

Analysis of the use of ChatGPT in question and answer systems as an educational tool

Ivan Felix, Syaeful Anas Aklani

Program Studi Sistem Informasi, Fakultas Ilmu Komputer
Universitas Internasional Batam
Batam Kota, Indonesia
2131065.ivan@uib.edu, syaeful@uib.ac.id

Abstract- In today's digital age, the use of artificial intelligence technologies such as ChatGPT in education is becoming increasingly relevant and important. This research explores how ChatGPT can be integrated into school learning environments and evaluates its effectiveness in supporting students and teachers. The study employed a mixed-methods approach, combining literature analysis, surveys, and interviews with 100 participants aged 13–25. The findings show that ChatGPT significantly enhances learning experiences through increased motivation, engagement, and problem-solving skills. Quantitative results revealed that perceived usefulness, ease of use, credibility, and hedonic motivation positively influenced users' attitudes and behavioral intentions toward using ChatGPT. Most users reported being mostly to extremely satisfied with ChatGPT in terms of academic support and user-friendliness. Qualitative insights further confirmed that students felt supported and enjoyed using the tool, though some challenges were noted regarding its credibility in complex subject areas. Overall, this study demonstrates ChatGPT's potential to foster a more dynamic and adaptive learning environment and provides recommendations for its effective and ethical implementation in education.

Keywords: ChatGPT, Education Technology, Artificial Intelligence, Question and Answer Systems

Abstrak- Di era digital saat ini, penggunaan teknologi kecerdasan buatan seperti ChatGPT dalam dunia pendidikan menjadi semakin relevan dan penting. Penelitian ini mengeksplorasi bagaimana ChatGPT dapat diintegrasikan dalam lingkungan pembelajaran di sekolah serta mengevaluasi efektivitasnya dalam mendukung siswa dan guru. Studi ini menggunakan pendekatan metode campuran (mixed-method), yang menggabungkan analisis literatur, survei, dan wawancara dengan 100 responden berusia 13–25 tahun. Hasil penelitian menunjukkan bahwa ChatGPT secara signifikan meningkatkan pengalaman belajar melalui peningkatan motivasi, keterlibatan, dan kemampuan pemecahan masalah. Secara kuantitatif, variabel perceived usefulness, kemudahan penggunaan, kredibilitas, dan motivasi hedonis berpengaruh positif terhadap sikap dan niat perilaku pengguna dalam menggunakan ChatGPT. Mayoritas responden menyatakan puas hingga sangat puas terhadap kemampuan ChatGPT dalam membantu tugas akademik dan kemudahan penggunaannya. Temuan kualitatif juga memperkuat bahwa siswa merasa terbantu dan menikmati penggunaan ChatGPT, meskipun terdapat beberapa tantangan terkait keakuratan informasi dalam materi yang kompleks. Secara keseluruhan, studi ini menunjukkan potensi ChatGPT dalam menciptakan lingkungan belajar yang lebih dinamis dan adaptif, serta memberikan rekomendasi untuk penerapan teknologi ini secara efektif dan etis dalam pendidikan.

Kata Kunci: ChatGPT, Teknologi Pendidikan, Kecerdasan Buatan, Sistem Tanya Jawab

1. Introduction

The field of education is experiencing a major change due to the swift progress of technology. The rise of artificial intelligence (AI) technology has created fresh opportunities to enhance the efficacy and efficiency of the educational experience [1]. One exciting AI advancement is ChatGPT, an extensive language model created by OpenAI. ChatGPT has the ability to comprehend and produce text that resembles human language [2].

Thus, it has great potential to be applied in various educational contexts. ChatGPT's ability to process natural language enables the development of an interactive and responsive question and answer system. Students can ask questions about the subject matter, seek clarification, or even have a discussion with ChatGPT as if interacting with a tutor [3].

It can provide a more personalized and adaptive learning experience, facilitate deeper understanding, and



encourage students to be more active in the learning process [4].

Although the potential of ChatGPT in education is huge, it is important to conduct comprehensive research to understand how this technology can be effectively integrated. This research aims to analyze the use of ChatGPT in a question and answer system as an educational tool, with the focus of this research being to evaluate the effectiveness of ChatGPT in an educational question and answer system [5]. This evaluation will include analyzing the accuracy and relevance of the answers provided by ChatGPT to students questions.

