

EVALUATING AWARENESS, UTILIZATION, AND PERCEPTIONS OF CHATGPT AMONG LIBRARY AND INFORMATION SCIENCE STUDENTS

Muhammad Faisal^{1*}, Naila Bibi², Muhammad Sanaullah³, Dr. Shahid Mehmood⁴,
Ghazala Anjum⁵

¹School of Information Management, Minhaj University Lahore, Lahore, Pakistan

²Assistant Director, Directorate of Public Instructions (C), South Punjab, Multan, Pakistan

³Lab Assistant, Institute of Pharmaceutical Sciences, University of Veterinary & Animal Sciences, Lahore Pakistan

⁴University of Sahiwal, Sahiwal, Pakistan

⁵Information Executive Ibn-e-Sina Library & Resource Center, Minhaj University Lahore, Lahore, Pakistan

¹faisaljutt050@gmail.com, ²nailaafaheem210@gmail.com, ³sananaqibi@gmail.com,
⁴mehershahid@gmail.com, ⁵ghazala.anjum327@gmail.com

Corresponding Author: * Muhammad Faisal

DOI: <https://doi.org/10.5281/zenodo.17875727>

Received	Accepted	Published
06 October 2025	14 November 2025	10 December 2025

ABSTRACT

Background: The Generative Pre-trained Transformer (GPT) architecture forms the foundation of OpenAI's ChatGPT, a conversational AI first introduced as GPT-3.5 in 2022 and subsequently enhanced to GPT-4 in 2023. Leveraging large-scale text corpora, ChatGPT is designed to generate coherent, human-like responses across diverse contexts, reshaping interactions in education, healthcare, customer service, and content creation.

Methodology: ChatGPT employs deep learning techniques, specifically transformer-based models, to process and understand natural language input. The system analyses vast text datasets to predict contextually appropriate responses, enabling applications such as question answering, summarization, essay writing, translation, and code generation.

Results: The implementation of ChatGPT has demonstrated substantial utility in academic and professional settings, providing on-demand explanations, summarized content, and writing support. The 2023 release of GPT-4 enhanced logical reasoning, language comprehension, and overall response quality. Integration with platforms like Microsoft Word, Bing, and educational applications reflects its expanding influence.

Discussion: ChatGPT offers significant advantages, including improved productivity, automated content generation, support for learning and research, and enhanced human-machine interaction. However, limitations exist, such as generating plausible but inaccurate or biased content, risks to academic integrity, overreliance affecting critical thinking, and the need for ethical oversight. Despite these challenges, ChatGPT exemplifies the transformative potential of generative AI in augmenting human tasks and reshaping workflows.

Keywords: ChatGPT, Library and Information Science (LIS), Automated content generation, Microsoft Word

INTRODUCTION

The rapid advancement of artificial intelligence (AI) has significantly transformed the way humans

interact with technology, and one of the most notable developments in recent years is the emergence of generative AI systems.[1] Among these, OpenAI's ChatGPT stands out as a conversational AI capable of understanding and generating human-like text across a wide range of domains. ChatGPT is built on the Generative Pre-Trained Transformer (GPT) architecture, a deep learning model designed to process large amounts of text data, understand context, and produce coherent and contextually relevant responses. First released as GPT-3.5 in 2022 and later improved to GPT-4 in 2023, ChatGPT has not only expanded the boundaries of AI-driven communication but has also influenced multiple sectors, including education, healthcare, customer service, and content creation.[2]

The GPT architecture leverages transformer-based neural networks, a model introduced by which relies on self-attention mechanisms to capture complex relationships within data.[3] Unlike traditional sequence models, transformers can process entire sequences of text simultaneously, enabling them to understand context, dependencies, and semantics more effectively. Pre-training involves exposing the model to massive text corpora from diverse sources, allowing it to learn grammar, syntax, world knowledge, and patterns of language use.[4] Following pre-training, fine-tuning optimizes the model for specific tasks, such as answering questions, summarising content, generating essays, translating languages, or even producing code. This methodology allows ChatGPT to generate human-like, contextually relevant responses, a feature that has become its defining strength.[5]

