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From Conversation To Competence: The Influence Of ChatGPT Use And Learning Motivation In Improving Self-Directed Learning

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Keywords:
Artificial Intelligence (AI); learning motivation; self-directed learning; the use of ChatGPT

Abstract

The rising popularity of ChatGPT has an impact on student learning behavior. This study focused on how ChatGPT use and learning motivation affect students' self-directed learning. This study involved 98 respondents, who were undergraduate and master's students and had used ChatGPT for learning at least 1 (one) time, selected using the convenience sampling technique. This research employed multiple regression analysis methods. The research results show a significant and positive influence of ChatGPT use ($R=0.747$, $\beta=0.419$, $p<0.01$) and learning motivation ($R=0.802$, $\beta=0.553$, $p<0.01$) on self-directed learning. The study also found that learning motivation provided higher contribution to self-directed learning than ChatGPT use. These findings offer new insights to the existing knowledge on the role of artificial intelligence and learning motivation in supporting self-directed learning in students.

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Abstrak

Popularitas ChatGPT yang semakin menanjak berdampak pada perilaku belajar mahasiswa. Penelitian ini berfokus pada bagaimana penggunaan ChatGPT dan motivasi belajar memengaruhi pembelajaran mandiri pada mahasiswa. Sebanyak 98 mahasiswa S-1 da S-2 yang pernah menggunakan ChatGPT untuk keperluan belajar setidaknya sekali terlibat dalam studi ini. Data penelitian ini dianalisis dengan menggunakan metode analisis regresi berganda. Hasil penelitian menunjukkan adanya pengaruh signifikan dan positif penggunaan ChatGPT (R=0,747, β=0,419, p<0,01) dan motivasi belajar (R=0,802, β=0,553, p<0,01) terhadap pembelajaran mandiri siswa. Studi ini juga menyimpulkan bahwa motivasi pelajar memiliki pengaruh yang lebih besar terhadap pembelajaran mandiri siswa daripada penggunaan ChatGPT. Temuan ini menambah kontribusi baru pada pengetahuan yang ada tentang peran penggunaan kecerdasan buatan dan motivasi belajar terhadap pembelajaran mandiri siswa.

Kata kunci:
kecerdasan buatan; motivasi belajar; pembelajaran mandiri; penggunaan *ChatGPT*

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INTRODUCTION

Background Of The Study

Rapid technological advances have also encouraged the development of artificial intelligence (AI). Recently, an AI technology called ChatGPT has been rising in popularity. Based on an article published on Business of Apps, ChatGPT set a record as the fastest application to reach 100 million users in February 2023 (Curry, 2024). AI was introduced by John McCarthy in 1955 (McCarthy, Minsky, Rochester, & Shannon, 2006). Decades later, on November 30, 2022, OpenAI launched ChatGPT (Generative Pre-training Transformer). ChatGPT comes in the form of chatbots, which have a dialogue system for interacting with users that can imitate and interpret human communication. This system makes it feel like individuals are talking to real humans when using the technology (Ali, Shamsan, Hezam, & Mohammed, 2023).

AI can be trained to simulate the human brain and perform routine tasks using large amounts of data (Bengio, LeCun, & Hinton, 2021; Susanto et al., 2022). For example, in healthcare, AI can help health professionals synthesize patient records, interpret diagnostic images, and highlight health problems (Aung, Wong, & Ting, 2021). In education, AI is used to improve administrative services and academic support. One representative example is Intelligent Tutoring Systems (ITS), which can be used to simulate one-on-one personal tutoring. The results of a meta-analysis show that ITS generally has a moderately positive effect on the academic achievement of college students. However, ITS development can be challenging, as it involves content creation, design, and refinement of feedback phrases and dialogue strategies (Steenbergen-Hu & Cooper, 2014).

Using ChatGPT in education has benefits such as personalized learning, accessibility and affordability, interactive learning resources, homework assistance, and problem-solving. With ChatGPT, students can complete their assignments in a short time. However, there have been pros and cons of using ChatGPT in research and education (Suharmawan, 2023). The use of ChatGPT for learning raises issues, including privacy, data security, and algorithm bias, that can reduce the effectiveness and reliability of ChatGPT-based interventions (Baskara, 2023; Baskara & Mukarto, 2023). It also raises concerns about academic honesty and plagiarism (Cotton, Cotton, & Shipway, 2023).

