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Economic Efficiency in Higher Education Through ChatGPT Integration: Case Study of Budi Utomo National Institute

Ida Pujiani[1], Franciskus Antonius Alijoyo[2]
Sekolah Tinggi Manajemen Informatika & Komputer Likmi, Indonesia[1]
Sekolah Tinggi Manajemen Informatika & Komputer Likmi, Indonesia[2]
Email: idapujiani91@gmail.com[1], franciskus.antonius.alijoyo63@gmail.com[2]

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Artificial Intelligence (AI); ChatGPT; academic integrity; economic efficiency.

ABSTRACT
This research is motivated by the need for higher education institutions to enhance economic efficiency in the learning process through innovative technology. ChatGPT, as an artificial intelligence (AI) model, is expected to support more effective and efficient learning processes significantly. This study aims to evaluate ChatGPT integration's impact on economic efficiency at Budi Utomo National Institute. The research uses a quantitative method with a survey approach involving 150 respondents consisting of lecturers and students. Data collection was conducted through questionnaires, and the results were analyzed using simple linear regression techniques. The findings show that the integration of ChatGPT significantly improves operational cost efficiency in education, reduces administr ative burdens, and accelerates access to learning resources. The disc ussion focuses on AI's long-term potential in enhancing teaching quality and the challenges of implementing such technology in higher education institutions. This study concludes that ChatGPT can be an effective tool for achieving economic efficiency in higher education, though proper strategies are needed to optimize its use sustainably.

INTRODUCTION

The rapid development of artificial intelligence (AI) has reshaped various sectors, including education. In higher education, there has been a notable shift toward utilizing AI tools to enhance learning processes, student engagement, and overall institutional efficiency (Zhong, 2020). This shift is driven by the increasing demand for more personalized and efficient education systems that can meet the diverse needs of students and institutions worldwide (Goksel, 2019). One AI tool that has gained considerable attention is ChatGPT, a language model developed by OpenAI, which offers numerous benefits in improving academic tasks, such as writing, tutoring, and information retrieval (Ouyang, 2021). Higher education institutions are under pressure to deliver high-quality education while managing limited resources. This challenge has sparked interest in exploring how AI integration can promote economic efficiency in educational settings (Schwartz, 2021). Particularly in developing countries like Indonesia, institutions face budget constraints, making AI tools like ChatGPT appealing solutions for reducing costs and optimizing learning outcomes (Li, 2022). This research focuses on the economic efficiency of integrating ChatGPT into higher education at the Budi Utomo National Institute, exploring how this tool can streamline academic processes and contribute to institutional goals.

Economic efficiency in higher education refers to the optimal use of resources to achieve desired academic outcomes with minimal waste. This concept is grounded in economic theories of productivity and cost minimization, where institutions seek to maximize output (e.g., student

success, research output) while minimizing inputs (e.g., faculty time and administrative costs) (Blackwell, 2021). ChatGPT offers potential benefits, serving as a tool to assist students and faculty in academic tasks, thus potentially reducing workload and resource consumption (Zhang, 2019). Several theoretical frameworks underpin the use of AI in education, such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). These models explore how users accept and use technology based on perceived ease of use, usefulness, and the social influence of technology (Venkatesh, 2021). Applying these models to ChatGPT in higher education reveals that students and faculty are more likely to adopt AI tools if they perceive them as enhancing academic performance while being easy to use (Tao, 2020).

Numerous studies have explored the benefits of AI integration in education. For example, research (Zhong, 2020) highlights the role of AI in enhancing teaching methods, providing personalized learning experiences, and improving institutional efficiency. Similarly, (Yang, 2023) discusses how ChatGPT specifically aids in academic writing and tutoring, providing quick feedback and assistance to students. These studies suggest that ChatGPT can reduce the time faculty spend on grading and administrative tasks, allowing them to focus on more critical academic responsibilities. (Guo, 2022)conducted a study on the cost-benefit analysis of AI tools in education, demonstrating that institutions adopting AI technologies experienced significant reductions in operational costs while maintaining or improving educational outcomes. This finding is supported by (Wang, 2022), who investigated the impact of AI on student engagement and retention, concluding that AI tools like ChatGPT enhance student motivation and retention by offering 24/7 support for learning. These studies provide a solid foundation for investigating the potential of ChatGPT to improve economic efficiency in higher education.

