

ChatGPT: The Future Research Assistant or an Academic Fraud? [A Case Study on a State University Located in Jakarta, Indonesia]

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ABSTRACT

ChatGPT is an artificial intelligence (AI) technology currently popular among the public. This groundbreaking technological development has reached various fields, including education, where ChatGPT can facilitate learning activities, making them more effective and efficient. However, this development can also be misused and may facilitate academic fraud. This paper aims to understand the benefits and threats of using ChatGPT for educational purposes and its potential misuse for academic fraud. This study involves a literature review of published journals containing pertinent scientific articles and utilizes data processed from questionnaires distributed to students at a university in Jakarta. Our analysis shows that ChatGPT is useful in several ways, including providing ideas and frameworks for researchers, supporting access to various types of literature, constructing abstracts, formulating research questions and hypotheses, and detecting grammatical errors. In contrast, significant risks are associated with using ChatGPT, particularly in research. These risks include plagiarism, ethical concerns, integrity issues, and the potential inaccuracy of data generated by ChatGPT. Therefore, further validation is needed. Consequently, our analysis also indicates that using ChatGPT to write scientific articles or for closed-book exams is considered academic dishonesty.

Keyword: ChatGPT, AI, Fraud, Academic Fraud, Academic Dishonesty.

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1. INTRODUCTION

An act of dishonesty for personal gain (Smith et al., 2011), fraud can come in many shapes and sizes, including academic fraud, a fraudulent action, or an attempt to use unauthorized means for academic gains (Lambert et al., 2003). Since the early 2000s, the fabrication and plagiarism of academic works have reportedly been on the rise in tandem with the expansion of the internet (Hafner, 2001; Wilson, 2001). The breakthrough of ChatGPT, an artificial intelligence (AI) language model adept at generating human-like answers over far-reaching commands (Cotton et al., 2023), can potentially worsen this trend. With its ability to give human-like responses to inquiries, ChatGPT can potentially threaten the integrity of the academic world, some of which are AI-assisted cheating and the inclusion of fabricated information in generated texts (Zhu et al., 2023). Not only that, ChatGPT can generate various forms of texts that are high-quality in structure, but upon further inspection, few of them were laced in junk sciences (Xames & Sheva, 2023). Thus, ChatGPT can help streamline academic work while also threatening the integrity of the academic world with its potential misuse (Dergaa et al., 2023). However, currently, there is a lack of literature review regarding the threat of ChatGPT as a means to commit academic fraud. Seeing that, this paper aims to shed light on what ChatGPT is and its potential benefits and threats, as well as to provide the perspective of students and previously reviewed research regarding the apparent potential misuse of AI for fraud.

2. LITERATURE REVIEW AND HYPOTHESIS

Fraud and Academic Fraud

Smith et al. (2011) describe fraud as “some form of intention of deception and/or dishonesty alongside the achievement of some kind of gain,” while ACFE (n.d.) depicts fraud as “any activity that relies on deception to achieve a gain.” In 1953,

Dr. Donald Cressey, a criminologist, introduced the fraud triangle theory. The fraud triangle theory is the initial framework that accounts for the factors leading to fraud. The first aspect of the triangle denotes a pressure or drive to carry out fraudulent action, the second angle illustrates a perceived opportunity, and the third side symbolizes rationalization. The fraud triangle framework has been explored to gain insight into the behavior associated with academic cheating. Muhsin et al. (2018) noted that academic pressure, opportunities, and rationalization in cheating positively influence students' academic fraud behavior.

Walker & Holtfreter (2015) divided academic fraud into two primary divisions: academic dishonesty and research misconduct. Academic dishonesty could be described in numerous ways. Jensen et al. (2002) described academic dishonesty as “students' attempt to present others' academic work as their own.” Lambert et al. (2003) describe it as “any fraudulent actions or attempts by a student to use unauthorized or unacceptable means in any academic work.” Additionally, Von Dran et al. (2001) and Weaver et al. (1991) consecutively defined academic fraud as “any intentionally unethical behavior” and “a violation of an institution's policy of honesty. While the term research misconduct as articulated by the White House Office of Science and Technology Policy (OSTP) in 2000 is “fabrication, falsification, or plagiarism (FFP) in proposing, performing, or reviewing research, or in reporting research results.” The problem with research misconduct is its underreported case caused by many academics not reporting their deceptive co-worker practices to proper authorities (Titus et al., 2008). It also goes along with what many academics believe “copy and paste” plagiarism is increasing in line with the invention and rapid growth of computers and the internet over the past few years (Hafner, 2001; Wilson, 2001).

Smart Society

The rollout of the smart society framework aims to address problems that arise from technological advancement. The smart society focuses on how humanity can harness the power of technology to its full potential while still maintaining the values of sustainability, resource management, and ethics (Ouyang et al., 2022). This includes leveraging artificial intelligence as a means to improve individual well-being and increase the efficiency of task completion without undermining other aspects of life and crossing ethical boundaries. While a smart society could bring benefits in education and knowledge sharing, the development of such a society could also expose vulnerabilities to cybercrime.