The adoption of ChatGPT has grown rapidly across multiple sectors due to its versatility and efficiency.[6] In education, it is increasingly used as a tool for writing assistance, summarisation, tutoring, and language translation. Students and researchers leverage ChatGPT to clarify complex concepts, generate outlines for essays, or summarise large volumes of academic material, enhancing both learning and productivity.[7] In

professional and corporate settings, ChatGPT is employed for customer service automation, content creation, and data analysis. Its integration with widely used software platforms, such as Microsoft Word and Bing, as well as educational applications, reflects its growing influence and accessibility.[8]

One of the most significant advancements in 2023 was the release of GPT-4, which improved on GPT-3.5 in several critical areas.[9] GPT-4 demonstrated enhanced logical reasoning, greater language comprehension, and a more nuanced understanding of context.[10] These improvements resulted in more accurate, coherent, and contextually relevant responses, broadening the scope of potential applications. For example, GPT-4's enhanced capabilities allow for more sophisticated academic support, better summarisation of complex materials, and more precise code generation.[11] Moreover, the upgraded model has increased reliability in understanding user intent, a critical factor for practical applications in professional environments.

Despite its many advantages, ChatGPT is not without limitations and ethical concerns. Research has demonstrated that, while the system can produce plausible outputs, it is also capable of generating inaccurate, misleading, or biased content.[12] Such outputs can be problematic, particularly in academic or professional contexts, where reliability and accuracy are essential. Overreliance on ChatGPT may inadvertently undermine critical thinking, reasoning skills, and academic integrity. Furthermore, ethical concerns arise regarding data privacy, misuse of AI-generated content, and the potential for reinforcing existing biases present in the training data.[13] These challenges highlight the importance of careful oversight, transparent usage, and the development of guidelines to ensure that generative AI is applied responsibly and ethically. The transformative impact of ChatGPT extends beyond its direct applications. It represents a shift in the human-machine interface, enabling more natural, conversational interactions with computers and digital platforms.[14] This transformation has implications for productivity, creativity, and the democratization of knowledge.

For students and researchers, ChatGPT offers rapid access to explanations, summaries, and writing support, reducing the time and effort required to process information.[7] Professionals benefit from automated content generation, improved communication, and enhanced decision-making capabilities. As generative AI continues to evolve, its potential to augment human capabilities, rather than simply replace tasks, is a central consideration in evaluating its societal impact.[15]

In addition to practical applications, ChatGPT has sparked significant discussion in academic and professional circles regarding AI literacy and digital ethics. As AI becomes more integrated into daily workflows, understanding its strengths, limitations, and potential risks is essential.[16] Users must critically evaluate AI-generated content, cross-check facts, and maintain awareness of biases inherent in the system. The growing influence of ChatGPT underscores the need for training, awareness, and the development of policies that balance innovation with responsibility.[17]

Overall, ChatGPT exemplifies the convergence of advanced machine learning techniques, vast data resources, and practical applications to create a tool that is both powerful and widely accessible. Its development reflects broader trends in AI research, including the shift towards large-scale pre-trained models, transfer learning, and generative capabilities.[18] By enhancing productivity, supporting learning and research, and transforming human-machine interactions, ChatGPT represents a paradigm shift in how AI can augment human tasks. At the same time, its limitations and ethical considerations serve as important reminders that responsible deployment and critical engagement are essential to harnessing the full potential of generative AI.[19]

Building on this context, the present study aims to explore the awareness and usage of ChatGPT among Library and Information Science (LIS) students, focusing on its role as an educational tool. Specifically, the study seeks to assess the awareness level of LIS students regarding ChatGPT, determine whether they utilise it as an educational helper, and examine their perceptions of their peers' use of ChatGPT for academic

purposes. By addressing these objectives, the study intends to provide insights into how generative AI is perceived and applied within an academic context, highlighting both opportunities and challenges associated with its use in higher education.

