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Abstract

In the context of contemporary technological advancements, Artificial Intelligence (AI) has gained considerable significance in the field of education. In light of ChatGPT's growing popularity, this research aims to explore how higher education students perceive the use of ChatGPT in academics, examining factors influencing its acceptance, as well as its benefits, limitations, and ethical concerns. The study applied a survey design, collecting data through Google Forms from undergraduate, postgraduate, and doctoral students. A total of 162 participants, who were using ChatGPT selected through convenience sampling. The findings indicate a positive perception among respondents regarding ChatGPT's academic applications, its benefits, limitations, acceptance factors, and ethical concerns. The study also reveals that the perception of higher education students towards ChatGPT usage is not significantly influenced by gender, academic programs, and streams. The insights gained from this study holds significant implications for the responsible and effective integration of ChatGPT in higher education environments, taking into account its perceived benefits and ethical concerns.

Introduction

Artificial intelligence (AI) applications in the field of education have received noticeably more attention in recent years (Zawacki-Richter et al., 2019). The 2018 Horizon report by Educause, (a non-profit organization reporting key trend and emerging technologies in higher education), extensively explores the significance of AI and adaptive learning technologies as major breakthroughs in the field of educational technology. In country like India, the National Education Policy (2020), recognizes the emergence of disruptive technology like AI, which has the ability to not only match but even surpass the capabilities of talented persons, making it a useful tool to improve learning and education. On the other hand, National Institution for Transforming India (2018), formerly known as the Planning Commission of India, accords significant weight to AI in the education sector. For example, it can be used to advance the quality and accessibility of education in India by personalizing learning, creating smart content, predicting student performance, assisting teachers in successfully managing classrooms, and also improving student learning outcomes.

Recently Open AI launched generative pre-trained transformer (ChatGPT) in November 2022. Due to the quality of its language model, ChatGPT has received a lot of interest in few months (Neumann, 2022). One million users have registered for the platform in the first week after it was made available to the public (Haque et al., 2022).

ChatGPT is frequently utilized in various fields, such as higher education, K–12 education, and improving practical skills. The influence of ChatGPT on productivity, efficiency, and ethical issues is one of the topics that are most frequently discussed on social media networks (Mogavi et al., 2023). Keeping in view its popularity and its rapid application in different context and specifically in higher education, an attempt has been made to explore its usage perception among higher education students in terms of its academic usage, benefits, limitation, acceptance factors and ethical considerations.

Generative Pre-trained Transformer (GPT-3), which was first proposed in a work by Vaswani et al. (2017) and has since become a popular choice for natural language processing tasks (NLP). GPT-3 distinguishes itself as one of the most substantial language models currently available with its vastness evident in its 175 billion parameters (Cotton et al., 2023). The ChatGPT is a NLP which is an intelligent tool that is used to produce coherent and pertinent responses to human questions on a variety of topics (Mogavi et al., 2023). Even though ChatGPT's primary function is to replicate human speech, it is more than capable of doing much more. It can actually come up with original ideas for poetry, stories, or novels, as well as act in whatever way it can (Tlili et al., 2023).

Literature Review

Related literature has been explored using databases such as Google scholar, ProQuest, ScienceDirect. The available studies are primarily comprised of published journal articles, along with some emerging preprints in this evolving field.

Academic Usage of ChatGPT

As the study shows, ChatGPT is frequently employed in three contexts like higher education, K-12 education, in practical skill acquisition. Productivity, efficiency, and ethics are the three most commonly discussed aspects of ChatGPT on social media networks (Mogavi et al., 2023). In a systematic review on application of AI in higher education, Zawacki-Richter et al. (2019), explored its applications in academic level of higher education i.e., profiling, prediction of students learning, assessment, personalized learning and intelligence tutoring system. The usage of ChatGPT as an AI tool has the potential to aid academics in generating systematic, cohesive, (mostly) accurate, and helpful publications, as highlighted by (Zhai, 2022).

Sulisworo and Dahlan (2023) found that lecturers are using the ChatGPT in their teaching for various purposes such as getting ideas, information, translating writings, creating questions for deeper understanding of the topic. It is also interesting and effective to use ChatGPT in teaching but lecturers are of the opinion that, one should be critical and careful to use it. Student use ChatGPT for getting academic information and strengthening communication skills. As the study shows, students request to the institution to organise training session and to offer paid accounts in order to maximize its utilization (Phuong et al., 2023). The ChatGPT is being used by the higher education students for some academic purposes such as, homework, as a writing assistant, solving problem, preparing test, analyzing data, getting conceptual clarification, supporting research, providing supplementary learning material (Hasanein & Sobaih, 2023). Faculties have unfavorable attitude towards ChatGPT usage in

higher education as it leads to plagiarism and increasing cheating (Ahmed, Hassaan, Iqbal, and Nayab, 2022). Experiment shows that writing essay by students using ChatGPT is getting low score than manual writing. Student not able to write authentic, quality content by using it (Banovac, 2023). On the other hand study shows that students mostly use ChatGPT for academic content construction, getting information, novelty, and convenience (Jishnu et al., 2023).

Benefits and Limitations

Students had a high level of comfort embracing new technologies, and their regular usage of ChatGPT had helped them to form habits. Besides, students thought ChatGPT's user-friendly interface, which was accessible in several languages and operated efficiently with minimal prompts, was appealing to them (Strzelecki, 2023). Using ChatGPT also has some benefits for both the students and teachers by decreasing burden of teachers in the process of assessment, working like a teaching assistant, helping in personalized learning of the students, playing role as a research assistant, also creating content, helping in translating the language, and its limitations are it can't' understand like a human, it has lack of data after 2021 as well cant' replace human knowledge and capability (Khan et al., 2023; Shidiq et al., 2023 and Zhai, 2023).

The initial use of ChatGPT in education also manifested some more areas of opportunities as well as ethical issues i.e., greater level of student engagement in academic activities, developing digital literacy, supporting intellectual practices, interaction, collaboration, accessibility, feedback, translating language, summarizing text, questioning and answering, personalized assessment, as well as explored some issues with regard to academic integrity, i.e., difficulty in evaluating sources, generating inaccurate information, reliability issues, plagiarism and unclear authorship (Cotton et al., 2023; Javaid et al., 2023; Rasul et al., 2023; and Schonberger, 2023). Analysis of the generated text of ChatGPT for academic progress explores that, manuscript, literature review, citations, plagiarism, and references are becoming main concerns after the advancement of AI. On the other hand, it has great potential to generate quality information, novel ideas, knowledge and thoughtful insight (Bukar et al.,2023).

Strength, weakness, opportunities and threat (SWOT) analysis of ChatGPT, explored that providing believable responses, self-improving capabilities, and real-time responses are some of the strengths. Weakness includes limited depth of understanding, challenges in evaluating response quality, potential for bias, and absence of higher-order cognitive capabilities. In terms of opportunities, ChatGPT can improve access to knowledge, promote complicated, individualized learning, and reduce instructional workload.