Artificial Intelligence

McCarthy (2007), one of the founding fathers of Artificial Intelligence (AI), described it as the scientific and engineering principles involved in developing intelligent machines, primarily computers. He further suggested that AI is linked to the equivalent task of leveraging computers to comprehend human intelligence, yet biologically observable methods do not limit AI. Furthermore, Xu et al. (2021) explained AI as the branch of science and engineering dedicated to designing systems proficient in tasks typically attributed to intelligent entities, including learning, judging, and decision-making. Additionally, AI has proven to be capable of solving various complex tasks, including tasks in education (Zhai, 2023). However, AI also has the potential to be exploited as a tool for fraud, enabling the creation of spam, ransomware, and other harmful outputs.

Machine Learning

While humans learn through their experience and use their five senses, AI perceives and adapts, employing data to accomplish any desired outcome (High Level Expert Group on Artificial Intelligence, 2019). This process is called machine learning, defined as the science

and art of programming computers to gain knowledge from data (Géron, 2019), simplified by one of the founding fathers of AI, Arthur Samuel (1959), as “the ability to learn without being explicitly programmed.”

There are a few subfields of machine learning, one of which is deep learning. As implied by the name, deep learning delves into layers of data that allow computers to learn in a hierarchy of concepts, which are then defined into simpler concepts. These are called neural networks (Rudolph et al., 2023). Neural networks are the base of modern language models—statistical models that assign a probability to a sequence of words—which are the backbone of Chatbot AIs, the types of AI that can produce similar responses for human dialogue, as well as tasks (Elkins & Chun, 2020). Machine learning plays a dual role in enhancing fraud detection in a smart society but could also be misused to create sophisticated fraud techniques.

ChatGPT

ChatGPT, established by an American AI research laboratory, is an artificial intelligence technology in the form of a chatbot called OpenAI. This AI technology is based on a generative pre-trained transformer (GPT) family of large language models (LLMs). It has a fine-tuning method utilizes supervised and reinforcement learning (Xames & Sheva, 2023). According to a UBS study, the AI chatbot was released on November 30th, 2022, and became the most rapidly growing consumer application of all time. As of December 2022, ChatGPT had around 57 million monthly active users, which jumped to 100 million in January 2023.

ChatGPT has been used for diverse purposes, including writing essays, summarizing text, answering questions, writing programming code, performing translation, and even interacting with it like peers. It can carry out numerous language tasks with minimal training tailored to specific tasks (Cotton et al., 2023).

Xames and Sheva (2023) claimed that ChatGPT can aid researchers throughout all research phases, from generating ideas to analyzing results, selecting journals, and suggesting potential reviewers. Although confident in its potential, they advised caution about not becoming too dependent on the technology. Likewise, Sok and Heng (2023) contended that ChatGPT has a great likelihood of being advantageous for students, educators, and researchers. That said, it is vital to remember that such a transformative AI tool has some susceptibility, including the possibility of academic integrity, prejudiced assessment among students, inaccuracies in facts, and excessive dependence on AI that may hinder the growth of essential life skills. ChatGPT can support smart society in education and content creation but also introduces risks if misused for fraud, such as generating deceptive information that mimics human responses (Cotton et al., 2023).

Previous Research

Many researchers have researched the pros and cons of ChatGPT, particularly in academics. The following table provides a summary of previous research, which mainly explains the opportunities and threats of ChatGPT. It also summarizes researchers' views regarding whether the use of ChatGPT is a form of academic dishonesty.

3. METHODS

This study uses a quantitative approach, collecting primary data through a questionnaire. The data is then tabulated, and the results are compared with a literature review. The population in this study is 6th-semester undergraduate students of the Faculty of Economics at a State University in Jakarta. This population was chosen because the students had completed fraud-related education through Forensic Accounting

and Investigative Audit courses. We hope that respondents already understand the fraud concept to answer the questions asked.

Questionnaires were sent in July 2023 with a population of 236 respondents. This questionnaire was distributed using a voluntary sampling method, where students in the faculty could fill out the questionnaire if they were interested in participating. From this data, 45 questionnaire results were accepted and processed. This selection is based on the suitability of the respondents' backgrounds with the requirements for selecting the population. The questions in the questionnaire were compiled based on a summary of previous research in Table 1. The list of questions that we proposed can be seen in **Appendix 1**. The questions consist of respondent profiles and respondents' perceptions regarding (1) the use of ChatGPT in academic realms and academic dishonesty, (2) the benefits and opportunities of ChatGPT in preparing research/journals, and (3) the challenges and threats of using ChatGPT in preparing research/journals.

The questions submitted are closed questions utilizing the Likert's scale method ranging from 1 – 5. Scale 1 means the respondent strongly disagrees, while scale 5 means the respondent strongly agrees with the questions or statements submitted. Additionally, some questions are semi-closed. Respondents rank the choices provided in the questionnaire. Where the scale is interpreted as the smaller the rank, the more often respondents perform said actions. The questionnaire results are processed using statistical descriptive analysis to test hypotheses. This analysis is conducted by presenting the questionnaire results in graphical form and then describing them to draw research conclusions. This research conclusion will be compared with the hypothesis obtained based on previous studies.

