Adoption Of Artificial Intelligence Chatbot Technology In Academic Activities Of Jakarta Students: Ease Of Use

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Abstract

Artificial Intelligence (AI) Chatbot technology has garnered significant attention recently as an innovative solution for various needs, from learning to counseling. However, its adoption among university students remains a crucial research area. This study aims to understand the usage patterns of university students in Jakarta regarding Chatbot technology, focusing on usage frequency, ease of use, and factors influencing adoption. Conducted from March to May 2024, the research involved 100 students from various Jakarta universities, selected through convenience sampling to capture diverse characteristics. Data collection methods included document studies and questionnaires. The analysis identified the level of Chatbot technology adoption among Jakarta students and the factors influencing it. Results indicate a high frequency of Chatbot use, with perceived usefulness, ease of use, and comfort being the primary drivers of adoption and positive attitudes toward this technology. This study provides significant insights for companies developing Chatbot technology, offering an in-depth understanding of students' preferences and behaviors. These insights can guide companies in creating more effective marketing strategies and enhancing Chatbot design and functionality to be more user-friendly and aligned with user expectations, thereby increasing adoption rates and user satisfaction.

Keyword: AI Chatbot; technology adoption; students; education; Jakarta

1. Introduction

Artificial Intelligence (AI) Chatbot Technology refers to the use of artificial intelligence algorithms and techniques to develop systems that can interact with users in a conversational mode designed to understand human language, process questions or commands, and provide relevant and meaningful responses (Følstad & Brandtzaeg, 2020). The factors for using Chatbot technology include assisting with learning processes, scheduling, and even counseling (Pérez et al., 2020). Chatbot, as software applications that interact with users using natural language, are a perfect example of consumer-oriented artificial intelligence that stimulates human habits (Ciechanowski et al., 2019). In recent years, interest in this technology has been evidenced by an increasing number of studies highlighting their focus on Chatbot and their potential role in enhancing satisfaction (Chung et al., 2018) and corporate perception (Araujo, 2018). A recent report by Research and Markets predicts that the global Chatbot market will reach a value of USD 3.99 billion by 2030, with the market experiencing a growth rate of 25.7% from 2022 to 2030. The educational Chatbot market is projected to grow at a rate of 30.8 between 2020 and 2027 due to the increasing popularity of messaging platforms and the growing trend to create more personalized learning experiences (Research and Markets, 2022). Although Chatbot technology has promising potential to enhance and facilitate learning, there remains uncertainty about its acceptance and adoption among learners. Therefore, additional research is needed to gain a comprehensive understanding of the factors influencing the acceptance and use of this innovative technology by learners. Chatbot are still in the early stages of their utilization (Hwang, G.J., 2021), and they face many challenges that may affect students' acceptance of their use in learning (Wu W., et al., 2022). Among the challenges mentioned in related studies are accessibility and usability, including technical issues and ease of use (Pérez, J.Q., 2020), ethical concerns, including privacy and security risks (Hasal M., et al., 2021), and students' attitudes towards the use of Chatbot in learning (Okonkwo C.W., et al. 2021).

In the context of Chatbot technology adoption among students, our main objective is to gain a deeper understanding of students' usage patterns of Chatbot technology. We aim to identify the frequency of Chatbot use by students for various purposes, such as information retrieval, academic assistance, or other daily needs. Therefore, to fill this knowledge gap, this study aims to answer key questions, such as; how often and to what extent do Jakarta students adopt Chatbot technology; and identify the main factors influencing students in adopting Chatbot technology among Jakarta students. The urgency od his research lies in the in-depth understanding of the extent to which students rely on Chatbot technology in decision-making as well as their preferences towards using this technology. Identifying the main factors influencing students in choosing or using Chatbot technology is also important for developing solutions that meet their needs (Arif Mahmud et al., 2024). This research provides a strong foundation to inform perceptions of ease of use and adoption of Chatbot technology among Jakarta students.

