THE EFFECTIVENESS OF CHATGPT AS A LEARNING TOOL IN SUPPORTING SELF-REGULATED LEARNING IN STUDENTS: A SYSTEMATIC REVIEW

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Abstrak

Di era digital saat ini, integrasi teknologi kecerdasan buatan dalam pendidikan menjadi solusi inovatif untuk meningkatkan kualitas pembelajaran. ChatGPT, sebagai salah satu teknologi berbasis AI, memiliki potensi besar untuk mendukung Self-Regulated Learning (SRL), yakni kemampuan siswa dalam mengatur proses belajar secara mandiri. Penelitian ini bertujuan untuk menganalisis efektivitas ChatGPT sebagai learning tool dalam mendukung SRL pada siswa, serta mengidentifikasi berbagai kendala yang dihadapi siswa dalam memanfaatkan teknologi ini. Metode penelitian menggunakan Systematic Literature Review (SLR) dengan pendekatan PRISMA, dimana artikel-artikel relevan dipilih berdasarkan kriteria inklusi dan eksklusi yang telah ditetapkan. Hasil penelitian menunjukkan bahwa ChatGPT efektif dalam meningkatkan strategi SRL, seperti penetapan tujuan, manajemen waktu, refleksi diri, dan pencarian bantuan. Teknologi ini juga berkontribusi dalam meningkatkan motivasi belajar serta pemahaman siswa terhadap materi pembelajaran. Namun, tantangan ditemukan dalam keterbatasan ChatGPT memberikan umpan balik yang spesifik dan adaptif, khususnya bagi siswa dengan literasi AI rendah. Selain itu, interaksi yang kurang optimal dengan teknologi ini juga menjadi kendala, karena siswa memerlukan pemahaman yang lebih baik dalam memberikan instruksi yang jelas dan terstruktur. Oleh karena itu, peningkatan literasi AI siswa dan pengembangan fitur adaptif sangat diperlukan untuk mengoptimalkan peran ChatGPT dalam mendukung pembelajaran mandiri di era digital ini.

Kata kunci : *ChatGPT*; *Learning Tools*; *Self-Regulated Learning*; Siswa

Abstract

In today's digital era, the integration of artificial intelligence technology in education has emerged as an innovative solution to enhance the quality of learning. ChatGPT, as a prominent AI-based technology, holds significant potential to support Self-Regulated Learning (SRL), which refers to students' ability to independently manage their learning processes. This study aims to analyze the effectiveness of ChatGPT as a learning tool in supporting SRL among students, as well as identify the challenges faced by students in utilizing this technology. The research employs a Systematic Literature Review (SLR) using the PRISMA framework, where relevant articles were selected based on predetermined inclusion and exclusion criteria. The findings reveal that ChatGPT effectively improves SRL strategies, such as goal setting, time management, self-reflection, and help-seeking. Additionally, it contributes

to enhancing students' learning motivation and comprehension of subject materials. However, challenges were identified regarding ChatGPT's limitations in providing specific and adaptive feedback, particularly for students with low AI literacy. Moreover, suboptimal interactions with the technology were also a barrier, as students need a better understanding of how to give clear and structured prompts. Therefore, improving AI literacy among students and developing more adaptive features are essential to fully optimize ChatGPT's role in supporting independent learning in the digital age.

Keywords*: ChatGPT; Learning Tools; Self-Regulated Learning; Students*

I.   Introduction

The advancement of technology in the field of education has brought significant changes to learning methods in the digital era. One of the innovations that is currently receiving attention is the integration of artificial intelligence (AI) in the teaching and learning process. ChatGPT, as one of the implementations of AI based on large language models (Large Language Model/LLM), offers various potentials to support learning, ranging from providing information to helping students complete their study tasks (Javaid, et al., 2023). This technology allows students to access learning resources more flexibly and interactively, thereby creating new opportunities for developing independent learning skills (Robiul R., et al., 2023).

Self-Regulated Learning (SRL) or self-regulated learning is one of the essential skills needed by students to succeed in 21st-century learning. SRL involves a series of processes in which students actively set goals, monitor progress, and reflect on their learning strategies (Dinata et al., 2016). This ability not only supports academic success but also fosters student independence in facing complex learning challenges. In this context, ChatGPT can serve as a learning tool that provides support to students in carrying out the main functions of SRL, such as providing information, offering feedback on questions, and helping students develop learning plans (Prambudi & Sinaga, 2024).