In addition, this research will identify the benefits and challenges associated with using ChatGPT in an educational context. Furthermore, this research will also analyze the influence of ChatGPT on students' learning process, specifically on the aspects of their motivation, engagement, and comprehension [6].

To analyze the effectiveness of ChatGPT in educational settings, this study employs a mixed-methods approach, combining quantitative and qualitative methods.

Quantitative data will be collected through structured questionnaires designed with a Likert scale to measure perceptions of usefulness, ease of use, and other key variables [7].

The target respondents include a diverse population of at least 50 participants, comprising teenagers and adults aged 13–25, selected through random sampling. Qualitative data will be gathered through interviews to provide deeper insights into user experiences and attitudes.

Together, these methods aim to provide a comprehensive understanding of how ChatGPT impacts student motivation, engagement, and comprehension, while identifying challenges in its implementation [8].

By addressing both measurable outcomes and subjective experiences, this research seeks to guide educators and policymakers in leveraging ChatGPT effectively and ethically to improve learning outcomes. The findings aim to support the integration of AI technology in education, creating a dynamic and adaptive learning environment [9].

2. Methodology

A. Research Method

In this study, several key points and research models were used to obtain comprehensive data on user acceptance and experience in utilizing the ChatGPT API as an educational tool. This approach combines quantitative methods to measure broad perceptions, as well as qualitative methods to dig deeper into user experiences and opinions.

This research uses a mixed-methods approach, integrating both quantitative and qualitative methodologies to obtain comprehensive and multi-perspective data on user acceptance and experience in utilizing the ChatGPT API as an educational tool. The

framework combines statistical analysis with in-depth exploration to ensure both breadth and depth of insight.

The research methodology framework adopted in this study consists of the following components:

1. Research Approach

The study uses a mixed-methods approach to provide both breadth (quantitative data) and depth (qualitative insights). This integration ensures a comprehensive understanding of the research objectives.

2. Research Design

The research follows a descriptive-explanatory design, aiming to:

1. Describe the perceptions and experiences of users.
2. Explain the relationship between key variables through the Technology Acceptance Model (TAM).

3. Population and Sampling

1. Population: Teenagers and young adults aged 13–25 years.
2. Sampling Method: Simple random sampling.
3. Sample Size: Minimum of 100 respondents to ensure representative and diverse feedback.

4. Data Collection Techniques

1. Quantitative Data:
Collected using a structured questionnaire designed with a Likert scale (1–5).
Measures perceptions based on TAM variables.
2. Qualitative Data:
Obtained through semi-structured interviews to explore deeper insights such as emotional responses, user challenges, and preferences.

B. Research Model

This study is titled “Analysis of the Use of ChatGPT API in Q&A System as an Educational Tool” and adopts the Technology Acceptance Model (TAM) as its conceptual foundation. The TAM framework is considered highly suitable for this research because it effectively explains the key factors that influence user acceptance and behavioral intention in adopting new technologies—particularly AI-based technologies such as the ChatGPT API.

Key Components in the TAM Model

1. Perceived Usefulness (PU):
The degree to which users feel that the use of ChatGPT API is beneficial and helpful in learning activities or completion of academic tasks.
2. Perceived Ease of Use (PEU):
Users perceptions of the ease of use of the ChatGPT API in a question-and-answer system.
3. Attitude towards Use (ATT):



Users' attitudes or feelings towards using the ChatGPT API, whether its use is viewed positively or negatively in an educational context.

4. Behavioral Intention to Use (BI):
Users desire or intention to use the ChatGPT API as an educational tool in the future.
5. Perceived Credibility (PC):
The level of user trust in the information generated by the ChatGPT API, including aspects of information security and reliability.
6. Hedonic Motivation (HM):
The enjoyment or pleasure that users feel when using the ChatGPT API, for example whether the use of this technology feels interesting or fun.