One of the main concerns in using ChatGPT is that student assignment results do not reflect their true abilities (Rahayu, 2023). In addition to increase plagiarism incidence, ChatGPT can also encourage laziness and reduce students' critical thinking abilities (Milahi, 2023; Saraswati, Karmina, Efendi, Candrakanti, & Rakhmawati, 2023). ChatGPT cannot track what lecturers teach because this system only provides knowledge to users in the form of arguments (Fernando, 2023). A professor at Texas A&M University withheld the diplomas of students who used ChatGPT in daily tasks (Josina, 2023).

Perceptions regarding the use of ChatGPT in self-directed learning vary. Firstly, personalized support can be used to make choices and reach one's learning goals. Both real-time feedback and guidance allow students to receive feedback quickly and get

direction regarding the learning materials provided. Third, there will be increased accessibility because the technology can be accessed via various platforms. Fourth, convenient and flexible learning can be used anytime by individuals. Fifth, enhancing the use of open educational resources helps students obtain learning materials easily. Lastly, self-assessment and reflection are used to reflect in learning (Balasubramanian, 2023; Firat, 2023).

Self-directed learning is described as a process in which individuals take the initiative, with or without help from others, to diagnose learning needs, formulate learning objectives, identify human resources and learning materials, select and implement appropriate learning strategies, and evaluate their learning outcomes. In general, self-directed learning requires goal setting and task analysis, implementation of prepared plans, and self-evaluation of the learning process (Parveen, Jan, Rasool, Waseem, & Bhat, 2023; Timothy et al., 2010).

Individuals who study independently generally look for various resources on online learning platforms. Research on independent learning using technology shows that students' views on collaborative learning can potentially improve their independent learning abilities. The independent learning process also plays a role in the use of internet communication technology for collaborative learning activities (Geng, Law, & Niu, 2019).

Self-directed learning allows individuals to increase their self-confidence, autonomy, motivation, and lifelong learning skills. This condition turns learners into active participants in the learning process and encourages them to study something in depth. However, there are several competencies required for independent learning (Tekkol & Demirel, 2018). Independent learners must use deep thinking skills and the ability to integrate incoming information with the knowledge they have. Another important part of self-directed learning is the ability to interact and reflect on the educational curriculum, teachers, peers, other people, and various other educational resources (Silén, 2023).

Mhlanga (2023) reviewed eight articles about ChatGPT use in education. Educators expressed concern that students might turn their assignments over to

ChatGPT because of its ability to produce acceptable text quickly. Therefore, it is necessary to emphasize the importance of responsible and ethical use of ChatGPT.

Sallam (2023) reviewed 60 articles about ChatGPT in health, medical education, and academic contexts. The literature review listed various concerns regarding ChatGPT use in those contexts; ranging from the risk of bias, plagiarism, copyright issues, transparency issues, legal issues, lack of originality, incorrect responses, limited knowledge, and inaccurate quotations. Therefore, ChatGPT-assisted learning requires immediate attention to ensure optimize its benefits are optimized and minimize drawbacks.

Learning how to use AI offers greater student engagement and achievement than learning in traditional classrooms (Blikstein, 2011). ChatGPT can be a more affordable alternative to traditional resources, such as books or private teachers (Suharmawan, 2023). Another study found that students admired ChatGPT's capabilities and found it interesting. They feel they can use it quickly and get structured answers. However, many students feel that ChatGPT answers are incorrect, and most think that additional analysis is required. Because no matter how intelligent AI is, it cannot replace human intelligence (Shoufan, 2023).

Using chatbots can significantly increase student motivation and engagement (Ali & Bin-Hady, 2019). Motivation is a complex part of human behavior that influences how individuals invest their time, how much energy they expend in a particular task, how they think and feel about the task, and how long they persist in carrying it out. Motivation is reflected in students' choices of learning tasks, their time and effort, their persistence in learning tasks, and how they face obstacles in the learning process (Bakar, 2014). *Motivation* is a process that begins with a deficiency or need that activates behavior or encouragement aimed at a certain goal. This is why motivation is defined as "the reason behind behavior" (Luthans, Luthans, & Luthans, 2015).