Lack of contextual understanding, threats to academic integrity, continuation of educational prejudice, democratization of plagiarism, and a decline in high-order cognitive abilities are all threats to education (Farrokhnia et al., 2023; Rahman and Watanobe, 2023). Students' favorable opinions of ChatGPT and their determination to use it pushed for its implementation in education. However, no statistical association exists among students' perception and their intent to use ChatGPT (Bonsu and Baffour-Koduah, 2023).

Rane et al. (2023), investigated that ChatGPT cannot perform like an author adequately due to several limitations.

These include "limited understanding, absence of critical thinking in users, declining creativity, restricted access to current research, ethical concerns, bias in generated text, absence of hands on experience of ChatGPT, incorrect information, lack of current update in information, lack of emotional intelligence, inadequate feedback, deficiency in guidance and also criticism for the personal improvement of the student." According to Iqbal Nayab, Ahmed & Hassaan (2022), ChatGPT is helping in planning the lesson, assessment but the major risk is associated with plagiarism and cheating. Students have positive views towards the application of ChatGPT. Additionally, students believe ChatGPT usage has benefitted them in areas such as, time- saving, providing information, personalized tutoring, giving feedback and enlightening ideas in academic context. The most concerns revolve around the quality and reliability of the sources, along with a lack of accurate source citation (Tho, 2023).

Acceptance Factors

By utilizing UTAUT2 (Unified Theory of Acceptance and Use of Technology) model, Foroughi et al. (2023) and Lara-lara (2023), explored that "user experience, performance expectations, hedonic motivation, perceived value, and habit" played a significant role in shaping the intention to use ChatGPT. Furthermore, facilitating setting, habit, and behavioral target were identified as conditioning factors influencing user behavior. Another study by Lawal Faruk et al. (2023), applied psycho-technical approach as predictors of ChatGPT usage and revealed that perceived usefulness significantly predict its usage.

Further contextual factors such as its novelty and humanness leads to its usage. Among the psychological element, openness, agreeableness, and neuroticism determine the usage scenario. In another context, relative advantage, compatibility, ease of use, observability, and triability are significantly identified as adoption factors of ChatGPT by higher education students (Raman, 2023). In addition to this, "male students have prioritized compatibility, ease of use, and observability while female students prioritized adoption of ChatGPT with relation to ease of use, compatibility and relative advantages (Raman, 2023).

Using ChatGPT in software engineering research is backed by motivator factors such as, code summarization, generating necessary descriptions, and synthetic data generation, which lead the possible value and utility of ChatGPT (Akbar et al., 2023). Study also revealed favorable attitude and the utilization of ChatGPT which were determined by factors like ease of use, postive attitude towards technology, social influence, low perceived risk and low anxiety (Abdaljaleel et al., 2023). On the other hand, it's fast response and ease of use act as acceptance factors in academic activities (Hasanein and Sobaih, 2023). Maheshwari (2023), explored some factors of using ChatGPT such as "perceived ease of use, usefulness, interactivity, personalization, and adoption intentions in shaping their utilization of ChatGPT for their academic pursuits".

Another study by Tiwari & Bhat (2023), indicated that student hold a positive perception of incorporating ChatGPT into instruction. The utility, social presence, legitimacy of the tool, along with enjoyment and motivation contribute to a positive inclination towards using ChatGPT in an educational setting. However, the students' adoption and utilization of ChatGPT were not significantly influenced by the perceived ease of use. In contrast Yifan et al. (2023) revealed that "perceived usefulness, perceived ease of use, social impact, convenience, and

perceived interest has an impact on the willingness of university students to use ChatGPT".

Ethical Concerns

As the above studies reveals some of the usage of ChatGPT in academia, there arising some ethical concerns like falling creativity, and violations of academic integrity (Raman, 2023). According to Vaccino-salvadore (2023), when using ChatGPT in language learning, privacy, bias, reliability, accessibility, authenticity, and negative impact on academic integrity are significant ethical implications to consider while integrating ChatGPT into the language classroom.

Risk associated with plagiarism of the content, issues of copyright, citation practices, and the potential impact on the "Matthew Effect in scholarly publishing" (*which denotes that, researcher and journal of high level get more citations than they really deserve*) have been identified by (Alkhaqani, 2023;Lund et al., 2023; Rane et al., 2023; Tawfeeq et al., 2023;Yu, 2023). Akbar et al. (2023), found some principles of ethical concerns of using ChatGPT in engineering research, such as "bias, privacy, accountability, reliability, intellectual property, security, manipulation, unintended consequences, human labour displacement, legal compliance, ethical governance, trust, informed consent, fairness, transparency, long-term consequences, exacerbating inequalities, lack of accountability, and the ethical implications of automation." Among these ethical principles, bias, fairness, and privacy are identified as more significant than others.

ChatGPT might be useful as writing aid; yet, in order to maintain academic integrity and ensure ethical use, it is essential to adhere to responsible procedures. Proper citation and acknowledgement of ChatGPT contribution is essential to prevent plagiarism and to maintain the standard of academic writing .So by following the citation guideline scholars can maximize the benefit of the ChatGPT usage (Jarrah & Wardat, 2023). Within the context of higher education where online exams are increasingly prevalent, ChatGPT presents a possible threat to the authenticity of these assessments (Susnjak, 2022). Utilizing ChatGPT in educational settings necessitates adherence to the subsequent principles: individual privacy, fairness, lack of bias, and transparency in use (Mhlanga, 2023).

Rationale of the Study

ChatGPT has received lots of interest and popularity of its usage in each and every sector of the society, which also demands the need of research into its use in the higher education field as we found it is being applied in higher education in some previous studies. Janssen et al., (2022) explored the reasons for Chatbot's failure due to its ineffective practices, lack of resources, data security, not meeting user expectations. On the contrary, another study by Haque et al. (2022) highlighted that ChatGPT used not in education field but also in various other fields. Hence, as a new technology, further research required to comprehensively explore its potential use, benefits, limitations and impact in the field of education (Firat, 2023).

From the related literature we got that most of the studies related to ChatGPT focused on the analysis of secondary

sources like social media, newspaper and very rare empirical articles also. The previous literature contains a scarcity of empirical studies on ChatGPT. Moreover, there have been very few studies conducted on the perception of higher education students regarding the utilization of ChatGPT. However, concerns brought up by a highly intelligent Chatbot like ChatGPT were not systematically investigated in the context of education. Therefore, it is yet unclear whether ChatGPT will allay or potentially amplify the concerns that had been indicated by earlier Chatbots. In order to ensure safe use, it is crucial to look into the issues with using ChatGPT in higher education.