Although ChatGPT has great potential, its use in supporting SRL also faces certain challenges. Some previous studies indicate that students may face difficulties in using AI technology effectively without adequate guidance. For example, the research conducted by Kurniawan et al. (2024) on the Potential of AI in Enhancing Creativity and Literacy in Indonesian Language Learning, and also the research by Faisal (2024) on the Impact of Artificial Intelligence (AI) on the Smart Thinking Patterns of Students in Pontianak. Furthermore, students' limited understanding of this technology's capabilities can affect the quality of interaction and learning outcomes (Suyuti et al., 2023). Therefore, further exploration is needed on how ChatGPT can be optimized to support students' self-directed learning processes, especially in learning environments designed based on the Self-Regulated Learning approach.

Research on the effectiveness of ChatGPT as a learning tool for SRL has not been extensively conducted, especially those focusing on students as the main population. Most existing studies focus more on the use of AI technology in general or in the

context of higher education, leaving a research gap in its application to support self-directed learning for students at the elementary and secondary education levels. This gap highlights the importance of identifying the role of ChatGPT in facilitating the SRL process, while also understanding the challenges that may arise during its implementation.

Based on that background, this study aims to analyze the effectiveness of ChatGPT as a learning tool in supporting Self-Regulated Learning among students. This research also aims to identify various obstacles faced by students in integrating ChatGPT into the self-directed learning process. Thus, the results of this research are expected to contribute to the development of more effective and relevant technology-based learning strategies to meet the needs of students in the digital era.

II. Research Method

This research method uses a Systematic Literature Review (SLR) approach guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The SLR process begins with the identification of relevant articles through leading databases, such as Scopus, Web of Science, and Google Scholar. Next, the selection of articles is carried out based on the established inclusion and exclusion criteria. Articles that pass the selection will undergo a full review process to extract their main data, including information related to the effectiveness of ChatGPT as a learning tool in supporting Self-Regulated Learning. The results of this review are then analyzed descriptively and through narrative synthesis to address the research objectives.

The inclusion criteria in this study are articles published in the last 5 years (2019–2024), focusing on discussions about ChatGPT as a learning tool in supporting Self-Regulated Learning, with students as the research subjects, in the form of journal articles accessible in full-text, and written in English or Indonesian. Meanwhile, the exclusion criteria include articles that are not relevant to the research focus, do not have full-text access, are written in languages other than English or Indonesian, and articles in the form of conference abstracts or editorials. With these criteria, it is expected that only relevant and high-quality articles will be included in the analysis. for the elaboration of the criteria, it can be observed in Table 1.

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Publication year	2019 - 2024	Before 2019
Literatur types	Journal article	Book, *book chapter*
Accesibilities	*Full-text*	Only abstract
Language	Indonesian & English	In spite of Indonesia & Inggris
Research focus	ChatGPT as a learning tool to support self-regulated learning	Use ChatGPT as a learning tool to support self-regulated learning.