ChatGPT can increase student learning motivation (Siregar, Hasmayni, & Lubis, 2023). Because this chatbot provides direct and personalized feedback, student motivation and attention will increase during its usage (Ali & Bin-Hady, 2019). Students can ask questions and get clear explanations (Muñoz et al., 2023). Motivation is vital in self-directed learning, helping students make decisions and increasing their willingness

to complete tasks to achieve goals (Handayani, Marlina, & Desyandri, 2022). However, other factors, such as teacher and the learning environment, also play a role in students' learning motivation (Meşe & Sevilen, 2021).

Research Gap

The development of AI tools like Chat GPT can completely change how students increase their academic potential. Related literature has shown how AI can assist and enhance learning. Through AI-based tutoring programs, student performance and motivation in the learning environment will increase (Srinivasa, KurnI, & Saritha, 2022). However, high learning motivation has been found to inconsistently lead to the use of effective learning strategies. Motivated students may still need guidance in developing effective strategies to support their independent learning (Credé & Phillips, 2011).

Previous studies involving related variables have been conducted in various countries, such as the Netherlands (Baars, Wijnia, & Paas, 2017), the United States (Ahmed, 2017), Russia (Ilishkina, Bruin, Podolskiy, Volk, & van Merriënboer, 2022), and China (Pan, 2020). Therefore, it is essential to carry out similar research in Indonesia to obtain results from the relationship between these variables to enable comparison with similar research in other regions.

Rationale Of The Study

ChatGPT has become increasingly popular for its ability to produce text that resembles human writing. This technology offers great potential for research advancement but also opens the door to abuse and dishonesty in the academic field. Previous research has highlighted its impact in the context of AI-based writing, with quite worrying results. These negative consequences, especially in the context of non-formal education, need to be given more attention. Therefore, we need to dig deeper and understand the interaction between technology, ethics and academic behavior amid the progress in the digital era (Rosyanafi, Lestari, Susilo, Nusantara, & Nuraini, 2023).

Research misconduct has become a significant concern in academia. *Research misconduct* is defined as unethical practices, including plagiarism, data manipulation, and other violations of scientific integrity. The implications of research misconduct are severe because it can erode public trust in science and hinder the progress of knowledge (Steneck, 2006). Previous research has identified this issue as a severe challenge amid

technological advances, where sophisticated algorithms such as ChatGPT can influence the frequency and type of academic research violations (Fang, Steen, & Casadevall, 2012).

Novelty Of The Study

Previous studies examined the link between learning motivation and independent learning across various populations. Baars, Wijnia, & Paas (2017) studied 136 second year students from secondary school students in the Netherlands. Then, Ahmed (2017) study involved 5,456 students aged 15 from 274 American schools. Ilishkina, Bruin, Podolskiy, Volk, & van Merriënboer (2022) also conducted similar research with 716 participants from two universities in Russia. There was also research conducted by Pan (2020), with 332 respondents from a university in China. The four studies discovered a significant relationship between learning motivation and independent learning.

It was also found that online learning has a positive significance on students' learning motivation (Meşe & Sevilen, 2021). By providing helpful information and resources, ChatGPT can help students better achieve their academic goals and improve productivity (Fauzi, Tuhuteru, Sampe, Ausat, & Hatta, 2023).

There has been no research that directly discusses the influence of AI use and learning motivation on students' independent learning. This research sought to explain the influence of AI use; in this case, ChatGPT; and learning motivation on students' independent learning. The difference between this research and previous studies also lied in the research sample. This research involved adults in Indonesia.

Purposes/Hypothesis Of The Study

This research aimed to examine the influence of ChatGPT use and learning motivation have on self-directed learning. Based on the literature and arguments presented, the hypotheses of this research were as follow: a) H1: ChatGPT use has positive impact on self-directed learning, b) H2: learning motivation has positive impact on self-directed learning, and c) H3: ChatGPT use and learning motivation simultaneously influence self-directed learning.

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METHODS

Research Design

This study used a quantitative approach with a multiple regression analysis method. This research examined three variables, namely learning motivation (X_1) and the use of ChatGPT (X_2) as independent variables, and self-directed learning (Y) as the dependent variable.