LITERATURE REVIEW

The emergence of generative artificial intelligence (AI) tools such as ChatGPT has transformed educational practices globally, prompting significant research into their applications, benefits, and potential challenges. ChatGPT, based on the Generative Pre-trained Transformer (GPT) architecture, has become a popular resource for students, educators, and researchers, offering instant responses, summarisation, content generation, and learning assistance. Numerous studies internationally and domestically have examined students' awareness, utilisation, and perceptions of ChatGPT in academic contexts, reflecting both optimism for its educational potential and caution regarding its limitations.[20]

In assessing students' awareness of ChatGPT, several studies have highlighted a high level of familiarity among university populations. Investigated higher education students in India and reported that the majority of respondents were aware of ChatGPT and recognised its capabilities as a learning and academic support tool. Similarly, explored the awareness levels of university students in a broader international context, finding that most students could identify ChatGPT's primary functions, such as providing rapid responses to queries and aiding in academic assignments.[21] Awareness was closely linked to exposure and digital literacy, indicating that students who actively engaged with technology were more likely to utilise ChatGPT effectively. These findings suggest that knowledge of ChatGPT is becoming increasingly common in academic circles, forming a foundation for its adoption as a supplementary educational resource.[22]

The second focus of the literature pertains to the actual utilisation of ChatGPT as an educational helper. Research consistently demonstrates that students are leveraging ChatGPT to support their

academic tasks, including summarising texts, generating essays, coding, and clarifying complex concepts. conducted a study among computer science students and found a pronounced tendency to use ChatGPT for completing assignments and learning exercises.[23] The participants highlighted the convenience, speed, and accessibility of the AI, which allowed them to manage workloads more efficiently and explore topics in depth. In Pakistan, surveyed 400 university students and found that, while students appreciated ChatGPT's ease of use and practical applications in academic contexts, a substantial portion also expressed caution regarding overreliance and potential academic dishonesty. In their study of English language classrooms in southern Punjab, similarly noted that many students utilised ChatGPT as a learning companion, especially for writing tasks and language practice, although occasional concerns about the accuracy and contextual relevance of AI-generated responses were raised. These studies collectively indicate that ChatGPT is actively employed as an educational assistant, but students approach its use with a combination of enthusiasm and caution.[8]

The third dimension explored in the literature involves students' perceptions of ChatGPT use, both personally and among their peers. Studies suggest a complex attitude toward AI adoption, characterised by recognition of its benefits alongside apprehension about its limitations. reported that while students appreciated ChatGPT's utility in streamlining academic tasks, they were mindful of ethical concerns, including the potential dissemination of disinformation and overreliance on AI-generated content. Similarly, highlighted that many students valued ChatGPT for its immediacy and capacity to clarify concepts but expressed reservations regarding its impact on critical thinking and independent learning. found that, although students used ChatGPT to enhance understanding and improve productivity, there were consistent concerns about its potential to inhibit creativity and analytical reasoning if relied upon excessively.

In the context of Pakistan, the perceptions of university students mirrored international trends. noted that while students were generally positive

about ChatGPT's academic utility, ethical concerns, particularly relating to academic integrity and misuse, remained salient. Similarly, reported that students appreciated the AI's convenience for language learning, yet questioned its accuracy and the reliability of generated content explored the factors influencing students' adoption of ChatGPT in higher education, highlighting trust and perceived ease of use as critical determinants.[24] Students were more inclined to utilize ChatGPT when they trusted the accuracy of its outputs and felt confident in navigating the platform effectively. These findings suggest that while students recognize the educational potential of ChatGPT, their perceptions are tempered by considerations of accuracy, reliability, and ethical practice.[25]