The articles to be reviewed are sourced from the Scopus and Semantic Scholar databases. The article search was conducted using the Publish or Perish application with the help of the boolean operators "AND" and "OR". The keywords used in the search are "ChatGPT" AND "Learning Tools" AND "Self Regulated Learning" AND "Student OR Siswa". Articles were filtered based on the criteria specified in Table 1. Here is the PRISMA flowchart to explain the article screening process.
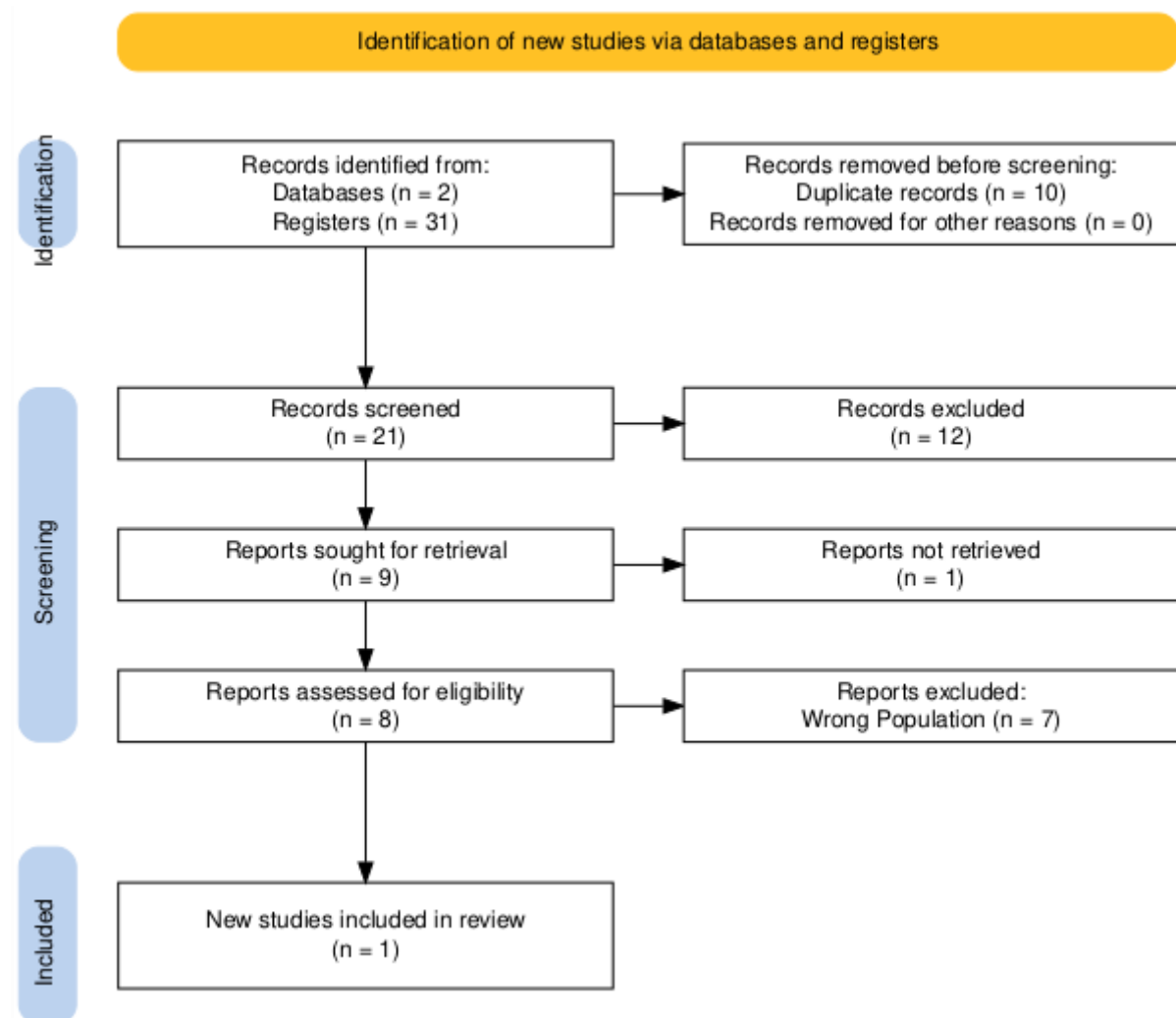

Figure 1. PRISMA Flow Diagram

III.   Findings and Discussion

A. Finding

The article screening results in only one article that aligns with the research focus of this article, which is the effectiveness of ChatGPT as a learning tool in supporting self-regulated learning among high school students. The article discusses a pioneering study on the effectiveness of ChatGPT in supporting self-regulated learning (SRL) among high school students in the context of science education. The study compared the ChatGPT-based SRLbot with the rule-based Nemobot among 74 students learning the concepts of force and motion. For a more comprehensive presentation of the findings, please refer to Table 2.

