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Students' Perceptions of ChatGPT in Education: A Rapid Systematic Literature Review

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Abstract. This research explains the perceptions of university students regarding the use of ChatGPT in their learning and research. The research is based on evidence provided in articles that were considered in a systematic literature review using the PRISMA model. The motivation for this study was informed by a realization that there are limited studies that provide a comprehensive understanding of students' perceptions regarding the use of ChatGPT in learning and research. Many existing studies either focus on educators' perceptions or isolated cases of empirical studies. It is therefore not clear what factors influence students' adoption of ChatGPT. This gap was addressed by this study by conducting a systematic literature review to identify factors influencing the adoption of ChatGPT, the positive impact of ChatGPT on students' education and the concerns raised by students regarding the integration of ChatGPT into academic practice. The research focus was on articles that discuss the students' perceptions of ChatGPT, all of which were drawn from Google Scholar. In total 32 articles were considered for analysis for this study and in this paper, we present five constructs that influence the adoption of ChatGPT in academic activities. Even though the students' perceptions of ChatGPT are widely varied, the findings of this research show that students concur that ChatGPT has a positive influence on their learning. The students further highlighted concerns relating to their use of ChatGPT in learning, which could be improved if the tool's educational effectiveness is to be realized. The contribution of this study is three-fold. First, the findings of this research explain the perceptions of students about using ChatGPT in academic practice. Second, the results of this study inform the university management and policymakers about

how to effectively integrate ChatGPT into the education system. Third, the study suggests, recommends, and guides educators who wish to incorporate this new, powerful tool (ChatGPT) into their teaching.

Keywords: Students · ChatGPT · Chatbots · Education · Artificial Intelligence (AI) · Perceptions · Benefits · Concerns

1 Introduction

The disturbances in education that were experienced during the emergence COVID-19 pandemic in 2019 forced stakeholders to consider alternatives to brick-and-mortar and face-to-face-based education methods. Chatbots particularly ChatGPT emerged as a popular artificial intelligence (AI) tool for facilitating teaching and learning ChatGPT was developed by OpenAI, “a research laboratory for artificial intelligence that was founded in San Francisco to promote and create “friendly AI” for the benefit of humans” [1]. ChatGPT is a chatbot that was designed to mimic humans in writing content and in responding to queries [2, 3]. ChatGPT stands for “Chat Generative Pre-Trained Transformer” [3]. ChatGPT is “a powerful machine learning software that uses the Generative Pre-trained Transformer (GPT) algorithm” [4] to learn patterns and generate new content such as text, images, sounds, videos, and code [5]. Powered by GPT-4, ChatGPT is the latest development in artificial intelligence [6] that can generate human-like text conversationally [6, 7] and is capable of changing how students learn, research and study [8]. The ChatGPT’s conversational manner is a result of training through reinforced learning from human feedback where humans provide feedback by ranking the quality of machine response and further fine-tuning the model using Proximal Policy Optimization [9].

Since AI tools are now widely accessible, it has become imperative to understand how students perceive their integration into learning, research, and study practice. It was on this note that this research conducts a systematic literature review to investigate and explain students’ perceptions of ChatGPT in education. Students’ perceptions are critical for enhancing educational outcomes through adjusting teaching approaches and materials according to their feedback. This feedback is also valuable for pinpointing deficiencies in digital skills and incorporating critical thinking, information validation, and ethical use of AI into the curriculum.

Thus, the rest of this paper is organized as follows: Sect. 2 deals with background of the study’, Sect. 3 delves into methodology, Results is given in Sect. 4, Sect. 5 is discussion, Sect. 6 gives comparison of study findings with related works, Finally Sect. 7 and Sect. 8 delves into conclusion and future works respectively.

2 Background of the Study

Since its emergence in November 2022, ChatGPT has been used by students in areas that include writing essays, articles, research, and assignments [10]. There has been an increase in the adoption of ChatGPT in higher education [11], however, the integration of ChatGPT in education has been controversial [12]. The tenants of ChatGPT view it as a tool for transforming teaching and learning, while the opponents of ChatGPT are

concerned that ChatGPT compromises the quality of education due to the loopholes of this AI tool. For example, there are concerns that the use of ChatGPT leads to academic integrity and AI-assisted cheating [3, 10]. Although debate on the adoption of ChatGPT in education much research explores the potential role, implications, opportunities and threats of ChatGPT to academia and the higher education sphere [5, 10]. Despite the growing interest in ChatGPT, its integration into education, and research concerns on students’ perception of educational ChatGPT utilization, there seems to be limited literature that presents a systematic review of the students’ perceptions of adopting ChatGPT as an educational tool, which implies that students’ perceptions about ChatGPT utilization are less represented in literature [13]. Many such studies relate to chatbots in general [14]. This is contrary to the important role of perceptions in influencing an individual’s adoption behaviours. Table 1 summarizes various similar studies that have been conducted on the use of generative AI tools in education.