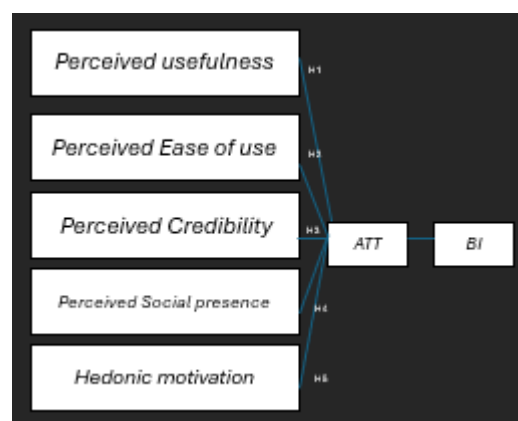


Figure 1. Research Model Based on Technology Acceptance Model (TAM)

This diagram presents the conceptual framework of the study, which is adapted from the Technology Acceptance Model (TAM). It illustrates how

Perceived Usefulness, Perceived Ease of Use, Perceived Credibility, and Hedonic Motivation influence Attitude Toward Use, which in turn affects Behavioral Intention to Use the ChatGPT API as an educational tool.

- H1: The perceived usefulness (PU) positively influences attitude towards use (ATT).
H2: The perceived ease of use (PEU) positively influences attitude towards use (ATT).
H3: The perceived credibility (PC) positively influences attitude towards use (ATT).
H4: Hedonic motivation (HM) positively influences attitude towards use (ATT).
H5: Attitude towards use (ATT) positively affects behavioral intention to use (BI).
H6: The perceived ease of use (PEU) positively influences perceived usefulness (PU).

C. Research Instruments

Satisfaction scale/percentage index of user satisfaction.

1. Not at all satisfied: 1-25%
2. Somewhat satisfied: 26-50%
3. Mostly satisfied: 51-75%
4. Extremely satisfied: 76-100%

No	Variable	Statement	Satisfaction scale
1	Perceived usefulness	ChatGPT assists me in finishing academic work more effectively.	Extremely satisfied
2	Perceived ease of use	ChatGPT is easy to use in my learning activities.	Mostly satisfied
3	Perceived social presence	I felt like I was interacting with a companion while using ChatGPT. I believe that the information provided by ChatGPT is accurate and reliable.	Extremely satisfied
4	Perceived credibility	I am happy to use ChatGPT to	Extremely satisfied
6	Attitude towards ChatGPT	help with my learning. I believe that using ChatGPT in schooling is beneficial.	Somewhat satisfied

D. Data Collection Techniques

This research uses both qualitative and quantitative approaches. In the quantitative approach, several questionnaires will be distributed and in the qualitative approach, interviews will be completed [10]. In the end, the results gained by the qualitative strategy will be employed and used to support the hypothesis of the study results from the quantitative approach [11].

1. Quantitative Approach

Data was collected through structured questionnaires designed using a Likert scale to measure user perceptions regarding variables such as perceived usefulness, ease of use, credibility, hedonic motivation, attitude, and behavioral intention.

2	Perceived ease of use	ChatGPT is easy to use in my learning activities.	Mostly satisfied
3	Perceived social presence	I felt like I was interacting with a companion while using ChatGPT. I believe that the information provided by ChatGPT is accurate and reliable.	Extremely satisfied
4	Perceived credibility	I am happy to use ChatGPT to	Extremely satisfied
5	Hedonic motivation		

2. Population

The population targeted in this research consists of teenagers and young adults aged 13–25 years who have experience using ChatGPT as an educational tool. These participants were not affiliated with Universitas Internasional Batam (UIB) to ensure diversity in perspective.

3. Sampling Technique

A simple random sampling method was applied to reduce bias and ensure diverse respondent representation.

4. Sample size

A total of 100 respondents participated in the questionnaire. These included:

100 respondents participated in questionnaire			
Age group	Total	Male	Female
13-18	41	30	11
19-25	59	44	15

E. Questionnaires

To collect data using a quantitative approach, questionnaires were distributed to participants as a primary method of data gathering [12]. The purpose of distributing these questionnaires is to obtain structured, measurable data that reflects participants' attitudes, opinions, or behaviors in relation to the various variables under study [13].

