

Artificial Intelligence in University Students: Analyzing ChatGPT's Academic Engagement and Usage Frequency

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ABSTRACT:

Higher university students are doubtful about how to use ChatGPT for academic purposes effectively due to the lack of clear guidance and other issues such as academic dishonesty. This will discourage students from fully engaging in it. In current time, the skill becomes increasingly important in various careers, especially as AI tools become more integrated into day-to-day work. This research takes a survey on quantitative study approach to identify students' academic engagement on ChatGPT for academic purposes. Samples of 429 have been collected among university students from a reputed private university in Malaysia. Descriptive analysis of SPSS version 29.0 is utilized to identify the mean, percentage and standard deviation. Meanwhile the Independent T Test and Spearman Rho's correlation analysis were used to test the relationship between variables. Study revealed 30% students used ChatGPT for academic purposes weekly, 17% used monthly, 16% daily, 29% rarely, and interestingly 7% never used it. Mann-Whitney U Test analysis showed that there are no differences in academic engagement between males ($M=3.59$, $SD=1.01$) and females ($M=3.38$, $SD=.99$), $U=16126.5$, $Z=-1.70$, $p>.05$. There is no significant difference in ChatGPT academic engagement between conventional students ($M=3.47$, $SD=.89$) and Modular students ($M=3.42$, $SD=1.06$), $U=21683.5$, $Z=-.265$, $p>.05$. A Kruskal-Wallis H test analysis showed no difference of ChatGPT usage across level of study (PhD, Master, Bachelor and Diploma), $H(4)=7.120$, $p>.05$ indicated level of studies or depth studies do not influence the frequency of ChatGPT usage. Overall students' academic engagement is in medium ($M=3.44$, $SD=1.01M$, $N=429$). T Stakeholders, policy makers, academicians, institutions and instructors must create a well-informed guideline of using this tool for students to connect effectively with the tool in learning and performing academic tasks.

KEYWORDS: ChatGPT, academic engagement, Social Cognitive Theory

1) INTRODUCTION

Academic engagement is strongly related to academics' scientific productivity that is characterized by energy, dedication and absorption. It is linked with motivational processes and plays an important role in achieving work goals. Students with strong academic engagement tend to devote more efforts to academic tasks and will be completed successfully [1, 2]. ChatGPT is an artificial intelligence (AI) chatbot developed by OpenAI and launched in 2022. It was created by OpenAI that uses machine learning to recognize and generate human-like text that was created by OpenAI [3]. It can respond to or answer questions about approximately any issue, write articles, essays, social media posts, cover letters, code, emails and even can solve complex problems and translating languages into code. The images generated are constructed on natural language prompts [4, 5].

ChatGPT is competent on large text data by using an algorithm known as transformer in acquiring and generating text. It is like a human machine that reinforces learning through human feedback. It is the best model to handle human requests [6]. In career development ChatGPT can be used to support job applications, such as structure resumes and writing cover letters. In research, ChatGPT can write research for papers, presentations, studies, and more [7]. ChatGPT potentially could boost academic engagement by offering personalized feedback, quick and easy access to data, by which it can stimulate students to vigorously take part in learning. [8]. It would be able to create a more comprehensive learning environment and foster higher order thinking skills [9]. However, its utilization must be considered when the students misuse copying and plagiarizing the information because of lack of guidance from educators. Proper training and facilitation from educators are a must to ensure responsible application [10].

(a) Behavioral Engagement

ChatGPT can impact academic engagement by providing explanations that fit the responses of individual student needs, and relevant examples based on their understanding level, hence can promote deeper engagement [11]. ChatGPT can offer positive behavioral engagement students such as students are more likely to submit tasks on time when using ChatGPT. The tasks completed are more efficient because this LLM (Large Language Model) helps them to enhance their assignment, refine writing and generate new ideas required by the course tasks [12].