4. RESULTS AND DISCUSSION

Participants Profile

This questionnaire included 16 male respondents (36%) and 29 female respondents (64%). Nearly all participants were in the 21- to 25-year-old age group, with one person in the below-20 age group. Participant's Perspective Regarding the Use of ChatGPT in the Academic World

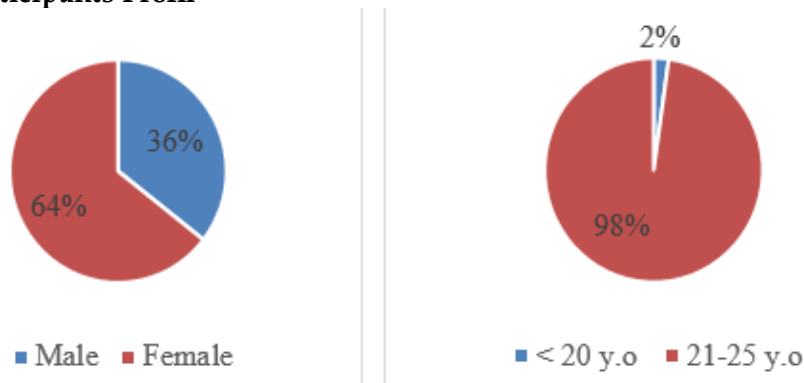
The first question was whether the participants understood ChatGPT's use for academic tasks. Most participants (87%) stated that they have enough knowledge to utilize ChatGPT for academic purposes, with 49% choosing a scale of 4 and 38% choosing a scale of 5 (Figure 2).

The use of ChatGPT for the participants is further explored by inquiring as follows, "In the academic fields, ChatGPT has benefitted the respondents for the following tasks," and having the participants rank the inquired tasks on a scale of 1 to 4, with one being the most beneficial or often used, and 4 being the opposite. Based on the aforementioned statement, we have summarized the participants' responses in Table 1.

Participants' Perspective Regarding ChatGPT and Academic Dishonesty

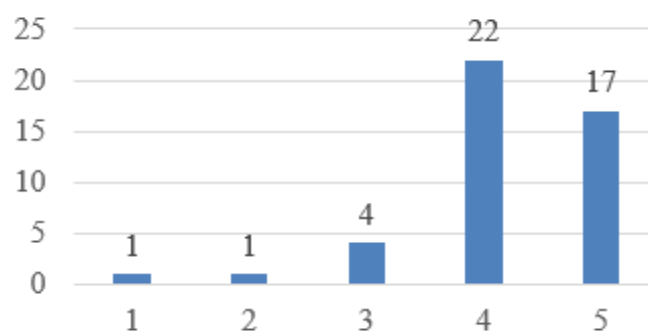
Subsequently, we intend to understand the participants' views regarding ChatGPT and academic dishonesty. The statement

Figure 1. Participants Profil



Source: Data Processed

Figure 2. Participants understanding of ChatGPT



Source: Data Processed

we asked is, “The use of ChatGPT in the academic field is not a form of cheating/academic dishonesty” (Figure 3). The results have shown to be quite interesting. While 17 respondents (38%) chose a scale of 4 and 10 (22%) chose a scale of 5, 18 seemed unsure with said statement. Out of 18 respondents, 3 chose a scale of 2, while 15 chose a scale of 3. This shows that 40% of the participants doubt the integrity of ChatGPT usage and its possibility for academic dishonesty.

To sharpen the perception of academic dishonesty, we inquire about more specific statements, as shown in Figure 4 and Figure 5. In Figure 4, the inquired statement is, “ChatGPT is a form of cheating/academic dishonesty if used to answer closed-book exams.” As for this statement, 18 respondents (40%) chose a scale of 5, and 11 (24%) chose a scale of 4. Therefore, 64% of respondents agree that using ChatGPT in closed-book exams is an academic dishonesty.

Figure 5 shows participants’ responses to the statement, “The use of ChatGPT to answer open book exams or assignments/

questions (as long as there is no prohibition from the lecturer) is allowed and is not a form of cheating/academic dishonesty.” Based on this statement, participants’ perceptions are pretty balanced on a scale of 3 (31%, 14 participants) and scales 4 and 5, each 33%. Thus, it can be concluded that 66% of respondents believe that the use of ChatGPT is not academic dishonesty in an open book exam.

Regarding learning and teaching, some researchers mentioned concerns about the academic dishonesty of ChatGPT. Thus, universities must ensure its ethical and responsible use by regulation or other forms of control (Cotton et al., 2023). Farrokhnia et al. (2023) and Rahman & Watanobe (2023) agreed that using ChatGPT will potentially threaten academic integrity, e.g., cheating in online exams through ChatGPT.