Sampling Technique And Research Sample

The sampling technique used in this research was convenience sampling. Convenience sampling is a type of non-random sampling. Convenience samples are the people closest and most accessible for the researcher. This method is beneficial when the respondent criteria are very general and can be found in various places. Apart from that, the main advantage of this approach is efficiency, both in terms of time and cost and there is no limit on sample size (Pace, 2021).

Based on various considerations, researchers only took samples based on pretty general criteria: 1) men or women, 2) aged 18-40 years, 3) an undergraduate, master's, or doctoral student at the time of the research, and 4) used ChatGPT for learning activities at least 1 (one) time.

Respondents in this study were 98 people (32 men and 66 women), with an age range of 18-40 years (M= 18.00, SD= 4.42). If we look at domicile, 90.8% or 89 respondents came from Java, and the rest came from outside Java. There were more respondents with a bachelor's degree (N= 96) than respondents with a master's degree (N=2). The comprehensive data can be viewed in Table 1.

Table 1.
Demographic Data of Research Respondents

Demographics		Frequency	Percentage
Gender	Male	32	32.7%
	Female	66	67.3%
	Total	**98**	**100%**
Age	18-25 years	82	83.7%
	26-40 years	16	16.3%
	Total	**98**	**100%**
Educational Background	Bachelor's Degree	96	98%
	Master's Degree	2	2%
	Total	**98**	**100%**
Location	Outside of Java	7	7.1%

Demographics		Frequency	Percentage
	Java Island	89	90.8%
	Not identified	2	2%
	Total	**98**	**100%**

Instruments Of Measurement

The three instruments used in this research were ChatGPT Use Questionnaire, Learning Motivation Scale and Self-Directed Learning Inventory. In this research, researchers used ChatGPT use and learning motivation instruments adapted Siregar, Hasmayni, & Lubis (2023). Chat GPT Use Questionnaire was originally developed by Shoufan (2023) with 10 items, for example; "*Do you agree that Chat GPT has powerful capabilities?"* and "*Do you agree that Chat GPT is an effective tool for learning?"*. Meanwhile, Learning Motivation Scale was originally developed by Lubis, Idrus, & Sarji (2018) with 10 items, e.g., "*Are you motivated to learn new things?"* and "*Do you have a strong desire to succeed academically?*". For the Self-Directed Learning Inventory, researchers used a proprietary instrument by Suh, Wang, & Arterberry (2015) with a total of 28 items, e.g., *"I have a great desire to learn various things"* and *"I am able to learn knowledge and skills perfectly."*

All three instruments measure responses on a five-point Likert scale (5=strongly agree and 1=strongly disagree). The scale was adapted to the Indonesian cultural context. Researchers tested the validity of the instruments. The validity test conducted was content validity. Content validity is usually evaluated through expert judgment and not directly analyzed using SPSS. The expert judgment is carried out by psychometric experts and linguistic experts. In this context, statistical analysis such as reliability testing (Cronbach's α) can be used to support this assessment. Meanwhile, the results of the reliability test measured by Cronbach's α were as follows: Learning Motivation Scale (α=0.961), ChatGPT Use Questionnaire (α=0.939), and Self-Directed Learning Inventory (α=0.972). To view the categorization formula of each variable, refer to Table 2.

Data Collection Technique

The data collection technique used in this research is a questionnaire with the help of Google Forms and distribution via social media to obtain respondents. Participation in this study was voluntary. Research participants were fully informed of the nature of

the study and their rights to withdraw from the study at any time. They were also ensured of the confidentiality and anonymity of their data.

Data Analysis Technique

All the statistical analyses were performed using the IBM SPSS Statistics 22. This software performed assumption tests, namely linearity tests, normality test, multicollinearity tests, and multiple linear regression. Multiple linear regression is a regression analysis that can explain the relationship between the dependent variable and factors that influence more than one predictor (independent variable) (Triyanto et al., 2019).

Ethical Approval

This research was declared not to violate research ethics based on the letter of passing the ethical test number 297/DK.FIS/200.09.14/X/2024 published by the Faculty of Social Sciences, Nahdlatul Ulama University Indonesia (Universitas Nahdlatul Ulama Indonesia).

