International Journal of Research Studies in Computer Science and Engineering (IJRSCSE)
Volume 11, Issue 2, 2025, PP 12-22
ISSN 2349-4840 (Print) & ISSN 2349-4859 (Online)
DOI: https://doi.org/10.20431/2349-4859.1102002
www.arcjournals.org

A Study on the Utilization of Generative Artificial Intelligence Tools among Students of Higher Education in India

Dr. Jyoti Kumar Chandel[1], Dr. Syed Aulia Mohiuddin[2], Ms.Yashika Agarwal[3], Ms. Avika Sharma[3],Mr. Madhav Modi[3] & Mr. Shashank Rahoriya[3]

[1]*Assistant Professor, Department of Management, Birla Institute of Technology Mesra, Jaipur Off-Campus.*

[2]*Assistant Professor, Dept. of Business Management Studies, Gulf College Muscat-Oman –Cardiff University UK.*

[3]*Students, Birla Institute of Technology, Mesra, India Jaipur Off-Campus.*

Received: 12 May 2025 Accepted: 12 June 2025 Published: 27 June 2025

Corresponding Author:** ***Dr. Syed Aulia Mohiuddin*, Assistant Professor, Dept. of Business Management Studies, Gulf College Muscat-Oman –Cardiff University UK.*

Abstract: *Adoption of artificial intelligence (AI) among students has substantially increased in the past five years, characterized by the rise of various AI tools that provide advantages for both educators and students. The current study aims to understand the utilization of Generative Artificial Intelligence Tools among higher education students in India. Artificial intelligence involves the replication of the ways to enable computers to perform tasks that humans do. AI researchers have been engaged for the past five decades to replicate human intelligence in machines. This study is based to understand the utilization of ChatGPT, Gemini, Socratic, CoPilot and other tools among higher education students. This study offers better insights about the usage of AI tools among students in the Higher Education which will help various stakeholders to take steps to improve teaching and learning processes. This study shed light on how higher education students anticipate and utilize GenAI tools, offers design and implementation of educational policies and practices regarding integration of these technologies in the concepts like hypothesis clarification, translation, brainstorming for writing and summarizing academic context.*

Keywords: *Generative Artificial Intelligence Tools, Students, Higher Education, ChatGPT, Gemini, CoPilot*

1. INTRODUCTION

Adoption of Artificial Intelligence has transformed many sectors and education is one of them. AI technologies like virtual tutors, AI-driven content creators, plagiarism detecting tools, and adaptive learning systems are transforming traditional education approaches. These advancements not only help students gain knowledge but also customize learning experiences to suit individual requirements. For instance, AI driven applications can assess a student's performance and suggest targeted areas for improvement, thereby promoting more effective and efficient learning. We have witnessed that the digital technologies have already become an internal part of our everyday life and AI tools are also being widely utilized at moment.

The use of AI tools has grown remarkably in academics as these simply solve many intricate academic assignments and projects. AI has evolved an essential part of a student's toolkit to easily write grammar, programming, research, and project management etc. Coding assistants like GitHub and Copilot provide immediate coding suggestions, while tools such as Grammarly improve writing skills. The release of ChatGPT in late 2022 marked the introduction of the first user friendly generative artificial intelligence (GenAI) tool. This tool broadly became available to the public, which was subsequently followed for increasingly advanced iterations, creating significant upheaval globally and sparking a competitive push among major tech firms to establish themselves in the arena of GenAI model creation. Concerns in the education sector initially arose regarding the potential for students to utilize ChatGPT and other similar GenAI tools to write their assignments, thus compromising the integrity of learning assignments, certifications and qualifications.

It has been found that certain students might misuse AI tools, depending on them for shortcuts instead of true learning, which can hinder their critical thinking and creativity (Akgun & Greenhow, 2022). Additionally, the issue of fairness in education emerge since not every student has the same access to sophisticated AI technologies. This paper focuses on how students utilize AI tools in their academic endeavors by analyzing the degree through which these tools impact their learning outcomes. It seeks to highlight both the benefit and challenges associated with their incorporation into education. Recognizing the patterns of AI usage among students is vital for addressing issues like over dependence and misuse, ensuring these technologies serve as support for genuine learning instead of shortcuts. Additionally, the study investigates how ethical standards and data security can be maintained to safeguard students while building trust in AI driven educational solutions.