Table 2 Findings and Identification of Article Issues

Article	Categories	Findings	Issues
Ng, D. T. K., Tan, C. W., & Leung, J. K. L. (2024). Empowering student self-regulated learning and science education through ChatGPT: A pioneering pilot study. *British Journal of Educational Technology*, *55*(4), 1328–1353. https://doi.org/10.1111/bjet.13454	Development of SRL	1) SRLbot based on ChatGPT enhances SRL strategies such as goal setting, environment management, time management, seeking help, and self-evaluation. 2) There is a significant increase in student motivation and knowledge related to physics material (force and motion).	Some students feel that the feedback is too general and not specific to their learning needs.
	Adaptability	SRLbot provides flexible and personalized recommendations tailored to students' needs, similar to a real teacher.	SRLbot sometimes generates irrelevant responses if the student's prompt is not specific or structured.
	Interaction	The frequency of interaction with SRLbot is positively related to the development of students' SRL.	The absence of an automatic feature that provides reminders or responses without student initiative, thus requiring integration with other platforms.
	AI Literacy	Students with high AI literacy are more capable of providing relevant prompts, resulting in more beneficial responses.	Students with low AI literacy find it difficult to make the most of SRLbot due to their inability to provide clear and specific prompts.
	Research Scale	Research shows the great potential of ChatGPT in supporting SRL learning.	Students with low AI literacy find it difficult to make the most of SRLbot due to their inability to provide clear and specific prompts.
	Technological Limitations	SRLbot is capable of facilitating metacognitive reflection and providing quick solutions compared to rule-based chatbots (Nemobot).	The generated responses are sometimes too long or not suitable for the learning context, especially for students with lower knowledge levels.

The research results show that the ChatGPT-based SRLbot is capable of enhancing students' self-regulated learning (SRL) strategies compared to rule-based chatbots like Nemobot. This improvement is evident in students' abilities in goal setting, time management, task strategies, and self-evaluation, which significantly differentiate the experimental group from the control group (Ng, Tan, & Leung, 2024). SRLbot provides personal and flexible support according to students' needs, resembling the role of a teacher in helping solve problems and facilitating metacognitive reflection. Furthermore, students' motivation to learn and their knowledge of science, particularly in the concepts of force and motion, have also seen significant improvement, demonstrating the potential of generative AI technology in creating more adaptive and in-depth learning experiences (Ng et al., 2024).

However, this research also revealed several challenges faced by students in using SRLbot. Some students, especially those with lower levels of knowledge, felt that the feedback provided was too lengthy or too general, making it less suitable for their specific needs. This indicates the need for AI literacy among students, where the skill of providing specific prompts becomes key to obtaining more relevant recommendations (Ng et al., 2024). In addition, SRLbot has limitations because it cannot provide automatic reminders like other platforms, so integration with multimedia-based communication platforms such as Facebook Messenger could be a solution to enhance student engagement (Ng et al., 2024).

This study also highlights the importance of student interaction with SRLbot in influencing learning effectiveness. It was found that the frequency of student interactions has a positive correlation with the development of SRL, while the gender factor did not show a significant influence (Ng et al., 2024). Students who interact more frequently with SRLbot tend to show improvements in the development of self-regulated learning strategies and problem-solving. On the other hand, the limitation of the research scale involving only 74 students is an important note, thus further research with a larger sample is needed to strengthen the generalization of the results (Ng et al., 2024).

In addition, the difference in adaptability between SRLbot and Nemobot also highlights the superiority of generative technology. SRLbot is capable of providing more flexible and contextual feedback compared to Nemobot, whose responses are limited to predetermined scripts. However, this flexibility also presents challenges, as students must be able to formulate prompts clearly and specifically for the answers provided to be accurate (Ng et al., 2024). Therefore, AI literacy becomes important not only for students but also for teachers. Teachers need to enhance their competencies in designing AI-based learning, monitoring student interactions with chatbots, and integrating this technology with appropriate teaching approaches. With the right strategy, technology like SRLbot has the potential to optimally and sustainably support the development of students' SRL in various learning contexts (Ng et al., 2024).

IV.   Conclusion

This study concludes that ChatGPT, through its AI-based SRLbot, is effective in supporting students' Self-Regulated Learning (SRL). It is able to enhance SRL strategies such as goal setting, time management, self-reflection, and help-seeking, which have a positive impact on students' motivation to learn and understanding of learning materials. SRLbot also demonstrated the ability to provide flexible personalized support according to students' needs, resembling the teacher's role in facilitating independent learning.

However, the effectiveness of ChatGPT still faces challenges such as limitations in providing specific and adaptive feedback, especially for students with low AI literacy. Optimal student interaction with this technology relies on the ability to provide clear and specific instructions. Therefore, improving students' AI literacy and developing more adaptive features are important to maximize the potential of ChatGPT in supporting self-directed learning.

V.   References

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