

# Impact of ChatGPT Usage on Vocational Students' Critical Thinking: A Conceptual Framework

Ahmad Syarif<sup>1</sup>

<sup>1</sup>Department of Business Education, Universitas Negeri Jakarta, Indonesia

## Abstract

This study explores the impact of ChatGPT usage on vocational students' critical thinking skills, particularly within the context of Indonesian vocational schools. With the rapid development of AI technologies, particularly ChatGPT, this research investigates how its integration into the education system can either enhance or hinder the development of critical thinking. The study employs a qualitative approach with literature review and utilizing small surveys administered to both teachers and students, to gather insights on how ChatGPT influences students' ability to analyze, evaluate, and make decisions. The findings suggest that while ChatGPT has the potential to foster critical thinking by providing tools for in-depth analysis and information synthesis, there is also a risk of over-reliance on AI-generated responses. This study highlights the importance of managing the use of ChatGPT to ensure that students continue to develop independent critical thinking skills, which are crucial for vocational students preparing to enter the workforce. The conceptual framework presented offers a foundation for future research on the integration of AI in education and its effects on cognitive skills development.

**Keyword:** *ChatGPT; Critical Thinking Skills; Vocational Students*

## 1. Introduction

The development of technology is increasingly supported by the development of science. Technology has doubled and even multiplied continuously. One of the most massive and large forms of development in technology is the existence of *Artificial Intelligence*. ChatGPT, which has been in development since 2018 and launched in 2022, has become the fastest growing consumer application/software/website in history, garnering 100 million monthly active visitors within two months of launch (Zhou et al., 2024). AI ChatGPT is one of the Artificial Intelligence technologies that can be able to perform commands or problems in terms of writing whose solutions are also delivered in typewriting. AI ChatGPT can understand words and basic human intelligence concepts (Vilema et al., 2023).

There are many things that ChatGPT can do in terms of writing, for example, helping with homework or answering simple questions or regular chit-chat with AI ChatGPT users. ChatGPT is trained on a large corpus of text data and uses machine learning algorithms to learn language patterns, enabling it to generate coherent and contextually appropriate responses to a wide variety of questions (Aggarwal, 2023). ChatGPT is being used in many ways such as in education and industry. The increasing use of ChatGPT will certainly have an impact on many things, such as simple productivity in making tasks, work and others. ChatGPT also affects the performance of the brain to be able to get a lot of information at one time, affecting cognitive matters (Essel et al., 2024a). One of the biggest users is in education. The incorporation of ChatGPT in education is significant, as it addresses several aspects of the learning process. By simulating real-world dialog, this model facilitates a more natural and immersive learning experience, making complex topics more accessible and engaging for students of all ages (Vilema et al., 2023). The integration of ChatGPT into education is in line with the changing skills needed in the 21st century, there is an increasing emphasis on critical thinking, creativity and effective communication (Jiang et al., 2024).

Nadia Fairuza, a researcher at the Center of Indonesian Policy Studies (CIPS), emphasized that the use of ChatGPT must be accompanied by strong critical thinking skills. This approach not only helps prevent over-reliance on the tool but also ensures that students use ChatGPT in a productive and appropriate manner (V.Sahfitri, 2012). According to the theory of effectiveness, technology is deemed effective when it provides added value or positively influences user behavior. In today's rapidly evolving technological landscape, critical thinking is essential for addressing a wide range of challenges in both personal and social life (Nuryanti et al, 2018).

Critical thinking involves the ability to engage in active and continuous reflection, based on thorough investigation using thinking and reflection procedures to produce valid, accurate, and persuasive conclusions (Sihotong, 2020). It aims to assess or confirm existing information, turning it into a probability or hypothesis by evaluating data with strong analytical evidence and facts. Additionally, critical thinking is convergent, requiring individuals to gather information from various sources to broaden their understanding of a topic. This skill emphasizes the ability to combine multiple ideas into a coherent thought that aligns with societal norms (Shaloom et al, 2023). Facione identifies six core components of critical thinking: interpretation, analysis, evaluation, inference, explanation, and self-regulation (Kurniasari et al, 2020).