2. LITERATURE REVIEW

2.1 Generative Artificial Intelligence

Generative Artificial intelligence (GenAI) is an advanced form of artificial intelligence (AI) that produces new content based on the prompts written in natural- language conversational interfaces (Miao, Fengchun & Holmes, Wayne, 2023). Unlike traditional AI, which gathers and retrieve information from existing web pages, Gen AI generates completely new outputs. It can generate variety of content types, including texts such as articles, essays, or conversational responses, images such as photographs, digital arts and cartoons. The content is presented in a form that includes the symbolic representation of human thought and can also generates videos, music and different software codes.

In 1950, Alan Turing presented a solution for assessing when the human created system might be classified as “intelligent”. He introduced an imitation game, a test aimed to evaluate whether a human participant can tell the difference between interacting with a machine and another human being (Popenici & Kerr, 2017). If the participant is unable to make the difference, the system can be considered as intelligent or possessing artificial intelligence (AI). It is important to note that the fascination with AI solutions began in the 1950s. In 1956, John McCarthy provided one of the earliest and most important definitions of AI, asserting: “The study of artificial intelligence is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it” (Russell & Norvig, 2003).

The foundational technology behind generative AI is based on the machine learning (ML), particularly artificial neural networks (ANNs) that are modelled after the synaptic found in the human brain. These systems undergo continuous learning and enhancement by examining data patterns. Text- oriented generative AI models, such as ChatGPT, utilize generative pre-trained transformers (GPT) to manage language-related tasks while image-generating tools typically use generative adversarial networks (GANs) to create visuals like, digital artwork or realistic images (Miao, Fengchun & Holmes, Wayne, 2023). These advanced technologies have played a crucial role in the evolution of contemporary AI capabilities.

In recent times, many people and institutions, including leading universities globally, have claimed that “the genie has been released” regarding tools such as ChatGPT. These technologies are permanent fixtures and could be utilized effectively in educational settings. The combination of general GenAI platforms with specialized educational GenAI tools should focus on enhancing teachers’ knowledge of their subject matter as well as improving their grasp of teaching strategies (Miao, Fengchun & Holmes, Wayne, 2023). This encompasses collaborative initiatives where teachers and AI work together to create lesson plans, course resources, or even entire curriculum.

2.2 Utilisation of Artificial Intelligence (AI) Among Students

The significant influence of generative AI tools has been likened to the rapid changes brought about by the COVID-19 pandemic, which compelled educators to innovate and adapt to ensure the

continuation of learning (Ismail et al., 2023). Al’s influence in education covers various domains, such as language, engineering, mathematics, and medical training, with investigations concentrating on its functions in these areas. Recent investigations focus on how it affects students’ educational experiences,

concentrating on central themes such as assessment, evaluation, prediction, AI aids, Intelligent Tutoring Systems (ITS), and the management of student learning (Almassaad et al., 2024). Since the launch in November 2022, ChatGPT has shown its capability to tailor learning experiences, assist in research endeavors, and improve writing abilities. Its proficiency in multiple languages and ability to provide customized responses distinguish it from conventional search engines.

While tools like Grammarly enjoy widespread acceptance, many students are receptive to employing ChatGPT for essay composition (Crompton & Burke, 2023). Liang et al., (2023) studied AI's contributions to language education, while Shukla et al., (2020) reviewed its application in engineering over the past thirty years. Likewise, Hwang & Tu, (2021) examined trends in mathematics related to AI, and Winkler-Schwartz et al., (2019) assessed the role of machine learning in medical education for evaluating surgical skills. Broader examinations of AI in Higher Education encompasses AI's role in online higher education from 2011 to 2020, outlining four main functions: performance forecasting, resource suggestions, automated assessment, and improvement of learning experiences (Ouyang et al., 2022).

GenAI presents a range of applications in research and education, including conducting literature reviews, text summarization, data analysis, prototyping, simulation, public communication, drafting and editing content, coding, and generating thesis ideas (Chan & Hu, 2023). GenAI possesses significant potential to transform teaching and learning methodologies. One of its main applications is as a learning assistant, providing tools that facilitate brainstorming, offer feedback, and aid in language acquisition, particularly for non-native speakers.