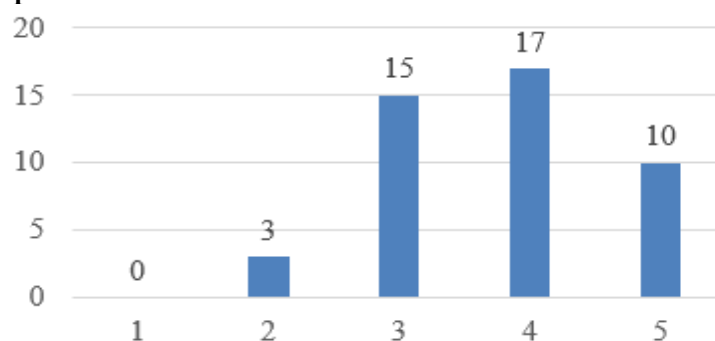
Participants’ Perspectives Regarding the Benefits and Opportunities of ChatGPT To understand the participants’ views on the benefits of ChatGPT, especially as research assistants, we asked them to rank

Table 1. The Uses of ChatGPT in The Academic World

No	Benefits of ChatGPT	Rank 1	Rank 2	Rank 3	Rank 4
1	Construct research paper and various academic writings	25	6	8	6
2	Answer tasks and/or questions from lecturer	3	22	15	5
3	Answer open book assessment tests	6	15	18	6
4	Others	11	2	4	28
	Total	45	45	45	45

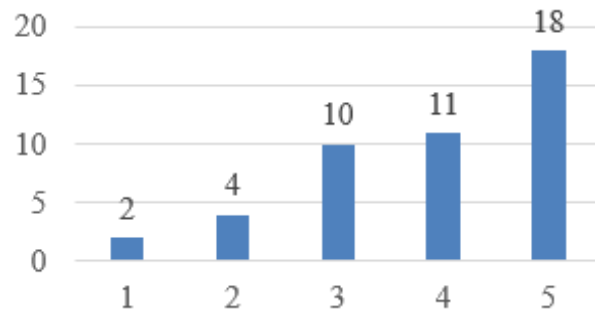
Source: Data Processed

Figure 3. Participants' View on ChatGPT is not a Form of Academic Dishonesty



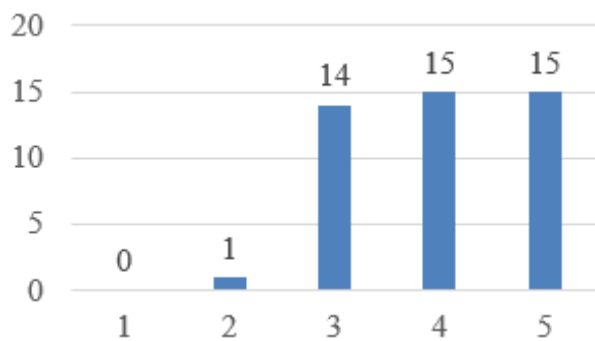
Source: Data Processed

Figure 4. **ChatGPT is a Form Academic Dishonesty if Used for Closed Book Assessment Test**



Source: Data Processed

Figure 5. **ChatGPT is not a Form of Academic Dishonesty in An Open Book Assessment Test**

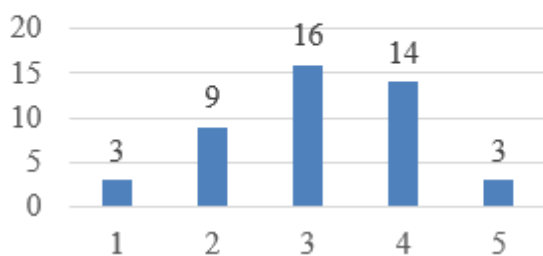


Source: Data Processed

statements regarding the use of ChatGPT for research and academic writing, with rank 1 being the most useful or often used and rank 7 being the opposite. The inquiry used was, "Which of the following statements does the respondent deem as the use of ChatGPT?" Based on that inquiry, we have provided the results in Table 2.

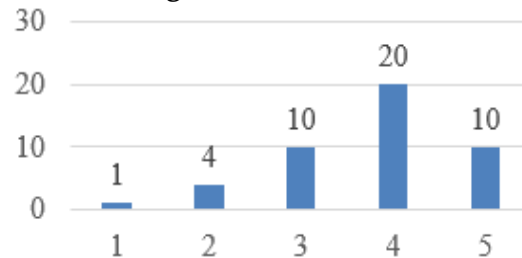
Figure 6. **Usage of ChatGPT can Potentially Decrease Students Ability to Think Critically**

Figure 6. Usage of ChatGPT can potentially decrease students ability to think critically



Source: Data Processed

Figure 7. **Usage of ChatGPT on Academic Writing Increase the Risks Of Plagiarism**



Source: Data Processed

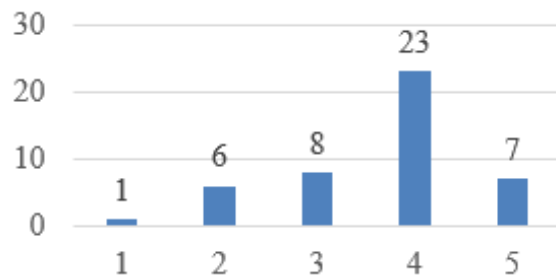
Participants' Perspective Regarding the Risk of ChatGPT in the Academic Field

We asked several questions to find out respondents' perceptions of the risks of using ChatGPT in academics and in writing scientific papers. These risks include the potential decrease in respondents' ability to think critically, increased plagiarism, ethical risk, and inaccurate data/biased information. We present the results of questions regarding the four risks of using ChatGPT in Figures 6, 7, 8, and 9.