Critical thinking skills help individuals analyze problems in greater depth and make more informed decisions. This is very useful, not only in school, but also in various aspects of life, including the world of work. Vocational high schools (Sekolah Menengah Kejuruan (SMK)) in Indonesia emphasize the importance of applied skills so that graduates are ready to enter the workforce. Therefore, critical thinking skills are crucial for them. Critical thinking skills enable vocational high school graduates to not only complete job tasks, but also solve more complex problems (Mardatillah et al, 2024).

The objective of this study is to explore the issues and concepts related to both variables, which will aid in developing the conceptual framework. Additionally, this paper seeks to discuss the process of constructing a conceptual framework to investigate the impact of using ChatGPT on vocational students' critical thinking. As such, this paper is structured as follows:

- 1) Past literature on the concept of the impact of using ChatGPT on vocational students' critical thinking will be presented in this paper.
- 2) Possible research problems on the impact of using ChatGPT on vocational students' critical thinking will be discussed in this paper.
- 3) Analyze the results of a small survey to support the literature review on the impact of using ChatGPT on vocational students' critical thinking skills.
- 4) The construction of the conceptual framework of the impact of using ChatGPT on vocational students' critical thinking will also be presented in this study.

## **2. Literature Review**

### **2.1 AI ChatGPT**

AI is derived from two words: "Artificial" and "Intelligence." Artificial refers to something made or produced by humans, not occurring naturally, often as an imitation of something natural. Intelligence refers to the ability to acquire knowledge, understand, and make decisions or judgments based on logic.

Artificial Intelligence (AI) was first introduced by Stanford professor John McCarthy in 1955, who defined AI as the science and engineering of creating intelligent machines. This aligns with what Haroon Sheikh mentioned in his book "Mission AI" (2023), where he described AI as a technology that allows machines to mimic various complex human abilities. Emisita and Efrizal, in their book on Artificial Intelligence (2023), explained that AI is a field of computer science focused on developing systems and machines capable of performing tasks that typically require human intelligence. AI utilizes algorithms and mathematical models to enable computers and other systems to learn from data, recognize patterns, and make intelligent decisions.

The benefits of Artificial Intelligence (AI) span across various fields, as highlighted by several studies. In the medical field, AI is used to assist in detecting internal diseases and similar conditions, as demonstrated by Nhat et al. (2023). AI also plays a crucial role in cybersecurity, where it helps enhance protection against cyber threats, as noted by Lazic (2019) during the 11th International Conference on Business Information Security. In the military sector, AI aids in decision-making processes, providing valuable insights for strategic operations, as discussed by Bosch and Bronkhorst (2018) in their NATO report.

In the realm of education, AI's impact is particularly significant. According to Baidoo-Anu and Ansah (2023), AI has been increasingly integrated into education systems, helping to improve learning outcomes. Chen and Chen (2020) further emphasize that the application of AI algorithms and systems in education has gained substantial attention since 2010. One of the most notable benefits of AI in education is personalized learning, where AI tailors the learning experience to suit each student's pace and style (Harry and Sayudin, 2023). This personalized approach allows students to achieve better learning outcomes by adapting the material to their individual needs.

ChatGPT is an advanced language model that has revolutionized natural language processing by generating human-like text with context and coherence, opening new opportunities for interaction between humans and AI, as noted by Roumeliotis and Tselikas (2023). It is further explained that ChatGPT is a language model based on the Generative Pretrained Transformer (GPT) architecture, developed through advancements in Artificial Intelligence technology, according to Ray (2023). Harry and Sayudin (2023) also pointed out that since its introduction in 2022, ChatGPT has seen significant development and is increasingly being utilized in education.

ChatGPT offers several benefits in education, particularly for educators. These include creating learning assessments, enhancing pedagogical practices, providing virtual personalized guidance, generating frameworks, and exploring new ideas (Sok and Heng 2023). There are additional benefits of ChatGPT for students, such as offering personalized tutoring, automating essay assessments, translating languages, enabling interactive learning, and supporting adaptive learning (Baidoo-Anu and Owusu-Ansah 2023). These features help both educators and students improve overall learning experience by making education more efficient and accessible.

