2024 4th International Conference of Science and Information Technology in Smart Administration (ICSINTESA) | 979-8-3503-7611-1/24/$31.00 ©2024 IEEE | DOI: 10.1109/ICSINTESA62455.2024.10748220

Analyzing the Impact of ChatGPT on Enhancing Academic Skills and Learning Concepts Among University Students in Jakarta

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***Abstract*—There has been a noticeable change in the way that academic skill development and learning work with the introduction of ChatGPT as a key educational technology tool, especially for Jakarta university students. This study aims to clarify how ChatGPT helps students get a deeper knowledge and improve their academic performance, as artificial intelligence (AI) becomes more and more integrated into educational environments. With a quantitative approach, we investigated the usefulness, interaction, flexibility, and possible drawbacks of ChatGPT in educational contexts using questionnaires. The results of 331 university students who participated in a snowball sampling process indicated a strong preference for ChatGPT as a tool to improve studying. The model is effective at enhancing learning experiences, according to preliminary results, but it also raises questions about the critical thinking abilities that may be compromised by an over-reliance on artificial intelligence. Therefore, this study contributes and give insights into the application of ChatGPT in education, offering educational institutions, teacher, or student a comprehensive strategy for leveraging AI technology to improve the academic skill and learning concepts.**

Keywords—ChatGPT, Student Performance, AI in Education, Learning Enhancement, Academic Skills

I. Introduction

The increased use of artificial intelligence (AI) in educational environment technology like ChatGPT has revolutionize and increased learning and academic skill development. The worldwide market for educational technology, which was worth around .49 billion in 2020, is expected to expand at a compound annual growth rate of 19.9% from 2021 to 2028 [1]. The increased use of AI in academic shows a gradual integration of new technology which result in significant enthusiasm among educators and students. This tendency is particularly noticeable in Jakarta, a city that is leading the way in adopting technology in education.

The application of artificial intelligence (AI) in education is not something new. nonetheless, the powers of ChatGPT in analyzing natural language and offering interactive learning opportunities are unmatched. using artificial intelligence educational systems show potential in increasing student engagement and enhancing learning outcomes [2]. Therefore, we know that ChatGPT is revolutionizing education with its ability of language generation and interpretation.

Previous research has shown that AI chatbots like ChatGPT have a major impact and one of them is on mathematics instruction where it demonstrate how AI may dramatically boost students' interest and enjoyment while learning challenging topics [15]. Furthermore, as stated in ProQuest, a case study investigation of Google Smart Compose indicates the substantial influence of AI on the student writing process, providing insights into how technology is changing traditional teaching techniques and increasing student-teacher relationships [16].

In Jakarta, where the higher education industry is quickly adapting to integrate digital technology, the significance of such AI tools becomes particularly obvious. Artificial intelligence (AI) has been associated to improved research skills, analytical reasoning, and personalized learning experiences in educational environments [3].

Rapid AI tool integration in universities of Jakarta is transforming the educational experience. These tools, which may include advanced AI such as ChatGPT, are associated with improved research capabilities, enhanced analytical reasoning, and the creation of individualized learning patterns for students [17]. This change in technology introduce us to new look at different approach to education where AI are utilized to enhance comprehension and elevate learning outcomes of student and learner nowadays.

Analyzing the effect of ChatGPT on the academic environment and knowledge of university students in Jakarta is the objective of this study. In this research we are going to dig deeper into how ChatGPT as an AI language model can cultivate his knowledge to student and enhances their comprehension. Data collection in this study will be utilized questionnaires since it accordance with the quantitative research model.

II. Literature Review

A. ChatGPT Trend (CT)

The evolution of AI Chatbot like ChatGPT available for worldwide use is an improvement on society. These chatbot is changing the way we learn in significant ways and gives students plenty of different ways to learn while at the same time it can be adjusted to fit many different needs [4]. It has a big impact on education because it can change how people speak to each other and interact with educational content [5]. Feedback from teachers and students about using ChatGPT shows that it works in real life and shows how important it is for educational technology to keep getting better [7].

B. Overall AI Satisfaction (OCT)

The level of satisfaction with AI in education especially with ChatGPT is being observed and evaluated. Reports

claim that using artificial intelligence (AI) is good for both teachers and students because it gives quick, complete, and varied information in a talking way that is easy to understand. Significant advantages of ChatGPT include its 24/7 accessibility and flexibility to meet different educational needs. Though it is limited by the requirement for constant evaluation to make sure the technology is being used to its fullest educational impact, AI has the potential to significantly improve educational process.

