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Acceptance of ChatGPT as an AI Chatbot at Among Students: An Analysis Using the UTAUT Model

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Abstract

This study explores the degree to which university students in Surabaya accept ChatGPT, an AI-powered chatbot, by utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Adopting a quantitative methodology, data were collected through questionnaires distributed to respondents. The data analysis was carried out using the Structural Equation Modeling (SEM) method with the aid of SmartPLS software. The results demonstrate that the fundamental elements of UTAUT namely performance expectancy, effort expectancy, social influence, and facilitating conditions exert a significant influence on students' intentions and predicted behaviors concerning ChatGPT usage. These findings imply that simplicity, perceived usefulness, social support, and adequate technological infrastructure serve as key drivers in the adoption of ChatGPT. Hence, with proper educational facilitation and a supportive learning environment, ChatGPT is likely to offer substantial long-term value in academic settings.

Keywords: *Technology Acceptance, UTAUT, ChatGPT, Artificial Intelligence, SmartPLS.*

1. Introduction

Artificial intelligence (AI) has rapidly advanced and is becoming increasingly influential across multiple sectors, including communication, commerce, and education. A notable development in this field is the emergence of natural language processing (NLP)-driven chatbots, such as ChatGPT [1]. ChatGPT is a language-based AI model created by OpenAI that leverages deep learning techniques to comprehend and produce human-like text. It is capable of interpreting context and engaging in interactive and natural-sounding dialogue. ChatGPT has one of the advantages of being able to provide in-depth answers to complex questions that can enable users to obtain information quickly and effectively. ChatGPT's success in generating high-quality text is supported by an extensive training process, which has been tested on a number of texts from many sources. ChatGPT can learn from user interactions and generate responses based on previously inputted context [2].

ChatGPT has attracted worldwide attention for its innovative and interactive capabilities. In the first two months of launch, ChatGPT managed to reach 100 million active users. This makes it the fastest growing app in the history of technology[3]. In recent years, ChatGPT is widely used in various fields namely customer service, content creation, programming and academic research. Its ability to provide fast and accurate answers makes it one of the most popular AI chatbots in Indonesia, especially among students and professionals [4]. Some research indicates that variables such as performance expectancy, effort expectancy, social influence, and facilitating conditions significantly contribute to the decision-making process regarding the adoption of this technology [5].
According to a study conducted by Wulandari [1], perceived ease of use and user experience had respective impacts of 25.8% and 6.2% on user acceptance and interaction effectiveness. Meanwhile, the study by Galantry & Tanamah [4] revealed that performance expectancy and facilitating conditions were the most dominant factors influencing the intention to use ChatGPT, whereas other elements like effort expectancy and social influence also played a role in shaping user behavioral intentions.

In this study we used the UTAUT model. This model was developed by Venkatesh [7], which is to suggest technology acceptance by combining several previous theories such as TAM (Technology Acceptance Model) and TPB (Theory of Planned Behavior). This model is often used in understanding the adoption of new technologies, including the AI-based chatbot ChatGPT. UTAUT enables the analysis of key factors that influence the acceptance of ChatGPT in everyday life [6]. To evaluate the extent to which ChatGPT is influential based on previous research, this study aims to measure the level of acceptance of the technology, aims to measure the level of acceptance of the technology. The main focus of this research is to identify the factors that influence students' interest in using ChatGPT.

2. Literature review

2.1. Artificial Intelligence

Artificial Intelligence (AI) is a discipline within computer science that concentrates on creating systems and machines capable of performing tasks that would usually necessitate human intelligence. It applies algorithms and mathematical models to enable computers and related systems to learn from data, recognize patterns, and make informed decisions [19]. Essentially, AI enables machines to simulate human cognitive abilities. Its implementation spans a broad range of sectors globally, including healthcare, education, and corporate governance, as highlighted in various studies on AI adoption [20].
Recent advancements in AI have been driven by greater computational capacity, the rise of big data, and improvements in machine learning and deep learning methods. Today, AI-powered technologies are capable not only of automating routine processes but also of conducting predictive analytics, offering tailored recommendations, and supporting decision-making in complex environments.