(Schwartz, 2021) further highlight the importance of AI in addressing faculty burnout by reducing the time spent on repetitive tasks such as grading and content review. By automating these processes, institutions can improve faculty productivity, reduce costs, and maintain the quality of education (Venkatesh, 2021). The integration of ChatGPT at Budi Utomo National Institute aligns with these findings, as the institution aims to enhance student and faculty experiences while optimizing resource allocation (Wu, 2020). The primary objective of this study is to assess the economic efficiency of ChatGPT integration at the Budi Utomo National Institute. Specifically, the research seeks to Analyze the cost-benefit of ChatGPT in reducing administrative and academic workloads, Evaluate the impact of ChatGPT on student learning outcomes and engagement, Investigate how ChatGPT integration influences faculty productivity and resource allocation, Explore the potential of ChatGPT to streamline administrative processes, such as grading and academic advising (Sun, 2021).

RESEARCH METHOD

The research uses a quantitative approach to facilitate the comparison of data in numerical form and describes information about the awareness and use of ChatGPT in the academic world. The data was collected online through a Google form distributed to the research subjects in July 2024. (Sugiyono, 2021) a population is a generalization region consisting of objects or subjects with a certain quantity and characteristics that the researcher sets for study and from which conclusions will be drawn. This study's population comprises the final-level students of the Management Studies Program at the National Utomo Institute, which amounts to 150 people. The sampling technique used is random sampling. To determine the size of a sample with a margin of error of 10%, the Slovin formula is used, which results in a sample size of about 60 people. The research instrument is a survey filled out through a Google form using a Likert Scale of 1-5: very disagreeable (score 1), disagreeable (score 2),

neutral (score 3), agreeable (score 4), delightful (score 5). This questionnaire includes ChatGPT usage data and questions about the impact or outcomes of ChatGTP usage.

RESULTS AND DISCUSSION

Result

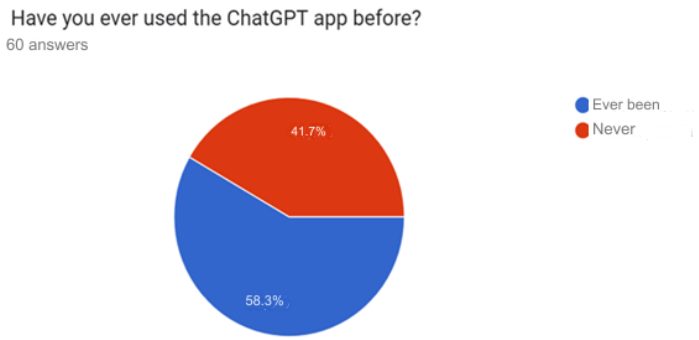

Figure 1. ChatGPT Usage Diagram

Research shows that most graduate students have learned and used ChatGPT as a learning aid. 59.3% of students have already used ChatGPT, and 40.7% have never used chatGPT. Based on the questionnaire results, as many as 51.7% of students agreed that the use of ChatGPT had improved their understanding of the topics in the final assignment, as much as 48.3% agreed to be neutral about the efficiency of chatGPT in completing final assignments or scripts compared to the traditional methods, 46.7% agreed neutral to use chatGPT contribu ted to the final quality of the final appointment or scribes, 45% said neutral to the skills acquired through chatGPT would improve my competitiveness in the job market after graduation, 43.3% said neutral about concerns that using chatgpts in final writing could reduce academic honesty, 38.3% said that neutrality ChatGPT use could potentially increase the risk of plagiarism in the end assignment or script, 41.7% believed that strict policies and supervision would be necessary to regulate the usage of chatGPT in final write-up assignments, 48.3% agreeed that development of ethical guidelines specific to ChatGpt use in academic scripture would greatly help maintain the critical risk of self-integration in final tasks, 41% said that the net integrity of the chatgps has been reduced by 45% of students who have completed the final job.

Validity Test

Table 1. Validation Outcome Instrument Statement

Description	Result	Statement
Item 1	0.855	Valid
Item 2	0.764	Valid
Item 3	0.601	Valid
Item 4	0.736	Valid
Item 5	0.772	Valid
Item 6	0.716	Valid
Item 7	0.864	Valid
Item 8	0.881	Valid
Item 9	0.623	Valid

Source: Data processed, 2024

The questionnaire item is said to be valid if Count > Table. Based on the validity table, the table's value with the sum N=30 at the significance level of 5% is R=0.361. All statements comprising ten are declared valid and can be used in questionnaires distributed to respondents.

Reliability Test

Table 2. Case Processing Summary Instrument

		N	%
Cases	Valid	30	100.0
	Excluded	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Source: Data processed, 2024

The output table above provides information about the number of samples or respondents (N) analyzed in the SPSS program, which can be as many as 30 students; the valid number is 100%.

Table 3. Instrument Reliability Outcome

Cronbach's Alpha	N of Items
.907	10

Source: Data processed, 2024

Based on the Reliability table above, it is known that all variable indicators have Cronbach's alpha values above 0.60. This suggests that the instrument can be used in the same research elsewhere.