By understanding in detail, the level of adoption, and the preferences of students towards Chatbot technology, we will be able to provide a deeper explanation of the role and impact of this technology in the lives of Jakarta students. This information will be an important foundation in understanding students' preferences towards the use of Chatbot

technology. Moreover, the results of our research can also make a significant contribution to further research in the field of Chatbot technology usage, with the potential to explore new aspects of human-machine interaction and user behavior patterns that can inform the development of future products and services.

2. Literature Review

2.1. Definition of Artificial Intelligence

Artificial Intelligence (AI) is a branch of computer science focused on creating machines that mimic human intelligence, enabling them to think, learn, perceive, and adapt (Russell & Norvig, 2016). A key branch of AI is machine learning, which allows systems to improve their performance by learning from data without explicit programming (Goodfellow et al., 2016). The global AI market is projected to reach USD 196.63 billion by 2023, with a compound annual growth rate (CAGR) of 37.3% from 2023 to 2030, driven by its adoption across various sectors, including healthcare and automotive (Grand View Research, 2023). Major technology companies such as Amazon, Google, Apple, Facebook, IBM, and Microsoft are heavily investing in AI research and development. Companies are leveraging AI to enhance customer experiences and solidify their presence in Industry 4.0. For example, McDonald's invested USD 300 million in an AI startup in Tel Aviv in March 2020 to deliver personalized customer experiences using AI (Grand View Research, 2023).

2.2. Definition of Chatbot

A Chatbot is a computer program designed to communicate with humans in the form of text or voice, using artificial intelligence techniques such as natural language processing and machine learning (McTear et al., 2016). The goal is to simplify interactions between humans and computer systems, often used in customer service, education, and various other applications. Despite their sophistication, Chatbot operate based on pre-programmed data and algorithms rather than independent cognitive abilities (Brandtzaeg & Følstad, 2017).

2.3. Benefits of Chatbot

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2.4. Research Variable

2.4.1 Usefulness

According to Alhasanah (2014), usefulness is the quality of ease and speed in operating an application or website, with a design presented to the user. Usefulness is crucial in our research on the adoption of artificial intelligence Chatbot by students in Jakarta. The speed and ease of operating Chatbot are essential for enhancing the adoption and use of this technology. Artificial intelligence Chatbot can be programmed to provide quick and relevant responses to students' questions and needs. The ease of use of this technology will encourage students to use it in their daily lives.

2.4.2 Ease of Use

Ease of use refers to being easy to learn, easy to understand, simple, and easy to operate (Ernawati & Noersanti, 2020). Ease of use is a crucial aspect in the acceptance of artificial intelligence Chatbot technology by students in Jakarta. The integration of artificial intelligence ensures that Chatbot are easy for users to learn and understand. With customized algorithms, Chatbot ability to respond to questions and solve problems becomes simpler for users. With intuitively designed features, students can easily operate Chatbot without requiring in-depth technical knowledge. This ensures that Chatbot technology becomes a practical and efficient solution in helping students overcome various challenges in their academic lives in Jakarta.

2.4.3 Convenience

Convenience is the extent to which a person enjoys using technology for its own sake (Hadi, 2020). convenience in using artificial intelligence-based Chatbot technology has a strong relationship with user experience. With the adoption of this technology, convenience includes ease of interaction, quick responses, and accurate understanding of user needs. When users feel convenience using Chatbot, they are more likely to adopt the technology in their daily lives. Artificial intelligence plays a key role in enhancing this convenience by providing more personal and effective solutions, which in turn increases user acceptance and satisfaction with Chatbot technology in the context of student life in Jakarta.

2.4.4 Attitude

Attitude is the positive or negative evaluation, as well as the psychological disposition towards a particular object, which tends to influence an individual's behavior towards that object (Eagly & Chaiken, 1993; Petty & Wegener, 1998). A positive attitude of students towards Chatbot can strengthen technology adoption and encourage students to be more open and active in using it. This positive attitude can create an environment that supports the growth and acceptance of new technology in the student community.