2.2. Natural Language Processing

Natural Language Processing (NLP) a branch of Artificial Intelligence (AI), focuses on enabling machines to understand, interpret, and process human language in both its spoken and written forms. To accurately grasp the meaning, intention, and emotional tone embedded in linguistic data, NLP draws on multiple areas of study including computational linguistics, statistical analysis, machine learning, and deep learning techniques [21]. In its development, NLP has been applied in various modern technologies such as virtual assistants, recommendation systems, spam detection, social media sentiment analysis, to smart chatbots such as ChatGPT. NLP's ability to capture context and language structure makes it capable of responding to questions, translating sentences, and even summarizing information automatically. With NLP, interactions between humans and computers become more natural, efficient, and adaptive to user needs.

2.3. ChatGPT

ChatGPT, short for Generative Pre-Trained Transformer, is an AI-based system developed by the American technology company OpenAI. OpenAI is recognized for its dedication to advancing research and innovation in AI-based technologies. With its AI functionalities, ChatGPT can process a wide range of information from basic to complex and generate contextually appropriate replies. Nevertheless, the accuracy of its responses is not guaranteed, as the system relies on information gathered from the internet, which may sometimes result in incorrect or misleading content [22].

2.4. UTAUT

The Unified Theory of Acceptance and Use of Technology (UTAUT) functions as a conceptual basis to explore how likely individuals are to embrace and make use of certain technologies. This theory outlines twelve essential variables that influence users' technology adoption decisions, such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit, behavioral intention, and actual usage. Moreover, factors like gender, age, and experience act as moderators that affect the intensity of the relationships among these main variables [8][24].

2.5. ChatGPT as an Implementation of AI and NLP

ChatGPT is an implementation of Artificial Intelligence technology that relies on natural language processing (NLP) capabilities. The system was developed by OpenAI by involving a research process of large-scale text data, including books, articles, and various forms of human communication. The purpose of this training is for ChatGPT to be able to recognize the intent of the questions given by users, and then compose appropriate answers automatically based on the understood context [26].

2.6. Risk Perception and Ethical Use of ChatGPT

The use of ChatGPT in learning can pose risks, such as the emergence of over-dependence that can reduce self-confidence and critical thinking skills. The tendency to always rely on ChatGPT is also considered to hinder students' ability to interact socially and discuss actively in an academic environment [28]. The ease offered by ChatGPT in accessing scientific writing information has the potential to erode the ability of individuals to think critically and research independently [30].
Ensuring the ethical use of ChatGPT in higher education involves adhering to ethical standards, where users are expected to take responsibility for the ways in which the technology is applied. Although ChatGPT is able to support the learning and research process, users should still must filter information critically, not rely entirely on AI, and maintain the originality of academic work. Another important aspect is to keep personal data safe and avoid copyright infringement [10].

3. Research Methodology

3.1. Preliminary Stage of Research

The research process initially starts by identifying and reviewing relevant literature. Following this, a specific topic is selected by taking into account the researcher's existing knowledge and identifying gaps within the current body of research. Exploring literature related to the chosen topic serves to enhance comprehension. Through examining multiple sources, the research is reinforced with broader insights and allows for a more in-depth and thorough analysis.

3.2. UTAUT Conceptual Model

This research adopts the UTAUT (Unified Theory of Acceptance and Use of Technology) conceptual model and utilizes questionnaires as the main instruments for gathering data. UTAUT functions as a core framework for analyzing and predicting technology adoption within organizational environments [9]. The subsequent section provides definitions of each variable incorporated in the UTAUT model.

3.2.1. Performance Expectancy (PE)

Performance expectancy refers to an individual's perception that using a particular system will improve their performance in carrying out certain tasks. It reflects the perception that the technology can assist in finishing work more quickly, efficiently, and with improved professional outcomes [29].