(b) Emotional Engagement

ChatGPT can offer a safe and positive environment, allow active listening, providing empathetic responses and supervision [13]. Emotional engagement refers to the involvement of positive emotions such as interest during a learning activity [14]. In a previous metanalysis study advocated that ChatGPT-based learning is effective in nurturing students' behavioral, cognitive and emotional engagement than non-ChatGPT learning. This study suggested ChatGPT could play a pivotal role in encouraging students' engagement such as personalized coaching, programming, teamwork, building content and assisting. The problem arises when students disengage such as over-reliance [15], that may jeopardize students' cognitive abilities like critical thinking and problem-solving skills.

Despite rising concern on the risk of ChatGPT assisted in learning to the humans' behavioral, cognitive and emotion, many studies at the same time showing an optimistic finding such a clinical study which demonstrated that ChatGPT can produce appropriate EA (emotional awareness) responses. The theoretical and clinical implications of ChatGPT can be utilized as one of the cognitive trainings for clinical populations with EA impairments. Interestingly this study showed that ChatGPT's EA-like capabilities may help with psychiatric diagnosis and assessment and be used to improve emotional language.

Notably, ChatGPT's role is a significant acknowledgement in enhancing emotional well-being and fostering emotional resilience by offering personalized interactions, nonjudgmental space, and active listening characteristics of ChatGPT [17]. Study by [18] revealed that users with an anxious attachment personality are inclined to grow an emotional dependency on ChatGPT and capable of engaging in complex conversations with humans. Moreover, it keeps sophisticated language competences and the capacity to pretend sympathetic answers [19].

(c) Cognitive Engagement

A study by [20] was raised concern on the impact of ChatGPT personalized learning may reflect critical and creative thinking among university students in Ghana showed that integrating ChatGPT obviously influenced the students' critical, thoughtful, and creative intelligent skills and their proportions. In another study among undergraduates' students by [21] showed that the experimental group experienced a noteworthy rise in cognitive engagement as compared to the control group, but unpredictably the control group proved higher academic achievement. This is due to the imbalance implementation and poor management of ChatGPT personalized learning. Educators and technologists must work together to increase the benefits of ChatGPT to the cognitive skills and decrease potential negative effects.

(d) Theoretical Basis

In exploring students' academic engagement during utilizing ChatGPT, this study utilizes Social Cognitive Theory, developed by Albert Bandura in the 1960s. Social Cognitive Theory (SCT) suggests that people's behavior is shaped by both internal cognitive processes and external social environments [22]. Social cognitive theory is a general theory that emphasizes learning from environment [23]. It describes the environmental factors on individual behavior, providing opportunities for social support through inculcating self-efficacy and expectations [24]. People are active agents who can both influence and are predisposed by their environment. One supposition of social learning is that we learn new behaviors by perceiving the behavior of others and the consequences of their behaviors [25].

Social cognitive theory builds upon and extends social learning theory. While social learning theory emphasized that individuals acquire knowledge and behaviors primarily through observing others, social cognitive theory highlights the critical role of cognition, self-regulation, and human agency in the learning

process. By integrating both social influences and internal cognitive processes, social cognitive theory provides a comprehensive foundation for explaining how individuals learn and modify behaviors within social contexts. Humans are agents to influence others and become contributors to their lives, not just a product of them [26]. The theory underlying it had been much larger than the theory of learning. It not only addressed how people obtain knowledge and capabilities but also how they inspire and control their actions and produce social systems that establish and structure their lives [27]. The use of ChatGPT in education positively innovates learning behaviors is in line with this theory [28].

2) METHODOLOGY

This study was carried out at a private university in Malaysia, with Diploma and Bachelor's degree students serving as the target population. A total of 429 students, comprising both undergraduate and graduate cohorts, participated in the research. A descriptive survey design was employed to examine students' academic engagement when using ChatGPT to complete various academic tasks. Prior to the main study, a pilot test involving 30 respondents was undertaken to validate the questionnaire. Non-probability convenience sampling was applied, with the source population defined as students from the selected private university. The sample size was determined using the formula for a single population proportion, with parameters set a 5% margin of error, a 95% confidence level, and an assumed proportion of 50%. The resulting margin of error of 5.67% was deemed acceptable.