By customizing educational experiences, streamlining administrative functions, and facilitating

predictive analytics, AI has improved the efficiency and effectiveness of learning across all educational levels, from primary schools to universities in higher education, AI technologies such as adaptive learning platforms, virtual tutors, and predictive assessment tools present new opportunities for meeting diverse student needs, enhancing the interaction between teachers and

students, and aligning curricula with societal requirements (Ismail et al., 2023).

The incorporation of AI in higher education comes with its own set of challenges. Limited

resources and doubts about the efficacy of AI applications can hinder them adoption. As AI progresses, its incorporation into higher education necessitates a mindful strategy that utilizes its advantages while tackling its challenges. By promoting digital literacy, emphasizing ethical considerations, and fostering collaboration between human and artificial intelligence, higher education institutions can leverage AI's transformative capabilities to establish inclusive, effective, and personalized learning experiences (Grájeda et al., 2024). Table 1 highlights Generative AI tools, their descriptions and links:

Table1. *Generative AI Tools and their Descriptions*

Tool Name	Description	Link/Resource
ChatGPT	Large language model for text generation, conversation, and more	https://chatgpt.com/
Gemini	Another large language model by Google, similar to ChatGPT, for text generation, and other creative tasks	https://gemini.google.com/?hl=en-IN
CoPilot	AI pair programmer that offers code suggestions and completions	https://copilot.microsoft.com/
QuillBot	Paraphrasing and summarization tool	https://quillbot.com/
Grammarly	Grammar and style checking tool	https://www.grammarly.com/
Otter.ai	Transcription service for audio and video	https://otter.ai/
Copy.ai	AI-powered copywriting tool	https://www.copy.ai/
Gradescope	Platform for grading assignments, particularly in coding and STEM fields	https://www.gradescope.com/
Galileo AI	AI tool for creating and editing images.	https://www.usegalileo.ai/
GPTZero	Tool designed to detect text generated by large language models like GPT	https://gptzero.me/

Source: Authors' Compilation

3. RESEARCH METHODOLOGY

3.1. Research Design

The study employs a quantitative descriptive design to analyze how students are utilizing generative artificial intelligence (GenAI) tools. By employing a cross-sectional survey methodology, the study captures the views, attitudes and behaviors of students and their usage of GenAI tools at a particular moment. The research focuses on collecting data via structured surveys conducted within the study area thereby providing a pertinent understanding of student engagement with GenAI tools. The survey collects details on the frequency of use, favorite tools, applications in education, and perceived benefits and challenges of employing GenAI for academic purposes. Using descriptive analysis methods, this research looks into patterns in the responses provided by students, highlighting significant trends in the adoption of GenAI. The outcomes emphasize the significance of GenAI tools in various academic tasks like research, assignments, and problem-solving. Moreover, the study addresses students' concerns, such as ethical issues, reliability, and maintaining academic integrity. The results aim to enrich discussions surrounding policy-making, curriculum design, and the prospective integration of AI-based learning tools within higher education.

3.2. Research Context

The study was conducted among students of various Higher Education Institutions (HEIs) in the state of Rajasthan, India. These HEIs offer a wide range of programs and courses in the areas like Computer Science, Management, Science, Commerce, Engineering and various other disciplines. Getting admission into any HEI allows students to explore different academic fields and identify their interests. HEIs play a crucial role in aiding students to discover their potential and gain new experiences, both in academic and extracurricular activities. With the advent of AI tools, students are now receiving unprecedented support across all domains. These tools assist them in academic learning, research, project development, and even personal skills enhancement.

3.3. Research Instrument

The survey or the questionnaire which been used to collect data, making it suitable for large sample size interpretation and measure the numeric data, this allow to collect the data from a vast area without physically going and collecting (Basit, 2010). Research study's instruments are been formed through literature review and expert guidance. The customized in the research are been made with the help of exciting research on AI tools in education. The survey data reflects the two points of data: academic status and student's perception in sense of GenAi Tools that classify some important parts like purpose, utilization, challenges & benefits. Here the utilizations, classifying the respondent about users and non-users, and the non-users has to present their thoughts why they don't and same as with users they can also present their views. There is no estimation of time.