From the aforementioned analysis, it is clear that this new AI technology is being highlighted from the standpoint of academics in the field of educational research. It is also getting more and more acceptable and popular day by day. The researcher has therefore conducted this study in order to comprehend and examine how higher education students perceive the usage of the ChatGPT, as well as its acceptance, benefits, limitations, and ethical considerations. To ensure ChatGPT's successful adoption in educational contexts, it is essential to comprehend the distinctive perceptions of higher education students.

Investigating students' perceptions can also give developers and educators insightful input that can be used to improve and optimize AI-based educational technology. Understanding user viewpoints is crucial for building AI systems that take users' wants, preferences, and ethical considerations into account (Li & Shonfeld, 2020). Therefore, keeping in view the above justification, this study aims to investigate the following objectives

Objectives of the Study

1. To examine the extent to which higher education students use ChatGPT for academic purposes
2. To identify the benefits and limitations of using ChatGPT in higher education as perceived by higher education students
3. To examine the factors that influences the acceptance of ChatGPT among higher education students
4. To identify the ethical issues associated with the use of ChatGPT in higher education from the perspective of students
5. To study the perception of higher education students towards ChatGPT with reference to gender, academic programs and streams of education

Hypotheses

$H_0$1 There is no significant difference in the perception among Ph.D., Masters and Bachelors students towards the usage of ChatGPT

$H_0$2 There is no significant difference in the perception of Boys and Girls students of higher education towards the usage of ChatGPT

$H_0$3 There is no significant difference in the perception among Arts, Commerce and Science students towards the usage of ChatGPT

The above objectives of the study have been studied by employing the following research methodology.

Method

Survey method has been used to conduct this research. In a survey design the researcher collects data and examines the current attitude, beliefs, opinion, or practices of people (Creswell, 2012 p377). Survey serves as a valuable method for capturing the current trends of the world, making it an ideal method for measuring perception of ChatGPT as the ChatGPT is being popular now-a-days in every sector of the society. In this study student's perception was assessed and analyzed quantitatively to reveal insights into the utilization, acceptance, benefits-limitations and ethical concerns associated with ChatGPT usage.

Participants

Total 162 higher education students from different higher education institutions and different academic programs (Ph.D., Masters and Bachelors) of India has been responded to the questionnaire. The data was collected through a Google Form, using a combination of purposive and convenience sampling methods. Participants who employed the ChatGPT voluntarily provided their responses. The data collection took place during the months of April and June of 2023. Table 1 presents a comprehensive overview of the demographic composition of the participants.

Table 1. Variable Wise Distribution of Participants

SL No.	Variable	Dimension	Frequency	Percentage
1	Gender	Male	83	51.1
		Female	79	48.8
2	Program	Ph.D.	90	55.6
		Masters	58	35.8
		Bachelors	14	8.6
3	Stream	Arts	98	60.49
		Science	50	30.86
		Commerce	14	8.64
	Total		162	100

Tools and Techniques

A Likert type scale has been prepared by the researcher by following some related studies (Kashive et al., 2021; Limo et al., 2023; Shoufan, 2023). The statements of the scale consist five dimensions such as ChatGPT academic usage, acceptance factor, benefits, limitations and ethical concerns which overall aims to measure the perception of higher education students.

The questionnaire consists of a total 28 items pertaining to measure each dimension of the perception of higher education students towards its usage. The first section of the scale includes demographic information of the respondents (gender, institution, academic program & stream). The second section deals with measuring students' perception in terms of their academic usage (frequency, specific purpose, time duration of using), what are the

factors lead them to use the ChatGPT, what benefits and limitations they are facing, what ethical concerns they are perceiving by using this AI tool (such as plagiarism, assessment).

The reliability of the scale was measured using Cronbach's Alpha with the help of Statistical Package for Social Science Research (SPSS). The overall Cronbach's Alpha coefficient for all dimensions was 0.882 considered as appropriate value and it is > 0.7 **(**Cortina, J. M. (1993)**.** Specifically, the Cronbach's Alpha coefficients for the dimensions of academic usage, perceived benefits, acceptance factors, and ethical concerns were found to be 0.644, 0.832, 0.801, and 0.062 respectively. These values were found to have reliable alpha exceeding the 0.7 threshold. Table 2 displays the Cronbach's Alpha values for each dimension and overall measure.

Table 2. Reliability Statistics for the Perception Scale of ChatGPT

Sl.no	Dimensions	No of Items	Cronbach's (α)
1	Academic usage	07	0.644
2	Perceived benefits	12	0.832
3	Acceptance factors	06	0.801
4	Ethical concerns	03	0.062
	Overall	28	0.882

Data Analysis

Microsoft Excel was used to organize the data, and the statistical package for social science research (SPSS), version 22 was used for analysis. Initially, a percentage analysis was conducted for each dimension in relation to its respective objective to determine the results of each objective. In the first dimension (academic usage), questions 1, 2, 3, and 6 are presented in categorical response format with different response options. A percentage analysis was conducted to analyze the responses for these questions as well as rest of the items of the scale. Subsequently, an independent samples t-test and one way ANOVA were used to study the variations in perceptions with relation to gender, academic programs, and streams of higher education students.

Results

The Extent to Which Higher Education Students Use ChatGPT for Academic Purposes

Table 3 depicts the overall responses with respect to usage perception of ChatGPT for academic purposes. The results reveal that a more that average proportion of higher education students (53.1%) have been using ChatGPT for academic purposes for less than two months, while (25.9%) have been using it for exactly two months. Therefore, it is evident that higher education students have recently started to use ChatGPT for academic purposes, with majority of less than 2 months of experience. It shows that it is a new tool in the field of academia in higher education.

On the other hand, if we focus on the frequency of its usage for academic purposes then majority of the students

are using it several times a week (32.7%) and once a week (21%). And less than half of students (24.7%) are using it rarely. This shows that the ChatGPT is being used frequently for their academic purposes. Responses indicate a diverse range of academic activities, with (29%) favoring its use for research purposes.

Table 3. Academic Usage towards ChatGPT

Questions	**Responses in %**				
1. Time range of using ChatGPT for academic purposes	2 Months	3-6 Months	Less than 2 months		
	25.9% (42)	21% (34)	53.1% (86)		
2. Frequency of using ChatGPT for academic purposes	Several times a week	Once a week	A few times a month	Rarely	
	32.7% (53)	21% (34)	21.6% (35)	24.7% (40)	
3. Kind of academic activities using ChatGPT	Writing assignment	Summarizing or paraphrasing text	Taking notes	Conducting Research	Other
	22.2% (36)	22.8% (37)	16.7% (27)	29% (47)	9.25% (15)
4. Relying on ChatGPT as primary source of information for academic tasks?	Always	Never	Often	Rarely	Sometimes
	16.7% (27)	12.3% (20)	(17.3% (28)	32.1% (52)	21.6% (35)
5. Degree of overall usefulness of ChatGPT for academic purposes?	Very useful	Somewhat useful	Neutral	Somewhat Not useful	Not useful at all
	27.8% (45)	39.5% (64)	21% (34)	8.6% (14)	3.1% (5)
6. Spending of time by using ChatGPT for academic purposes?	<10 Minutes	10-30 Minutes	30 to 1 hr	1-2 hrs	More than 2hrs
	24.7% (40)	43.2% (70)	18.5% (30)	11.1% (18)	2.5(4)
7. Rating of proficiency in using ChatGPT for academic tasks?	Expert	Intermediate	Beginner		
	17.3(28)	48.1(78)	34.6% (56)		