While ChatGPT has many benefits, it also has some risks that can arise. ChatGPT presents several risks in education, including issues with academic integrity, unfair learning assessments, inaccurate information, and an over-reliance on (AI Sok and Heng 2023). There are also additional risks, such as limited understanding, biases in training data, a lack of creativity, dependence on internet-based information, insufficient contextual understanding, and limited ability to personalize teaching (Baidoo-Anu and Owusu-Ansah 2023). These risks underscore the need for careful integration of ChatGPT in educational settings to mitigate potential negative impacts while maximizing its benefits.

## **2.2 Critical Thinking Skills**

The word "thinking" comes from the root "think" which refers to reason, memory, or imagination. According to Wowo in the book *Taxonomy of Thinking* (2011), thinking involves using the mind to consider and make decisions, as well as reflecting on something in memory. In other words, anyone who uses their reasoning engages in the activity of thinking, whether it involves making judgments or decisions. "Critical" refers to the sharp ability to analyze something, not readily believing in something without questioning it, or constantly finding errors in it. The terms "thinking" and "critical" form an inseparable unit. According to Brookfield (1991) as cited in Lieung (2019), critical thinking is described as the process of identifying and evaluating assumptions, questioning others' opinions or statements, seeking alternatives and new ideas, and providing clear reasoning in debates.

Critical thinking is one of the learning and innovation skills and one of the most frequently mentioned competencies considered essential for both academic and career success believed to play a central role in logical thinking, decision making, and problem solving (Altun et al, 2023). Another definition highlights that critical thinking is more about the intellectual processes and methods involved rather than the result. A critical thinking skill, like any other skill, refers to the ability to perform a certain activity, process, or method. Generally, possessing a skill means knowing how to act appropriately in different situations. Therefore, being proficient in critical thinking involves understanding both the steps involved and the appropriate moments to apply them, even if this knowledge is implicit or difficult to express verbally (Altun et al, 2023). Critical thinking skills involve using judgment, reflection, analysis, synthesis, and considering the context. The challenge in thinking critically often arises from the complexity of the problem or the need to make decisions or solve issues when the available information is incomplete, uncertain, or not fully reliable (Halpern, 2001).

Critical thinking skills offer several benefits, including the ability to solve problems easily, a better understanding of one's capabilities, becoming more open-minded, improved communication skills, increased opportunities for collaboration, and the ability to resolve conflicts (Elsabrina, U. R. et al. 2020). From these benefits mentioned, it can be concluded that critical thinking is highly valuable for personal growth and developing a mindset that is advantageous for self-improvement. Critical thinking skills, according to Nuryanti in Sofri Fikri Arif & Nur Cahyono (2020), include the following indicators:

- a. Basic clarification, which includes: (1) formulating a question, (2) analyzing arguments, and (3) asking and answering clarification questions.
- b. The bases for a decision, which includes: (1) considering the credibility of a source, and (2) observing and evaluating the results of observations.
- c. Inference, which includes: (1) making deductions and evaluating the results of deductions, (2) making inductions and evaluating the results of inductions, and (3) forming and evaluating the value of decisions.
- d. Advanced Clarification, which includes: (1) identifying terms and evaluating definitions, and (2) referring to unstated assumptions.
- e. Supposition and Integration, which includes: (1) logically considering premises, reasons, assumptions, positions, and other proposals, and (2) combining other abilities and dispositions to form and sustain a decision.

In the Indonesian Vocational High Schools, there are several topics that heavily require critical thinking. For instance, in the practice of understanding customer satisfaction in the department of marketing in vocational schools. Students must use critical thinking to grasp customer satisfaction, as can be observed through repeat purchases and various other factors (Oktaviani et al., 2024). Consequently, this paper presents the formulation of a conceptual framework based on past studies investigating the relationship between the usage of ChatGPT and vocational students' Critical Thinking Skills.