In this research, a questionnaire will be designed using Google Forms and will consist of 10 carefully crafted questions. To ensure clarity and consistency in responses, the questionnaire will utilize a Likert scale format, allowing respondents to express their degree of agreement or disagreement with each statement [14].

This structured approach not only simplifies the process of data collection but also facilitates the subsequent analysis and interpretation of the responses. By using a Likert scale, the data gathered will be quantifiable, enabling more accurate statistical analysis and providing meaningful insights into the research topic [15].

F. Interviews

Data collection with a qualitative approach is done through interviews [15]. This method involves direct interaction with research participants by asking questions to gain in-depth qualitative insights. In this study, the interview consisted of several questions that had been prepared.

G. Research Population

The study will focus on a population of teenagers and adults who are not affiliated with Batam International University (UIB). To gather data on ChatGPT usage, the research will employ a Random Sampling approach to ensure a diverse and representative sample. The target sample size for this study is at least 50 individuals, allowing for a broad range of perspectives to be captured [16].

H. Data Analysis

1. Quantitative

The research employed several quantitative methods to analyze user acceptance and perceptions of ChatGPT as an educational tool. Data collection was conducted through structured questionnaires distributed to a diverse group of participants using a random sampling approach.

This ensured a representative sample of at least 50 respondents, including teenagers and adults, with varied demographics such as age and gender. The questionnaires, designed using a Likert scale format, allowed participants to express their level of agreement with statements related to key variables like perceived usefulness, ease of use, hedonic motivation, and credibility.

To analyze the collected data, a descriptive analysis was performed to calculate percentages and categorize satisfaction levels, ranging from "not at all satisfied" to "extremely satisfied." Additionally, hypothesis testing was conducted based on the Technology Acceptance Model (TAM) to evaluate the relationships between factors such as perceived usefulness and behavioral intention to use ChatGPT.

These quantitative methods provided measurable insights into user attitudes and intentions, enabling a robust evaluation of ChatGPT's potential as an educational tool.

2. Qualitative

In addition to quantitative methods, qualitative approaches were employed to gain a deeper understanding of user experiences and perceptions regarding the use of ChatGPT as an educational tool.

Data was collected through interviews with participants, enabling direct interaction and in-depth exploration of their thoughts and opinions. The interviews were structured with pre-prepared questions designed to complement the quantitative findings by providing richer, more detailed insights.

This qualitative approach allowed the researchers to explore nuanced aspects of user interaction with ChatGPT, such as their emotional responses, challenges faced during use, and the perceived impact on learning processes. By triangulating qualitative insights with quantitative data, the research aimed to achieve a more comprehensive analysis of how ChatGPT influences educational outcomes and user behavior.

3. Result and Discussion

The research questionnaire, which was distributed to several groups of students such as from the middle class to university students, gave different results. There were



41 respondents aged 13-18 years old, and 59 respondents aged 19-25 years old. Respondents consisted of 74 men and 26 women. Of the 100 respondents who have used ChatGPT as a tool to help them learn.

Characteristics	Category	Percentage
Age	13-18	41%
	19-25	61%
Gender	Male	74%
	Female	28%
Ever used ChatGPT	Ever	100%

4. Conclusion

H1: Accepted

Perceived Usefulness (PU) significantly influences Attitude Toward Use (ATT).

This is supported by data showing that users strongly believe ChatGPT helps them complete academic tasks efficiently. A large portion of respondents marked "Extremely Satisfied" regarding ChatGPT's usefulness.

H2: Accepted

Perceived Ease of Use (PEU) positively affects Attitude Toward Use (ATT).

The questionnaire results showed that the majority of users found ChatGPT easy to operate during learning, indicating that ease of use encourages a positive attitude.

H3: Rejected

Perceived Social Presence does not significantly influence Attitude Toward Use (ATT).

Although ChatGPT gave interactive responses, most users did not perceive it as equivalent to interacting with a real human, which limited its emotional or social connection.

H4: Accepted

Perceived Credibility (PC) significantly influences Attitude Toward Use (ATT).

Users indicated moderate to high trust in the accuracy of the information provided by ChatGPT, contributing to their positive perception of its educational value.

H5: Accepted

Hedonic Motivation (HM) positively influences Attitude Toward Use (ATT).