The similar percentages of students (22.8%), use ChatGPT for writing assignments, summarizing, and paraphrasing, while only (16.7%) use it for taking notes. A small portion of respondents are found to be using it for asking question, coding, getting ideas, concept learning, programming language, letter and email writing. The data suggests that, there is no strong reliance on ChatGPT as the primary source of information for academic tasks, with a significant portion of respondents (32.1%) rarely and sometimes (21.6%) relying on it and a small portion of the respondents (16.7%) reported always relying on it, while 12.3% stated that they never rely on it. (39.5%) respondents responded that, ChatGPT has some potential advantages for academic purposes. It is important to note that only a small portion (27.8%) believe it to be very useful. It is revealed that, majority 43.2% of respondents spent between 10- and 30-minutes utilizing ChatGPT for academic purposes the most frequently while fewer respondents rate themselves as beginners (34.6%) or experts (17.3%).

Benefits and Limitations of Using ChatGPT in Higher Education as Perceived by Students

The second objective aims to assess how they are getting benefits and what are the limitations they are experiencing by using it. Table 4 reveals that majority of students are in favor of positive direction i.e., agreed (41.4%), strongly agreed (26.5%) that ChatGPT saves their time in completing assignment. On the other hand, ChatGPT provides very convenient way for accessing academic resources as a greater number of respondents is agreed (72.2%) with this statement.

Table 4. Benefits and Limitations of ChatGPT

Statements	**Responses in%**				
	Strongly Agree	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
8.Saves time for completing assignment	26.5% (43)	41.4% (67)	18.5% (30)	9.3% (15)	4.3% (7)
9. More convenient for to access academic resources and information	24.1% (39)	48.1% (78)	13.6% (22)	11.7% (19)	2.5% (4)
10.Helping in better understanding difficult concepts	19.1% (31)	51.2% (83)	19.1% (31)	8% (13)	2.5% (4)
11.Helps in personalized learning	22.2% (36)	50% (81)	14.8% (24)	9.9% (16)	3.1% (5)
12.Increasing confidence in academic abilities	17.3% (28)	42.6% (69)	17.3% (28)	17.9% (29)	4.9% (8)
13. Helping in coming up with more creative solutions to academic problems	18.5% (30)	48.8% (79)	16% (26)	13.6% (22)	3.1% (5)
14. Improves writing skills	19.1% (31)	38.9% (63)	19.1% (31)	16% (26)	6.8% (11)
15. Effectiveness in helping to complete academic tasks	23.5% (38)	49.4% (80)	17.3% (28)	6.8% (11)	3.1% (5)
16. Raises uncertainty about the reliability of the information provided	22.8% (37)	50.6% (82)	15.4(25)	8% (13)	3.1% (5)
17. Declines the creativity and critical thinking	18.5% (30)	42% (68)	16% (26)	17.9% (29)	5.6% (9)
18. Using for academic tasks makes feel less dependency from peers and teachers.	14.2% (23)	48.8% (79)	13.6% (22)	16.7% (27)	6.8% (11)
19. May not understand the nuances of certain topics or assignments.	15.4% (25)	60.5% (98)	17.9% (29)	5.6% (9)	0.6% (1)

According to the findings, most students (70.3%) strongly agreed or agreed that ChatGPT make it easier for them to learn complex ideas. However, a small portion of students (19.1%) are still undecided. The overall proportion of students who disagree or strongly disagree is relatively low (10.5%), indicating a generally positive perception i.e., (70.3%) of ChatGPT as tool for improving understanding. It is also helpful in making learning personalized as majority of respondents (72.2%) showed positive perception while relatively low percentage of students disagree or strongly disagree (13%) on this statement.

A significant percentage of students (combined, 60%) either strongly agree with or agree that ChatGPT can boost their confidence in their academic abilities. However, a small portion of students (17.3%) are still undecided and the prevalence of pupils who disagree (17.9%) may also point to some restrictions or difficulties in this aspect. Similarly, positive perception (67.3%) also found in terms of assisting the respondents in finding more creative solution of the problems.

A significant number of students (58% combined) either strongly agreed or agreed that ChatGPT can improve their writing skills. However, there is a notable proportion of students who remain undecided (19.1%) or disagree (16%), indicating potential variations in the effectiveness of ChatGPT in enhancing writing skills. A majority of students (72.9%) agreed and strongly agreed that ChatGPT is helping them in completing academic tasks.

It is revealed that a significant proportion of students (73.4%), either strongly agree or agree that using ChatGPT raises uncertainty about the reliability of information provided. This indicates that students have concerns regarding the reliability or accuracy of the information obtained through ChatGPT. Majority of students (61.1%) also agreed or strongly agreed that using ChatGPT declines their creativity and critical thinking. Using ChatGPT for academic tasks makes feel them less dependent on peers and teachers as (63%) of respondents agreed on this statement. ChatGPT may not understand the nuances of certain topics or assignment as a greater number of students (76.9%) agreed or strongly agreed on this aspect.

Factors Influencing the Acceptance of ChatGPT among Higher Education Students

The third objective deals with the factors, which attracted the higher education students to accept the ChatGPT. In Table 5, it is shown that majority of the respondent (82.8%) agreed or strongly agreed that ChatGPT is easy to use, also it is cost effective to use (83.9%). A significant proportion of respondents (72.3%) expressed an intention to continue using the ChatGPT for academic purposes. Majority of respondents (71.6%) either agreed or strongly agreed that they would recommend the ChatGPT to their peers. (55.2%) of respondents, or a significant portion, agreed or strongly agreed that they trusted the ChatGPT's accuracy and reliability of the information it generates. A considerable percentage of respondents (27.8%) expressed either disagreement or uncertainty. 71% of respondents are strongly agreed or agreed that using the ChatGPT improved their learning experience. Only (18.9%) of respondents expressed their disagreement or uncertainty. This shows that respondents thought the ChatGPT is a useful tool for enhancing the learning process. Therefore, all the factors, such as ease of use, cost-effectiveness, intention to use, peer recommendations, trust in accuracy and reliability, and enhancing learning outcomes, demonstrate the acceptance of ChatGPT among higher education students with a positive perception.