2.4.5 Technology Adoption

Technology adoption refers to the process of accepting and using new technology by individuals, groups, or organizations in a specific context (Rogers, 2003). In the educational context, the adoption of technology by students has significant implications for their learning efficiency. When students choose to adopt Chatbot technology, they gain faster and easier access to information, assistance, and support in their studies. By utilizing Chatbot as an additional learning resource, students can enhance their learning efficiency and effectiveness, as well as expand their understanding of the subjects they are studying.

2.5 Previous Studies

The literature review presented encompasses various studies on Chatbot applications across different sectors, highlighting the potential of this technology in facilitating everyday communication and operations. Følstad & Brandtzaeg (2020) revealed the positive effects of Chatbot in simplifying user interactions with services and information, with their article published in Interactions emphasizing how Chatbot can transform human-computer interactions, particularly in terms of user-friendliness and service accessibility. On the other hand, Pérez et al. (2020), in a study published in the Journal of Educational Technology, highlighted the benefits of Chatbot in education and counseling. This study illustrates how this technology can contribute to the learning process by evaluating the use of Chatbot in

educational and counseling contexts. From this review, it can be concluded that Chatbot offer various benefits.

2.6 Theoretical Framework

Research across several journal articles mentioned has diverse backgrounds but focuses on issues related to the use of artificial intelligence (AI) and Chatbot. Duila (2023) identifies the risks of excessive automation in AI use, including job loss and associated ethical considerations. The research method employed is a literature review of journal articles. On the other hand, Arif Mahmud et al. (2024) and Tawfeeq et al. (2023) examine Chatbot usage among students, highlighting factors influencing the acceptance and use of this technology, as well as ethical and privacy concerns. Both research methods involve surveys to measure respondents' attitudes toward Chatbot. From the research findings, various factors influencing the acceptance and use of Chatbot technology among students, as well as ethical and privacy concerns, are identified.

This study aims to explore and deepen the practice of using Chatbot technology by students, as well as to understand the factors influencing their decisions to adopt and use this technology in an educational context. By investigating usage patterns, preferences, and perceptions of AI Chatbot among students, this research aims to provide insights into how this technology affects students' learning interactions and contributes to a broader understanding of the role of technology in decision-making processes. As education increasingly shifts towards technology, understanding how students interact with specific technologies like Chatbot becomes increasingly important. By investigating the extent to which students adopt and utilize Chatbot to obtain information, assistance, and support in learning, this research aims to identify dominant usage patterns and factors influencing the acceptance of this technology.

3. Material and Method

The study employed a quantitative research design to investigate the usage patterns of university students in Jakarta regarding Chatbot technology.

3.1 Design Study

The research focused on millennial university students in Jakarta, Indonesia, who use Chatbot technology, utilizing convenience sampling to select 100 participants from various universities. Eligible participants actively used Chatbot technology for purposes such as learning, counseling, or other services. Data were collected through a structured questionnaire, which covered aspects like usage frequency, ease of use, perceived usefulness, comfort level, and factors influencing Chatbot technology adoption, and through document studies that reviewed existing literature on Chatbot technology adoption and user preferences. Participants were recruited using convenience sampling techniques, ensuring diversity in gender, age, academic majors, and Chatbot usage experiences. Data collection occurred from March to May 2024, with questionnaires distributed either in person or through online platforms based on participants' preferences and availability.

3.2 Data Analysis

According to Sugiyono (2019), data analysis is the process of organizing and grouping data from various sources to make it easily understood and communicated to others. Once data

collection is complete, the next step is data analysis, which involves processing data according to variables and respondent categories.