Table 1. Summary of similar studies in the use of generative AI tools in education

Author and Year	Research aim/purpose	Methodology used	Key Findings	Limitation
[15]	To evaluate ChatGPT’s level of knowledge and its potential for use in education by students doing Primary Education degree	Non-experimental, quantitative research, using a questionnaire	Students perceive ChatGPT positively and see its potential in education. They don’t consider it a threat to the educational system if the data sources are verified	Digital literacy is needed to address the impact of ChatGPT in education
[16]	To analyse the perceptions of students on ChatGPT generating laboratory reports	Quantitative survey	Instructors and institutions need to clarify expectations for student use of ChatGPT. Mixed feelings, with potential benefits and drawbacks	The need for a broader analysis instead of a selected cluster for students’ perceptions
[17]	To examine students’ interactions with ChatGPT and their views on its impact on language learning	Quantitative study	Students’ feedback showed that ChatGPT could be a useful study companion and assist with language tasks	Need for personalized guidance, technology-embedded language support, and fostering students’ lifelong learning skills with ChatGPT

(continued)

Table 1. *(continued)*

Author and Year	Research aim/purpose	Methodology used	Key Findings	Limitation
[18]	Investigating students' views on how ChatGPT aids them in their computer science studies	Experimental study	Most students have tried AI chatbots for various tasks like coding help, teaching, and improving understanding	Instructors must reconsider their teaching and testing methods to accurately assess students' knowledge and skills
[19]	To analyse the perceptions of teachers about current and future uses of generative AI in classrooms	Mixed method research	The results indicate that AI has influenced students' learning outcomes	The study involved few participants; more surveys are necessary to implement policy changes at a higher level
[20]	Studying the efficacy of a ChatGPT-based flipped learning guiding (ChatGPT-FLGA) method	A quasi-experimental study	ChatGPT-FLGA greatly enhanced students' academic performance, confidence, and attitudes towards learning, motivation, and creativity	ChatGPT-FLGA was designed for the multimedia courseware course and may not be as effective in other courses
[21]	To evaluate the role of ChatGPT as a learning tool for undergraduate health sciences students, particularly in chronic diseases	A single-blind, crossover, randomized trial, mixed methods study	AI in education is important, but there are concerns about data privacy as students realize the value of AI in their learning	The short intervention period may restrict capturing long-term effects or changes in participants' perceptions

(continued)

Table 1. (continued)

Author and Year	Research aim/purpose	Methodology used	Key Findings	Limitation
[22]	Create and assess scales for measuring usability and user experience variables of the Bing Chat CAI tool for educational purposes in higher education	A survey study	Students' perceptions of user experience and various specific usability features of Bing Chat positively	The study only examined Bing Chat, not other conversational AI tools such as ChatGPT/GPT-4 and Bard
[23]	To examine students' views on how ChatGPT can enhance academic teaching and learning	A survey study	Students doubt the benefits of using ChatGPT for learning and believe that universities should offer clearer instructions and more education on its appropriate use in learning activities	Students need clearer guidelines for using the ChatGPT tool
[24]	To assess doctors' and medical students' perceptions on the use of ChatGPT in medicine	Cross-Sectional Survey	Participants were worried that ChatGPT's response was superficial, lacked scientific evidence, and required expert verification	ChatGPT responds based on the prompt and might adjust its answer based on how the question is phrased

It is therefore imperative to provide a holistic understanding of students' perceptions of using ChatGPT in education since [5] acknowledges that students' perceptions can assist educators and policymakers in making informed decisions on how to integrate ChatGPT to result in effective learning outcomes. There is therefore a great need to understand the perceptions of students about the benefits, concerns and factors influencing their adoption of ChatGPT as an education tool [5]. More so existing literature is based on empirical studies conducted within unique cases and contexts, there is therefore a need for a study that reviews empirical studies involving larger and more diverse samples of different cultural backgrounds [5]. Adding to this, [12] observe that many

studies focus on educators' perceptions more than the students' perceptions of ChatGPT and a focus on students' perceptions could inform educators on how to develop strategies for using ChatGPT to benefit students' learning. Most importantly, literature acknowledges that ChatGPT is a new phenomenon, with limited sources that appropriately discuss the topic concerning how students perceive its use as an educational tool [3, 25]. Furthermore, [26, 27], emphasizes the need to detail the comprehensive experiences and perceptions of students about their engagement with ChatGPT. To address the aforementioned problems and fill the gap in the literature, this study makes a systematic review of the literature to answer two questions:

- 1) What benefits have the students experienced from interacting with ChatGPT in the education practice?
- 2) What are the students' concerns about using ChatGPT to perform educational activities?