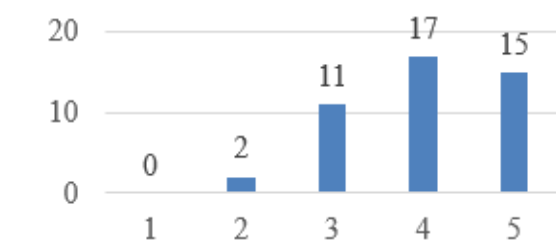
Table 2. **Benefits of ChatGPT for Researchers and Academic Writings**

No	Benefits of ChatGPT	Rank 1		Rank 2		Rank 3		Rank 4		Rank 5		Rank 6		Rank 7	
		Q	%	Q	%	Q	%	Q	%	Q	%	Q	%	Q	%
1	Generating idea and/or framework	16	36	5	11	8	18	6	13	6	13	1	2	3	7
2	Making research questions and hypotheses	0	0	11	24	11	24	8	18	5	11	7	16	3	7
3	Paraphrasing and summarizing theoretical foundations	7	16	10	22	5	11	16	36	6	13	1	2	0	0
4	Finding various relevant theoretical foundations	16	36	8	18	9	20	3	7	1	2	6	13	2	4
5	Constructing an abstract	1	2	2	4	4	9	9	20	22	49	4	9	3	7
6	Improving writing techniques (e.g.: find typos)	2	4	4	9	4	9	1	2	5	11	22	49	7	16
7	Others	3	7	5	11	4	9	2	4	0	0	4	9	27	60

Source: Data Processed

Figure 8. **Usage of ChatGPT has an Ethical Risk**

Source: Data Processed

Figure 9. **Risk of Biases and Inaccuracy on Information Provided by ChatGPT**

Source: Data Processed

The first question related to critical thinking. Respondents gave their responses as shown in Figure 6. Nine

respondents (20%) chose a scale of 2, 16 respondents (36%) chose a scale of 3, and 14 respondents (31%) chose a scale of 4. Thus, respondents' opinions are fairly balanced between doubt and agreement regarding the risk of decreasing their ability to think critically while using ChatGPT.

The second question concerns the risk of plagiarism. The results are presented in Figure 7. Twenty respondents (44%) answered on a scale of 4, and 10 (22%) answered on a scale of 5. Thus, 66% agreed that using ChatGPT carries a risk of plagiarism.

The third question concerns ethical risk. For example, an author may be considered unethical or lack integrity if he or she relies too heavily on ChatGPT. For this question (see Figure 8), 23 respondents (51%) chose a scale of 4, and 7 respondents (16%) chose a scale of 5, which means that 66% of respondents agreed that using ChatGPT to prepare journals or writings poses an ethical risk.

Figure 10. **Data/Information/Analysis Provided by ChatGPT Needs to be Further Validated to the Original Information Sources**

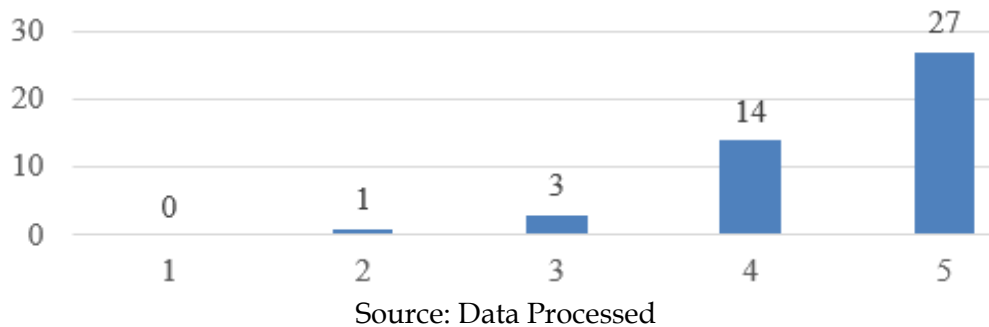


Figure 11. **Academic Writings/Journal/Research Produced Entirely Using ChatGPT/ Ai are a Form of Academic Dishonesty**



The final question concerns the accuracy of ChatGPT's data. As many as 17 respondents (38%) chose a scale of 4, and 15 respondents (33%) chose a scale of 5. Therefore, 71% of respondents agreed that there is a risk that the data/information generated by ChatGPT is inaccurate/biased.

Regarding the accuracy of ChatGPT data, we asked respondents' opinions about the need to validate the initial information sources provided by ChatGPT (Figure 10). Most respondents (27 people/ 60%) chose a scale of 5, and 14 (31%) chose a scale of 4. Thus, 91% of respondents believed that the data/information/analysis produced by ChatGPT needed further validation by comparing it to the original information sources.