3.2.1. Hypothesis Testing Methods

As defined by Sugiyono (2019), a hypothesis is a tentative answer to the research problem statement. To obtain answers to the research problem statement and the research hypotheses that have been formulated, hypothesis testing is required:

3.2.1.1. Simple Linear Regression Coefficient Test

Simple linear regression analysis, according to Sugiyono (2019), is a linear relationship between one independent variable (X) and a dependent variable (Y). In this study, it is used to analyze the relationship between the ease of use variable (X) and Chatbot adoption behavior (Y). The requirements for this analysis include a non-probability sample, a causal relationship between X and Y, a normal distribution of Y values, and the validity of the linear equation.

3.2.2. Descriptive Test

Descriptive tests provide information about the characteristics or features of the main research variables. Descriptive statistics are used to describe data without making general conclusions or generalizations (Sugiyono, 2018). Descriptive statistics in this study are represented by respondent behavior.
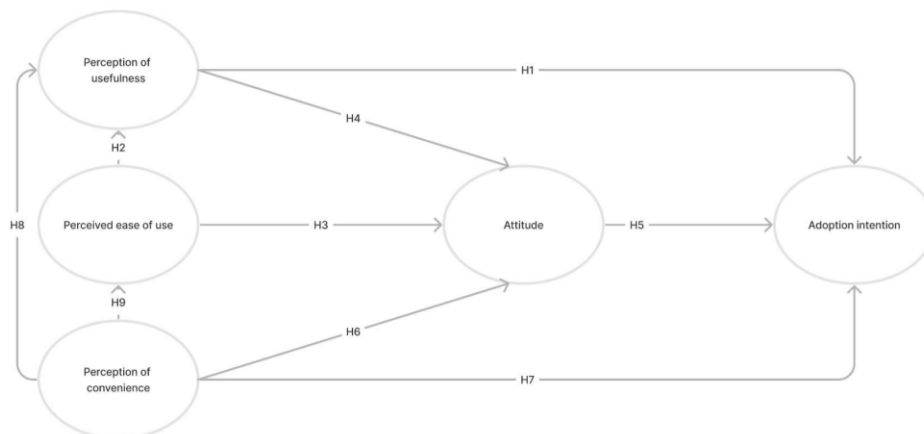

Figure 1. Research Model

4. Result

Table 1. Correlation

Correlations

		P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	Total
P01	Pearson Correlation	1	.423**	.106	.290**	.437**	.334**	.389**	.373**	.496**	.333**	.610**
	Sig. (2-tailed)		<.001	.291	.003	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	101	101	101	101	101	101	101	101	101	101	101
P02	Pearson Correlation	.423**	1	.181	.463**	.441**	.492**	.470**	.386**	.478**	.310**	.685**
	Sig. (2-tailed)	<.001		.071	<.001	<.001	<.001	<.001	<.001	<.001	.002	<.001
	N	101	101	101	101	101	101	101	101	101	101	101
P03	Pearson Correlation	.106	.181	1	.400**	.267**	.142	.145	.183	.173	.103	.356**
	Sig. (2-tailed)	.291	.071		<.001	.007	.157	.149	.067	.084	.308	<.001
	N	101	101	101	101	101	101	101	101	101	101	101
P04	Pearson Correlation	.290**	.463**	.400**	1	.470**	.445**	.325**	.312**	.415**	.308**	.628**
	Sig. (2-tailed)	.003	<.001	<.001		<.001	<.001	<.001	.001	<.001	.002	<.001
	N	101	101	101	101	101	101	101	101	101	101	101
P05	Pearson Correlation	.437**	.441**	.267**	.470**	1	.584**	.551**	.621**	.469**	.410**	.783**
	Sig. (2-tailed)	<.001	<.001	.007	<.001		<.001	<.001	<.001	<.001	<.001	<.001
	N	101	101	101	101	101	101	101	101	101	101	101
P06	Pearson Correlation	.334**	.492**	.142	.445**	.584**	1	.581**	.447**	.475**	.511**	.778**
	Sig. (2-tailed)	<.001	<.001	.157	<.001	<.001		<.001	<.001	<.001	<.001	<.001
	N	101	101	101	101	101	101	101	101	101	101	101
P07	Pearson Correlation	.389**	.470**	.145	.325**	.551**	.581**	1	.469**	.526**	.422**	.741**
	Sig. (2-tailed)	<.001	<.001	.149	<.001	<.001	<.001		<.001	<.001	<.001	<.001
	N	101	101	101	101	101	101	101	101	101	101	101
P08	Pearson Correlation	.373**	.386**	.183	.312**	.621**	.447**	.469**	1	.502**	.393**	.705**
	Sig. (2-tailed)	<.001	<.001	.067	.001	<.001	<.001	<.001		<.001	<.001	<.001
	N	101	101	101	101	101	101	101	101	101	101	101
P09	Pearson Correlation	.496**	.478**	.173	.415**	.469**	.475**	.526**	.502**	1	.451**	.734**
	Sig. (2-tailed)	<.001	<.001	.084	<.001	<.001	<.001	<.001	<.001		<.001	<.001
	N	101	101	101	101	101	101	101	101	101	101	101
P10	Pearson Correlation	.333**	.310**	.103	.308**	.410**	.511**	.422**	.393**	.451**	1	.667**
	Sig. (2-tailed)	<.001	.002	.308	.002	<.001	<.001	<.001	<.001	<.001		<.001
	N	101	101	101	101	101	101	101	101	101	101	101
Total	Pearson Correlation	.610**	.685**	.356**	.628**	.783**	.778**	.741**	.705**	.734**	.667**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	
	N	101	101	101	101	101	101	101	101	101	101	101