C. *Factor influencing ChatGPT Usage in Educational Settings*

The A variety of important factors influence students willingness to use ChatGPT in educational settings are describe as follows:

- ChatGPT Effectiveness (CE) ChatGPT's effectiveness is shown by its ability to provide accurate and relevant information, facilitating a deeper understanding of academic concepts. Because it can generate natural language, it makes a valuable instrument for educational purposes [10].
- ChatGPT Engagement (CG). Engagement with ChatGPT is driven by its conversational nature, which makes learning interactive and thus, more engaging. Having AI like ChatGPT as an always-accessible educational partner promotes regular involvement in academic activities [1].
- ChatGPT Limitation (CL). While ChatGPT offers numerous benefits, it's not without its drawbacks. There are times where it might not deliver completely accurate information. Adittionaly, there's a risk of students becoming overly reliant on this tool, which might reduce their critical thinking abilities [7].
- ChatGPT Adaptability (CA). The adaptability of ChatGPT is proved by its strong implementation across a broad variety of educational subjects and levels. this emphasises the tool's capacity to create customised learning experiences to meet the requirements of each unique user [2].

III. Methodology and Data Source

The author provides further details on the techniques used in this section for the research's data collection and analysis. Furthermore, the author will also present a research model that explains the several aspects that affect people's influence and usage of ChatGPT.

A. *Methodology*

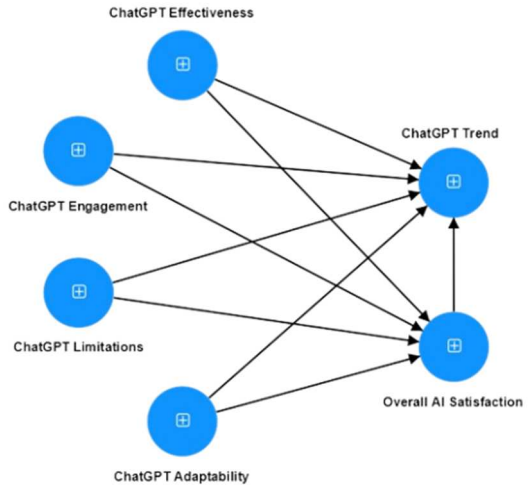

Fig. 1. Research Model

The study's hypothesis is tested using quantitative techniques. To test the hypothesis, data processing is carried out using the Partial Lease Square (SEMPLS) tool and the Structural Equation Model. The research model utilized for this research is shown in Fig 1. To determine how much each indication depends on each of these six topic-related variables, the author makes connections between them using a number of previous journal references. Based on the respondent's profile and circumstances, each variable included in this research has been examined before and provides varying conclusions about the usage of e-wallets. Every variable therefore becomes something worth investigating again.

B. *Hypothesis Development*

TABLE I. HYPHOTHESIS

	Description
H1	ChatGPT Effectiveness → Overall ChatGPT Satifaction
H2	ChatGPT Adaptability → Overall ChatGPT Satifaction
H3	ChatGPT Limitation → Overall ChatGPT Satifaction
H4	ChatGPT Engagement → Overall ChatGPT Satifaction
H5	ChatGPT Effectiveness → ChatGPT Trend
H6	ChatGPT Adaptability → ChatGPT Trend
H7	ChatGPT Limitation → ChatGPT Trend
H8	ChatGPT Engagement → ChatGPT Trend
H9	Overall ChatGPT Satifaction – ChatGPT Trend

The relationships between the variables in the previous figure and their description are detailed in the Table I. Every hypothesis tries to achieve the study's objectives by describing the connections that drive the research objectives.

C. *Data Source*

TABLE II. DATA RESPONDENT

Criteria	**Respondent**		
	Category	***Total***	***Percentage***
	Male	269	81.3%

Gender	Female	62	18.7%
Age	15 - 24 years old 25 - 34 years old 35 - 44 years old >44 years old	331 0 0 0	100% 0% 0% 0%
ChatGPT user	Yes No	328 3	99.1% 0.9%

Data for this study were collected through the distribution of Google Form questionnaires. 331 respondents (or 99.1% of the total) were acquired by the authors using the snowball sampling approach where 328 of them used ChatGPT. The cross-sectional approach used in this study has a time horizon, meaning that data is gathered just once in a specific time frame.

IV. RESULT AND DISCUSSION

This section will go through the outcomes of the calculations for this study.