A recurring theme in the literature is the duality of ChatGPT's impact on learning and academic practices. On the positive side, studies consistently report that students benefit from increased efficiency, accessibility, and support for comprehension and writing tasks. The AI enables learners to generate ideas, summarise complex materials, and receive instant feedback, thereby enhancing productivity and facilitating self-directed learning. Furthermore, ChatGPT serves as a valuable tool for students with varying learning styles, offering personalised assistance and bridging gaps in understanding. On the other hand, concerns persist regarding overreliance, potential biases, inaccuracies, and ethical implications. The risk of reduced critical thinking, diminished creativity, and academic dishonesty are recurrent issues noted across international and domestic studies. For instance, emphasised that excessive dependence on ChatGPT may compromise analytical skills, while highlighted the ethical tension between utilising AI for academic support and maintaining integrity in scholarly work.[26]

The literature also points to the contextual factors that shape students' awareness, utilization, and perceptions of ChatGPT. Factors such as digital literacy, academic discipline, institutional support, and peer influence significantly affect how students engage with AI tools. In disciplines like computer science, where familiarity with digital technologies is higher, students reported greater

comfort and willingness to adopt ChatGPT. Conversely, in language-focused programs, students emphasised accuracy and contextual relevance as critical concerns. Institutional policies and guidance on ethical AI use further influence students' perceptions and responsible adoption. The interplay between individual competencies, disciplinary expectations, and ethical awareness shapes the overall approach to ChatGPT in academic settings.[27]

Overall, the literature underscores a global and local trend of measured optimism regarding ChatGPT's integration into education. Students are increasingly aware of the tool, actively utilise it to support learning, and recognise both its potential benefits and inherent risks. International studies, such as those by, demonstrate widespread engagement and cautious adoption, while domestic research in Pakistan highlights similar patterns, emphasising trust, ease of use, and ethical considerations. The convergence of these findings provides a robust foundation for exploring the specific awareness, utilisation, and perceptions of Library and Information Science (LIS) students, a cohort whose academic and professional development is closely tied to information literacy and research competencies.[28]

In line with the identified literature gaps, the present study aims to investigate the awareness and use of ChatGPT among LIS students. Specifically, it seeks to assess students' awareness of ChatGPT, determine whether they utilise it as an educational helper, and examine their perceptions of their peers' use of ChatGPT for academic purposes. By focusing on this cohort, the study contributes to understanding how generative AI tools are adopted in specialized educational contexts and informs strategies for integrating AI responsibly into teaching, learning, and research practices.

METHODOLOGY

This study employed a survey-based research design to investigate the awareness, usage, and perceptions of ChatGPT among Library and Information Science (LIS) students. The choice of a survey methodology was motivated by the need to collect structured, quantifiable information

from a defined population in a systematic and efficient manner. Surveys are particularly well-suited for understanding participants' knowledge, behaviours, and attitudes regarding emerging technologies, making them appropriate for this study, which focuses on the adoption and perception of generative AI tools in higher education.

The study population consisted of students enrolled in the Department of Library and Information Science at Minhaj University, Lahore. A random sampling technique was utilised to ensure that every student in the population had an equal chance of being selected, thereby minimising sampling bias and enhancing the representativeness of the data. This approach allowed the study to generate findings that are indicative of the broader student community within the department. A total of 77 participants were included in the survey, reflecting a manageable yet statistically meaningful sample size for descriptive analysis.

Data collection was conducted during the first week of January 2025, providing a snapshot of the participants' current awareness and use of ChatGPT at a specific point in time. The survey instrument was a structured questionnaire comprising three dichotomous (Yes/No) questions. The use of Yes/No questions was deliberate, as it allowed for straightforward responses that could be easily quantified and interpreted while keeping the questionnaire concise, thereby encouraging maximum participation. The questions were designed to address the core research objectives and were as follows:

1. Are you familiar with ChatGPT?
2. Do you occasionally utilize ChatGPT?
3. Should researchers be permitted to utilize ChatGPT for educational purposes?