A questionnaire was written in English and prepared underwent item content validation. To evaluate the questionnaire's reliability. Cronbach's Alpha is used to measure the internal consistency. Result shows all items of academic engagement survey that were sent to 30 respondents have high score/value between .835 to .914. Survey data were exported from Google Form to Microsoft Excel and analyzed using SPSS version 29 (IBM Corp., Armonk, NY). Descriptive statistics summarized categorical (frequency, percentage) and quantitative data (mean, standard deviation, range). Univariable analyses employed the Kruskal-Wallis H test, Mann-Whitney U test, and Spearman's rho correlation to assess associations between demographic variables and academic engagement, with significance set at $p < 0.05$ and $p < 0.01$.

(3) RESULT

(a) Participants

A total of 429 university students from a local private university participated in the study. Table 1 presents the distribution of a sample of 429 participants based on gender, level of studies, and mode of studies. Of the sample, the majority were female (73.2%, $n = 134$), while males represented 26.8% ($n = 115$). In terms of academic level, participants from diploma (40.3%, $n = 173$), bachelor's program (42.0%, $n = 180$), foundation program (12.4%, $n = 53$), while fewer were master's (3.5%, $n = 15$) and PhD programs (1.9%, $n = 8$). Regarding the mode of studies, (60.4%, $n = 259$) were conventional students, while 39.6% ($n = 170$) were online distance learners.

Table 1: Gender, Level, and Mode of Studies of 429 Participants

Variables	Percentage	Number
Gender		
Male	26.8%	115
Female	73.2 %	134
Level of Studies		
Diploma	40.3%	173
Bachelor	42.0%	180
Master	3.5%	15
Phd	1.9%	8
Foundation	12.4%	53
Mode of Studies		
Online Distance	39.6%	170
Conventional	60.4%	259

(b) Frequency of Using ChatGPT

As specified above, the questionnaire contained of 25 questions, which are discussed in detail in this section. The frequency of the use of ChatGPT shows that the students weekly used it (131/30.5%) followed by rarely used it (124/28.9). Students quite regular used it monthly (73/17.02%) although not much daily (71/16.55%). Interestingly 30/6.99% students never used it for academic purposes as shown in Figure 1 below.

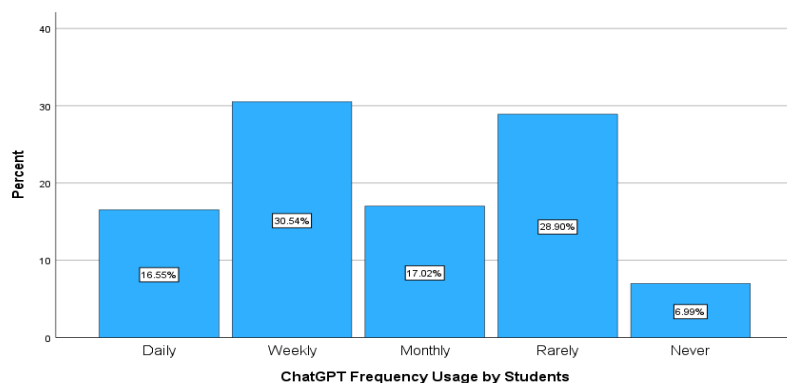


Figure 1: Frequency of Using ChatGPT for Academic Purposes

(b) Result of Kruskal-Wallis

A Kruskal-Wallis H test was used to examine if there were differences in the frequency of ChatGPT usage across different education levels (Foundation, Diploma, Bachelor, Master, PhD). The result indicated no significant differences in usage between the groups, $H(4)=7.169$, $p=.127$, suggesting that education level does not have a statistically significant effect on how frequently participants use ChatGPT. The result of Kruskal-Wallis is shown in Table 2 below.

Table 2: Frequency of ChatGPT Usage by Students Across Different Levels of Study

Education Level	N	Chi-Square	df	p-value
Diploma	173	7.169	4	.127
Bachelor	180			
Master	15			
PhD	8			
Foundation	53			

(c) ChatGPT Academic Engagement Cross Gender

Mann-Whitney U Test was conducted to examine whether there were differences in academic engagement between males and females. The results as shown in Table 3 indicated there were no significant difference between males ($M=3.59$, $SD=1.01$) and females ($M=3.38$, $SD=.99$), $U= 16126.5$, $Z = -1.70$, $p = >0.05$. This suggests that gender does not influence academic engagement, or its distribution is the same across categories of gender. Consequently, it retains the null hypothesis.