3 Methodology

The study adopted a systematic literature review (SLR) to provide evidence-based insights on students' perceptions of ChatGPT in education [28]. The SLR was necessary to gain a comprehensive understanding of learners' attitudes, beliefs, and experiences in various settings. Since ChatGPT was released in November 2022, this study derived literature based on peer-reviewed journal articles and conference papers published from the period, December 2022 to the date that is 2023. This study followed the PRISMA guidelines depicted in Fig. 1. The PRISMA model was used to identify the relevant articles on students' perceptions of integrating ChatGPT into education practice. The review was completed in November 2023, with papers retrieved from Google Scholar that contained text titles, abstracts, keywords, and whole texts that are included in the following query:

((ChatGPT OR AI Chatbot OR GEN AI) AND (perceptions OR perspectives OR feelings OR attitude OR *concerns OR *benefits*)) AND (university OR higher education* OR student* OR learner* OR undergraduate* OR postgraduate*) AND (education OR study* OR learn* OR class* OR lesson*))).

The search covered articles published in the English language across the globe. The selection process considered both empirical and theoretical studies to identify suitable sources for this research. Such terms and phrases as "ChatGPT," "AI Chatbot," "GEN AI," "perceptions," "feelings," "attitude," "concerns," "benefits," "university," "higher" "education," "student," "learner," "undergraduate," "postgraduate," "education," "study," "learn," "class" and "lesson" were searched for. The search results were filtered by title and the abstract for each article. An evaluation of the articles' suitability according to the inclusion and exclusion criteria yielded 32 articles as indicated in Fig. 1.

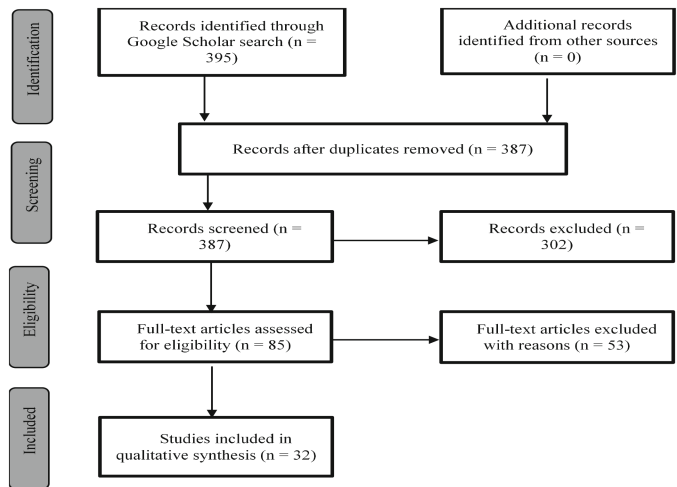


Fig. 1. Diagram of the SLR using the PRISMA model (Source: [18])

As shown Fig. 1, the search for peer-reviewed conference papers and journal articles resulted in 395 records that were retrieved from Google Scholar and eight duplicates were removed to remain with 287 records for screening. In the screening process, there was an examination of the titles and reading through the abstracts, which resulted in the elimination of 302 articles to remain with only 85 articles after considering both the inclusion and the exclusion criteria that are depicted in Table 2. The full-text review of the 85 articles was conducted to analyze them for eligibility, which resulted in the further elimination of 53 irrelevant articles that were either based on irrelevant research participants (non-students) and/or an irrelevant empirical situation (neither a university nor higher education institution). Only 32 studies remained for consideration in the qualitative analysis. The inclusion and exclusion criteria for answering the research questions are demonstrated in Table 2.

The authors then conducted a thematic analysis of the eligible 32 articles that were considered for this study. A detail of the included literature is depicted in Table 3 under the results section.

Table 2. Inclusion and Exclusion Criteria (Format adapted from [3])

Type of criterion	Criteria	Inclusion	Exclusion
Type of publication	Books		*
	Journal articles	*	
	Conference papers	*	
	Dissertations		*
	Blogs		*
	Institutional web sites		*
Access	Online	*	
	Paper		*
Publication period	Dec 2022 – Nov 2023	*	
Place of publication	Worldwide	*	
Type of Study	Empirical	*	
	Theoretical	*	
Research Method	Quantitative		
	Qualitative		
	Mixed		
Data Collection Instruments	Questionnaires	*	
	Interviews	*	
	Focus Group Discussions	*	
	Participant Observations		*
	Document Analysis		*

4 Results

Table 3 presents the 32 articles considered for inclusion in this study. The papers were analyzed to consider their focus and research findings.