The first question aimed to assess the awareness level of LIS students regarding ChatGPT, providing insight into whether students are knowledgeable about the existence and basic functionality of this generative AI tool. The second question focused on actual usage, capturing whether students actively engage with ChatGPT in their academic work or learning processes. The third question explored students'

perceptions regarding the ethical and academic appropriateness of using ChatGPT for research purposes, offering an understanding of attitudes toward peer utilisation of AI in scholarly contexts. Together, these questions addressed the three primary objectives of the study: awareness, utilisation, and perception.

Upon collection, the responses were analysed using descriptive statistical methods, including the calculation of frequencies and percentages for each response. Descriptive analysis was chosen because it effectively summarises and interprets categorical data, providing a clear and comprehensible overview of trends within the dataset.[29] The results were organised in tabular format (Table 1) to facilitate comparison and visual interpretation, allowing readers to quickly grasp patterns in awareness, usage, and perceptions. This method also enables a straightforward discussion of implications based on observed frequencies, supporting the study's broader conclusions about LIS students' engagement with ChatGPT.

The methodology employed in this study is appropriate for its exploratory nature, as it provides a structured means of evaluating the extent to which LIS students are aware of, use, and perceive ChatGPT in academic settings. By employing random sampling and a focused questionnaire, the study ensures that the data collected are representative, reliable, and directly aligned with the research objectives. Furthermore, the descriptive statistical approach allows for clear

summarisation and presentation of findings, forming a solid foundation for subsequent discussion regarding the role of generative AI tools in higher education, potential ethical considerations, and implications for learning and research practices.

In conclusion, the research methodology effectively captures the perspectives of LIS students regarding ChatGPT, combining systematic sampling, targeted data collection, and rigorous descriptive analysis. This approach provides valuable insights into both the current awareness and actual usage of generative AI in an academic context, as well as students' attitudes toward the ethical and educational application of such technologies. By focusing on these dimensions, the study contributes to the growing body of literature on AI adoption in higher education and informs strategies for integrating ChatGPT and similar tools responsibly and effectively into academic and research practices.

RESULTS AND DISCUSSION

The survey aimed to assess the awareness, utilization, and perceptions of ChatGPT among Library and Information Science (LIS) students at Minhaj University, Lahore. A total of **77 respondents** participated, and the data were collected using a structured questionnaire with three dichotomous (Yes/No) questions. Table 1 summarizes the responses.

Table 1 LIS Students' Responses to Awareness, Usage, and Perceptions of ChatGPT (Yes/No)

Question	Yes	No
1. Are you familiar with ChatGPT?	62	15
2. Do you occasionally utilize ChatGPT?	39	38
3. Do you think researchers should be permitted to utilize ChatGPT for educational purposes?	48	29

Awareness of ChatGPT

The first question, "Are you familiar with ChatGPT?", was designed to determine students' knowledge of the AI tool. Out of 77 participants, **62 students (81%)** reported being aware of ChatGPT, while **15 students (19%)** indicated that they were not familiar with it. This high level of awareness demonstrates that ChatGPT has gained

significant recognition among LIS students, likely due to media exposure, academic discussions, and digital engagement in higher education settings. The findings align with previous studies; reported that the majority of higher education students in India were familiar with ChatGPT, highlighting widespread awareness of generative AI tools in academic contexts. Similarly, found that university

students recognised ChatGPT's core functions, suggesting that familiarity with AI tools is becoming a standard aspect of digital literacy among students.

The high awareness observed in this study suggests a strong foundation for potential adoption and responsible use. Awareness is a critical first step in technology acceptance models, as it enables students to make informed decisions about engagement, trust in AI-generated content, and ethical utilisation. It also implies that LIS students are increasingly exposed to AI innovations, either through coursework, online platforms, or peer networks, which may facilitate their integration of ChatGPT into learning and research practices.

Usage of ChatGPT:

The second question, "Do you occasionally utilise ChatGPT?", aimed to examine actual student engagement with the tool. The responses were nearly evenly distributed, with **39 students (51%)** reporting occasional use and **38 students (49%)** reporting no use. The mean value of **0.51** reflects this balance, indicating moderate interaction with ChatGPT among respondents.