3.2.2. Effort Expectancy (EE)

Effort expectancy represents the degree of ease associated with the use of a system. In the context of ChatGPT, EE captures how easily users, such as students, can operate the platform and utilize its features. As a core component of the UTAUT framework, EE is considered a major predictor in determining one's intent to adopt a new technology [27].

3.2.3. Social influence (SI)

Social influence is defined as the belief that others especially important or influential individuals within a person's social circle can affect one's decision to use a system or technology. When such people express support or expectations, it can significantly influence an individual's motivation to adopt the technology [23].

3.2.4. Facilitating Conditions (FC)

Facilitating conditions encompass the availability of supportive resources and infrastructure that enable individuals to effectively use a system or technology [7]. These include access to technical help, training, and institutional backing, all of which collectively encourage technology adoption. Research using the UTAUT framework confirms that these elements directly affect users' technology usage behavior [25].

3.2.5. Behavioral Intention (BI)

Behavioral intention reflects the extent to which a person intends to continue or begin using a system or technology, either in the short or long term. This intention is shaped by multiple influencing factors, including social pressure, perceived value, available support resources, and personal motivation all of which play a role in encouraging user engagement with a given application. In this context, BI serves as a key indicator to predict whether someone will actually use the technology on an ongoing basis [15].

3.2.6. Behavioral Expectation (BE)

Behavioral Experience (BE) refers to an additional construct that represents an individual's expectation or belief regarding their future use of a particular technology. This is based on current experience, intention, and support.

3.3. Development of a Framework of Thought

Then, the preparation of a framework that is based on the UTAUT model, but does not include variables in the analysis process. The following is a research model used as a framework.

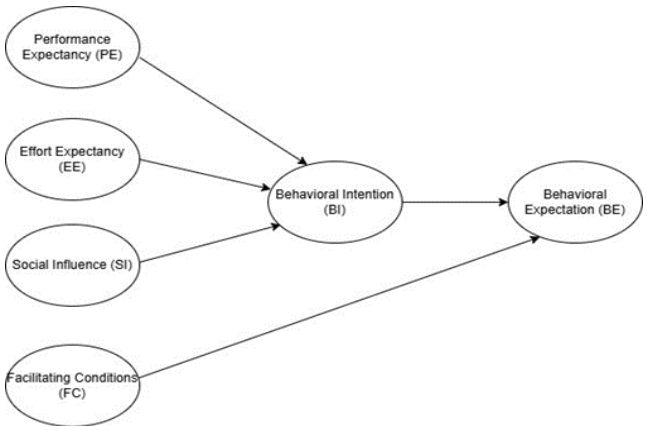

Fig. 1: Thinking Framework Model

3.4. Hypothesis Formulation

Hypothesis formulation based on the framework that has been made.
H1. Performance Expectancy (PE) has a positive correlation with students' Behavioral Intention (BI) to use ChatGPT.

Performance Expectancy represents students' beliefs that using a technology like ChatGPT will enhance their productivity. When students recognize its usefulness in helping them finish academic tasks more effectively, improving learning outcomes, and saving time, they are more inclined to adopt and continue using it. The perception of practical advantages is key to shaping students' behavioral intention.

H2. Effort Expectancy (EE) positively affects students' Behavioral Intention (BI) to use ChatGPT.
Effort expectancy relates to how intuitive and easy a system is to operate. When students consider ChatGPT as simple to use, with minimal barriers and accessible features, they are more likely to develop a willingness to keep using it. Reducing complexity can help lower psychological or technical burdens during technology adoption

H3. Social Influence (SI) has a significant role in influencing students' BI to adopt ChatGPT.
Social Influence involves how individuals such as peers, instructors, or group members encourage or recommend technology usage. When students perceive support or recommendations from key people around them to use ChatGPT, their likelihood to adopt and continue using it rises. Such support fosters shared confidence that reinforces the intention to engage with the tool.