A comprehensive study of the selected papers facilitated the organization of perceptions into two themes relating to benefits derived from utilizing ChatGPT and concerns regarding the use of ChatGPT in learning and research. The resultant categories matched the two research questions discussed in Sect. 2, which focused on the benefits and concerns of the academic use of ChatGPT:

- The benefits gained from integrating ChatGPT in the education practice.
- The concerns of using ChatGPT to perform educational activities.

This was followed by an identification of the codes relevant to each theme, which was completed through the help of Mendeley, computer software capable of achieving the task of identifying codes from articles. The authors identified 70 initial codes that were categorized into 28 emergent sub-themes, which relate to the two major themes of

positive perception and negative perception respectively. Both the emergent themes and their related codes are shown in Table 4.

Table 3. Details of articles included in the systematic literature review

Study	Focus	Findings	Year
F. Farhi, R. Jeljeli, I. Aburezeq, F. Fayez, and S. A. Al-shami	Analyzing the students’ views, concerns, and perceived ethics about ChatGPT usage	Positive perception of ChatGPT	2023
N. Abouammoh, et al.	Exploring Perceptions and Experiences of ChatGPT in Medical Education: A Qualitative Study Among Medical College Faculty and Students in Saudi Arabia	ChatGPT is interesting and engaging	2023
C K U, Chan & W, Hu	Students’ Voices on Generative AI: Perceptions, Benefits, and Challenges in Higher Education	Positive attitude for ChatGPT provides personalized learning support, writing and brainstorming assistance, and research and analysis capabilities	2023
M. E. A. Rahim, A. Rahim, N. Mohamed, and N. A. Razawi	Students’ Perception on the Use of ChatGPT as a Language Learning Tool	ChatGPT helps to improve their ability specifically in writing and the students also think that the use of ChatGPT makes English Language learning more enjoyable and engaging	2023
K. Gamage, S. Dehideniya, Z. Xu, and X. Tang	ChatGPT and higher education assessments: More opportunities than concerns?	ChatGPT can be used to cheat on written formative and summative assessments	2023
S, Atlas	ChatGPT for Higher Education and Professional Development: A Guide to Conversational AI	ChatGPT helps with personalized learning, and effective prompts and improves essay writing	2023
M. Sullivan, A. Kelly, and P. McLaughlan	ChatGPT in higher education: Considerations for academic integrity and student learning	ChatGPT is associated with academic integrity concerns and opportunities for innovative assessment design	2023
C, K., Lo	What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature	ChatGPT has the potential to serve as a virtual tutor but also generate incorrect or fake information and promotes plagiarism	2023
R. Michel-villarreal, E. Vilalta-perdomo, D. E. Salinas-navarro, and F. Thierry-Aguilera, Ricardo Gerardou	Challenges and Opportunities of Generative AI for Higher Education as Explained by ChatGPT	Use of ChatGPT threatens academic integrity	2023

(continued)

Table 3. (continued)

Study	Focus	Findings	Year
F. X. R. Baskara and F. X. Mukarto	Exploring the Implications of ChatGPT for Language Learning in Higher Education	ChatGPT could provide Personalized learning and generate content faster but it can also replace human teachers	2023
A. M. Hasanein and A. E. E. Sobaih	Drivers and Consequences of ChatGPT Use in Higher Education: Key Stakeholder Perspectives	Use of ChatGPT is associated with ethical concerns	2023
A. Shoufan	Exploring Students' Perceptions of ChatGPT: Thematic Analysis and Follow-Up Survey	ChatGPT is interesting, motivating, and helpful for study however, it provides inaccurate information	2023
T. Petricini, C. Wu, and S. Zipf	Perceptions About Generative AI and ChatGPT Use by Faculty and College Students	Concerns with academic integrity are prevalent	2023
S. Muñoz et al.	Examining the Impacts of ChatGPT on Student Motivation and Engagement	The research indicates that ChatGPT helps increase student motivation and engagement in the learning process. Therefore, policymakers should promote the incorporation of	2023
O. Filipec and J. V. Woithe	Perception, and Learning Impact of ChatGPT in Higher Education	ChatGPT enables personalized learning	2023
P. Limna, T. Kraiwanit, K. Jangjarat, and P. Klayklung	The use of ChatGPT in the digital era: Perspectives on chatbot implementation	ChatGPT produces inaccurate information and has privacy and security issues	2023
B., Liu	Chinese University Students' Attitudes and Perceptions in Learning English Using ChatGPT	ChatGPT supports learning but has information security issues	2023
M. Neumann, M. Rauschenberger, and E.-M. Schon	"We Need to Talk About ChatGPT": The Future of AI and Higher Education	ChatGPT is capable of virtual tutoring but prevents creativity	2023
T. T. A. Ngo	The Perception of University Students of the Use of ChatGPT in Education	ChatGPT provides personalized tutoring and feedback and illuminating ideas in writing but it also produces inaccurate citations and references	2023
M. Abdaljaleel, et al.	Factors Influencing Attitudes of University Students towards ChatGPT and its Usage: A Multi-National Study Validating the TAME-ChatGPT Survey Instrument	Positive attitude towards ChatGPT	2023