Table 3: Report of the U statistics, Z score, p-value, and the mean rank for each group

	Group	N	Mean Rank		U	Z	p-value
Academic engagement	Male	115	208.86		16126.5	-1.70	0.89 (>.05)
	Female	314	231.77				

(d) ChatGPT academic engagement across mode of study

Mann-Whitney U Test was conducted to examine whether there were differences in academic engagement between online distance learners and conventional/face to face students. The results in Table 4 indicate

no significant difference between conventional students ($M=3.47$, $SD=.89$) and Modular students ($M=3.42$, $SD=1.06$), $U=21683.5$, $Z= -.265$, $p = >.005$. It indicated no difference in academic engagement between the means of the sample. Consequently, it accepts the null hypothesis that there is no difference between conventional and online learners. It is also suggesting that the mode of study does not significantly influence ChatGPT academic engagement.

Table 4: Report on Mean Rank values for both groups, test statistic and p-value

	Mode of Study	N	Mean Rank	U	Z	p-value
Academic engagement	Conventional	170	216.95	21683.5	-.265	.791 ($<.05$)
	Modular/Online	259	213.72			

(e) ChatGPT Academic Engagement across Level of Study

A Kruskal-Wallis H test was conducted to examine if there were differences in ChatGPT academic engagement across five levels of study (Foundation, Diploma, Bachelor, Master, PhD). The results in Table 5 indicate no significant difference in engagement across the groups, $H(4) = 7.120$, $p=.130$. The comparisons revealed that the level of studies had no significantly different levels of engagement. Consequently, it rejects the null hypothesis that the level of studies has no influence on the ChatGPT academic engagement

Table 5: The Mean rank of each group based on the Kruskal-Wallis's test, H-value and p-value

	Level of studies	N	Mean Rank	H-Value	p-value
Academic engagement	Foundation	173	207.5	7.120	.130 ($>.05$)
	Diploma	80	228.77		
	Bachelor	15	240.77		
	Master	8	229.00		
	PhD	53	183.30		

(f) ChatGPT Academic Engagement Result

Table 6 demonstrated that mean for item 1 is 3.41, $SD=1.13$, mean for item 2 is 3.22, $SD=1.20$, mean for item 3 is 3.35, $SD=1.20$, mean for item 4 is 3.55, $SD=1.17$ and mean for item, 5 is 3.67, $SD=1.11$. Item 5 "I seek out additional resources after using ChatGPT for my studies" indicates highest mean among other item showing that most respondents were agreed that ChatGPT helped them to seek out additional resources after using ChatGPT in their studies. Meanwhile, item 2 showing most respondents disagree that ChatGPT usage made them actively participated in their studies.

Specifically, the result for item 1 displays that students agree (28%, 120) that ChatGPT make them interested in academic subject. Fascinatingly majority of them showing partially agree, not completely/somewhat agree (31.7%, 136) to the statement that ChatGPT makes them interested with subject matters. followed by 20 %, 86 are strongly agree with the tool. Least of them express strongly disagreeing (6.1%, 26) followed by disagreeing (14.2%, 21) with that statement. Figure below illustrates the percentage of agreement of item 1.

The percentage of level of agreement whether using ChatGPT can allow them actively participating in studies more compared to not using it. Excitingly majority of students reveal 'somewhat agree' or unsure (32.40%, 139 students) if ChatGPT makes them more actively participated in any study works. However, result deliberate students agree with it (24.7%, 106 students) and then strongly agree (17.2, 73 students). Few students strongly disagree (10.26%, 44 students) and disagree (15.6%, 67) that they engage actively in studies when utilizing ChatGPT.

Majority of students feeling uncertain whether utilizing ChatGPT motivated them more in learning (32.87%, 142). However, many too students agree with that (24.7%, 106) and strongly agree (20.7%, 88).