Table 5. Factors of Acceptance of ChatGPT

Statements	Responses in %				
	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
20. Easy to use	19.8% (32)	63% (102)	9.3% (15)	5.6% (9)	2.5% (4)
21. Cost effective to use	21.6% (35)	62.3% (101)	5.6% (9)	6.8% (11)	3.7 % (6)
22. Intended to continue using for academic purposes.	20.4% (33)	51.9% (84)	14.8% (24)	6.2% (10)	6.8 % (11)
23. Recommending to peers	20.4% (33)	51.2% (83)	12.3% (20)	11.1% (18)	4.9 % (8)
24.Trusting the accuracy and reliability of information	11.7% (19)	44.4% (72)	16% (26)	19.8% (32)	8% (13)
25.Enhances learning experience	15.4% (25)	55.6% (90)	11.1% (18)	11.7% (19)	6.2% (10)

Ethical Issues Associated with the Use of ChatGPT in Higher Education from the Perspective of Students

The fourth objective of the study deals with the ethical concerns associated with ChatGPT usage among higher education students. Table 6 shows that a significant percentage of respondents (82.1%) either agreed or strongly agreed that they had concerns about the potential for plagiarism when using the ChatGPT. This suggests that there is a perceived risk of plagiarism associated with the use of the ChatGPT. The usage of the ChatGPT raises concerns about fairness and accuracy in academic assessments, according to the majority of respondents (78.4%). Higher education students are agreed and strongly agreed (79.6%) that too much dependency on ChatGPT for academic task leads to addiction. This suggests that there is a perceived risk of becoming overly dependent on the ChatGPT for academic tasks, leading to potential addiction.

Table 6. Ethical Concerns in Using ChatGPT for Academic Purpose

Statements	Responses in %				
	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
26.Concerned about the potential for plagiarism when using ChatGPT	25.3% (41)	56.8% (92)	13% (21)	3.7% (2)	1.2% (2)
27.Raises concerns in academic assessments about fairness and accuracy.	20.4% (33)	58% (94)	11.7% (19)	6.2% (10)	3.7% (6)
28.Too much dependency for academic task could lead to addiction	30.2% (49)	49.4% (80)	10.5% (17)	6.2% (10)	3.7% (6)

Perception of Higher Education Students towards ChatGPT Usage in terms of Gender

The null hypothesis of the study was to find out the difference in perception of higher education students towards

ChatGPT in relation to gender. This was tested using an independent sample 't' test since the data met the assumptions of normality and homogeneity of variance. Table 7 indicates the result of the test.

Table 7. Perception towards ChatGPT in Relation to Gender

Dimensions	Gender	N	Mean	SD	SED	t	P value
Academic usage	Boys	83	8.72	2.270	0.365	-0.204	0.838
	Girls	79	8.80	2.377			
Benefits and limitations	Boys	83	40.14	7.719	1.160	0.474	0.636
	Girls	79	39.59	7.005			
Factors of acceptance	Boys	83	22.31	4.553	0.690	0.289	0.773
	Girls	79	22.11	4.215			
Ethical concerns	Boys	83	8.20	1.873	0.256	0.058	0.953
	Girls	79	8.19	1.321			
Overall Perception	Boys	83	79.39	13.287	2.014	0.342	0.733
	Girls	79	78.70	12.295			

To examine the perception scores of male and female higher education students regarding the use of the ChatGPT, an independent sample 't' test was conducted. Table 7 indicates that there is no statistically significant difference between the mean scores of boys and girls at the 0.05 level, 't' (160) =0342, p=0.733. That is the average performance of score of Boys (M = 79.39, SD = 13.287) was not significantly different from that of Girls (M = 78.70, SD = 12.295). Hence, the null hypothesis "There is no significant difference in the perception of Boys and Girls students of higher education towards the ChatGPT usage" is retained. However, when dimension wise comparison made, no statistically significant difference found with relation to academic usage, benefits and limitations, factors of acceptance and ethical concerns as the $p > 0.05$ level of significance.

Perception of Higher Education Students towards ChatGPT Usage in terms of Academic Programs i.e., Ph.D., Masters and Bachelors

To compare the perception of higher education students among different academic program, one way ANOVA was conducted. Table 8 indicates the result of the group comparison.

Table 8. ANOVA Result on Perception of Higher Education Students towards ChatGPT Usage in terms of Different Academic Programs (Ph.D., Masters and Bachelors)

Sources	SS	df	MS	F	P
Between Groups	9.835	2	4.918	0.030	0.971
Within Groups	26275.769	159	165.256		
Total	26285.605	161			

Note- SS (Sum of square), df (degrees of freedom), MS (Mean square)

From Table 8, no statistically significant difference was found between group means as determined by one-way ANOVA (F (2,159) = 0.030, P=0.971) in overall perception of higher education students towards the use of ChatGPT in terms of different academic programs. Hence, the null hypothesis "There is no significant difference in the perception among Ph.D., Masters and Bachelors students towards the ChatGPT usage" was accepted.

Perception of Higher Education Students towards ChatGPT Usage in terms of Different streams of Education i.e., Arts, Science and Commerce.

In addition to compare the perception of higher education students among different streams of education, one-way ANOVA was conducted. Table 9 shows the result of the group comparison.

Table 9. ANOVA Result on Perception of Higher Education Students towards ChatGPT Usage in terms of Different Streams of Education i.e., Arts, Science and Commerce

Sources	SS	df	MS	F	P
Between Groups	196.824	2	98.412	0.600	0.550
Within Groups	26088.769	159	164.080		
Total	26285.605	161			

Note- SS (Sum of square), df (degrees of freedom), MS (Mean square)

According to Table 9, no statistically significant difference was found between group means as determined by one-way ANOVA (F (2,159) = 0.600, P=0.550) in overall perception of higher education students towards the use of ChatGPT in terms of different streams of education. Hence, the null hypothesis "There is no significant difference in the perception among Arts, Science and Commerce students towards the ChatGPT usage" was accepted.

Discussion

Major findings of the study are listed as below:

1. Most of the student use ChatGPT for two and less than two months, utilized more for research purposes, having no strong reliance on it as primary source of information and students also beginners in their response to use ChatGPT.
2. It has some benefits such as it is saving time, very convenient in accessibility, easier to learn complex ideas, personalizing learning, increasing confidence in solving academic problems, improving writing skills, autonomy in learning, and some limitations found by the study are uncertainty on reliability of information, affecting creative and critical thinking and not understanding nuances of certain topic.
3. Perceived factors of accepting the ChatGPT are ease of its use, cost effectiveness, positive intention, improving learning experience, recommending peers. However, the study explored a low perception score on the accuracy and reliability factors of ChatGPT.
4. Higher education students are concerned about its plagiarism issues, fairness in academic assessment,

and risk of its addiction associated with the ChatGPT usage.

5. Gender, academic program and streams of education have no statistically significant relationship in determining the perception of higher education students towards the usage of ChatGPT.