(continued)

Table 3. (continued)

Study	Focus	Findings	Year
H. Ibrahim et al.	Perception, performance, and detectability of conversational artificial intelligence across 32 university courses	The use of ChatGPT is associated with plagiarism	2023
Y. Shaengchart	A Conceptual Review of TAM and ChatGPT Usage Intentions Among Higher Education Students	ChatGPT is interesting to use	2023
Y. Shaengchart, N. Bhumpenpein, K. Kongnakorn, P. Khwannu, A. Tiwtakul, and S. Detmee	Factors Influencing the Acceptance of ChatGPT Usage Among Higher Education Students in Bangkok, Thailand	Use of ChatGPT is associated with privacy and security concerns	2023
M. Elkhodr, E. Gide, R. Wu, and O. Darwish	ICT students' perceptions towards ChatGPT: An experimental reflective lab analysis	ChatGPT improves performance and content comprehension	2023
I. S. Chaudhry, S. A. M. Sarwary, G. A. El Refae, and H. Chabchoub	Time to Revisit Existing Student's Performance Evaluation Approach in Higher Education Sector in a New Era of ChatGPT—A Case Study	ChatGPT solves complex problems	2023
J. K. West et al.	An Analysis of AI-Generated Laboratory Reports across the Chemistry Curriculum and Student Perceptions of ChatGPT	ChatGPT is a cheating tool	2023
O. Tsivitanidou and A. Ioannou	Envisioned Pedagogical Uses of Chatbots in Higher Education and Perceived Benefits and Challenges	ChatGPT positively impacts cognitive and affective learning	2023
M. Hosseini, et al.	An exploratory survey about using ChatGPT in education, healthcare, and research	ChatGPT is linked to harmful activities	2023
A. Haensch, et al.	Seeing ChatGPT through students' eyes: An analysis of tiktok data	ChatGPT is useful for writing essays or code	2023
A. Jamal et al.	Impact of ChatGPT on Learning Motivation: Teachers and Students' Voices	ChatGPT generally motivates learners to develop reading and writing skills	2023
J. Huallpa, et al.	Exploring the ethical considerations of using Chat GPT in university education	ChatGPT creates individualized learning but has privacy and security issues	2023
A. Imran and A. A. Lashari	Exploring the World of Artificial Intelligence: The Perception of the University Students about	ChatGPT hinders creative writing	2023

Table 4. A list of initial codes and the themes that emerged from the literature

Initial code	Sub-theme	Theme
PP1 Provides feedback	Learning support	Positive perception
PP2 Responds to queries		
PP3 Answers questions		
PP4 Solves complex problems		
PP5 Identify bugs in a programming code	Reliable tutoring	
PP6 Generate course material		
PP7 Predicts bugs in a programming code		
PP8 Explains bugs in a programming code		
PP9 Virtual tutoring capabilities		
PP10 Personalized tutoring		
PP11 Writes assignments	Convenient editing	
PP12 Proofread assignments		
PP13 Compose essays/poetry		
PP14 Translates language		
PP15 Improves writing skills		
PP16 Optimizes tasks and raises efficiency	Task optimization	
PP17 Assistance in reviewing material	Learning mentorship	
PP18 Interesting to use	Learning motivation	
PP19 Enjoyment		
PP20 Engaging	Efficient information retrieval	
PP21 Collect information	Research assistant	
PP22 Generate ideas		
PP23 Help to brainstorm		
PP24 Illuminates ideas in writing		
PP25 Facilitates collaboration		
PP26 Summarizes literature		
PP27 Paraphrases text		

(continued)

Table 4. (continued)

Initial code	Sub-theme	Theme
PP28 Generate coherent and fluent text on various topics		
PP29 Assist them in doing their homework, assignments, and projects,		
PP30 Content comprehension		
PP31 Practicing problem-solving		
PP32 Analysis capabilities	Problem solving	
PP33 Summarize information	Data analysis	
PP34 Help understand complex concepts	Study material organization	
PP35 Searches for relevant study material	Concept simplification	
PP36 Help revise for exams	Study assistant	
PP37 Provide suggestions		
PP38 Honing test-taking strategies		
PP39 Better organization of information		
PP40 Assist on how to approach academic tasks	Task management	
NP1 Compromise creativity	Compromised creativity	Negative perception/Concern
NP2 ChatGPT hinders creative writing		
NP3 Potential impact on critical thinking skills		
NP4 Fails to fix bugs in a programming code	Risks	
NP65 Have difficulties comprehending complex or abstract ideas		
NP7 Could replace human teachers		