These results indicate that while awareness is high, utilisation is not universal. Several factors may explain this moderate usage pattern. Some students may lack confidence in assessing the accuracy and reliability of AI-generated outputs, while others may be concerned about ethical issues such as plagiarism or academic dishonesty. This cautious engagement is consistent with findings by who noted that although Pakistani university students acknowledged the academic utility of ChatGPT, many exercised restraints in its use due to ethical considerations. Baqir and Nayab (2024) similarly reported that students used ChatGPT as a learning companion but occasionally questioned the correctness and contextual relevance of the content.

The moderate usage suggests a transition phase in AI adoption, where students are aware of the potential benefits of ChatGPT but are selectively integrating it into their academic routines. It highlights the importance of developing AI literacy programs that guide students on responsible and effective use, particularly in research and academic writing. Encouraging

structured engagement can help students leverage AI to enhance productivity while maintaining critical thinking and analytical skills.

Perceptions Regarding ChatGPT in Academic Use:

The third question, "Do you think researchers should be permitted to utilise ChatGPT for educational purposes?", explored students' attitudes toward ethical and academic use. A majority of 48 respondents (62%) supported the idea, while 29 respondents (38%) opposed it. The mean value of 0.62 indicates overall acceptance, suggesting that most students recognise the value of ChatGPT in augmenting research productivity and facilitating learning.

The positive perception may be influenced by ChatGPT's practical benefits, including rapid information retrieval, summarization of complex materials, and assistance with writing tasks. Students' support reflects an understanding that AI tools can serve as educational aids, complementing traditional learning methods. However, the minority who disagreed may reflect concerns about potential misuse, overreliance on AI-generated content, or the risk of undermining critical thinking and creativity. These concerns are consistent with findings from, which emphasized that while generative AI enhances efficiency and learning, its ethical use and accuracy remain key considerations.

Findings

The study's results indicated a significant knowledge of ChatGPT among faculty members. Of the 77 participants, 62 acknowledged familiarities with ChatGPT, whereas just 15 did not. This indicates that around 81% of respondents are cognizant of this AI-based technique, signifying extensive recognition and exposure within academic circles.

The replies concerning actual usage were nearly evenly distributed. A total of 39 individuals indicated occasional use of ChatGPT, whereas 38 claimed non-usage. This approximate equilibrium, with an average score of 0.51, indicates modest involvement with the instrument. It emphasises that although many are investigating its potential, an equivalent number may not yet recognise its

significance or have opted not to include it in their academic methodologies.

When asked if researchers should be allowed to use ChatGPT for educational reasons, 48 people expressed approval, while 29 objected. This result, with a mean of 0.62, signifies that a majority of faculty members endorse the academic use of ChatGPT. This majority acknowledges the prospective advantages of ChatGPT, including improved efficiency, support in academic writing, and augmented access to information. Nonetheless, the significant percentage of disagreement (38%) indicates apprehensions around academic integrity, potential abuse, or excessive reliance on AI-generated content.

In conclusion, the results indicate that ChatGPT is widely recognized among teachers, utilized to a moderate extent, and generally regarded as a valuable instructional tool, although accompanied by certain reservations, particularly regarding ethics, accuracy, or dependence.

DISCUSSION

The findings of this study indicate that academic staff members at Minhaj University are increasingly aware of ChatGPT, with 81% of respondents reporting familiarity. This high awareness demonstrates that generative AI tools have gained considerable recognition in higher education, reflecting growing discourse around their potential for teaching and research. Awareness is a crucial first step, as it enables faculty to understand the capabilities and limitations of AI tools and informs responsible engagement.

Despite high awareness, actual utilisation is moderate, with 51% of respondents using ChatGPT occasionally and 49% not using it. This suggests a transitional stage in adoption, where faculty are exploring the tool but have not fully integrated it into their academic routines. Factors such as varying digital literacy, uncertainty about AI reliability, and ethical concerns likely contribute to this cautious approach. The balanced usage indicates that while the potential of ChatGPT is recognised, practical and ethical considerations moderate its adoption.