As a closing question, we asked the respondents about academic dishonesty and their dependence on ChatGPT for journal/research preparation. For this question (Figure 11), 18 respondents (40%) chose a scale of 4, and 11 respondents (24%) chose a scale of 5. This means that

64% of respondents agreed that writing journals, scientific works, research, or final assignments entirely with the help of ChatGPT or AI is a form of academic dishonesty or cheating.

DISCUSSION

Participants Perspectives Regarding the Use of ChatGPT in the Academic World

From the results inferred from Table 1, we can concur that based on the frequency of its uses, ChatGPT is generally used for the following tasks: (1) Construct research paper and various academic writings; (2) Answer tasks and/or questions from lecturer; (3) Answer open book assessment tests; (4) Others. Additionally, participants stated that the other uses of ChatGPT include finding references, summarizing study materials, and acquiring theoretical knowledge to answer various problems.

Based on previous research, ChatGPT offers numerous advantages students and teachers could benefit from (Farrokhnia et al., 2023). ChatGPT can be used by teachers in various stages of teaching.

With the right command, lesson plans, assessment methods, and even grading can be assembled in seconds by ChatGPT (Rudolph et al., 2023). While for students, the existence of ChatGPT might be much more substantial. ChatGPT could help students achieve and complete their tasks in a way that is both quick and concise. Dergaa et al. (2023) and Cheon Hin Hong (2023) agreed that ChatGPT's highly realistic and human-like response can assist students in learning and simplifying complex theories. ChatGPT can also be used to answer basic questions and follow-ups, making it easier for students to complete their assessment tests or quizzes (Angelis et al., 2023).

Regarding learning and teaching, some researchers mentioned concerns about the academic dishonesty of ChatGPT. Thus, universities must ensure its ethical and responsible use by regulation or other forms of control (Cotton et al., 2023). Farrokhnia et al. (2023) and Rahman & Watanobe (2023) agreed that using ChatGPT will potentially threaten academic integrity, e.g., cheating in online exams through ChatGPT.

Benefits and Opportunities of ChatGPT

Based on the results shown in Table 2, it can concur that the primary uses of ChatGPT as a research assistant ranked as the most useful or often used are (1) generating ideas and/or framework, (2) making research questions and hypotheses, (3) paraphrasing and summarizing theoretical foundations, (4) Finding various relevant theoretical foundations, (5) constructing an abstract, (6) improving writing techniques (e.g. find typos), and (7) others. Participants also stated other benefits of ChatGPT besides the aforementioned points, including foreign language translation, generating conclusions, and summarizing lists of references.

Past research has concluded several opportunities on how AI can contribute to the world of academics, including but not limited to academic writing as well as teaching and learning. In terms

of academic writing, a few benefits can help researchers provide quality papers effectively. ChatGPT can offer ideas and frameworks for researchers (Sok & Heng, 2023). Following that, ChatGPT can provide ample journal suggestions as materials for literature reviews (Xames & Sheva, 2023). Moreover, ChatGPT can provide a research paper's prototype and initial manuscript (Dergaa et al., 2023). Once a manuscript is completed, ChatGPT can automatically detect grammatical errors (Rahman & Watanobe, 2023). Even further, ChatGPT can generate a completed version of various forms of text, including but not limited to essays and poetry (Cheong Hin Hong, 2023).

Risks of ChatGPT in the Academic Field

The results, as presented in Figures 8 to 11, interestingly match the results of several previous studies. Rahman & Watanobe (2023) suggest that over-dependence on AI might decrease students' critical thinking ability. There are also arguments regarding the ethical use of ChatGPT in completing academic tasks. It has been proven to be difficult to distinguish whether or not a student completes a task or AI, which results in an unfair assessment of each student's level of understanding (Cotton et al., 2023). Farrokhnia et al. (2023) and Angelis et al. (2023) agreed there are apparent plagiarism risks from works generated by ChatGPT, both voluntary and involuntary.

Involuntary plagiarism is caused by how ChatGPT evolves by learning information from its users. Therefore, some words have similar structures. This nature also causes some information or answers generated by ChatGPT to be sometimes biased toward a certain group of people (Dergaa et al., 2023) and inaccurate (Sok & Heng, 2023). Consequently, too much AI-generated work might cause an influx of fake research, harming the public's view and knowledge (Zhu et al., 2023). This predicament will ultimately devalue the essence of academic integrity and endanger people's safety, as some fields

of research directly influence people's lives, such as medicine and infrastructures (Angelis et al., 2023).

As Walker and Holtfreter (2015) mentioned, academic fraud can be classified into two definitions: academic dishonesty and research misconduct. Jensen et al. (2002) described academic dishonesty as presenting others' work as one's own. The results inferred from Figure 4 show that respondents agree that using ChatGPT during a closed-book exam is a form of academic dishonesty. Subsequently, as defined by the White House's OSTP (2000), research misconduct includes falsifying, fabricating, and plagiarism. The results inferred from Figure 11 show that 64% of the respondents agree that utilizing ChatGPT to produce journal/research entirely without proper citations and sources is a form of research misconduct. Additionally, Figures 8 and 9 show that the respondents agree that ChatGPT has a high risk of bias and inaccuracy. Further validations are needed for information acquitted through the chatbot, showing its use as a possible research misconduct. Seeing these points, the respondents conclusively perceive using ChatGPT as a risk of academic fraud.