RESULTS AND DISCUSSION

Results Of The Study

The mean (M) and standard deviation (SD) values provide insights into the data distribution (Table 2). From the M and SD values, the researcher concludes that SDL has the highest mean (M=84), followed by learning motivation (M=30), and ChatGPT usage (M=30). The relatively low standard deviation indicates that the data tends to be homogeneous for each variable.

Table 2.

Descriptive Statistics

Variable	1	2	3
1. Self Directed-Learning	-		
2. ChatGPT Use	0.00**	-	
3. Learning Motivation	0.00**	0.00**	-
Mean	84	30	30
SD	18.67	6.67	6.67
N	98	98	98

*p<0.05; **p<0.01

Table 3 indicates that the majority of respondents exhibit very high levels of self-directed learning, ChatGPT use, and learning motivation. Only a small proportion of respondents fall into the low or very low categories for these three variables. This data categorization used hypothetical statistics. In this technique, the mean and standard deviation used for determining categories are obtained from measuring instruments (Widhiarso, 2017).

Table 3.

Categorization For Self-Directed Learning, ChatGPT Use, And Learning Motivation

	Category	Score	Frequency	Percentage
Self-Directed Learning	Very High	112 ≤ X	54.1	54.1%
	High	93.33 < X ≤ 112	30.6	30.6%
	Average	74.67 < X ≤ 93.33	7	7.1%
	Low	56 < X ≤ 74.67	5	5.1%
	Very Low	X ≤ 56	3	3.1%
	Total		**98**	**100%**
The Use of ChatGPT	Very High	40 < x	41	41,80%
	High	33.33 < X ≤ 40	24	24.50%
	Average	26.67 < X ≤ 33.33	23	23.50%
	Low	20 < X ≤ 26.67	5	5.10%
	Very Low	X ≤ 20	5	5.10%
	Total		**98**	**100%**
Learning Motivation	Very High	40 <x	78	79.60%
	High	33.33 < X ≤ 40	11	11.20%
	Average	26.67 < X ≤ 33.33	3	3.10%
	Low	20 < X ≤ 26.67	1	11.00%
	Very Low	X ≤ 20	5	5.10%
	Total		**98**	**100%**

Based on the normality test using unstandardized residuals, it was found that the data for the three variables were normal with a Kolmogorov-Smirnov Z score of 0.943 and p = 0.336 (p>0.05).

Table 4.

Linearity Test Result

Variable	Deviation From Linearity		Interpretation
	F	p	
Learning Motivation x Self-Directed Learning	0.871	0.634	Linear
ChatGPT x Self-Directed Learning	1.793	0.26	Linear

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The linearity test results presented in Table 4 indicate the nature of relationships between two sets of variables: learning motivation and self-directed learning, as well as ChatGPT use and self-directed learning. Both sets of variables showed linearity.

Table 5.

Multicollinearity Test Result

Predictors	Tolerance	VIF	Remarks
ChatGPT	0.641	1.541 (<10.00)	No Multicollinearity
Learning Motivation	0.641	1.541 (<10.00)	No Multicollinearity

The multicollinearity test ensures no solid linear relationship between the independent variables that could interfere with the model estimation. Table 5 shows no multicollinearity between independent variables.

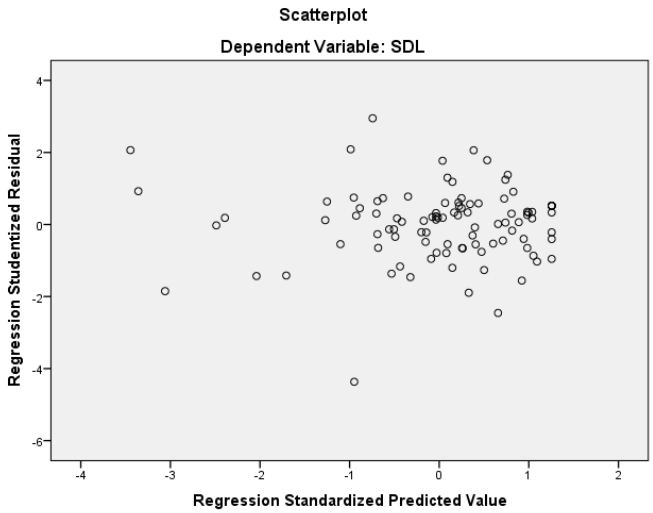

Figure 1. Heteroscedasticity Test Result

If the points are spread out, have no pattern, and start on a line above zero, then the scatterplot does not have heteroscedasticity. It can be seen in Figure 1 that there was no heteroscedasticity.