A. Result

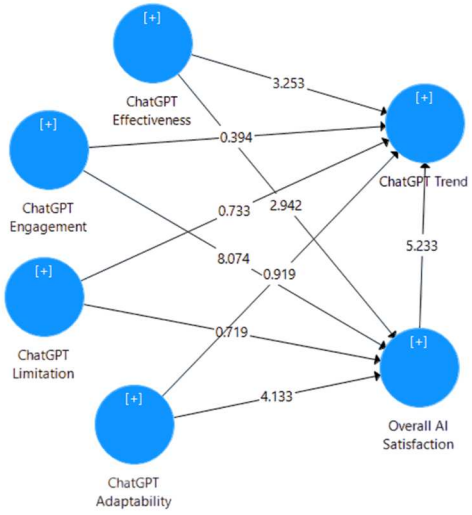

Fig. 2. Research Model with Result

Fig II illustrates the relationships between the effectiveness, adaptability, engagement, and limitations of ChatGPT, and their influence on overall satisfaction and trendiness among university students, the details will be explained in the next part.

B. Validity Result

TABLE III. VALIDITY

	CA	CE	CG	CL	CT	OCS
CA1	0,927					
CA2	0,889					
CA3	0,993					
CA4	0,916					
CE1		0,921				
CE2		0,924				
CE3		0,859				
CE4		0,693				
CG1			0,922			
CG2			0,952			
CG3			0,923			
CG4			0,784			
CL1				0,956		
CL2				0,678		
CL3				0,961		
CL4				0,547		
CT1					0,650	
CT2					0,871	
CT3					0,817	
CT4					0,826	
OCS1						0,936
OCS2						0,932
OCS3						0,940
OCS4						0,764

Table III describes the validation measures used for each criterion in determining the final Cross Loading end result. In validity testing, a loading value above 0.7 is generally considered good, indicating that the indicator strongly correlates with its associated factor. In the table, the indicators mostly exceed 0.7, demonstrating high internal validity. However, CL2 (0.678), CL4 (0.547), and CT1 (0.650) fall below this threshold, suggesting a relatively weaker relationship with their factors. Despite these few exceptions, the overall results confirm that the indicators produce valid measurements for their respective constructs.

C. Realibility Result

TABLE IV. CRONBACH'S APLHA & AVE

	Cronbach's Alpha	AVE
CA	0,936	0,840
CE	0,874	0,730
CG	0,918	0,806
CL	0,827	0,649
CT	0,807	0,633
OCS	0,916	0,803

Table V indicates the level of consistency for each component, which can be used to assess study variables. If Cronbach's Alpha is more than 0.60, then these elements are considered to be consistent. Meanwhile, if the AVE value surpasses 0.50, the requirements are considered to be valid. All of the computations above show that each factor is valid.

D. Model Fit Result

TABLE V. FIT SUMMARY

	Value
Chi-Square	3636,333
SRMR	0,104
NFI	0,646

The model of fit includes several indices, including Chi Square, which is considered non-significant when its value surpasses 0.05, SRMR which is less than 0.8, and NFI which is greater than 0.95. The value in table V has an SRMR of 0.104, indicating a slightly satisfactory fit. NFI has an effect of 64.6%, indicating that the fit model in this study is acceptable.

E. R Square Result

TABLE VI. FIT SUMMARY

	R Square
CT	0,694
OCS	0,734

R Squared also known as the coefficient of determination is a metric utilized to measure the level to which the independent variables contribute to the variance observed in the dependent variable. In general, if a R Squared value surpassing 50% is considered to be an effective model. As indicated by the data in Table VI, the reported maximal R Squared value is 69.4%. This highlights that the previously described indicator is influential.

F. Tstat and PValue Result

TABLE VII. TSTAT AND PVALUE

Description	Original Sample	T Statistic	P Value	Significant
CA → CT	0,098	0,951	0,342	N
CA → OCS	0,342	4,047	0,000	Y
CE → CT	0,321	3,261	0,001	Y
CE → OCS	0,291	2,936	0,003	Y
CG → CT	-0,025	0,433	0,665	N
CG → OCS	0,335	8,205	0,000	Y
CL → CT	-0,038	0,792	0,429	N
CL → OCS	0,028	0,790	0,430	N
OCS → CT	0,469	5,921	0,000	Y

Table VII illustrates the significance of the relationship, which can be interpreted as follows.