(continued)

Table 4. *(continued)*

Initial code	Sub-theme	Theme
NP8 Privacy and data insecurity	Breached information privacy & security	
NP9 Lack of trust in the output of ChatGPT,	Compromised trust	
NP10 Concerns about accuracy		
NP11 Inability to replace words and use idioms accurately		
NP12 Answers are not always accurate		
NP13 Irrelevant or incorrect information		
NP134 Inability to assess the quality and reliability of sources	Ambiguous referencing	
NP15 Inability to cite sources accurately		
NP16 Concerns of cheating and plagiarism	Cheating and plagiarism	
NP17 Overreliance on tool	Dependency syndrome	
NP18 Bypassing plagiarism detectors		
NP19 Personal and psychological barriers	Lack of personal development	
NP20 Lack of a human touch in content generated by ChatGPT		
NP21 Potential loss of personal interaction with teachers		
NP22 Has ethical implication	Ethics violation	
NP23 Affects societal values	Breach of societal values	
NP24 Dependency on tool affects critical thinking	Lack of critical thinking	
NP25 Potential lack of critical thinking in the information provided		

(continued)

Table 4. (continued)

Initial code	Sub-theme	Theme
NP26 Impact on critical thinking		
NP27 Lack of problem-solving skills		
NP28 Loss of academic integrity	Lack of academic integrity	
negative social perceptions of the tool	Lack of research ownership	
NP29 User dissatisfaction with its usage		
NP30 Generating incorrect or fake information	Generation of inaccurate information	

5 Discussion

The findings of this systematic literature review provided insight into the perspectives of students about using ChatGPT in learning. From the analysis of the selected papers, it was clear that none of those papers could provide a comprehensive perspective of the students due to the diversity of the students, varied contexts and different methods used for collecting and analyzing the collected data. This research’s aim was then to organize the output of the systematic literature review into a coherent explanation of the students ‘perspectives about engaging with the ChatGPT to support their learning. The findings of the systematic literature review are therefore classified according to the positive impact reflected in the benefits gained from using ChatGPT in learning as well as the learning drawback deduced from the concerns raised by students as they experienced them while integrating ChatGPT into the education practice. This was informed by the two themes, benefits, and concerns that emerged from the literature that was considered for the systematic literature review.

5.1 Benefits of Using ChatGPT

The codes relating to the first theme on benefits of ChatGPT include learning support, concept-simplification, study material organization, study assistant, efficient information location, reliable tutoring, research assistant, learning motivation, convenient editing, task optimization, problem-solving, task management, data analyzing, learning mentorship. The positive impact theme and the associated sub-themes and/or codes are shown in Fig. 2.

The reviewed literature demonstrated a consistent view that ChatGPT has a positive impact on students’ learning, research, and study. The reviewed articles concurred that students prefer integrating ChatGPT into their academic activities. For example, [2, 29, 30], investigated the influence of ChatGPT on the learning of students in the United States

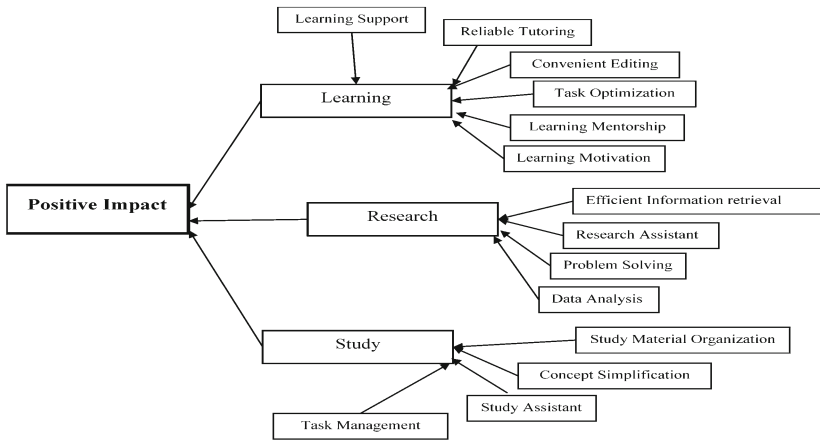


Fig. 2. A conceptual framework of the positive perceptions about ChatGPT

and reported similar results that ChatGPT positively influences students' education by improving their academic performance by helping them to understand difficult concepts and providing them with relevant study materials. This view is concurred by [31] those who reported that the cohort of students from Thailand had a positive perception of the ChatGPT tool as it provided the students with immediate feedback, answered questions, and provided them with needed support during the learning process. Similar sentiments were echoed by [32] those who confirmed that after conducting a study with a cohort of students from Australia, concluded that these students enjoyed interacting with ChatGPT because it helped them improve their academic performance [32–34].