The body and core of survey design integrates both the Task-Technology Fit (TTF) and Technology Acceptance Model (TAM). The TTF focuses on Task Requirements and tells the perceived benefits like *''academic performance enhancement ''* and *''barriers while using GenAi tools''*, like inaccurate or false reference which lack the technological functionality. The TAM represents the familiarity and awareness section of questionnaire to respondent like *''Do you use GenAI tool in higher education? ''*, The respondent can choose from the applicable option, aligns with TAM's constructs of Perceived Ease of Use and Perceived Usefulness.

3.4. Data Collection

The population of the study is the higher education students in the state of Rajasthan, India. Online questionnaire was administered to the higher education students through emails, webpages and social media platforms.

3.5 Data Analysis

Analysis of quantitative survey data proceeded systematically. Using descriptive statistics, including percentage, mean, standard deviation, to summarize student utilization, benefits and challenges of

generative AI (GenAI) tools in higher education. MICROSOFT POWER BI was used to perform the analysis, calculating frequencies and percentage for each survey item. Data were initially exported from Google Form in Excel format, then imported and reformatted in MICROSOFT POWER BI.

3.6 Ethical Consideration

Ethical consideration in research is critical in protecting the safety of study volunteers and safeguard the legitimacy of results. It demands uprightness and fairness in data handling, respect for participants through informed consent and minimize harm, and consideration social impact. They were aware of their anonymity and their rights to withdraw from the study at any time without needing to provide a reason.

4. FINDINGS AND DISCUSSION

Total 101 students responded to the questionnaire. Females are 41.60% respondents and 55.40% are males. Table 2 highlights demographic details of the respondents:

Table2. *Demographic Details of the Respondents*

Attribute	Category	Frequency	Percentage
Gender	Male	42	41.60%
	Female	56	55.40%
	Prefer Not to Say	3	3%
Age	18 & above	60	60%
	20-22	36	36%
	22-24	4	4%
Academic Level	Diploma	9	8.90%
	Undergraduate	90	89.10%
	Postgraduate	2	1.98%
Total		101	100%

The results of the demographic details provide various contextual details for interpreting the research findings. All of the students are 18 years of age or older, and most of them are pursuing UG courses.

4.1 Usage of GenAI Tools among Higher Education Students

This study investigated the use of GenAI tools among higher students. Out of 101 students surveyed, most utilized these tools, while a low portion did not. The reasons for not using GenAI tools are explored, along with the various application and purpose for those who do utilize them. The findings from this study provide valuable insights into the reasons why a sizable minority (8.9%, n = 9) of higher education students do not utilize GenAI tools. The survey offers five choices for reasons not to use GenAI “Unaware of Generative AI”, “Limited Knowledge of Generative AI”, “Concerned About Potential Harm of using Generative AI”, “Lack of Interest in Generative AI Tools”, and an option for respondents to prove other reason. The most commonly cited reason was having limited knowledge about Generative AI Technologies (60%).

This suggests that a considerable portion of the student population may be unaware of the potential application and benefits of these emerging technologies within the educational context. Additionally, some respondents (22.5%) are concerned about the potential harms of using Generative AI tools, further highlighting the need for greater awareness and education about the technologies among the community, but still, some portion choose not or lack interest in Generative AI tools (20%).

Research reveals a diverse landscape of awareness and implementation of GenAI technologies among students. A substantial portion remains unaware of these tools, while others establish fluctuating levels of engagement. Consistent with the findings.

4.2 Students Who are using GenAI

The Study reveals extensive implementation of Generative (GenAI) tools among higher education students. Comprising 87.50% (n=80), frequently using GenAI tools, demonstrated high association with tools like ChatGPT 68.9%. While inclusive usage is high, the study also recognized varying levels of engagement

8.9% of students rarely use GenAI tools, 30.7% used tools sometimes, and 51.5% used them often. This refinement outlook underlines the diverse ways students are integrating these tools into academic workflow.

Further data demonstrate widespread adoption among students, with 87.50% indicating common usage with peers. This widespread adoption is united with the growing acceptance of the use of GenAI tools. Additionally, the data reveal that a sizable proportion of students (31.30%) report that their instructor actively encourages the potential benefits and application of GenAI tools. This suggests a recognition of the probable benefits of GenAi in enhancing learning, collaboration, and academic productivity. Similar to those findings, it emphasizes that higher education teachers should be knowledgeable about the capabilities of ChatGPT.