Table 6.
Simple Regression Result

Variable	β	r	F	R^2	p	Remarks
ChatGPT	0.419	0.747	121.193	0.757	0.000	p<0.05
Learning Motivation	0.553	0.802	172.686		0.000	p<0.05

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Based on the data obtained in this study, it can be concluded that all variables were positively correlated (Table 6). There was a is a significant positive relationship between ChatGPT use and self-directed learning (R=0.747, β=0.419, p<0.01). Learning motivation was also found to have a relationship with self-directed learning (R=0.802, β=0.553, p<0.01). Figure 2 shows the conceptual framework of the study.

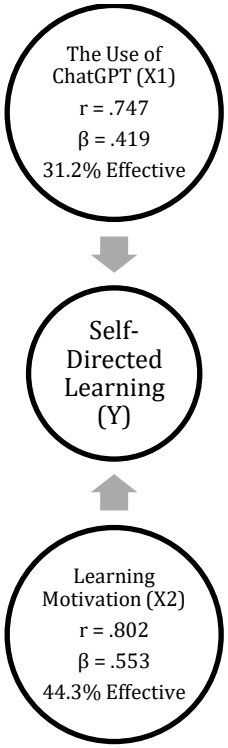

Figure 2. Conceptual Framework

These two independent variables together make a significant contribution in explaining variation in self-directed learning. The interaction between the two independent variables and the dependent variable can increase self-directed learning by providing an effective contribution of 75.7%. While other factors influence the other 24.3%. If we look at the influence of each variable, ChatGPT use could provide an effective contribution of 31.2%, while learning motivation could provide an effective contribution of 44.3%. Then, based on relative contribution, ChatGPT use contributed 41.5%, while learning motivation contributed 58.5%.

Discussion

It can be concluded that learning motivation has a greater influence on self-directed learning than ChatGPT use. Other factors such as the influence of teachers, learning environment, metacognitive abilities, critical thinking skills, access to educational resources, and so forth, collectively contribute to 25% to self-directed learning (Meşe & Sevilen, 2021). ChatGPT can act as a tutor or mentor, which can help students learn independently and take responsibility for their learning (Biswas, 2023).

When AI technologies, such as Chat GPT, are used in educational settings, interactions between students, learning materials, and AI tools influence various mental processes. First, there are cognitive aspects involved in understanding and processing information. AI can present learning material interactively and adaptively according to the need of individual student. It triggers mental processes, such as attention, information processing, and problem-solving (Zhao & Chen, 2016). Using AI in tutoring programs can increase student learning motivation through immediate feedback and personalized learning experience. This influences mental processes, such as interest, intrinsic motivation, and students' self-perception of their abilities (Ali & Bin-Hady, 2019).

ChatGPT impacts self-directed learning by providing a personalized and adaptive learning experience. ChatGPT acts as an on-demand tutor, explaining, answering questions, and providing resources tailored to the learner's level of understanding. This interactivity increases cognitive engagement, which is critical for self-directed learning. Cognitive theories, such as Vygotsky's zone of proximal development (ZPD), suggest that learners benefit from guidance slightly beyond their current abilities (Eun, 2019; Shabani, Khatib, & Ebadi, 2010; Vygotsky, 1978; Ahmed, 2017). ChatGPT can operate within this zone, appropriately challenging students and encouraging more profound learning. However, the impact is mediated by students' ability to utilize technology effectively and integrate it into their learning process (Wardani, Mufidah, Mufidah, & Aristiawan, 2023).

The use of AI in self-directed learning really helps students in improving their abilities and knowledge. However, parents and educators need to play a role in providing, supervising, and evaluating students' use of this technology so that they can

use it wisely and effectively (Karyadi, 2023). AI capabilities in education for learning will realize self-directed, motivational, adaptive, resource-free, and embedded technology (Pambudi et al., 2023). The technological environment contributes to the formation of self-directed learning through learning motivation, which can encourage students' self-directed learning attitudes (Pan, 2020).