Table 4. Reliability Results of Instrument Items

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item1	33.50	31.224	.815	.890
Item2	33.63	32.102	.703	.896
Item3	33.90	32.507	.483	.912
Item4	33.70	31.666	.659	.899
Item5	33.53	31.292	.704	.896
Item6	33.53	31.913	.635	.900
Item7	33.40	30.800	.824	.888
Item8	33.47	30.326	.843	.887
Item9	33.37	33.689	.539	.905
Item10	33.97	34.102	.529	.906

Source: Data processed, 2024

Based on Table 4. above, Cronbach's Alpha value for the 10th item of the question is >0.60, so it can be concluded that the 10th item is reliable.

Normality Test

Table 5. Results of the normality test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
VAR00001	.100	60	.200*	.954	60	.025

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Data processed, 2024

Table 5 shows that the Asymp Sig value is more than 0.05, so the data used in this study are distributed normally.

Simple Linear Regression Test

Table 6. Results of Simple Linear Regression Test

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	11.661	2.135		5.461	.000
	ChatGPT	.423	.118	.427	3.598	.001
a. Dependent Variable: Y						

Source: Data processed, 2024

Based on Table 6 above, it is known that Sig. 0,001 < from a probability of 0.05, so it can be concluded that H0 was rejected and Ha accepted, which means that "There is Economic Efficiency through ChatGPT Integration". If there is no ChatGTP, then the consistent value of Economics Effectiveness in Higher Education is 11.661, and with each addition of 1% of ChatGPT use, economic efficiency will increase by 0.423.

Correlation Test

Table 7. Correlation test results

		X	Y
X	Pearson Correlation	1	.427**
	Sig. (2-tailed)		.001
	N	60	60
Y	Pearson Correlation	.427**	1
	Sig. (2-tailed)	.001	
	N	60	60
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Data processed, 2024

Based on Table 7 above, the known value of Sig. (2-tailed) is 0.001 < 0.05, meaning a significant correlation exists between the Economic Efficiency and ChatGPT Integration variables. The coherence of the relationship is 0.427 > r table 0.254, so it can be concluded that there are relationships or correlations between the economic efficiency variables and the chatGPT integration variables.

Determination Coefficient Analysis

Table 8. Results of Determination Coefficients

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.427[a]	.182	.168	2.985
a. Predictors: (Constant), X				

Source: Data processed, 2024

Based on Table 8 above, the known value of the determination coefficient or r^2 is 0.182 or 18.2%. The figure means that the ChatGPT integration variable impacts economic efficiency by 18.2%, while other factors influence the rest.

t-Test

Table 9. Results of the Hypothesis Test

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	11.661	2.135		5.461	.000
	X	.423	.118	.427	3.598	.001
a. Dependent Variable: Y						

Source: Data processed, 2024

Based on Table 9 above, the count t value for ChatGPT integrity is 3.598. This value will be compared with the t value of the table on the distribution table t. With α = 0.05, df = n-k-1 = 60-2-1 = 57, for two-sided testing obtained, the t-value of a table of 1.672. Thus, if the table's value is t count > t, then H_0 is rejected, which means ChatGPT integrity has a positive and significant impact on the economic efficiency of the college.

Descussion

Learning Efficiency and the Economic Impact of ChatGPT Application in the Learning Process improves learning efficiency and effectiveness and has significant economic implications. With a higher quality of education, college graduates are expected to have skills that are more tailored to the needs of the industry, thereby increasing the competitiveness and productivity of the labour force. This contributes to sustainable economic growth by providing a workforce ready to face the challenges of the global economy. Challenges and Opportunities in Academic Integrity Conversely, the main challenge in implementing ChatGPT is maintaining academic integrity. Students can easily access answers through ChatGPT, potentially reducing academic integrity and increasing plagiarism risk. Therefore, strict policies and supervision are required to ensure that ChatGPT supports honest and integrated learning. Developing ethical guidelines and raising students' awareness of the importance of academic integrity is essential.

CONCLUSION

ChatGPT benefits educators and learners by providing a better learning experience by following technological developments. However, academic integrity has become one of the concerns that needs to be pursued further, especially in digital ethics discussions regarding the use of ChatGPT and other Gen-AI. The research is expected to provide valuable guidance to educational institutions in implementing technology ethically and effectively, with academic integrity as the primary foundation of learning. The benefits of this research include developing a deeper understanding of the potential and limitations of the use of ChatGPT in the context of higher education, as well as providing guidance for educational institutes to implement this technology properly.

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