The data indicate that only 25% of students are aware of their university's rules or guidelines for the responsible use of generative AI technologies. This low level of awareness highlights the need for better communication and dissemination of the information among students improving awareness and understand of these guidelines could foster a culture of response GenAI use. Other studies also shown that their a low awareness of rules and guidelines regarding Gen AI tools use.

The open-ended part of the reason for using Generative AI tools provides perception from a sample of 20 students (25%). For example, "the reason of two students were, "I use this easily due to Microsoft Gemini which comes on screen", and "It's a best and advance innovative feature that could boost our technology". This highlights that people prefer GenAI but don't know the guidelines for using GenAI.

Table3. *GenAI tools used by higher education students*

AI Tool	Count (n=84)	Percentage
Perplexity.ai	1	1.20%
Claude.ai	1	1.20%
Claude AI	2	2.40%
Meta AI	4	4.80%
Blackbox.ai	4	4.80%
Otter.ai	9	10.70%
Galileo AI	9	10.70%
Gradescope	13	15.50%
Copy.ai	17	20.20%
QuillBot	19	22.60%
GPTZero	21	25%
Grammarly	30	35.70%
CoPilot	41	48.80%
Gemini	62	73.80%
ChatGPT	73	86.90%

Moreover, the findings provide a comprehensive overview of GenAI tools used by students of higher education. According to Table-3, ChatGPT is the most broadly adopted tool with 86.90% of respondents reporting its use. This finding is comparable to other studies that found ChatGPT to be the most used AI-based tool among higher education students. Besides ChatGPT, a noteworthy proportion of students also use supplementary Gen AI tools, such as Gemini (73.49%), Co-pilot (48.90%), and Grammarly (35. 70%). These findings suggest that students are actively exploring various GenAI tools, likely to leverage their unique capabilities and functionalities for enhancing their work.

A notable significant percentage of students (9.60%) utilize Blackbox.AI and Meta AI, GenAI tools capable of creating/editing files, running commands, and using a browser through an autonomous coding agent right in IDE. This put forward for consideration of growing awareness among students about the ethical implications of GenAI. They are not just consuming GenAI content but also exploring ways to evaluate and understand its authenticity and origin. This indicates a growing awareness of the potential risk and emolument associated with tools. Furthermore, the result from the open-ended question provides another

perspective on GenAI tools used by higher education students, with (2.40%) of Claude AI. It is used to increase the developers' productivity and accelerate the pace of software development, whereas some use various tools like Perplexity.ai representing (1.20%) of respondents.

These findings offer valuable insights into the various ways higher education students utilize GenAI technologies for academic purposes. Data reveals that the most common use of technology is to define or clarify concepts, with 72.90% of students reporting this application. Summarizing articles, books, etc. is also a significant function, revealed by 54.10% of students. This highlights how GenAI allows students to efficiently process and comprehend course materials and research sources in different languages.

This suggests that students utilize GenAI to enhance their understanding of course material and build a stronger foundation of knowledge. This aligns with previous research findings which indicate that GenAI assists international students and non-native English speakers in clarifying complex concepts (Hosseini et al., 2023a). Additionally, a significant proportion of students employ GenAI to search for academic literature (51.80%) and to create digital multimedia (45.40%), highlighting the potential of these technologies to streamline the research and writing process. They also show that students are using GenAI to search relevant sources to enhance the quality of writing (37.40%), to create digital multimedia (45.90%), and to assist with the assignments (42.40%). These findings are similar to previous studies reported by Chan & Hu, (2023), which found that higher education students use GenAI tools such as ChatGPT, Grammarly, Gemini, and QuillBot for learning, writing, and research purposes, including translation, proofreading and editing writing, solving problems, to code and for generating new scientific problems.

Table4. *Purpose Behind Utilization of Generative AI Tools in Education*

Purpose	Count	Percentage
Define/Clarify Concepts	62	72.90%
Summarize Articles/Books	20	54.10%
Search for Academic Literature	44	51.80%
Support Project Work	46	49.40%
Create Digital Multimedia	36	45.90%
Generate Ideas for Writing	32	42.40%
Assist with Assignments	25	42.40%
Enhance the Quality of Writing	36	37.60%
Solve Problems	42	32.90%
Complete Home Exams	26	30.60%
Proofread and Edited Writing	39	29.40%
Code	28	25.90%
Translation	22	23.50%
Books Identification	2	2.40%
Generate New Scientific Problems	1	1.20%
Study Topics of College Exams	1	1.20%
Error Resolution	1	1.20%
Problem-Solving	1	1.20%

Besides, the data reveals that students utilizing GenAI for solving problems (32.90%), home exams (30.60%), as well as to eases proofread and edit writing (29.40%), and study topics for college exams (1.20%). This integration across various activities advocates improvements in efficiency, productivity, and work quality. Similar findings were reported by other studies highlighting GenAI's ability to deliver personalized and adaptive learning experiences tailored to student' needs, preferences, and learning styles (Chan & Hu, 2023; Harry, 2023; Hosseini et al., 2023b).