H4. Facilitating Conditions (FC) have a significant positive impact on Behavioral Expectation (BE) related to ChatGPT usage among students.
Facilitating Conditions encompass the quality of the support environment, including access to devices, stable internet, and technical assistance. When students have sufficient resources to operate ChatGPT, they are more likely to feel assured in continuously using it. These supporting infrastructures shape optimistic behavioral expectations for its future use.

H5. Behavioral Intention (BI) has a positive relationship with Behavioral Expectation (BE) in students' future use of ChatGPT.
Behavioral intention indicates students' willingness to continue using ChatGPT in the future. When students are determined to use it regularly, they begin to expect it to become part of their daily academic routine. This sense of intention reinforces their belief that ChatGPT will remain integrated into their future educational activities

3.5. Data Collection

3.5.1. Sampling Method

The technique for selecting samples is tailored to the study's goals and the population's characteristics, ensuring that the chosen respondents are appropriate. This helps guarantee that the information obtained is accurate, relevant, and supports the findings of the analysis.

3.5.1.1. Purposive Sampling

At the initial stage, this study used Purposive Sampling to determine the population in accordance with the research criteria. In this study, the selected population is all students who live in Surabaya and have used ChatGPT.

3.5.1.2. Determination of Sample Size with Cochran's Formula

This study uses Cochran's formula to determine the suitable number of samples that can accurately represent the target population. The initial stage in implementing this technique involves identifying the intended population, which consists of students residing in Surabaya. Following that, the sample is selected randomly from this population. To establish the required number of participants, the calculation process is carried out as described below.

3.5.1.2.1. Calculating the Uncorrected Sample Size (n)

$$n = \frac{z^2 \times p \times (1-p)}{E^2}$$
$$n = \frac{1.96^2 \times 0{,}5 \times (1-0{,}5)}{0{,}10^2}$$
$$n = \frac{3{,}8416 \times 0{,}25}{0{,}01}$$
$$n = \frac{0{,}9604}{0{,}01}$$
$$n = 96$$

The Z value is taken from the standard normal distribution, such as 1.96, which corresponds to a 95% confidence interval. The p value refers to the estimated proportion (or assumed to be 0.5 when unknown), while E represents the margin of error.

3.5.1.2.2. Calculating Sample Size Adjusted to Population

$$n_{adj} = \frac{n}{1+\frac{(n-1)}{N}}$$
$$n_{adj} = \frac{96}{1+\frac{(96-1)}{244.424}}$$
$$n_{adj} = \frac{96}{1+0.0003906}$$
$$n_{adj} = \frac{96}{1.0003906}$$
$$n_{adj} = 96$$

The number of respondents in this study was determined using statistics provided by the Central Bureau of Statistics of East Java Province, which indicated that there were 273,229 students living in Surabaya City. This population figure was used as the basis for computing the required sample size. Based on this total, the minimum sample size needed for this research was calculated to be 96 participants.

3.5.2. Data Collection Instruments

This study gathers primary data using a questionnaire as the tool for data collection. The questionnaire was developed based on the UTAUT model variables, which include performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). The effort expectancy items were adapted from previous research [14] and [7], while the social influence variable used items sourced from studies [13], [14], and [7]. The facilitating conditions indicators were based on instruments used in prior research [7], [11], and [12]. The behavioral intention to use ChatGPT was measured using questionnaire items derived from research [11]. The responses were collected using a four-point Likert scale, where (1) = Strongly Disagree, (2) = Disagree, (3) = Agree, and (4) = Strongly Agree. The questionnaire was distributed online via a Google Form link sent to participants. The sampling technique used was purposive sampling, and the responses gathered were analyzed through statistical methods such as factor analysis and regression, in order to examine the relationship between UTAUT model variables and the level of ChatGPT usage.