### **2.3 Issues Pertaining to the Impact of Using ChatGPT on Vocational Students' Critical Thinking.**

The implementation of ChatGPT in educational settings shows potential for improving critical thinking skills, particularly through the necessity to analyze and refine AI-generated content. For instance, research demonstrates that ChatGPT results often require students to engage in deeper analysis, as the responses provided by the AI are not always perfect, encouraging students to critically assess and paraphrase them for more accurate results (Sagita Harahap, 2024). This process promotes the development of critical thinking because it involves evaluating the reliability of information and reconstructing knowledge in their own words.

One of the key issues regarding the impact of using ChatGPT on vocational students' critical thinking lies in the balance between enhancing their analytical skills and preventing over-reliance on AI. ChatGPT provides students with instant access to information and solutions, which, on one hand, promotes deeper engagement with content by prompting them to analyze and paraphrase the provided information. As a result, this supports the development of their critical thinking abilities (Sagita Harahap, 2024). However, on the other hand, the convenience of ChatGPT can lead to complacency, as students may rely too heavily on AI-generated answers without engaging in the necessary analytical processes. This can diminish the development of critical thinking, as noted in studies where some students were found to directly copy and paste responses without reflection (Rami Rivani Israwan et al., 2023).

Moreover, while ChatGPT enhances students' ability to engage with complex problems by breaking down information, there is a concern that it could reduce the user's motivation to independently seek solutions. In some cases, the ease of access provided by AI may reduce students' initiative to critically evaluate or explore alternative perspectives, which is essential in vocational education, where adaptability and problem-solving are crucial (Rami Rivani Israwan et al., 2023). Thus, while ChatGPT offers tools to improve critical thinking, it is essential that its use is carefully managed to ensure that students still develop the independent critical faculties necessary for their professional development (Sagita Harahap, 2024).

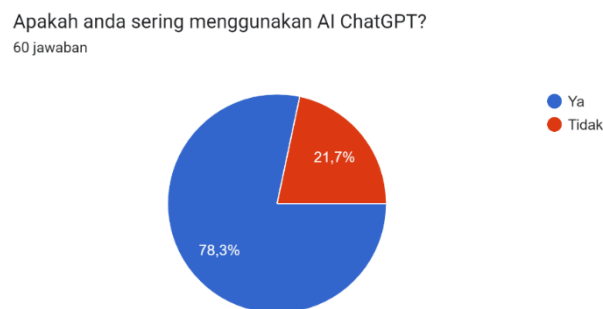
### **3. Method**

The method used in this paper is qualitative approach aimed at exploring the effects of using AI, specifically ChatGPT, on the critical thinking skills of vocational high school students. The research involves collecting literature review and data through a small survey administered to a group of teachers and students from vocational high schools in an area in Indonesia. This survey serves to gather insights into how AI tools, such as ChatGPT, influence students' critical thinking in the context of studying both theoretical materials and practical applications. The survey design focuses on assessing critical thinking indicators, such as students' ability to analyze and infer, which are essential skills in understanding complex concepts. By engaging both teachers and students, the survey captures perceptions from both the instructional and learning perspectives, providing a more comprehensive understanding of how AI tools contribute to students' critical thinking development. These perspectives help to validate and support the findings of previous research in the literature review.

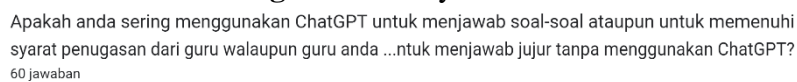
To ensure depth and context in the analysis, the survey results are cross-referenced with existing literature on the use of AI in education and critical thinking development. This comparison strengthens the theoretical foundation by aligning the survey outcomes with established research findings (Kamalov et al., 2023). Additionally, the results from this small-scale survey are used to propose a conceptual framework. This framework combines the critical thinking indicators—such as basic clarification, reasoning, inference, and integration—with the expected impact of AI-assisted learning on students' abilities to engage with complex topics in vocational education.