This study provides strong evidence of the significant influence of learning motivation on independent learning. The results of the regression analysis show that learning motivation significantly contributes to self-directed learning. These findings are in line with previous research that has documented a positive relationship between learning motivation and independent learning (Ahmed, 2017; Baars, Wijnia, & Paas, 2017). Furthermore, the results of this study provide a deeper understanding of how learning motivation drivers can be used to improve independent learning. Appropriate motivation strategies can help increase active participation and improve learning outcomes (Ilishkina, Bruin, Podolskiy, Volk, & van Merriënboer, 2022).

Learning motivation directly and profoundly impacts self-directed learning because learning motivation encourages students to have initiatives, be persistent, and make an effort. According to Self-Determination Theory, motivation can be intrinsic (driven by interest and pleasure) or extrinsic (driven by external rewards). Intrinsically motivated learners are more likely to engage deeply with learning tasks, seek challenges, and persist in adversity, all of which are essential components of self-directed learning. Motivation enhances cognitive and metacognitive strategies, enabling students to set goals, monitor progress, and organize learning (Ryan & Deci, 2000).

The more significant influence of learning motivation on self-directed learning compared to ChatGPT can be attributed to motivation's fundamental role in initiating and sustaining learning activities. Although ChatGPT provides valuable support and resources, the extent to which it is used effectively depends on the learner's motivation. Motivation is a driving force that encourages learners to seek out and engage with educational tools, including AI technologies like ChatGPT. Without sufficient motivation, even the best tools cannot significantly improve self-directed learning (Nufus, 2024). Ahmed (2017) highlighted that motivated learners are more proactive in

their learning, deliberately improving and applying what they learn, relying less on external tools and more on internal encouragement.

Psychological dynamics such as self-efficacy, goal orientation, and metacognitive awareness are essential in self-directed learning. Bandura's self-efficacy theory emphasizes the importance of belief in one's ability to organize and carry out the actions necessary to manage prospective situations (Bandura, 1977, 1997; Zagoto, 2019). High self-efficacy leads to greater motivation and persistence, increasing self-directed learning (Dogham et al., 2022; Firdaningsih, 2016). Goal orientation theory, which distinguishes between mastery and performance goals, also impacts self-directed learning. Learners with mastery goals are more likely to engage in deep learning strategies and persist in the face of challenges (Tuominen, Niemivirta, Lonka, & Salmela-Aro, 2020).

This study also emphasized the importance of considering individual variability in learning motivation and the different ways in which people respond to their motivation for self-directed learning (Geng, Law, & Niu, 2019). One of the challenges in this research was finding participants who were willing to take part in the study. This constraint arises because the research required participants who had previously used ChatGPT in their studies. Meanwhile, many students, especially outside of Java Island, were still unfamiliar with ChatGPT. As a result, this study had a limited number of respondents.

CONCLUSIONS AND SUGGESTIONS

Conclusions

Based on the research results, learning motivation and the use of ChatGPT have a significant positive impact on students' self-directed learning. Learning motivation has a more significant influence than ChatGPT use on self-directed learning. This indicates that internal motivation to learn is very important in increasing self-directed learning, while the use of ChatGPT without motivation may provide a less significant increase in self-directed learning. These results indicate that these two factors can help improve students' ability to manage their learning. Educators must understand the impact of ChatGPT and learning motivation on students' self-directed learning. They can design

learning programs that incorporate AI technology and increase learning motivation to support better self-directed learning. Students need to be given guidance on using ChatGPT and given motivation to study independently. Further research could explore other factors influencing self-directed learning and the role of AI technologies in education more broadly. Education must continue to evolve as technology advances, and educators need to utilize it effectively in their teaching.

Suggestions

Suggestions for further research include exploring the use of ChatGPT in natural settings, such as in the classroom or at home. This will allow researchers to gain a deeper understanding of how students actually use ChatGPT and how the technology impacts their learning process. Additionally, future research could explore the use of ChatGPT with different student groups, such as students with disabilities or students from diverse cultural backgrounds. This step will provide better insight into how ChatGPT can be used to optimize the student learning process.

CONFLICT OF INTEREST

The author(s) of this article declare no conflict of interest.

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AUTHORS CONTRIBUTION STATEMENT

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