- The relationship between ChatGPT's Adaptability and ChatGPT Trend is not statistically significant, as demonstrated by a T-Statistic value of 0.951 (below the necessary 1.96 threshold) and a P-value of 0.342 (above the 0.05 significance level).
- A statistically significant relationship is found between ChatGPT's Adaptability and Overall AI Satisfaction, as indicated by a T-Statistic of 4.047 (more than the 1.96 threshold) and a P-value of 0.000 (below the 0.05 significance level).
- There is a significant relationship between ChatGPT's effectiveness and ChatGPT Trend, as indicated by a T-Statistic of 3.261 (above the 1.96 threshold) and a P-value of 0.001 (below the 0.05 significance level).
- ChatGPT's effectiveness is significantly correlated with overall AI satisfaction, with a T-statistic of 2.936 (above the 1.96 threshold) and a P-value of 0.003 (below the 0.05 significance level).
- There is not a significant relationship between ChatGPT's Engagement and ChatGPT Trend, with a T-Statistic of 0.433 (below the necessary 1.96 threshold) and a P-value of 0.655 (more than the 0.05 significance level).
- There is a high, significant relationship between ChatGPT's engagement and overall AI satisfaction, as indicated by a T-Statistic of 8.205 (far over 1.96 threshold) and a P-value of 0.000 (below the 0.05 significance level).
- The relationship between ChatGPT's limitation and ChatGPT Trend is not significant, as indicated by a T-Statistic of 0.792 (below the necessary 1.96 threshold) and a P-value of 0.429 (more than 0.05 significance level).
- There is no significant relationship between ChatGPT's limitations and overall AI satisfaction, as indicated by a T-Statistic of 0.790 (below the necessary 1.96 threshold) and a P-value of 0.430 (more than 0.05 significance level).
- A significant relationship appears between Overall AI Satisfaction and ChatGPT Trend, with a T-Statistic of 5.921 (far over 1.96 threshold) and a P-value of 0.000 (below the 0.05 significance level).

G. Hypotesis Result and Discussion

TABLE VIII. HYPHOTHESIS RESULT

Hypothesis	Result
H1	H0 Rejected H1 Accepted
H2	H0 Rejected H1 Accepted
H3	H0 Accepted H1 Rejected
H4	H0 Accepted H1 Rejected
H5	H0 Rejected H1 Accepted
H6	H0 Accepted H1 Rejected
H7	H0 Accepted H1 Rejected
H8	H0 Rejected H1 Accepted
H9	H0 Rejected H1 Accepted

Table VII displays the hypothesis's results as calculated using several previous indices. This research demonstrates that ChatGPT has an impact on students' academic skills and learning concepts. Based on these data, we can conclude that this study strengthens previous research.

V. Conclusion

From this study, it can be concluded that there are several factors such as ChatGPT engagement, adaptability or their effectiveness that can influence factor on overall AI satisfaction among university students. This implies that when ChatGPT adapts to different academic needs and styles, students are more satisfied, even if this adaptation does not increase ChatGPT's popularity or visibility. The engagement of ChatGPT also indicating that the more engaged the users are, the more satisfied they tend to be, regardless of the trendiness of the tool. The effectiveness of ChatGPT in generating natural language that accurate and relevant also a key factors in their satisfaction.

Surprisingly, limitations of ChatGPT do not seem to affect its trendiness or overall satisfaction, which could imply that users are either willing to overlook flaws or that the limitations do not significantly impede the practical utility of ChatGPT. Lastly, Overall AI satisfaction has a significant relationship with the trendiness of ChatGPT, suggesting that the general happiness with AI tools can boost their popularity among students.

This study is very useful for academic institution, teacher, or student in utilize the use of ChatGPT in learning process since it has a positive impact. Despite some limitations, the tool has the potential to enhance academic skills and provide personalized learning experiences. By developing strategies to mitigate the drawbacks and encourage meaningful engagement, we can ensure that ChatGPT and similar AI tools are effectively utilized to improve learning outcomes.

Acknowledgment

Special thanks to Prof. Dr. Evaristus Didik Madyatmadja , S.T., M.Kom., M.T, Dicky Hida Syahchari, S.T., M.M., Ph.D and the entire team at Bina Nusantara University's School of Information Systems in Jakarta, Indonesia, for their support and contributions to this research. Their understanding, guidance, and encouragement were important to the effective completion of this research. Additionally, special thanks is extended to all volunteers who served as respondents in this study. Your participation was critical to for our study.

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