5. CONCLUSION

Based on the literature review results and descriptive statistics obtained by processing the questionnaire, it can be concluded that while ChatGPT has shown numerous benefits, it still has several downsides, especially regarding its questionable ethical uses and apparent threats to academic integrity.

On the other hand, ChatGPT can help researchers produce quality papers effectively. Various benefits include ChatGPT providing ideas and frameworks for researchers, journal suggestions as materials for literature reviews, prototypes, and initial manuscripts of a research paper, and automatic detection of grammatical errors. ChatGPT is also useful for formulating abstracts, research questions, and

hypotheses and for translating foreign languages.

Although ChatGPT is widely revered as a helpful tool for completing tasks swiftly and accurately, blind reliability on AI might be harmful in the long run. Therefore, ChatGPT has various risks when used as a research assistant. The majority of respondents in this study agree that the use of ChatGPT carries at least the risk of plagiarism, ethical/integrity risks, and the risk that the data/information generated by ChatGPT is less accurate/biased. Furthermore, respondents were only partially convinced that using ChatGPT would reduce their ability to think critically. To mitigate these risks, further validation of data/information obtained from ChatGPT compared to the original literature is needed.

Regarding academic fraud, most respondents agreed that ChatGPT is used in the closed-book exam. According to respondents, another form of academic dishonesty is when a researcher compiles a journal, scientific work, research, or final project entirely using ChatGPT or AI.

This research population is limited to 45 students due to time constraints. For future research, we suggest that researchers collect more samples and make comparisons between professions, such as academics (students/lecturers) and practitioners who have tasks related to R&D in their institutions. Additionally, we hope future researchers can include questions about how universities and institutions implement academic dishonesty prevention from excessive use of ChatGPT. Furthermore, we suggest that subsequent research develop the instrument/questionnaire and explore the result by conducting qualitative research.

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Appendix 1. Resume of Previous Research

No.	Author	Title	Opportunities	Threats	Academic Dishonesty
1	Debby R. E. Cotton, Peter A. Cotton, J. Reuben Shipway	Chatting and cheating: Ensuring academic integrity in the era of ChatGPT	<ul style="list-style-type: none"> a. increase student engagement and collaboration; facilitate collaboration by creating student groups, allowing students to work together on projects and assignments b. helping writers and content creators generate ideas and overcome writer's block c. able to translate between languages with high levels of accuracy, and to generate summaries of long documents that are coherent and informative d. create chatbots that can hold conversations with users and answer questions, e. demonstrating its ability to understand and respond to natural language inputs f. generate articles and other types of written content. 	<ul style="list-style-type: none"> a. concerns regarding academic honesty and plagiarism. b. the potential for GPT-3 to be used to create 'fake news' or to manipulate public opinion c. increasing plagiarism d. inequality of access to ChatGPT creates unfair advantages to student e. difficult to distinguish student-made writing and ChatGPT bots resulting in an incompatible assessment of the student's understanding level 	<p>mentioned as having so much benefit potential but also challenge and concern toward academic dishonesty and plagiarism.</p> <p>Universities must ensure its ethical and responsible use</p>

No.	Author	Title	Opportunities	Threats	Academic Dishonesty
2	Luigi De A., Francesco B., Guglielmo A., Gaetano P. P., Paolo F., Alberto E. T., and Caterina R.	ChatGPT and the rise of large language models: the new AI-driven infodemic threat in public health	<ul style="list-style-type: none"> a. good at interacting in a human-like conversation b. a solution to tame the scientific literature and support researchers in collecting the available evidence c. AI tools can make programmers' jobs easier d. aid in education and make programming more accessible e. abstract screening for systematic reviews, thus saving researcher's time and effort f. streamline the work of researchers, providing valuable support throughout the scientific process, g. suggesting research questions to generate hypotheses h. suggest titles, write drafts, and help to express complex concepts in fluent and grammatically correct scientific English 	<ul style="list-style-type: none"> a. Sometimes writes incorrect or non-sensical answers, due to its inability of fact-checking and its knowledge (limited until 2021) b. over-reliance on the generated outputs, especially non-programmers may quickly become accustomed to auto-suggested solutions c. deskilling in researchers' writing abilities d. leading to a decline in the author's ability to craft meaningfully and substantively her objects of study e. the possibility of "involuntary plagiarism" or intellectual property issues surrounding the output of the model. f. can be easily tricked into producing text on controversial topics, including misinforming content g. In fields where fake information can endanger people's safety, such as medicine. 	The misuse of ChatGPT in scientific research could lead to the production of fake scientific abstracts, papers, and bibliographies.