The current analysis focused on how higher education students perceived using ChatGPT for a variety of academic activities, as well as how they felt about its advantages and limitations, factors that contributed to its acceptance, and ethical issues related to academic activities. It also aimed to find out the differences in perception in terms of gender, academic programs, and streams. There is paucity of research on this subject, particularly in the context of higher education; our findings have a significant impact on how students in higher education view the value of ChatGPT.

Few recent studies (Cotton et al., 2023; Mogavi et al., 2023; Zawacki-Richter et al., 2019; Zhai,2023) have explored some aspects of ChatGPT usage and application such as acquiring practical skill, efficiency and productivity, translating language, summarizing text, questioning-answering and helping researchers in producing papers that are methodical, coherent, (partially) accurate, and instructive in higher education. These results align closely with the findings of the present study. There is no strong reliance on ChatGPT as primary source of information for their academic task as the more number of students given response as rarely and sometimes. Gregorcic and Pendrill, (2023) also agree that ChatGPT is generating unreliable, incorrect and contradicted responses but linguistically it is advanced. Similarly, previous studies (Khan et al., 2023; Cotton et al., 2023; Javaid et al., 2023; Schonberger, 2023; Rasul et al., 2023) have provided supporting evidence for the benefits and limitations discussed in this research. These benefits include personalized learning, acting as a research and teaching assistant, content creation, language translation, supporting intellectual practices, providing feedback, answering questions, and facilitating academic tasks. On the other hand, the limitations identified encompass the absence of human-like creativity, potential negative effects on creativity levels, impacts on thinking skills, and the challenge of understanding students' unique learning preferences (Shidiq et al., 2023). Other limitations include a lack of contextual understanding and limited depth of comprehension (Farrokhnia et al., 2023; Rahman and Watanobe, 2023).

Students' perceptions of acceptance factors are consistent with the findings of Strzelecki (2023), who observed that the user-friendly interface and multilingual capabilities of ChatGPT have contributed to its acceptance. The ethical concerns are aligned with the prior research which revealed that, after the advancement of AI, manuscript, literature review, citations, plagiarism, references, and inaccuracy are becoming main concern (Bukar et al.,2023), risk to the integrity of online exams particularly in higher education (Susnjak, 2022), personal privacy (Mhlanga, 2023), reliability issues (Cotton et al., 2023), frequent use are affecting the thinking skill of the students in daily life (Shidiq et al., 2023). Related studies found that in employing AI, there is no correlation between learning capacity and gender (Devi and Rroy, 2023). Raman, (2023) found that “male students have prioritized compatibility, ease of use, and observability while female students prioritized adoption of ChatGPT with relation to ease of use, compatibility and relative advantages. Further male students prefer user friendly interface and related attributes more than female students and display greater interest in compatibility issues.”

Conclusions

It is crucial to understand that ChatGPT is a technology that, at least initially, may be used to assists teachers rather than to replace them (Koraishi, 2023). One million users have registered for the platform in the first week after it was made available to the public (Haque et al., 2022). The present study explored overall positive perception with regard to dimensions like, its academic usage, benefits, limitations, acceptance factors and ethical concerns towards the use of ChatGPT. The result of the study provides valuable insight about the perception of higher education students towards the use of ChatGPT in terms of their academic usage, benefits, limitations, factors of acceptance and ethical concerns, which will help to understand the student's current perception on this tool and subsequently it will support the higher education institution to implement, integrate and prepare framework how to use in the process of research and other academic activities. Higher educational institutions may benefit from the study's analysis of the advantages and limitations of using ChatGPT by optimizing those benefits and mitigating those limitations. Institutions can guarantee a well-balanced and successful implementation of ChatGPT in higher education by developing appropriate solutions to deal with these difficulties. Institutions can concentrate on strengthening of acceptance factors through training, education, and awareness campaigns by analyzing variables including its cost effectiveness, ease of use, trust in AI systems, and recommending to peers.

Institutions can formulate guidelines and procedures that address issues with plagiarism, and assessment, ensuring the rights and benefits of students in relation to quality practices, such as using AI detectors in the higher education institutions. Students can learn to use AI responsibly and ethically by participating in curriculum activities that encourage critical thinking and ethical discussion of AI issues. Further research needs to be conducted through a follow-up longitudinal study to monitor the long-term perceptions of higher education students towards the usage of ChatGPT, with an aim to investigate the evolution of perceptions as students continue to engage with the technology over an extended period. Studies need to be conducted by expanding the dimensions explored in the current study, which could provide a more comprehensive understanding about ChatGPT. Additionally, research may explore the impact of academic training and familiarity with AI technologies on students' perceptions of ChatGPT. Understanding how prior knowledge and exposure to AI contribute to their acceptance and usage is very crucial. Moreover, it is essential to study how ChatGPT influences academic performance at different levels of education. Another avenue of research could focus on examining the integration of ChatGPT in school education settings to assess its effectiveness and potential benefits. The present study highlights the overall perception of higher education students towards ChatGPT usage and also its limitations and ethical concerns which could assist the stakeholders of higher education to effectively use the ChatGPT by utilizing the gathered data.

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References

Abdaljaleel, M., Angeles, L., Barakat, M., Alsanafi, M., & Salim, N. (2023). *Factors Influencing Attitudes of University Students towards ChatGPT and its Usage : A Multi-National Study Validating the TAME-ChatGPT Survey Instrument*. https://doi.org/10.21203/rs.3.rs-3400248/v1

Akbar, M. A., Khan, A. A., & Liang, P. (2023). *Ethical Aspects of ChatGPT in Software Engineering Research*. http://arxiv.org/abs/2306.07557

Alkhaqani, A. L. (2023). ChatGPT and Academic Integrity in Nursing and Health Sciences Education. *Journal of Medical Research and Reviews*, 1(1), https://doi.org/10.5455/JMRR.20230624044947

Al-qadri, A. H., and Ahmed, S. A. M. (2023). *Assessing the ChatGPT Accuracy Through Principles of Statistics Exam : A Performance and Implications,*researchsquare. https://doi.org/10.21203/rs.3.rs-2673838/v1

Antonio, F., Limo, F., Nacional, U., and Enrique, D. E. (2023). Personalized tutoring : ChatGPT as a virtual tutor for personalized learning experiences. *Social space journal*. 23(01), 292–312. https://socialspacejournal.eu/menu-script/index.php/ssj/article/view/176

Banovac, A. (2023). ChatGPT-3.5 as writing assistance in students ' essays. *Humanities and Social Sciences Communication*, *6*(3), 1–6. https://doi.org/10.1057/s41599-023-02269-7

Bukar, U. A., Md Sayeed, Md. S., Razak, S.F.A., Yogarayan, S., & Amodu, O.A. (2023). Text Analysis of Chatgpt as a Tool for Academic Progress or Exploitation. SSRN: https://ssrn.com/abstract=4381394 or http://dx.doi.org/10.2139/ssrn.4381394

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of applied psychology*, *78*(1), 98-104. https://www.psycholosphere.com/what%20is%20coefficient%20alpha%20by%20Cortina.pdf

Cresswel.J.W. (2012). *Educational Research: Planning, Conducting, And Evaluating Quantitative And Qualitative Research*. Noida: Pearson India Education Services Pvt. Ltd.