Table 1: Instrumen dan Sumber Pengumpulan Data

Variable	Source	Question
Performance Expectancy (PE)	[29]	PE1 ChatGPT can help me do my assignments faster.
		PE2 ChatGPT helps increase my productivity in learning.
		PE3 ChatGPT makes my learning activities easier.
		PE4 I consider ChatGPT to be beneficial in assisting my academic activities.
Effort Expectancy (EE)	[29]	EE1 I think learning how to use ChatGPT is simple.
		EE2 The way ChatGPT works is easy to understand.
		EE3 I quickly adapted to using ChatGPT.
		EE4 Overall, I find ChatGPT easy to use.
Social Influence (SI)	[29]	SI1 People in my environment recommended that I try using ChatGPT.
		SI2 Those in my social circle think I ought to use ChatGPT.
		SI3 My friends' use of ChatGPT encourages me to use it too
		SI4 I feel encouraged to use ChatGPT because of the support of my surroundings.
Facilitating Conditions (FC)	[29]	FC1 I have enough devices and internet to use ChatGPT.
		FC2 I know how to use technology like ChatGPT.
		FC3 If I have difficulty using ChatGPT, I know where to go for help (e.g. through tutorials, friends, or forums)
		FC4 The surroundings I'm in encourage me to use ChatGPT.
Behavioral Intention (BI)	[29]	BI1I have the intention to keep using ChatGPT in the upcoming months.
		BI2 I anticipate using ChatGPT within the upcoming months.
		BI3 I intend to utilize ChatGPT regularly over time.
Behavioral Expectation (BE)	[29]	BE1 I think I will use ChatGPT in the next few months.
		BE2 I plan to use ChatGPT once more in the near term.
		BE3 I am pretty sure I will continue to use ChatGPT.

3.5.3. Data analysis and processing

This study adopts a quantitative research design, where data analysis and processing are carried out through the Structural Equation Modeling (SEM) technique. SEM integrates two main analytical methods: factor analysis, which uncovers new variables based on observed correlation patterns, and path analysis, which measures the strength of relationships between variables. The data will be processed using SmartPLS software. The questionnaire responses will undergo tests for both reliability and validity, and hypotheses will be assessed through the bootstrapping method available in SmartPLS.

4. Results and Discussion

4.1. Data Description

The description of the data obtained from our research is as shown in the table below:

Table 2: Data Description

Length of Use	Number of Respondents	Percentage
<1 month	4	3.4%
1-3 months	45	38.8%
>3 months	67	57.8%

4.2. Validity Test

The purpose of the validity assessment is to examine how accurately the gathered data represents the actual scope of the research. Validity shows how well a measurement instrument reflects what it is supposed to evaluate. It seeks to determine whether the questionnaire that has been developed can validly capture the intended construct. According to [16], this involves analyzing the relationship between each item's score and the total score of the questionnaire. A loading factor above 0.70 is regarded as an indicator of acceptable validity [17]. The outcomes of the validity test are presented below.

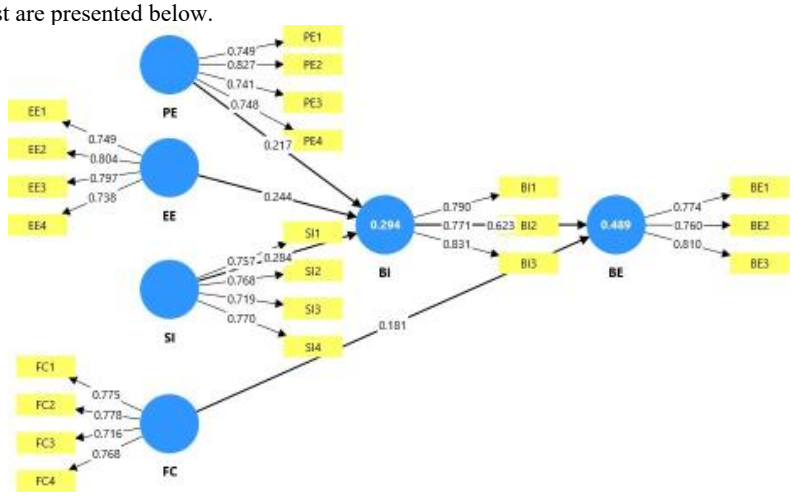

Fig. 2: Graphical Output of Validity Test Results

Based on the validity test findings, it can be concluded that each variable demonstrates a loading factor greater than 0.70. As a result, all variables fulfill the validity criteria and can proceed to the next stage of analysis.