Furthermore, the qualitative method allows for in-depth analysis of responses, uncovering patterns, attitudes, and experiences related to AI's role in enhancing critical thinking (Essel et al., 2024). The aim is not only to understand the immediate effects but also to explore how students are developing their cognitive skills over time while using AI tools. Through this approach, the study highlights the potential of AI to facilitate higher order thinking processes, encouraging vocational students to engage more deeply with their subject matter. In conclusion, by integrating survey findings and literature analysis, the qualitative method provides a well-rounded exploration of how AI tools can impact the development of critical thinking skills in vocational education. This approach paves the way for further research and the potential refinement of AI tools to enhance educational outcomes in the vocational sector.

#### 4. Survey Analysis



**Figure 1** Survey Result 1

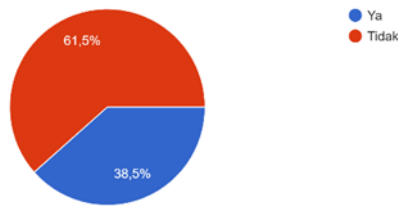


**Figure 2** Survey Result 2

Judging from some of the figures above, it shows that there are about 78.2% of students who often use ChatGPT out of a total of 60 people who answered. This proves that the massive increase in ChatGPT users is also seen from students. The last diagram shows that there are 41.7% of students who still use ChatGPT in an assignment even though their teachers teach and tell them not to use ChatGPT. From some of these small survey results, it can be concluded

that ChatGPT is one of the software or web-based artificial intelligence that has accompanied the education of vocational students today.

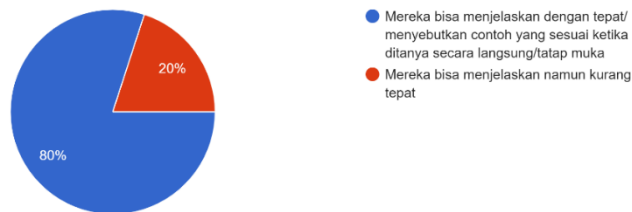
Apakah anda pernah melihat hasil tugas peserta didik yang secara terang-terangan membuat tugas dengan menggunakan ChatGPT?  
13 jawaban



**Figure 3** Survey Result 3

From the figure above, teachers responded that they had seen the results of students' assignments using AI ChatGPT which was answered by 38.5% or 5 out of a total of 13 answers. Where the 5 respondents who answered this continued with the results in the next figure:

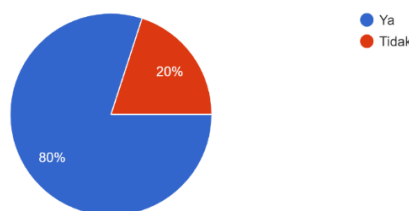
Pengaruh seperti apa yang terlihat?  
5 jawaban



**Figure 4** Survey Result 4

The figure above shows 5 teacher responses who previously answered that they had seen the assignment results from students who answered using ChatGPT where 4 out of 5 answers responded that the answers written by students provided critical and targeted answers to the task instructions. Indicating the effect of further critical thinking skills from the use of ChatGPT on the results of assignments given by teachers to learners. Then proceed with the following survey results:

Apakah jawaban tersebut termasuk kritis dan tepat sasaran sesuai perintah tugas?  
5 jawaban