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2. Reliability

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
P01	37.5149	22.652	.518	.855
P02	37.6832	21.739	.596	.849
P03	37.4752	24.652	.253	.871
P04	37.5347	23.031	.552	.854
P05	37.8911	20.918	.716	.839
P06	38.4455	19.410	.680	.842
P07	37.9802	20.980	.657	.844
P08	37.8713	21.253	.613	.848
P09	37.6634	21.866	.666	.845
P10	38.2970	20.731	.541	.856

Case Processing Summary				Realibility Statistics	
		N	%	Cronchbach's Alpha	N of Items
Cases	Valid	101	100,0	0.864	10
	Excluded	0	0,0		
	Total	101	100,0		
a. Listwise deletion based on all variables in the procedure.					

All questionnaires in Table 1 meet the criteria for correlation, with values greater than 0.279 and less than 0.05. Therefore, the data is considered valid. For Table 2, its questionnaire demonstrates good internal consistency, as Cronbach's Alpha exceeds the recommended threshold of 0.6. This indicates reliable data.

5. Discussion

The findings of this study reveal significant insights into the factors influencing Chatbot technology adoption among university students in Jakarta. The strong correlations and internal consistency observed among various constructs underscore the validity and reliability of the collected data. Specifically, the correlation matrix presented in Table 1 confirms that all questionnaires meet the necessary criteria for correlation, with values greater than 0.279 and significance levels less than 0.05. This validation is crucial as it demonstrates that the relationships between constructs are statistically significant and not due to random chance. Significant correlations were observed between constructs such as Degree of Belief in Ability (DBA) and Desire to Support Chatbot Management (DSCM), as well as between Perceived Ease of Use (PEUE) and Perceived Usefulness (PU). These relationships indicate that students who believe in their ability to interact with Chatbots are more likely to support their implementation and management. Furthermore, students who find Chatbot technology easy to use tend to perceive it as more useful. This finding aligns with previous research in technology acceptance models, reinforcing the notion that usability is a key driver of perceived value.