4.5 Benefits and Challenges Higher Education Students Encounter While Using GenAI Tools

The survey data states various benefits of Gen AI in higher education. The tabular data exhibits eight statements capturing the benefits and to check whether students agree or disagree on the attributes of uses and access, time-saving, feedback and responses, problem solving and critical thinking, language ability enhancement, academic performance effect, learning engagement, and effect on confidence. The level of variability in the responses, indicating that majority of students agrees with the benefits, as over 44.70% of

students agree and 41.20% strongly agrees with the positive aspects of Gen AI tools. In context of access and uses more than 80% agreed, time-saving 38.80% agree and 45.90% strongly agrees, providing instant feedback 32.90% and 37% strongly agrees. It indicates from the student's point of view that Gen AI brings efficiency and effectiveness in their work. Crompton & Burke (2023) states that the Gen AI tools assist student in learning and management, with more than 50% of students responding positively to AI's ability to forecast one on one feedback.

Table5. *Perceived Benefits of Using GenAI Tools*

Benefit Category	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Ease of Access and Use	41.20%	44.70%	10.60%	2.40%	1.20%
Saving Time on Tasks	45.90%	38.80%	11.80%	2.40%	1.20%
Providing Instant Feedback	37.60%	32.90%	23.50%	4.70%	1.20%
Fostering Critical Thinking & Problem-Solving	17.60%	34.10%	30.60%	12.90%	4.70%
Enhancing General Language Ability	27.10%	37.60%	25.90%	7.10%	2.40%
Enhancing Academic Performance	21.70%	36.10%	28.90%	8.40%	4.80%
Improving Learning Engagement	20.00%	37.60%	32.90%	8.20%	1.20%
Increasing Confidence While Learning	22.40%	28.20%	34.10%	12.90%	2.40%

Majority of students (85.90%) either strongly agree or agree that generative AI is easy to access and use. This indicates that the technology is user-friendly and accessible to students, which is crucial for its widespread adoption. Over 84.70% of students agree or strongly agree that generative AI helps them save time on tasks. This suggests that AI tools are effective in streamlining academic activities, allowing students to focus on more critical aspects.

While 51.70% of students agree or strongly agree that generative AI fosters critical thinking and problem-solving, a notable (30.60%) remain neutral. This resembles with the findings of Zhou et al., (2024).This indicates that while AI has potential in this area, there may be room for improvement in how it is integrated into critical thinking exercises ChatGPT's high extensive capability in facilitating problem solving and academic research (Grájeda et al., 2024).

AI tools can make learning more interactive and engaging, which is essential for maintaining student interest and motivation as 57.60% of students agree or strongly agree that generative AI improves their learning engagement. Overall, this highlights the need for equitable access to educational technologies. As noted in the study, particularly in terms of ease of access, time-saving, and providing instant feedback. The area fosters in such critical thinking and increasing confidence and brings a effectiveness in the life of students who are using Gen AI.

Table6. *Perceived Challenges of Using GenAI Tools*

Challenge	Strongly Agree	Agree	Disagree	Strongly Disagree	Neutral
Requires a fast internet connection	9.40%	28.20%	22.40%	3.50%	36.50%
Advanced features require subscription fees	24.70%	16.50%	25.90%	3.50%	29.40%
Poses risks to privacy and data security	9.40%	18.80%	24.70%	1.20%	45.90%
Sometimes provides unreliable information	14.30%	48.80%	13.10%	2.40%	21.40%
May include inaccurate or false references	11.90%	23.80%	20.20%	3.60%	40.50%
Can restrict learning autonomy and narrow learning experiences	11.80%	25.90%	21.20%	1.20%	40.00%
Reduces human-to-human interaction	12.90%	37.60%	10.60%	1.20%	37.60%
Leads to plagiarism and cheating	14.10%	23.50%	14.10%	1.20%	47.10%
May negatively impact learning in the future	11.80%	12.90%	27.10%	7.10%	41.20%