Although majority of them showing unsure but some of them having stick with their stance that they strongly disagree (9%, 39) and disagree (12.5%, 54) ChatGPT usage makes them feeling motivated.

It reveals the various level of percentage of agreement shown by students when asked about 'My interaction with ChatGPT encourage me to explore academic topics in depth'. Most of students are uncertain or agree to some extent (31%, 133), however many of them coincide or agree (28.4%, 122) that ChatGPT inspires them to discover academic topics in depth, and 24.9%,107 are strongly agree with that. Only 7.6%, 33 are totally opposed to followed by disagree 4.02%, 10.

The various percentage of students' agreement level that ChatGPT provides additional resources. Like in most other items, students were also uncertain whether ChatGPT can engage their learning or not. It shows students are unsure (32. 1%, 138) whether ChatGPT can give additional resources to their study or not. Though some of them agree (27.7%, 122) and strongly or totally agree (28.4%, 122) that the tool can provide them extra resources. Only 5.3%, 23 of them totally disagree followed by 6.2%, 27 were disagree. In sum, majority of students are unsure or uncertain that ChatGPT could provide additional resources for them in learning, completing academic tasks or other purposes related to their studies.

Table 6: Descriptive Statistic for Academic Engagement Indicator

Academic engagement	Mean	SD	Strongly Disagree (%)	Disagree (%)	Somewhat Agree (%)	Agree (%)	Strongly Agree (%)
Item 1: ChatGPT makes me more interested in my academic subjects.	3.41	1.13	6.1 (26)	14.2 (61)	31.7 (136)	28.0 (120)	20.0 (86)
Item 2: I actively participate in my studies more when I use ChatGPT.	3.22	1.20	10.3 (44)	15.6 (67)	32.4 (139)	24.7 (106)	17.2 (73)
Item 3: I feel motivated to learn more after using ChatGPT.	3.35	1.20	9.1 (39)	12.6 (54)	32.9 (142)	24.7 (106)	20.7(88)
Item 4: My interaction with ChatGPT encourages me to explore academic topics in depth	3.55	1.17	7.6 (33)	4.02 (10)	31.0 (133)	28.4 (122)	24.9 (107)
Item 5: I seek out additional resources after using ChatGPT for my studies.	3.67	1.11	5.4 (23)	6.3 (27)	32.2 (138)	27.7 (122)	28.4 (122)
N =249							

* SD: Standard Deviation

(g) Academic Engagement Mean Standard

Table 7 indicated the means standard of academic engagement. Result of all Mean for all item 1 (3.41), 2 (3.61), 3 (3.22), 4 (3.55) and 5 (3.67) are in medium level. In sum, the level of academic engagement with ChatGPT when students using it is in intermediate level.

Table 7 Comparison of Academic Engagement Elements with the Mean Standard

Self-esteem	Mean	Mean Standard	Result
Item 1: ChatGPT makes me more interested in my academic subjects.	3.41	2.34 – 3.67	Medium
Item 2: I actively participate in my studies more when I use ChatGPT.	3.61	2.34 – 3.67	Medium
Item 3: I feel motivated to learn more after using ChatGPT.	3.22	2.34 – 3.67	Medium
Item 4: My interaction with ChatGPT encourages me to explore academic topics in depth	3.55	2.34 – 3.67	Medium
Item 5: I seek out additional resources after using ChatGPT for my studies.	3.67	2.34 – 3.67	Medium
Academic engagement (Overall)	3.44, SD=1.01	2.34 – 3.67	Medium

*SD: Standard Deviation

(4) DISCUSSION

Surveys have shown that around 30-31% of students use ChatGPT weekly for academic purposes. This finding is in line with the findings by The Knowledge Academy in UK among university students that 32% of them admit to using it weekly. [29]. However, results from a study among healthcare undergraduate university students in Malaysia showed that only 13% used it weekly [30]. Weekly usage patterns indicate increasing student awareness of the value of AI tools such as ChatGPT. Future studies could examine factors influencing students' sustained use, including perceived effectiveness, ease of use, and the presence of alternative tools. ChatGPT has been shown to enhance students' understanding by offering diverse perspectives on learning topics [31], and it is frequently used to gain clearer insights into course content [32]. ChatGPT-based learning is more active in adopting student behavioural, cognitive, and emotional engagement than non-ChatGPT learning. A study also revealed that ChatGPT is an efficient mechanism for engaging students in learning [33].