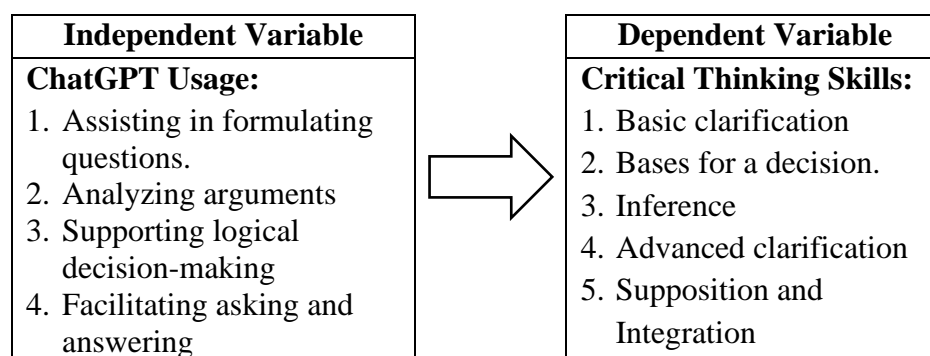
**Figure 5** Survey Result 5

The following diagram illustrates the impact of students using ChatGPT to complete their assignments, where 4 out of 5 teachers believed that students could accurately explain concepts or provide relevant examples when questioned directly or in person. This suggests that the use of ChatGPT positively influenced the students' conceptual understanding, which is a key component of critical thinking. These findings are consistent with previous research, as Aurell et al. (2024) noted that AI ChatGPT has the potential to enhance critical thinking skills.

## 5. The Conceptual Framework: Impact of ChatGPT Usage on Critical Thinking

Based on the empirical evidence from previous studies, it can be argued that the use of ChatGPT has a significant influence on enhancing vocational students' critical thinking skills. Therefore, this research proposes the following conceptual framework to explore the relationship between the usage of ChatGPT and the development of critical thinking skills among students in vocational schools, with ChatGPT usage as the independent variable and critical thinking skills as the dependent variable. According to Leavy (2017), an independent variable is one that likely influences or affects another variable. Future research can be based on the conceptual framework developed in this study. The structure of ChatGPT usage in enhancing students' critical thinking skills is adapted from the framework of AI integration in education, with key dimensions such as information processing, problem-solving support, and fostering interactive learning environments. On the other hand, the critical thinking framework for vocational students is adapted from studies on cognitive skill development, including analytical thinking, reflection, problem evaluation, and decision-making.

A review of the literature shows a significant relationship between the use of AI tools like ChatGPT and the enhancement of critical thinking skills among students (Essel et al., 2024; Aurell et al., 2024; Sagita Harahap, 2024). The previous sections provided an in-depth explanation of the connection between the independent variable, ChatGPT usage, and the dependent variable, critical thinking. Thus, based on the review of previous empirical research and relevant literature, the theory of AI-enhanced education and critical thinking forms the conceptual framework of this study. The framework presented here illustrates the relationship between the studied variables and offers theoretical guidance for studying the impact of ChatGPT usage on critical thinking skills in vocational schools in Indonesia. Therefore, a conceptual framework of the impact of ChatGPT usage on critical thinking is presented, where ChatGPT is posited to significantly contribute to improving students' critical thinking skills.



**Figure 6** A Conceptual Framework Impact of ChatGPT Usage on Vocational Students' Critical Thinking

While there is limited empirical research exploring the relationship between the use of AI tools like ChatGPT and the development of vocational students' critical thinking skills, it is important to seek a deeper understanding of how ChatGPT can impact students' cognitive abilities. Vocational high schools, known for their focus on practical skills, can benefit from exploring the potential of ChatGPT in fostering critical thinking, which is crucial for problem-solving and decision-making. Investigating the impact of ChatGPT usage on critical thinking

will not only fill a gap in current literature but also provide insights on how AI tools can be integrated effectively into education to enhance student learning outcomes.

This research could offer practical recommendations for educators in optimizing AI tools to improve students' cognitive engagement. Understanding the relationship between ChatGPT usage and critical thinking may also provide valuable theoretical contributions, particularly in the field of AI integration in education. Consequently, the conceptual framework developed in this study will serve as a foundation for future research on how AI, specifically ChatGPT, can influence students' critical thinking, thereby contributing to educational theory and practice at vocational schools.

## 6. Conclusion

In conclusion, the use of ChatGPT in vocational education has both significant potential and notable risks for the development of students' critical thinking skills. The study reveals that ChatGPT can assist students in formulating questions, analyzing arguments, and making logical decisions, thus enhancing their critical thinking abilities. However, the findings also emphasize the risk of students becoming overly dependent on AI-generated answers, which can hinder the independent thought process. Therefore, it is crucial for educators to carefully monitor and guide the use of AI tools like ChatGPT to ensure they complement, rather than replace critical thinking efforts. Further research is recommended to explore strategies that maximize the benefits of AI in education while mitigating the risks of over-reliance, particularly in vocational schools where problem-solving and decision-making skills are vital for career success.