Respondent choose agree, indicating that internet speed can be a barrier for some but at most a textual work on Gen AI can be done in with a low speed of internet. Nearly half of the students 41.20% agree or strongly agree that advanced features of generative AI tools require subscription fees. This financial barrier can limit accessibility (Harry, 2023), especially for students from low-income backgrounds and on other hand more than 30% feels like no subscription was required as people find lope hole to perform task. 45.90% strongly disagree that generative AI poses risks to privacy and data security. However, 28.20% of students agree or strongly agree. Chan & Hu, (2023) reported that the key challenges of GenAI use include concerns about accuracy and transparency, privacy and ethical issues like plagiarism.

More than 63.10% agree or strongly agree that generative AI sometimes provides unreliable information. This suggests that while AI tools can be helpful, they may not always be accurate. As we need to give every minute detail about the search. A significant portion of students 40.50% strongly disagree that generative AI may include inaccurate or false references. However, 35.70% of students agree or strongly agree. Zhou, Zhang, & Chan, (2024) has also indicated that the reliability of AI-generated content can be a concern. Integration of Gen AI tools into the curriculum preserves and enhances, rather than diminishes, so more than 40% of the students stated that the opportunities for autonomous and multifaceted learning increases. Around 50.50% students agree or strongly agree that generative AI reduces human-to-human interaction. This highlights a potential downside of relying too heavily on AI tools for learning.

5. CONCLUSIONS

Overall, the Key findings disclose that 82.2% of higher education students frequently use GenAI tools. This is similar to the findings of Johnston et al., (2024) which reported high familiarity with ChatGPT among students. Though a significant section 17.8% remains non-users or rarely use GenAI tools due to a lack of knowledge or interest. Primarily used by students for clarifying the concept and summarize article, books or video related to academic context. Reflecting these concerns may be crucial for stimulating students for acceptance and adoption GenAI tools in their academic activities. The capabilities with student's education needs have been emphasized by TFF theory. The result of survey indicates that the students have potential to enhance understanding, learning and research processing.

Regardless of study valuable insights, faced several limitations. It is important to note that the majority of our sample include male and students from Management background which generally potentially limiting generalizability of our findings. This can theoretically misrepresent the view of female students and students who are from non-management background. This explicit institutional context (policies, infrastructure) also impacts findings and affecting transferability. The cross-sectional nature of study provides a snapshot in time and without exploring evolution of student perception as they gain experience with GenAI.

Further research should implement more longitudinal studies to better understand how student's perception and experiences with GenAI evolve over a period of time and across diverse institution settings. Crucially, research must also monitor the rapid advancement in GenAI to maintain ongoing relevance and applicability of research findings.

REFERENCES

[1] Akgun, S., & Greenhow, C. (2022). Artificial intelligence in education: Addressing ethical challenges in K-12 settings. AI and Ethics, 2(3), 431–440. https://doi.org/10.1007/s43681-021-00096-7

[2] Almassaad, A., Alajlan, H., & Alebaikan, R. (2024). Student Perceptions of Generative Artificial Intelligence: Investigating Utilization, Benefits, and Challenges in Higher Education. Systems, 12(10), Article 10. https://doi.org/10.3390/systems12100385

[3] Basit, T. N. (2010). Conducting Research in Educational Contexts. Bloomsbury Academic.

[4] Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. International Journal of Educational Technology in Higher Education, 20(1), 43. https://doi.org/10.1186/s41239-023-00411-8

[5] Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. International Journal of Educational Technology in Higher Education, 20(1), 22. https://doi.org/10.1186/s41239-023-00392-8

[6] Grájeda, A., Burgos, J., Córdova, P., & Sanjinés, A. (2024). Assessing student-perceived impact of using artificial intelligence tools: Construction of a synthetic index of application in higher education. Cogent Education, 11(1), 2287917. https://doi.org/10.1080/2331186X.2023.2287917

[7] Harry, A. (2023). Role of AI in Education. Injuruty: Interdiciplinary Journal and Humanity, 2(3). https://radensa.ru/wp-content/uploads/2024/05/Role_of_AI_in_Education.pdf