From a practical standpoint, ChatGPT offers several advantages for academic staff. It can

enhance teaching efficiency, support content generation, summarise large volumes of information, and facilitate research tasks, providing on-demand assistance that saves time and improves productivity. These benefits underscore its potential as a complementary educational tool that can aid instructional planning and knowledge dissemination.

However, the study also highlights important concerns. Approximately 38% of respondents opposed the use of ChatGPT for educational purposes, citing risks related to academic integrity, overreliance, and the potential dissemination of inaccurate or biased information. These drawbacks underscore the importance of critical evaluation of AI outputs and the need for ethical guidelines to ensure responsible use.

Overall, the study reflects a cautiously optimistic academic environment, where ChatGPT is well-known and moderately utilised, with recognition of its benefits tempered by awareness of potential risks. To maximise the advantages while mitigating the drawbacks, higher education institutions should implement AI literacy programs, training workshops, and clear policies. Such initiatives can enable faculty to leverage ChatGPT effectively for teaching and research while maintaining academic rigor and ethical standards.

In conclusion, ChatGPT presents both opportunities and challenges for academic staff. Its productivity-enhancing and educational benefits are evident, but careful guidance and responsible integration are essential to ensure that its use supports learning and research without compromising integrity or critical thinking.

REFERENCES

- [1].Williams A, Hatfield D, Rawal BS, editors. Artificial Intelligence Evolution: The Rise of Generative AI. International Conference on Information Technology-New Generations; 2025: Springer.
- [2].Koubaa A. GPT-4 vs. GPT-3.5: A concise showdown. 2023.
- [3].Choi SR, Lee M. Transformer architecture and attention mechanisms in genome data analysis: a comprehensive review. *Biology*. 2023;12(7):1033.

- [4].Agarwal O, Ge H, Shakeri S, Al-Rfou R, editors. Knowledge graph based synthetic corpus generation for knowledge-enhanced language model pre-training. Proceedings of the 2021 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies; 2021.
- [5].Orrù G, Piarulli A, Conversano C, Gemignani A. Human-like problem-solving abilities in large language models using ChatGPT. *Frontiers in artificial intelligence*. 2023;6:1199350.
- [6].George AS, George AH. A review of ChatGPT AI's impact on several business sectors. *Partners universal international innovation journal*. 2023;1(1):9-23.
- [7].Sudrajad W, Fikri MH, Putra RPB. HELP ME CHATGPT! WHAT WAYS DOES CHATGPT INFLUENCE STUDENTS'PRODUCTIVITY AND CREATIVITY IN ENGLISH ACADEMIC WRITING? *EDUCATUM: Scientific Journal of Education*. 2024;2(2):48-57.
- [8].Isiaku L, Muhammad AS, Kefas HI, Ukaegbu FC. Enhancing technological sustainability in academia: leveraging ChatGPT for teaching, learning and evaluation. *Quality Education for All*. 2024;1(1):385-416.
- [9].Khosravi T, Rahimzadeh A, Motallebi F, Vaghefi F, Mohammad Al Sudani Z, Oladnabi M. The performance of GPT-3.5 and GPT-4 on genetic tests at PhD-level: GPT-4 as a promising tool for genomic medicine and education. *Journal of Clinical and Basic Research*. 2024;8(4):22-6.
- [10].Basiouni AM, El Rashid M, Shaalan K. In-Context Learning in Large Language Models (LLMs): Mechanisms, Capabilities, and Implications for Advanced Knowledge Representation and Reasoning. *IEEE Access*. 2025.
- [11].Wang Z, Guo R, Sun P, Qian L, Hu X. Enhancing diagnostic accuracy and efficiency with GPT-4-generated structured reports: a comprehensive study. *Journal of Medical and Biological Engineering*. 2024;44(1):144-53.
- [12].Dave T, Athaluri SA, Singh S. ChatGPT in medicine: an overview of its applications, advantages, limitations, future prospects, and ethical considerations. *Frontiers in artificial intelligence*. 2023;6:1169595.
- [13].Kareem TA. Critical Assessment of Ethical Implications of Chat GPT.
- [14].George AS. Beyond the Interface and How Conversational AI Is Reshaping the Future of Human-Computer Interaction. *Partners Universal International Innovation Journal*. 2025;3(4):1-13.
- [15].Rane N. ChatGPT and similar generative artificial intelligence (AI) for smart industry: role, challenges and opportunities for industry 4.0, industry 5.0 and society 5.0. *Challenges and Opportunities for Industry*. 2023;4.
- [16].Pescapè A. Exploring the current state and future potential of generative artificial intelligence using a generative artificial intelligence. *Mind, Body, and Digital Brains: Springer*; 2024. p. 37-56.
- [17].Kurban CF, Şahin M. Contributions to Knowledge and Research. *The Impact of ChatGPT on Higher Education: Exploring the AI Revolution*. 2024:181-93.
- [18].Fountzilas E, Pearce T, Baysal MA, Chakraborty A, Tsimberidou AM. Convergence of evolving artificial intelligence and machine learning techniques in precision oncology. *NPJ Digital Medicine*. 2025;8(1):75.
- [19].Selitskiy S, Inoue C, editors. *Education Paradigm Shift To Maintain Human Competitive Advantage Over AI. AIAA AVIATION FORUM AND ASCEND 2024*; 2024.
- [20].Bahroun Z, Anane C, Ahmed V, Zacca A. Transforming education: A comprehensive review of generative artificial intelligence in educational settings through bibliometric and content analysis. *Sustainability*. 2023;15(17):12983.