The findings of this research show that many studies that were included in the systematic literature review concur that students have a positive perception of ChatGPT in three aspects of education, namely, (1) learning, (2) research and (3) personal study. The grouping of the identified codes resulted in such emergent sub-themes ChatGPT facilitates personalized learning support [5, 9, 35–38]. ChatGPT is a useful virtual tutor [39, 40], ChatGPT is an engaging editor [12, 41] ChatGPT optimizes learning tasks [35], ChatGPT mentors students by identifying ideas for them [39], ChatGPT motivates learning as it is so engaging [12, 42–45] Research is another sub-theme that emerged from the reviewed literature. It appeared in discussions involving ChatGPT's capability to efficiently locate information during the content search [12, 32, 35], ChatGPT assists students when conducting research [5, 35], ChatGPT guides how to conduct research and make students skilled problem solvers [32, 35], ChatGPT equips students with data analysis capabilities [5, 35, 43]. The reviewed literature also indicated that ChatGPT has a positive impact on how the students study [10, 11]. This was revealed in sentiments such as ChatGPT is a helpful tool for organizing and providing them with relevant study material [2, 27, 39, 46], ChatGPT helps students to understand difficult concepts [2, 47] and better comprehend [48], ChatGPT was also commended for being a study buddy [5, 35], ChatGPT is also associated with study task management [49]. In conclusion, ChatGPT and other chatbots have a cognitive and affective impact on students' learning [50]. Despite the opportunities provided by ChatGPT, literature also shows that there

are several concerns regarding its use in academia, some of which are discussed in the subsequent section.

5.2 Concerns About Using ChatGPT in Education

The reviewed literature further pointed to concerns raised by students as they interact with ChatGPT. An analysis of these concerns led to the identification of a theme that the authors referred to as the “Negative perceptions” of using ChatGPT to perform academic activities. The negative perceptions were deduced from sentiments depicted in Fig. 3.

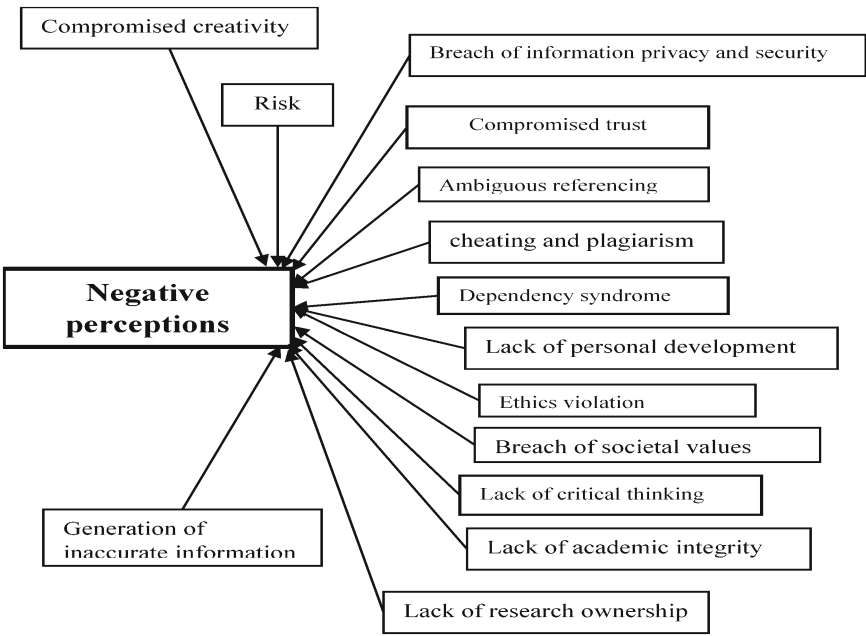


Fig. 3. A conceptual framework of concerns/Negative perceptions about ChatGPT

An analysis of the students’ concerns documented in the reviewed literature indicates that the use of ChatGPT in education compromises creativity [46, 51], and the use of ChatGPT is also associated with risks that could affect both the students and their institutions [10, 47, 52, 53]. The reviewed literature also revealed that the effective use of ChatGPT in education was also affected by the breach of information privacy and security [5, 31]. Further analysis of the literature showed that students were also concerned that ChatGPT would compromise the trustworthiness of their academic work [10, 46]. Another concern is that ChatGPT fails to provide reliable references as it generates ambiguous references [39, 46]. There were also concerns that the use of ChatGPT promoted cheating and plagiarism [26, 40, 46, 54, 55]. Another concern is that the integration of ChatGPT in academic activities leads to an over-reliance on the tool [2, 11, 32]. It was also further revealed in the literature that dependency syndrome on ChatGPT

prevents students from developing academically [5]. Several articles that were included in this research further identified ethical concerns as an issue related to the use of ChatGPT in education [2, 4, 5, 35, 39, 46, 49]. The use of ChatGPT is also viewed as a violation of societal values [5, 43, 52]. The continued use of ChatGPT in education is also deemed to affect students' critical thinking [2, 6, 32, 46]. It was also shown in the literature that the use of ChatGPT in education compromises academic integrity [26, 39]. It was also revealed in the literature that the integration of ChatGPT in education limits the student from improving the quality of their academic work [46]. The other concern relates to the generation of incorrect information by the ChatGPT tool [5].