4.3 Reliability Test

In addition, the reliability test is conducted to assess how well the measurement instrument can produce results that are both consistent and stable. A variable is said to be reliable if its composite reliability value reaches or surpasses the threshold of 0.70 [18]. The following table presents the results derived from the reliability analysis:

Table 3: Results of the Reliability Assessment

Variabel	Composite Reliability	AVE	Description
Performance expectancy (PE)	0.825	0.611	Reliable
Effort expectancy (EE)	0.840	0.636	Reliable
Social influence (SI)	0.855	0.597	Reliable
Facilitating conditions (FC)	0.845	0.577	Reliable
Behavioral Intention (BI)	0.851	0.588	Reliable
Behavioral Expectation (BE)	0.840	0.568	Reliable

According to the table, each variable shows a composite reliability score of ≥ 0.70. Therefore, all variables are considered to be reliable, allowing the analysis to move forward to the subsequent phase.

4.4 Hypothesis Test

The table below presents the path coefficient results, that show the direction of the connections between the variables for each proposed hypothesis.

Table 4: Hypothesis Test Results with Path Coefficient

Variable Relationship	Original Sample (O)	Sample Mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Result
BI → BE	0.623	0.618	0.069	9.050	0.000	Supported
EE → BI	0.244	0.245	0.087	2.819	0.005	Supported
FC → BE	0.181	0.194	0.064	2.855	0.004	Supported
PE → BI	0.217	0.220	0.104	2.079	0.038	Supported
SI → BI	0.284	0.299	0.103	2.765	0.006	Supported

Based on hypothesis testing, it is known that all relationships between variables in this model are significant. The factors studied have an influence on student intentions and expectations in using ChatGPT.

Based on the results, the relationships between variables were examined using p-values. A p-value less than 0.05 indicates a statistically significant connection, whereas a value greater than 0.05 means there is no significant relationship. The details of these relationships are as follows:

1. Performance Expectancy (PE) shows a meaningful impact on Behavioral Intention (BI) or students' willingness to use ChatGPT, supported by a p-value of 0.038, which is below the 0.05 threshold (0.038 < 0.05).
2. Effort Expectancy (EE) also demonstrates a significant relationship with Behavioral Intention (BI) or students' intent to use ChatGPT, with a p-value of 0.005, which is lower than 0.05 (0.005 < 0.05).
3. Social Influence (SI) contributes significantly to Behavioral Intention (BI) or students' decision to use ChatGPT, proven by a p-value of 0.006 (0.006 < 0.05).
4. Facilitating Conditions (FC) significantly affect Behavioral Expectation (BE) or students' expectations in using ChatGPT, with a p-value of 0.004, indicating significance as it is smaller than 0.05 (0.004 < 0.05).
5. Behavioral Intention (BI) significantly influences Behavioral Expectation (BE) or students' behavioral expectations of using ChatGPT, because the resulting p-value is 0.000, which is considerably below 0.05 (0.000 < 0.05).

5. Conclusion

This study investigates the extent of students' acceptance toward ChatGPT based on the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. The findings demonstrate that all proposed hypotheses are validated, where the main variables performance expectancy, effort expectancy, social influence, and facilitating conditions affect students' intentions and expected behaviors in using ChatGPT.

Among the examined variables, social influence appears to be the most dominant factor influencing the intention to adopt ChatGPT, followed by effort expectancy and performance expectancy. Moreover, facilitating conditions, together with behavioral intention, are shown to significantly shape students' actual behavior in utilizing ChatGPT within the learning process.

Overall, it can be concluded that students' acceptance of ChatGPT technology is relatively high. This acceptance is driven by several factors including ease of use, perceived benefits, peer encouragement, and system accessibility. These findings suggest that ChatGPT holds strong potential to be further integrated into academic settings, particularly when supported by effective learning environments and proper supervision.

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