No.	Author	Title	Opportunities	Threats	Academic Dishonesty
3	Ismail D., Karim C., Piotr Z., Helmi B. Saad	From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing	a. research assistants to help them organize their thoughts, receive feedback on their work, write codes, and even summarize research literature b. created research abstracts c. generating text that was almost indistinguishable from human writing d. process vast amounts of textual data in a short period, which can save researchers significant time and effort e. generate research questions, and an objective and unbiased summary, f. removing language barriers and enabling more people to write high quality text	a. the potential to produce spam, ransomware, and other harmful outputs b. concerning the authenticity and credibility of research publications c. the quality and reliability of the available information may limit ChatGPT's responses d. In many field the internet is rife with biased or inaccurate information e. researchers must always be cautious when evaluating online sources, include using ChatGPT	integration of false or biased information into papers, potentially leading to unintentional plagiarism and/or the misattribution of concepts.
4	M. Farrokhnia, Seyyed K. B., Omid N. & Arjen W.	A SWOT analysis of ChatGPT: Implications for educational practice and research	a. Generating plausible responses b. Self-improving capability c. Providing personalised responses d. Providing real-time responses e. Increasing accessibility of information f. Facilitating personalised learning g. Facilitating complex learning h. Decreasing teaching workload	a. Lack of deep understandingDifficulty in evaluating the quality of responses b. The risk of biases and discrimination c. Lack of higher-order thinking skills d. Perpetuating discrimination in education (when the trained data is biased towards a certain group, it may lead to unfair discrimination against different populations)	Threatening academic integrity (ex: cheating in online exams through ChatGPT, Democratisation of plagiarism in education/ research)

No.	Author	Title	Opportunities	Threats	Academic Dishonesty
5	W. Cheong Hin Hong	The impact of ChatGPT on foreign language teaching and learning: Opportunities in education and research	<ul style="list-style-type: none"> a. engage in dialogues with users in a natural and responsive way b. produce text responses that are similar to human language c. answer follow-up questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests d. generate text in various forms, such as essays 	<ul style="list-style-type: none"> a. ChatGPT is not able to “understand” the text it generates or the context of the information, which often results in “plausible-sounding but incorrect or nonsensical answers b. typically shallow, and at times comes with false facts and made-up references c. Authentic language use (As ChatGPT excels in mimicking human interactions) 	Academic integrity of research generated
6	Rahman, Md. M., & Watanobe, Y.	ChatGPT for Education and Research: Opportunities, Threats, and Strategies.	<ul style="list-style-type: none"> a. Help learners solve complex problems b. Assist educators in lesson planning, assessment, and evaluation c. Assist researchers in summarizing known researches and detect grammatical error in writing 	<ul style="list-style-type: none"> a. Blind reliance on AI b. Decline on the ability of thinking critically c. Ethical implication and potential biases in results 	Integrity of assignments and online exams
7	Sok, S., & Heng, K.	ChatGPT for Education and research: A review of benefits and risks.	<ul style="list-style-type: none"> a. Helps educator create learning assessment b. Enhance pedagogical learning c. Virtual personal tutoring d. Brainstorm ideas and/or create outline for article 	<ul style="list-style-type: none"> a. Unfair learning assessment b. Inaccurate information c. Over - reliance on AI 	Academic Integrity issues

No.	Author	Title	Opportunities	Threats	Academic Dishonesty
8	Xames, M. D., & Shefa, J.	ChatGPT for re-search and publica-tion: Op-portunities and chal-enges.	<ul style="list-style-type: none"> a. Opportunities for researcher b. Helps in the first four stages of research (Idea generation, prior literature synthesis, data identification and preparation, and testing framework determination and implementation), c. its potential as an e-Research assistant d. Helps to obtain initial manuscript draft e. Assist nonEnglish speaking researcher to produce high quality text f. An efficient journal suggestion tool g. A tool for journal reviewer suggestion h. Helps in manuscript quality checks, journal fit checks, and plagiarism check i. Identify potential journal reviewer j. Assess the clarity, conciseness, and coherence of the writing 	<ul style="list-style-type: none"> a. Nonexistent references (Imaginary citations) b. Unintentional plagiarism c. Biases and inaccurate information based on an obsolete dataset d. Potential increase in junk science by the emergence of fraudulent research articles that uses ChatGPT without proper review e. Copyright issues in regards of the ownership of text generated in AI f. Potential international inequalities regarding AI accessibility 	<p>Ethical issues concerning data privacy and confidentiality, fairness, transparency, and potential misuse</p> <p>Mentioned in between the lines as fraudulent research papers are those written by AI yet published without proper peer review</p>

No.	Author	Title	Opportunities	Threats	Academic Dishonesty
9	Zhu, C., Sun, M., Luo, J., Li, T., & Wang, M.	How to harness the potential of ChatGPT in education?	a. generating plausible response in human like conversation b. simplify complex scientific theories into simple languages c. providing expert solutions and guidance for complex tasks d. creating human like writing and content in terms of exercises and quiz materials e. evaluating task performance and giving feedback	a. Inclusion of inaccurate, fabricated, and biased information in its output b. Lack of depth and understanding of its own output c. Risks about third party usage of users data privacy and security d. Socio-cultural and technological issues regarding its accessibility	Risk of AI “assisted” cheating