## 8. References

- Kuswana, Wowo, S. (2013). *Taksonomi Berpikir*. Bandung: Remaja Rosdakarya.
- Sihotong, K. (2020). *Berpikir Kritis: Kecakapan Hidup di Era Digital*. Sleman: Kanisius.
- Saloom, G. (2022). *Menjadi Kritis dan Kreatif, in Pemikiran Kritis dan Kreatif*. Bandung: Penerbit Media Sains Indonesia.
- Sheikh, H., Prins, C. & Schrijvers, E. (2023). *Mission AI The New System Technology*. Netherlands: Springer.
- Sahfitri, V. (2012). Pengukuran Efektifitas Sistem Informasi. *Jurnal Ilmiah Matrik*, 14(3), 205–216.
- Sita Eriana, E. & Zein, A. (2023) *Artificial Intelligence*. Indonesia: CV. Eureka Media Aksara
- McCarthy, J., Minsky, M., Shannon, C. E. & Rochester, N. (1955). *A proposal for the Dartmouth summer research project on artificial intelligence*. Dartmouth College. <https://doi.org/10.1609/aimag.v27i4.1904>
- Lazic, I. (2019). Benefit from AI in CyberSecurity. *The 11th International Conference on Business Information Security (BISEC-2019)*.
- Aggarwal, S. (2023). A Review of ChatGPT and its Impact in Different Domains. *International Journal of Applied Engineering Research*, 18(2), 119–123. <https://doi.org/10.37622/ijaer/18.2.2023.119-123>
- Altun, E., & Yildirim, N. (2023). What does critical thinking mean? Examination of pre-service teachers' cognitive structures and definitions for critical thinking. *Thinking Skills and Creativity*, 49, 101367. <https://doi.org/10.1016/J.TSC.2023.101367>