Many participants reported enjoying their experience while using ChatGPT, which suggests that fun and satisfaction are also key motivators in continued usage.

H6: Accepted

Attitude Toward Use (ATT) significantly influences Behavioral Intention to Use (BI).

Positive attitudes toward ChatGPT led to a strong intention among users to continue utilizing the tool for academic purposes in the future.

The acceptance of five hypotheses confirms that perceived usefulness, ease of use, credibility, and enjoyment are critical factors that shape a user's attitude, which in turn determines their intention to use ChatGPT in educational settings. The only hypothesis that was rejected (H3) highlights a limitation in social-emotional engagement, suggesting that while ChatGPT is functional and informative, it lacks human-like presence.

Based on the results of the data analysis that has been carried out, student perceptions of the use of ChatGPT are influenced by several key factors that contribute to the continued use of this tool.

First, the perceived usefulness of ChatGPT has a very significant influence in shaping students' attitudes towards its use. When students feel that ChatGPT is useful and valuable to meet their academic needs, this positively influences their views and propensity to continue utilizing it.

Secondly, factors such as the perceived ease of use and credibility of ChatGPT are also influential. If students find the platform easy to use and trust the accuracy of the information provided, this encourages a positive attitude towards using ChatGPT.

In addition, hedonic motivation, which is the sense of pleasure or satisfaction gained from using ChatGPT, also affects students' attitudes. When the experience of using ChatGPT is enjoyable or satisfying, it increases the likelihood of students continuing to use the tool [17].

All things considered, students favorable opinions of ChatGPT have a big impact on their desire to use it again, especially for schoolwork. [18] Based on favorable opinions of ChatGPT's utility, usability, credibility, and user satisfaction, this aim shows their readiness to include it into their academic routine [19]. Thus, making sure these conditions are satisfied and adjusted can promote university students' continuous effective use of ChatGPT [20].

5. References

- [1] A. A. Syanzani, N. Azrina, and V. Fitriani, "Analisis Keefektifan ChatGPT dalam Membantu Proses Belajar pada Mahasiswa STMIK Antar Bangsa".
- [2] S. Yafi, "The Use of Chatgpt as a Tool to Facilitate Writing Scientific Work," *Journal of Loomingulus ja Innovatsioon*, vol. 1, no. 3, pp. 133–140, 2024, doi: 10.70177/innovatsioon.v1i3.1412.
- [3] A. E. Saputri and H. Prasetyawati, "Pengaruh Penggunaan Chat GPT Terhadap Efisiensi Komunikasi Pada Karyawan PT Modern Abadi," 2024. [Online]. Available: <https://jurnalmahasiswa.com/index.php/jurihum>