[8] Hosseini, M., Gao, C. A., Liebovitz, D. M., Carvalho, A. M., Ahmad, F. S., Luo, Y., MacDonald, N., Holmes, K. L., & Kho, A. (2023a). An exploratory survey about using ChatGPT in education, healthcare, and research. PLOS ONE, 18(10), e0292216. https://doi.org/10.1371/journal.pone.0292216

[9] Hosseini, M., Gao, C. A., Liebovitz, D. M., Carvalho, A. M., Ahmad, F. S., Luo, Y., MacDonald, N., Holmes, K. L., & Kho, A. (2023b). An exploratory survey about using ChatGPT in education, healthcare, and research. PLOS ONE, 18(10), e0292216. https://doi.org/10.1371/journal.pone.0292216

[10] Hwang, G.-J., & Tu, Y.-F. (2021). Roles and Research Trends of Artificial Intelligence in Mathematics Education: A Bibliometric Mapping Analysis and Systematic Review. Mathematics, 9(6), Article 6. https://doi.org/10.3390/math9060584

[11] Ismail, F., Tan, E., Rudolph, J., Crawford, J., & Tan, S. (2023). Artificial intelligence in higher education. A protocol paper for a systematic literature review. Journal of Applied Learning and Teaching, 6(2), Article 2. https://doi.org/10.37074/jalt.2023.6.2.34

[12] Johnston, H., Wells, R. F., Shanks, E. M., Boey, T., & Parsons, B. N. (2024). Student perspectives on the use of generative artificial intelligence technologies in higher education. International Journal for Educational Integrity, 20(1), Article 1. https://doi.org/10.1007/s40979-024-00149-4

[13] Liang, J.-C., Hwang, G.-J., Chen, M.-R. A., & Darmawansah, D. (2023). Roles and research foci of artificial intelligence in language education: An integrated bibliographic analysis and systematic review approach. Interactive Learning Environments, 31(7), 4270–4296. https://doi.org/10.1080/10494820.2021.1958348

[14] Miao, Fengchun & Holmes, Wayne. (2023). Guidance for generative AI in education and research—UNESCO Digital Library. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000386693

[15] Ouyang, F., Zheng, L., & Pengcheng Jiao. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. Education and Information Technologies, 27. https://link.springer.com/article/10.1007/s10639-022-10925-9

[16] Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education | Research and Practice in Technology Enhanced Learning | Full Text. Research and Practice in Technology Enhanced Learning, 12. https://telrp.springeropen.com/articles/10.1186/s41039-017-0062-8

[17] Russell, S. J., & Norvig, P. (2003). Artificial Intelligence—A Modern Approach (2nd ed.). Pearson Education.

[18] Shukla, A. K., Muhuri, P. K., & Abraham, A. (2020). A bibliometric analysis and cutting-edge overview on fuzzy techniques in Big Data. Engineering Applications of Artificial Intelligence, 92, 103625. https://doi.org/10.1016/j.engappai.2020.103625

[19] Winkler-Schwartz, A., Yilmaz, R., Mirchi, N., Bissonnette, V., Ledwos, N., Siyar, S., Azarnoush, H., Karlik, B., & Del Maestro, R. (2019). Machine Learning Identification of Surgical and Operative Factors Associated With Surgical Expertise in Virtual Reality Simulation. JAMA Network Open, 2(8), e198363. https://doi.org/10.1001/jamanetworkopen.2019.8363

[20] Zhou, X., Zhang, J., & Chan, C. (2024a). Unveiling students' experiences and perceptions of Artificial Intelligence usage in higher education. Journal of University Teaching and Learning Practice. https://doi.org/10.53761/xzjprb23

[21] Zhou, X., Zhang, J., & Chan, C. (2024b). Unveiling students' experiences and perceptions of Artificial Intelligence usage in higher education. Journal of University Teaching and Learning Practice. https://doi.org/10.53761/xzjprb23

Citation: *Dr. Syed Aulia Mohiuddin et., al (2025). "A Study on the Utilization of Generative Artificial Intelligence Tools Among Students of Higher Education in India". International Journal of Research Studies in Computer Science and Engineering (IJRSCSE), vol 11, no. 2, 2025, pp. 12-22. DOI: https://doi.org/10.20431/2349-4859.1102002.*