Finding shows that mode of study does not have a substantial influence on students' academic engagement, revealing that both online and conventional students have a similar level of the academic engagement when using ChatGPT for academic purposes. Previous studies found online students acknowledge ChatGPT has positive influence on their critical thinking, boost knowledge exploration and engagement [34]. Integrating AI chatbots like ChatGPT into education helping students' engagement, motivation, and self-self-reliant learning [35]. Higher level such as PhD students are often engaged in more complex academic tasks and may find ChatGPT to be a more valuable resource for their studies as compared to lower level like foundation students. Students with higher level may utilized technology frequently and sophisticatedly [37]. Students in higher level academic programs having greater confidence to use digital tools [38]. Lower academic level student has limited experience with current digital tools especially ChatGPT [39]. This finding may be resulted from several factors such as accessibility due to some internet availability, cost and speed Education management must provide cost for internet access for online students. Another factor like academic integrity when educators have warned the risk of plagiarism and cheating when utilizing ChatGPT. Instructors and education operations must provide workshop for students to use it properly. [40].

The level of ChatGPT academic engagement is at medium level, showing that ChatGPT less allows students to become more interested in the subject matters learnt, actively participate in studies, feeling motivated, allowing explore academic topic in depth and seeking additional resources. Previous study showed that ChatGPT has many benefits such as increasing student engagement and academic

participation and investigation [41]. This may result from several reasons like students who realize that ChatGPT may have certain negative impacts such as the possibility of inaccurate information and bias data provided by it.

Lecturers, despite reminding students of this, must assist and guide their students to use it effectively. The problems are that many lecturers do not know how to use ChatGPT efficiently. Lacking skills using this current tool among instructors, especially may cause the education system to lag behind. Though some agreed that excessive use of ChatGPT can reduce academic performance, memory deficit, and develop delay in cognitive development [42]. However, we can deny its usefulness these days. A recent study published in Technological Forecasting and Social Change identified 185 skills facilitated by ChatGPT, including script programming, inquiry response, storytelling and songwriting, article rewriting, script editing, digital content creation, information provision, problem-solving, and homework assistance [43].

Correlation analysis reveals a strong relationship between the items of academic engagement. It indicated that the more ChatGPT helps students to seek more additional resources, the more motivated students to participate more in course task jobs. ChatGPT permits students to explore academic topics in depth. As Bandura's (1997) Social Cognitive Theory posits, technology can successfully involve students academically by helping reflect and simulate positive behaviors through technology collaboration platforms [44]. The finding is in line with the previous study that ChatGPT is an effective tool to prepare students for the resources and plan throughout the learning process. It increases motivation, interest, engagement, efforts, ambition and enhances academic engagement [45]. However, engagement with AI has a significant influence on critical thinking performance compared to knowledge acquisition [46]. This study is limited which is highlighted on the academic engagement in general, further study is needed to compare the elements of academic engagement like cognitive, emotion and behavioral as impacted by ChatGPT utilization.

(5) CONCLUSION

Taken together, the findings suggest that the integration of ChatGPT into educational settings is expanding, underscoring the need for future research to examine its potential to enhance academic engagement among university students. At the same time, instructors play a pivotal role in helping students balance the use of such tools while cultivating autonomous learning skills. Issues of academic dishonesty and plagiarism must be addressed, and stakeholders should collaborate to establish comprehensive guidelines for the responsible application of ChatGPT in academic work. Given that ChatGPT is a tool rather than a human agent, the risk of inaccuracies remains a concern. Furthermore, insufficient skills and knowledge in using ChatGPT effectively may hinder autonomous learning and erode students' confidence in AI-assisted learning tools within 21st-century education.

Acknowledgement

We thank [Author 1], [Author 2], [Author 3] and [Author 4] for their contributions to this work. Special thanks to Centre for Research and Consultancy for their assistance and [UNITAR International university/IG2024/FEH/07] for financial support.

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