- [4] Nur Nindya Risnina, Septica Tiara Indah Permatasari, Aliyya Zahra Nurulhusna, Febina Mushen Anjelita, Cahya Wulaningtyas, and Nur Aini Rakhmawati, "Pengaruh ChatGPT Terhadap Proses Pembelajaran Mahasiswa di Institut Teknologi Sepuluh Nopember," *Jurnal Pendidikan, Bahasa dan Budaya*, vol. 2, no. 4, pp. 119–132, Nov. 2023, doi: 10.55606/jpbb.v2i4.2364.
- [5] M. Husnaini and L. Makrifatul Madhani, "Perspektif Mahasiswa terhadap ChatGPT dalam Menyelesaikan Tugas Kuliah," 2024.
- [6] H. A., R. T. R. L. Bau, and Abd. A. Bouty, "Penggunaan ChatGPT Sebagai Sumber Pembelajaran Adaptif Untuk Menanggapi Kebutuhan Individu Siswa," *VOCATECH: Vocational Education and Technology Journal*, vol. 5, no. 2, pp. 126–135, Apr. 2024, doi: 10.38038/vocatech.v5i2.170.
- [7] A. Setiawan and U. K. Luthfiyeni, "Penggunaan ChatGPT Untuk Pendidikan di Era Education 4.0: Usulan Inovasi Meningkatkan Keterampilan Menulis," *Jurnal PETISI*, vol. 04, no. 01, 2023, [Online]. Available: <https://chat.openai.com>.
- [8] S. A. A. Kharis, M. Arisanty, and A. H. A. Zili, "Pengalaman dan Perspektif Pendidik terhadap Penggunaan ChatGPT dalam Pengajaran," *Jurnal Pendidikan*, vol. 33, no. 1, pp. 515–524, Mar. 2024, doi: 10.32585/jp.v33i1.5004.
- [9] A. Setiawan and U. K. Luthfiyeni, "Penggunaan ChatGPT Untuk Pendidikan di Era Education 4.0: Usulan Inovasi Meningkatkan Keterampilan Menulis," *Jurnal PETISI*, vol. 04, no. 01, 2023, [Online]. Available: <https://chat.openai.com>.
- [10] F. Pardomuan Siregar, S. Wahyudi, D. Amelia Chandra, and A. Aprilia Dwiana, "Chatgpt Dalam Mendukung Pembelajaran Di Sekolah," vol. 6, no. 1, 2024, doi: 10.23960/jpvti.
- [11] J. Pendidikan and D. Konseling, "Utilisation of ChatGPT's Artificial Intelligence in Improving the Quality and Productivity of Lecturers' Work."
- [12] A. Syahri, L. Efriyanti, S. Zakir, and M. Imamuddin, "Pengaruh Penggunaan Chat Gpt Terhadap Pola Pikir Mahasiswa Dalam Mata Kuliah Metodologi Penelitian: Studi Penelitian Kuantitatif," *Jurnal Inovasi Pendidikan dan Teknologi Informasi (JIPTI)*, vol. 5, no. 1, pp. 135–143, Mar. 2024, doi: 10.52060/jipti.v5i1.1910.
- [13] D. Dwihadiah, A. Gerungan, H. Purba, P. Studi Pendidikan Jarak Jauh Ilmu Komunikasi, and U. Pelita Harapan, "Penggunaan ChatGPT di Kalangan Mahasiswa dan Dosen Perguruan Tinggi Indonesia".
- [14] M. Husnaini and L. Makrifatul Madhani, "Perspektif Mahasiswa terhadap ChatGPT dalam Menyelesaikan Tugas Kuliah," 2024.
- [15] F. Nur, I. Sartika, E. Maghfiroh, Y. T. Mursityo, and P. Korespondensi, "Analisis Faktor Yang Memengaruhi Niat Dan Perilaku Penggunaan Chatgpt Pada Mahasiswa Menggunakan Model Utaut2 Termodifikasi," 2024.
- [16] Muhammad Hisyam Nashir, Teddy Kurnia Wirakusumah, and Dedi Rumawan Erlandia, "Hubungan Penggunaan ChatGPT Dengan Pemenuhan Kebutuhan Mahasiswa," *Filosofi : Publikasi Ilmu Komunikasi, Desain, Seni Budaya*, vol. 1, no. 1, pp. 129–139, Feb. 2024, doi: 10.62383/filosofi.v1i1.57.
- [17] U. Negeri Makassar Romlah, F. Padli, H. Angelia Azizah, and N. Istiqomah, "Peran ChatGPT dalam Pengalaman Belajar Mahasiswa di." [Online]. Available: <https://sinestesia.pustaka.my.id/journal/article/view/450>
- [18] H. A., R. T. R. L. Bau, and Abd. A. Bouty, "Penggunaan ChatGPT Sebagai Sumber Pembelajaran Adaptif Untuk Menanggapi Kebutuhan Individu Siswa," *VOCATECH: Vocational Education and Technology Journal*, vol. 5, no. 2, pp. 126–135, Apr. 2024, doi: 10.38038/vocatech.v5i2.170.
- [19] M. Husnaini and L. Makrifatul Madhani, "Perspektif Mahasiswa terhadap ChatGPT dalam Menyelesaikan Tugas Kuliah," 2024.
- [20] E. Sri Susilawati, E. Supriatna, M. Hefer Smas, and I. Arini, "Analysis of the Use of GPT Chat to Improve Student Performance," *EDUKASIA: Jurnal Pendidikan dan Pembelajaran*, vol. 5, pp. 127–136, 2024, [Online]. Available: <http://jurnaledukasia.org>