Debby R. E. Cotton, Peter A. Cotton and J. Reuben Shipway (2023): Chatting and cheating: Ensuring academic integrity in the era of ChatGPT, Innovations in Education and Teaching International, DOI: 10.1080/14703297.2023.2190148

Devi, D., and Rroy, A. D. (2023). Role of Artificial Intelligence (AI) in Sustainable Education of Higher Education Institutions in Guwahati City: Teacher's Perception. *International Management Review*, 19, 111–116. Special Issue. https://americanscholarspress.us/journals/IMR/pdf/IMR-0-2023/IMR2023SpringSp-art10.pdf

Farrokhnia, M., Banihashem, S. K., Noroozi, O., and Wals, A. (2023). A SWOT analysis of ChatGPT: Implications for educational practice and research. *Innovations in Education and Teaching International*, *00*(00), 1–15. https://doi.org/10.1080/14703297.2023.2195846

Faruk,L.I.D., Rohan, R., Ninrutsirikun, U., Pal, D. (2023, December06–09). Generative AI (ChatGPT) from Psycho-Technical Perspective. *In 13th International Conference on Advances in Information Technology (IAIT 2023)*. Bangkok, Thailand. ACM, New York, NY, USA, 8 pages. https://doi.org/10.1145/3628454.3629552

Firat, M. (2023). How Chat GPT Can Transform Autodidactic Experiences and Open Education? https://doi.org/10.31219/osf.io/9ge8m

Foroughi, B., Senali, M. G., Iranmanesh, M., Khanfar, A., Ghobakhloo, M., & Annamalai, N. (2023). Determinants of Intention to Use ChatGPT for Educational Purposes : Findings from PLS-SEM and fsQCA. *International Journal of Human–Computer Interaction*,1–20. https://doi.org/10.1080/10447318.2023.2226495

Gregorcic, B., and Pendrill, A. (2023). ChatGPT and the frustrated. *Physics Education*, *58*(3), 1-10. DOI: 10.1088/1361-6552/acc299

Halaweh, M. (2023). ChatGPT in education: Strategies for responsible implementation. *Contemporary Educational Technology, 15*(2), ep421. https://doi.org/10.30935/cedtech/13036

Hasanein, A. M., & Sobaih, A. E. E. (2023). Drivers and Consequences of ChatGPT Use in Higher Education : Key Stakeholder Perspectives. *European Journal of Investigating in Health, Psychology. Education*, 2023, 13, 2599–2614. https://doi.org/ 10.3390/ejihpe13110181

Haque, M. A. (2023). A Brief Analysis of "ChatGPT"-A Revolutionary Tool Designed by OpenAI. *EAI Endorsed Transactions on AI and Robotics*, 1, e15. https://doi.org/10.4108/airo.v1i1.2983

Iqbal Nayab, Ahmed Hassaan, A. K. A. (2022). Exploring teachers' attitudes towards using chatgptl. *Global Journal for Management and Administrative Sciences*, *3*(4), 97–111. https;//doi.org/10.46568/GJMAS.V3I4.163

Janssen, A., Grutzner, L. and Breitner, M.H. (2021) Why do Chatbots fail? A Critical Success Factors Analysis. *Forty-Second International Conference on Information Systems*, Austin, Texas, December 12-15, 2021, https://www.researchgate.net/publication/354811221_Why_do_Chatbots_fail_A_Critical_Success_Factors_Analysis(PDF)

Javaid, M., Haleem, A., Pratap, R., Khan, S., and Haleem, I. (2023). Unlocking the opportunities through ChatGPT Tool towards ameliorating the education system. *BenchCouncil Transactions on Benchmarks , Standards and Evaluations*, *3*(2), 1-12 100115. https://doi.org/10.1016/j.tbench.2023.100115

Jishnu, D., Srinivasan, M., Dhanunjay, G. S., & Shamala, R. (2023). Unveiling student motivations: a study of chatgpt usage in education. *ShodhKosh: Journal of Visual and Performing Arts*, 4(2), 65–73. https://doi.org/10.29121/shodhkosh.v4.i2.2023.503

Jarrah, A. M., Wardat, Y., & Fidalgo, P. (2023). Using ChatGPT in academic writing is (not) a form of plagiarism: What does the literature say?. *Online Journal of Communication and Media Technologies*, 13(4), e202346. https://doi.org/10.30935/ojcmt/13572

Kashive, N., Powale, L. and Kashive, K. (2021), "Understanding user perception toward artificial intelligence (AI) enabled e-learning", *International Journal of Information and Learning Technology*, Vol. 38 No. 1, pp. 1-19. https://doi.org/10.1108/IJILT-05-2020-0090

Khan, R. A., Jawaid, M., Khan, A. R., and Sajjad, M. (2023). ChatGPT - Reshaping medical education and clinical management. *Pakistan Journal of Medical Sciences*, *39*(2), 605-607. https://doi.org/10.12669/pjms.39.2.7653

Koraishi, O. (2023). Teaching English in the Age of AI: Embracing ChatGPT to Optimize EFL Materials and Assessment. *Language Education and Technology (LET Journal)*, 3(1), 55-72. https://langedutech.com/letjournal/index.php/let/article/view/48/37

Lara-lara, F. (2023). Use of ChatGPT at University as a Tool for Complex Thinking : Students ' Perceived Usefulness. Journal of New Approaches in Educational Research,12(2),323–339. https://doi.org/10.7821/naer.2023.7.1458

Li, F., and Shonfeld, M. (2020). Artificial intelligence in education: promises, ethics, and challenges. *Journal of Research on Technology in Education*, 52(1), 5-8. https://www.researchgate.net/publication/332180327_Artificial_Intelligence_in_Education_Promise_and_Implications_for_Teaching_and_Learning

Lund, B. D., Wang, T., Mannuru, N. R., Nie, B., Shimray, S., & Wang, Z. (2023). ChatGPT and a new academic reality: Artificial Intelligence-written research papers and the ethics of the large language models in scholarly publishing. *Journal of the Association for Information Science and Technology*, *74*(5), 570–581. https://doi.org/10.1002/asi.24750

Maheshwari, G. (2023). Factors influencing students ' intention to adopt and use ChatGPT in higher education : A study in the Vietnamese context. *Education and Information Technologies*, *0123456789*. https://doi.org/10.1007/s10639-023-12333-z

Mhlanga, D. (2023). *Open AI in Education , the Responsible and Ethical Use of ChatGPT Towards Lifelong Learning*. SSRN. *February*. https://doi.org/10.2139/ssrn.4354422

Ministry of Education, Government of India. (2020). *National education policy* .https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