6 Comparison of Study Findings with Related Works

These findings are also consistent with existing literature. For example, [36] confirms that ChatGPT provides students with many benefits such as providing feedback from an assessment [9]. Literature also acknowledges that ChatGPT assists students in completing their assessments [13, 26, 56]. For example, the ChatGPT can help a student write a coherent assignment, (partially) accurate, informative, and systematic [9, 57]. Literature also acknowledges that there is consensus among students that ChatGPT supports students' interactive learning and supports their engagement with the learning process [4, 8, 25, 31, 56, 58]. Some empirical studies conducted using the cohort of students also support this study's findings by highlighting that the use of ChatGPT in education increases students' collaboration and accessibility [7]. In agreement with the findings of this research, recent studies also show that students who use ChatGPT are capable of performing complex tasks [49, 58] such as assisting students in debugging their programming code, predicting the bugs in a programming code and explaining the encountered bug in a programming code [59]. Existing literature also supports the findings of this research that the ChatGPT provides a platform for students to find answers to questions and generate ideas for research and projects [4, 6, 57].

The findings of this systematic literature review are consistent with existing literature as it highlights some concerns relating to the use of ChatGPT in learning [8]. For example, [7], confirms that the integration of ChatGPT into the academic practice has been associated with concerns relating to academic dishonesty and plagiarism. On this note, [1, 9] the report fears that students could cheat in an assessment by reproducing or outsourcing an assignment or project. Furthermore, similar to the findings of this study, it has also emerged from the literature that scholars are concerned that the ChatGPT has several limitations which include the generation of wrong information, biases in data training and privacy issues [54, 58]. One of the limitations of ChatGPT that is supported by literature is its incapability to effectively fix bugs in a programming code [59]. The results of this research are also acknowledged by literature regarding the improper use of ChatGPT which has become a cause of concern [54]. For example, unethical and uncontrolled use of ChatGPT can hinder the students' intellectual capabilities and interfere with the learning process since it produces harmful content [6]. In line with this study's findings, the literature also observes that the use of ChatGPT is limited in its capacity to cite and reference sources when conducting research [39, 57].

7 Conclusion

In conclusion, this systematic literature review has reported both benefits and concerns relating to the use of ChatGPT in learning, research, and personal study. Some of the identified benefits of ChatGPT in education include instant feedback to students, responses to questions, collaboration, assisting students to produce coherent and systematic assignments, solving complex problems, mentoring, and tutoring students, editing, motivating students to learn, engaging students in the learning process, generating and organizing ideas for research or projects. The concerns of students in working with ChatGPT include generation of incorrect content, failure to accurately cite or reference work, compromised information security, ethical or social concerns, limited capability to solve complex problems, over-reliance, or dependency syndrome, cheating and plagiarism. However, despite these concerns, the reviewed articles that were included in the systematic literature review concluded that students have a positive attitude towards the integration of ChatGPT in their learning, research and personal study [47]. There was a consensus that the use of ChatGPT improves students' performance as it motivates learning and has features that are engaging [12, 27, 35]. It was recommended that the students could benefit more from ChatGPT if the concerns raised in the preceding sections were addressed by the relevant authorities and stakeholders. Literature then concludes that the best approach to combating the improper use of such technology is one of inclusion rather than exclusion [8, 54, 58].

8 Study Limitations and Recommendations for Future Work

This research had limitations that could be addressed by future similar studies. First, the study is a rapid systematic literature review, which means it was conducted quickly and there is a possibility that more and different themes could emerge from the literature that could better explain students' perceptions of ChatGPT in education. Second, the reviewed literature was limited to articles published on Google Scholar, an inclusion of articles published in databases like ISI Web of Science, Scopus and other cross-references could also add weight to the findings relating to students' perceptions of ChatGPT in education. Lastly, the reviewed literature was based on empirical studies conducted globally, narrowing the scope to a particular context or region could provide a deeper insight into specific students since perceptions could be informed by contextual conditions, environmental conditions social norms and the background of the students. Furthermore, perceptions are subjective and not a one-size-fits-all scenario. Thus, future research is recommended to test this conceptual framework using a particular context.

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