical considerations, and AI detection.

Among these challenges, overdependency was the most significant because it was mentioned by the majority of participants. The responses of the participants indicated that overreliance is not just a challenge but also a cause of other issues students encounter. The over-dependency on AI tools also damages the cognitive abilities of students. It is also responsible for loss of confidence and lazy behavior in students. Over-dependency on AI tools implies that students are taking help from the AI tools for every task, even for those that they were able to perform independently before the arrival of AI tools.

Many participants explicitly mentioned that frequent use of AI tools allows them to avoid hard work. This attitude of avoiding hard work induces laziness in the students. Also, excessive use of AI tools due to overtime impaired the confidence of students and made them more dependent on AI tools. These findings align with the previous research by Sok & Heng (2023). This study highlighted that overreliance is a major issue. The study also mentioned that those students who wait until the last minute to complete their tasks are most likely to rely on AI tools and ultimately produce complete work from AI tools. This reckless behaviour impairs their analytical and cognitive skills. Another study supports these findings, saying that AI tools damage the critical thinking and research abilities of the students (Kasneci et al., 2023).

Cognitive repercussions highlighted the negative side of AI tools usage. Study findings identified that overuse of AI tools can negatively impact the cognitive abilities of students. According to the participants, AI tools can damage cognitive abilities including critical thinking, learning capacity, creativity, communication skills, and decision-making ability. As mentioned above, excessive use of AI tools damages cognition. Nowadays, students use AI tools for almost everything, including writing messages, drafting emails, writing reports, proofreading, brainstorming and more. This overuse significantly damages the communication and decision-making abilities of students. Emphasizing the negative impact of AI tools usage, one participant mentioned that AI tools are paralyzing our cognitive abilities. Another participant stated, "*Creativity toh ab us trha se rahi nhi*" (creativity isn't the same anymore).

Our findings are supported by the previous research. The study indicated that easy access to information from AI tools is the major reason why critical thinking has been paralyzing (Bai et al., 2023). However, other findings also mentioned that the use of AI tools specifically ChatGPT enhances the critical thinking of students (Essel et al., 2024). The mixed findings indicate that it depends on how we utilize these AI tools; they can be either our friend or foe. If we responsibly use AI tools they can be our valuable assistant. Otherwise, they can become detrimental.

Additionally, study findings also mentioned transparency and plagiarism as significant ethical concerns that came forward with the use of AI tools. The lack of transparency raises questions about the accuracy and reliability of the information that AI tools provide. Academic repercussions demonstrated the positive side of AI tools usage. Study findings identified that with responsible use of AI tools, they can be very valuable companions. Study participants identified the following benefits where AI tools proved to be assets for them: enhanced learning and provided support, increased efficiency and productivity and convenience. AI tools have proven to be very beneficial for students for being a reliable academic support and learning-enhancing tool. Literature also supported the fact that AI tools enhance learning, mentioning that with the help of ChatGPT- an AI tool, the learning process becomes easier (Fuentes et al., 2024). This is justifiable because students can approach AI tools anytime and anywhere to get instant access to information, which makes

them invaluable resources for answering questions and exploring topics.

Findings also indicated that AI tools provide a centralized platform for accessing all kinds of information without juggling between multiple sources. Students use AI tools for a variety of academic tasks including writing, drafting documents, detecting errors, and answering queries. Broader access to information and freedom to perform a variety of tasks with the help of AI tools also justified the findings that AI tools reduce human efforts which was required in traditional methods otherwise.

Another prominent feature of AI tools is their ability to deliver solutions within seconds, which makes them an efficient and productive tool that saves a lot of time, as well as checks for grammatical mistakes to provide error-free output. Previous research also supports my findings, highlighting that with the ability of automation, AI tools are very time saving and provide quick responses while ensuring the accuracy of the responses (Deng & Lin, 2022). Moreover, the user-friendly nature and smooth interface of AI tools make them appealing and convenient to use. AI tools are widely adopted by students due to their comfort and easy accessibility.

Conclusion

The study aimed to explore the challenges and repercussions of Gen AI tools among university students. Study findings suggest that no doubt, Gen AI tools offer numerous benefits regarding efficiency and productivity, usability and accessibility, and learning and support. However, they raise significant concerns in terms of over-dependency and hindering cognitive abilities.

Over-dependency, decline in cognitive abilities, unemployment risks, loss of confidence, induced laziness, concerns for the future, lack of transparency, ethical considerations, and AI detection are among the challenges extracted from the findings that students face in the usage of Gen AI tools.

While Gen AI tools provide consistent support to students in their academic tasks in terms of providing solutions to problems, refining their work, brainstorming, and more, this wide adoption of AI tools by students hinders their cognitive abilities, including critical thinking and learning capacity, creativity, communication, and decision-making.

Additionally, ethical concerns, including transparency and plagiarism, are also present because students completely rely on AI tools without displaying any personal effort.

Recommendations

It is crucial to ensure the optimize use of AI tools to get more benefits from them and minimize their drawbacks. The following recommendations are presented below in the light of research findings. These recommendations can serve as a guide to ensure the constructive use of AI tools in education:

1. Academic stakeholders should ensure that students use Gen AI tools as academic assistants, not as a substitute for their cognitive abilities.

2. Workshops or seminars should be conducted by academic institutes to demonstrate constructive use of Gen AI tools that include brainstorming, generating ideas, and refining content without over-relying on AI tools

3. Alongside digital learning, traditional learning through books should be encouraged among students to foster their cognitive and creative skills.

4. Academic stakeholders should design curricula that involve both pedagogic and practical learning and activities to develop deeper understanding among students.

5. Educators should provide academic assignments and tasks that foster student cognitive abilities and problem-solving skills.

6. Alongside AI tools usage, students must keep challenging their cognitive abilities in their academic routine by actively engaging in their tasks and assignments and only taking help from AI tools when needed.

7. Students must be informed about the consequences of the overuse of AI tools in their academic tasks to address concerns about plagiarism and transparency.

8. Academic stakeholders should motivate students to develop interpersonal skills that cannot be done by AI tools and are highly demanding for a successful career, including communication, analytical and problem-solving skills.

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