The reliability analysis, as illustrated in Table 2, demonstrates good internal consistency for the questionnaire, with Cronbach's Alpha values exceeding the recommended threshold of 0.6, specifically reaching 0.864 for the 10-item scale. This high level of internal consistency underscores the reliability of the data collected through the questionnaire, indicating that the items consistently measure the same underlying constructs. This robustness in measurement is critical for drawing valid conclusions from the data. These findings strongly support the hypotheses that ease of use and perceived usefulness are critical factors influencing Chatbot technology adoption among university students. The significant correlations among these constructs suggest that enhancing the usability and perceived benefits of Chatbot technology can lead to higher adoption rates and increased user satisfaction. This is consistent with the Technology Acceptance Model (TAM), which posits that perceived ease of use and perceived usefulness are primary determinants of technology adoption. Therefore, to foster greater acceptance and utilization of Chatbot technology in educational settings, it is essential to focus on improving the user interface and demonstrating the tangible benefits of Chatbots

to students. By addressing these factors, universities can better integrate Chatbot technology into their systems, ultimately enhancing the educational experience and operational efficiency.

In conclusion, the study provides valuable insights into the determinants of Chatbot technology adoption, emphasizing the importance of usability and perceived usefulness. These findings not only contribute to the existing body of knowledge on technology acceptance but also offer practical implications for the design and implementation of Chatbot systems in educational environments. Future research should continue to explore these relationships in different contexts and with diverse student populations to further validate and refine our understanding of the factors driving technology adoption.

6. Conclusion, Implication, and Recommendation

A. Conclusion

This study provides significant insights into the adoption and usage patterns of Chatbot technology among university students in Jakarta, highlighting the critical role of perceived ease of use and perceived usefulness in influencing students' acceptance and utilization. Our findings reveal strong correlations between constructs such as Degree of Belief in Ability (DBA), Desire to Support Chatbot Management (DSCM), Perceived Ease of Use (PEUE), and Perceived Usefulness (PU), suggesting that enhancing usability and perceived benefits can positively impact adoption rates. The reliability analysis confirms the robustness of our data, aligning with the Technology Acceptance Model (TAM) and emphasizing the importance of usability and utility. The widespread acceptance of Chatbot technology, with over 90% of students finding it user-friendly and valuable for learning, underscores its potential to transform educational experiences. Addressing challenges like accessibility, usability, and ethical concerns is imperative for fostering greater acceptance and satisfaction. Overall, this research provides a foundation for future studies to explore new dimensions of human-machine interaction and user behavior, informing the development of more effective and user-friendly Chatbot applications to enhance the learning process and user experience.

B. Implication

Implications for the company include prioritizing the development of user-friendly Chatbot technology that offers clear benefits, as both ease of use and perceived usefulness significantly increase adoption rates. The strong interest in Chatbot-assisted learning underscores its potential to transform education, with a majority of students experiencing efficiency gains and finding them easy to use. Personalization within the educational sector can further enhance user satisfaction and engagement, presenting a substantial opportunity in this rapidly expanding market. It is crucial to address technical issues and ensure accessibility through robust support and regular updates. Privacy and security concerns must be managed with strict data protection measures and transparent policies to establish user trust. By incorporating user feedback and employing empathetic design, companies can create Chatbots that are more engaging. Strategic partnerships with educational institutions can aid integration and provide valuable insights. Educating users about the benefits of Chatbots and showcasing successful implementations can drive adoption and underscore their value. This highlights the transformative potential of Chatbot in education, suggesting that they can significantly improve the efficiency and effectiveness of teaching and learning processes.

C. Recommendation

Further developing and integrating Chatbot technology in educational settings hinges on tackling critical challenges like accessibility, usability, and ethical considerations. Improving user interfaces for enhanced ease of use and providing robust technical support are pivotal steps. Stringent privacy measures and transparent policies are essential to foster user trust. Educational institutions should prioritize creating Chatbots tailored to diverse subjects, learning styles, and student needs to ensure a personalized and effective learning experience. Educators need comprehensive training to effectively integrate Chatbots into teaching methods, maximizing their benefits for students. Chatbot designs should prioritize user-friendliness, engagement, and accessibility to ensure universal student usability. However, it's crucial to mitigate potential over-reliance on Chatbots by emphasizing their supportive role alongside human interaction. With a strategic approach, Chatbots can evolve into invaluable educational tools, markedly improving teaching quality and learning outcomes.

7. Acknowledge

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