Mogavi, R. H., Deng, C., Kim, J. J., Zhou, P., Kwon, Y. D., Metwally, A. H. S., Tlili, A., Bassanelli, S., Bucchiarone, A., Gujar, S., Nacke, L. E., and Hui, P. (2023). Exploring User Perspectives on ChatGPT: Applications, Perceptions, and Implications for AI-Integrated Education. arxiv. http://arxiv.org/abs/2305.13114

National Institution for Transforming India, Government of India. (2018). *National strategy for artificial intelligence*.https://www.niti.gov.in/sites/defult/files/2023-03/National-Strategy-for-Artifical Intelligence.pdf

Neumann, M., Rauschenberger, M., and Schön, E.-M. (2023). "We Need To Talk About ChatGPT": The Future of AI and Higher Education. In 2023 *IEEE/ACM 5th International Workshop on Software Engineering Education for the Next Generation (SEENG)* (pp. 29-32). Melbourne, Australia. https://doi.org/10.1109/SEENG59157.2023.00010

Perspective, P., Ibrahim, L., & Faruk, D. (2023). *University Students ' Acceptance and Usage of Generative AI (ChatGPT) from a University Students ' Acceptance and Usage of Generative AI (ChatGPT) from a Psycho-Technical Perspective*. *December*. https://doi.org/10.1145/3628454.3629552

Phuong, N. T., Tien, C., Thi, K., & Quang, N. (2023). Interaction behaviors of students from thai nguyen university of education with chatgpt. *European Journal of Education Studies*, 10(11), 39–50. https://doi.org/10.46827/ejes.v10i11.5047

Rahman, M. M., and Watanobe, Y. (2023). ChatGPT for Education and Research:opportunities, threats, and strategies and Strategies. *Applied Sciences*, *13*(9),1-21. https://doi.org/10.3390/app13095783

Raman, R. (2023). *University students as early adopters of ChatGPT : Innovation Diffusion Study*. https://www.researchsquare.com/article/rs-2734142

Rane, N. L., Choudhary, S. P., Tawde, A., & Rane, J. (2023). ChatGPT is not capable of serving as an author :

ethical concerns and challenges of large language models in education. *International Research Journal of Modernization in Engineering Technology and Science*,5(10),851-874. https://doi.org/10.56726/IRJMETS45212

Rasul, T., Nair, S., Kalendra, D., Robin, M., Santini, F. de O., Ladeira, W. J., Sun, M., Day, I., Rather, R. A., and Heathcote, L. (2023). The role of ChatGPT in higher education: Benefits, challenges, and future research directions. *Journal of Applied Learning and Teaching*, *6*(1), 41–56. https://doi.org/10.37074/jalt.2023.6.1.29

Schonberger,M.(2023). ChatGPT in Higher Education : The Good , The Bad , and The University. *9th International Conference on Higher Education Advances.* Valencia, Spain, June 19 – 22, 2023, 331–338. https://doi.org/10.4995/HEAd23.2023.16174

Shidiq, M., Jadid, N., and Java, E. (2023). The use of artificial intelligence-based chat- gpt and its challenges for the world of education ; from the viewpoint of the development of creative writing skills. *Proceeding of 1st International Conference on Education, Society and Humanity*, Postgraduate program of Nurul Jadid University, Probolinggo, Indonesia, 01(01), 360–364. https://ejournal.unuja.ac.id/index.php/icesh

Shoufan, A. (2023). Exploring Students' Perceptions of ChatGPT: Thematic Analysis and Follow-Up Survey. IEEE Access, 11, 38805-38818. https://doi.org/10.1109/ACCESS.2023.3268224

Sulisworo, D., & Dahlan, U. A. (2023). Exploring the Usage of ChatGPT in Higher Education : Frequency and Impact on Productivity. *Buletin Edukasi Indonesia (BEI) 2*(01), 39–46. https://doi.org/10.56741/bei.v2i01.310

Strzelecki, A. (2023). To use or not to use ChatGPT in higher education? A study of students' acceptance and use of technology. *Interactive Learning Environments*, *May*, 1–14. https://doi.org/10.1080/10494820.2023.2209881

Susnjak, T. (2022). *ChatGPT: The End of Online Exam Integrity?*, http://arxiv.org/abs/2212.09292

Tanner, P., Asmalina, S. Krista, D. Glazewski, C. E. H. I. (2022). Exploring the use of GPT-3 as a tool for evaluating text-based collaborative discourse. *Companion Proceedings 12th International Conference on Learning Analytics and Knowledge (LAK22)* University of California, Irvine at the Newport Beach Marriott, March 21-25, 2022. https://tanner49.github.io/files/LAK22_Phillips_et_al_camera_reading.pdf

Tawfeeq, T. M., Awqati, A. J., & Jasim, Y. A. (2023). The Ethical Implications of ChatGPT AI Chatbot : A Review Journal of Modern Computing and Engineering Research. *Journal of Modern Computing and Engineering Research*, 2023, 49-57. https://www.researchgate.net/publication/374697825_The_Ethical_Implication_of_ChatGPT_AI_Chatbot_A_Review

Tho, C. (2023). The Perception by University Students of the Use of ChatGPT in Education. *Emerging Technologies in Learning*, *18*(17), 4–19 https://doi.org/10.3991/ijet.v18i17.39019.

Tiwari, C. K., & Bhat, M. A. (2023). What drives students toward ChatGPT? An investigation of the factors influencing adoption and usage of ChatGPT. *Interactive Technology and Smart Education*, https://doi.org/10.1108/ITSE-04-2023-0061

Tlili, A., Shehata, B., Adarkwah, M.A., et al. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. Smart Learning Environments, 10(1), 15.

https://doi.org/10.1186/s40561-023-00237-x.

Vaccino-salvadore, S. (2023). Exploring the Ethical Dimensions of Using ChatGPT in Language Learning and Beyond. *Languages*, 8(3) 1-6. https://doi.org/ 10.3390/languages8030191 4-9

Yifan, W., Mengmeng, Y., & Omar, M. K. (2023). "A Friend or A Foe" Determining Factors Contributed to the Use of ChatGPT among University Students. *International Journal of Academic Research in Progressive Education and Development*, 12(2), 2184–2201. https://doi.org/10.6007/IJARPED/v12- i2/17400

Yu, H. (2023). Reflection on whether Chat GPT should be banned by academia from the perspective of education and teaching. *Frontiers in Psychology*, 1-12. https://doi.org/10.3389/fpsyg.2023.1181712

Zawacki-Richter, O., Marín, V. I., Bond, M., and Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, *16*(1). https://doi.org/10.1186/s41239-019-0171-0

Zhai, X. (2023,April 12). ChatGPT for Next Generation Science Learning. *The ACM Magazine for students*, *29*(3), 42-46. https://doi.org/10.1145/3589649

Zhai, X. (2023b). ChatGPT User Experience: Implications for Education. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4312418

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