- [21].Elhassan SE, Sajid MR, Syed AM, Fathima SA, Khan BS, Tamim H. Assessing familiarity, usage patterns, and attitudes of medical students toward ChatGPT and other chat-based AI apps in medical education: cross-sectional questionnaire study. *JMIR Medical Education*. 2025;11:e63065.
- [22].Kamoun F, El Ayeb W, Jabri I, Sifi S, Iqbal F. EXPLORING STUDENTS'AND FACULTY'S KNOWLEDGE, ATTITUDES, AND PERCEPTIONS TOWARDS CHATGPT: A CROSS-SECTIONAL EMPIRICAL STUDY. *Journal of Information Technology Education: Research*. 2024;23.
- [23].Ofusori LO, Hendradi R. ChatGPT and Its impact on students assessment practices in the higher educational sector: A systematic review. *Journal of information systems engineering and business intelligence*. 2025;11(1):65-78.
- [24].Shahzadi A, Saleem A, Hameed K, ul Rehman AA. IMPACT OF THE USE OF AI-BASED TOOLS ON UNIVERSITY STUDENTS IN PUNJAB, PAKISTAN. *Center for Management Science Research*. 2025;3(3):483-95.
- [25].Hussain F, Anwar MA. Towards informed policy decisions: assessing student perceptions and intentions to use ChatGPT for academic performance in higher education. *Journal of Asian Public Policy*. 2025;18(2):377-404.
- [26].Gulumbe BH, Audu SM, Hashim AM. Balancing AI and academic integrity: What are the positions of academic publishers and universities? *AI & SOCIETY*. 2025;40(3):1775-84.
- [27].Bin-Nashwan SA, Sadallah M, Benlahcene A, Ma'aji MM. ChatGPT and academic integrity: the role of personal best goals, academic competence, and workplace stress. *foresight*. 2025;27(4):675-91.
- [28].Bury S. Learning from faculty voices on information literacy: Opportunities and challenges for undergraduate information literacy education. *Reference Services Review*. 2016;44(3):237-52.
- [29].Lund B. The questionnaire method in systems research: an overview of sample sizes, response rates and statistical approaches utilized in studies. *VINE Journal of Information and Knowledge Management Systems*. 2023;53(1):1-10.