- Baidoo-Anu, D. & Ansah. (2023). Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning. *Journal of AI*, 7(1), 52-62.
- Bosch, K, V, D. & Bronkhorst, A. (2018). Human-AI Cooperation to Benefit Military Decision Making. *NATO and STO*. 160, 1-12.
- Chen, L., Chen, P. & Lin, Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access*. 8.
- Elsabrina, U, R., Hanggara, G, S., & Agustiana, G, A, T. (2020). Peningkatan Kemampuan Berfikir Kritis Siswa Melalui Layanan Bimbingan Kelompok Dengan Teknik Creative Problem Solving. Pp 502-514.
- Essel, H. B., Vlachopoulos, D., Essuman, A. B., & Amankwa, J. O. (2024b). ChatGPT effects on cognitive skills of undergraduate students: Receiving instant responses from AI-based conversational large language models (LLMs). *Computers and Education: Artificial Intelligence*, 6, 100198. <https://doi.org/10.1016/J.CAEAI.2023.100198>
- Halpern, D. F. (2001). Critical Thinking, Cognitive Psychology of. *International Encyclopedia of the Social & Behavioral Sciences*, 2990–2994. <https://doi.org/10.1016/B0-08-043076-7/01586-2>
- Harry, A. & Sayudin. (2023). Role of AI in Education. *Injuruty: Interdisciplinary Journal and Humanity*. 2(3), 260-268.
- Jiang, X., Li, J., & Chen, C.-H. (2024). Enhancing Critical Thinking Skills with ChatGPT-Powered Activities in Chinese Language Classrooms. *International Journal of Chinese Language Teaching*, 5(1), 47. <https://doi.org/10.46451/ijclt.20240105>
- Kamalov, F., Santandreu Calonge, D., & Gurrib, I. (2023). New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution. *Sustainability (Switzerland)*, 15(16). <https://doi.org/10.3390/su151612451>
- Kurniasari, Y, R & Setyaningsih, Y. (2020). Mengukur Kemampuan Berpikir Kritis Siswa dengan Mengadaptasi California Critical Thinking Skills Test pada Siswa Sekolah Dasar. *Lingua Didaktika: Jurnal Bahasa dan Pembelajaran Bahasa*, 14(2), 144–160. doi: 10.24036/ld.v14i2.109126.
- Lieung, W. K. (2019). Pengaruh Model Discovery Learning Terhadap Keterampilan Berpikir Kritis Siswa Sekolah Dasar. *Musamus Journal of Primary Education*. 1(2), 74-76.
- Mardatillah, O., & Prayudha, S, J. (2024). The Importance Of Critical Thinking Skill To Vocational Students: Strategies And Benefits. *VOCATECH: Vocational Education and Technology Journal*, 5(2), 115–125. <https://doi.org/10.38038/vocatech.v5i2.136>
- Nhat et al. (2023). Clinical benefit of AI-assisted lung ultrasound in a resource-limited intensive care unit. *Critical Care*, 27(257), 1-8.
- Nuryanti, L, Zubaidah, S & Diantoro, M. (2018). Analisis Kemampuan Berpikir Kritis Siswa SMP. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 3(2)155–158. doi: 10.17977/jptpp.v3i2.10490.
- Oktaviani, H. T., Herawati, S., Ekonomi, F., Bisnis, D., Jenderal, U., & Yani, A. (2024). THE INFLUENCE OF STORE ATMOSPHERE AND SERVICE QUALITY ON INTEREST IN REVISITING MINISO RETAIL IN BANDUNG CITY PENGARUH STORE ATMOSPHERE DAN KUALITAS PELAYANAN TERHADAP MINAT BERKUNJUNG KEMBALI PADA RITEL MINISO DI KOTA BANDUNG. *COSTING: Journal of Economic, Business and Accounting*, 7(5).
- Rami Rivani Israwan, A., Putri Josca, M., Abdallah, R., Kevin, N., Ardhiansyah, C., Hasna Desiani, R., Renee Munaf, C., & Soerjati Priowirjanto, E. (2023). SOSIALISASI MENGENAI ASPEK HUKUM DARI PENGGUNAAN CHATGPT DALAM DUNIA PENDIDIKAN DI SMK AL-WAFA KABUPATEN BANDUNG. *Kabuyutan: Jurnal Kajian Ilmu Sosial Dan Humaniora Berbasis Kearifan Lokal*, 2(2), 92–99.

- Ray, P. (2023). ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope. *Internet of Things and Cyber-Physical Systems*. 3, 121-154.
- Roumeliotis, K. I., & Tselikas, N. D. (2023). ChatGPT and Open-AI Models: A Preliminary Review. *Future Internet MDPI*. 15, 192.
- Sagita Harahap, D. (2024). Implementation of ChatGPT to Improve Students' Critical Thinking Abilities. *Indonesian Journal of Education and Social Humanities*, 1(2), 33–39.
- Sofri Fikri Arif, D., & Nur Cahyono, A. (2020). *Analisis Kemampuan Berpikir Kritis Matematis Pada Model Problem Based Learning (PBL) Berbantu Media Pembelajaran Interaktif dan Google Classroom*. 3(1).
- Sok, S. & Heng, K. (2023). ChatGPT for education and research: A review of benefits and risks. *Cambodian Journal of Educational Research*. 3(1), 110-121.
- Vilema, M. D. I., Rivera, P. T., Flores, J. M. C., & Cajo, M. H. (2023). Integrating ChatGPT into Education: Exploring its Pedagogical Impact and Potential. *Migration Letters*, 21(S1), 424–433. <https://doi.org/10.59670/ml.v21is1.6076>
- Zhou, J., Ke, P., Qiu, X., Huang, M., & Zhang, J. (2024). ChatGPT: potential, prospects, and limitations. In *Frontiers of Information Technology and Electronic Engineering* (Vol. 25, Issue 1, pp. 6–11). Zhejiang University. <https://doi.org/10.1631/FITEE.2300089>