THE EFFECT OF CHATGPT IN FOSTERING SELF-DIRECTED LEARNING IN THE ESL WRITING CLASSROOM

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ABSTRACT

This study investigates the effect of ChatGPT on students' self-directed learning in the English Language writing classroom. With the increasing presence of AI tools in education, understanding its impact on students' learning is essential. Grounded in Knowles' (1975) Self-Directed Learning framework, this research explores the extent to which AI can support autonomy and self-assessment in student learning. The study is an quantitative exploratory study and employed a quasi-experimental design with an experimental group (N=24) using ChatGPT 3.5 for learning support and a control group without it (N=23). Quantitative data were gathered through pre- and post-surveys, measuring changes in students' self-assessment, motivation, study planning, and resource-seeking behaviors. Using paired-samples t-test, the quantitative analysis revealed that while ChatGPT significantly enhanced students' initiative and independence in learning in the experimental group, however other self-directed learning dimensions showed minimal impact. Additionally, the study's results emphasizes that ChatGPT cannot replace the teacher's role, as it lacks the contextual understanding, instructional flexibility, and motivational influence critical for holistic student development. These insights highlight the need for educators to guide students in critically engaging with AI tools, using them to supplement rather than substitute the teacher's presence in the classroom.

Keywords: ChatGPT 3.5, Generative AI, Self-directed learning, Writing

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INTRODUCTION

The rapid development of artificial intelligence (AI) has profoundly impacted education reshaping tradtional reaching and learning paradigms, AI-poweered tools, in particular, generative AI (GenAI), has gained prominence for its ability to produce human-like content, including text, visuals, and audio, through machine learning models that analyze and replicate patterns in large datasets (Brynjolfsson et al., 2023). ChatGPT, one of the most well-known GenAI applications, leverages large-scale language models like GPT-3.5 and GPT-4, enabling it to simulate natural dialogue and provide personalized, interactive learning experiences. Since its launch in November 2022, ChatGPT has captured global attention, with over 100 million users by early 2023 (Curry, 2024).

In educational contexts, ChatGPT has shown significant potential, particularly in supporting language learning such as in the writing classroom. Its capabilities offer students a virtual partner that gives instant feedback on written assignments, acess to detailed information on various academic topics, support for brainstorming ideas and editing, addressing challenges such as long turnover time of receiving feedback from teachers, and providing feedback that is more individualised to the learner, helping them identify and address gaps in their understanding (Luckin et. al., 2021).

Despite its advantages, the integration of ChatGPT into education raises concerns about

privacy, academic honesty, and potential over-reliance on AI tools, which may undermine critical thinking and authentic skill development (Cotton et. al., 2024; Al-Zahrani, 2024). In the language classroom, many studies show that leaners use ChatGPT as a virtual intelligent assistant and to enhance their writing and language skills (AlAfnan et.al., 2023; Basic et. al., 2023). Moreover, while existing research highlights its effectiveness in enhancing language learning, there is limited empirical evidence on its role in informal and self-directed learning contexts (Wang et. al. , 2024). This study aims to address these gaps by examining how ChatGPT supports self-directed learning in the English as a Second language education writing classroom.

Generative AI and Self-directed learning

Self-directed learning (SDL) is a vital aspect of education, emphasizing autonomy, personal accountability, and the pursuit of self-improvement (Gibbons, 2002; Wilcox, 1996). It has been conceptualized as a personal trait, a process, or a contextual feature of the learning environment (Song & Hill, 2007). Knowles' (1975) identifies SDL as a process where individuals take initiative to learn, diagonose their learning needs, set goals, find resources, implement learning appropriate learning strategies and evaluate learning outcomes. Garrison (1997) identifies SDL through three interconnected dimensions: motivation, self-management, and self-monitoring. Garrison (1997) further elaborates that motivation encompasses both the initial drive to engage in learning (entering motivation) and the sustained effort required to complete learning tasks (task motivation), whereas self-management refers to the ability to regulate learning resources, time, and environments effectively, while self-monitoring involves critical reflection and cognitive regulation to ensure meaningful learning outcomes (Doo & Zhu, 2023).

Hence, self-directed learning (SDL) is a pedagogical approach that emphasizes the role of the learner in managing their own education process. In the context of language learning, SDL empowers students to set their own objectives, choose learning strategies, and evaluate their progress. This autonomy not only enhances motivation but also deepens the engagement with the language content, leading to more personalized and meaningful learning experiences.

Research highlights the effectiveness of SDL in fostering linguistic competencies. For instance, a study by Zimmerman and Tsikalas (2018) showed that self-regulation, a key component of SDL, is crucial in successful language acquisition. They found that learners who effectively set goals, monitored their performance, and reflected on their learning outcomes achieved higher proficiency levels. More recent studies emphasize the role of technology in supporting SDL in language learning. Learner interaction with AI-driven platforms, such as adaptive language apps, has been shown to significantly improve language proficiency by offering tailored learning experiences that respond to the individual's pace and style of learning (Lee & Kim, 2020).

Moreover, SDL in language learning promotes critical thinking and problem-solving skills. As learners navigate through language acquisition, they encounter and resolve real-life communication challenges, thereby enhancing their analytical skills (Holec, 1996). This not only leads to better language outcomes but also prepares learners for lifelong learning and adaptability, which are crucial in today's globalized world.

With advancements in digital tools, SDL has increasingly been supported by technology-mediated environments. Applications like Duolingo and MOOCs have demonstrated the potential of digital platforms to enhance flexibility and accessibility for learners (Li et. al., 2024; Zhu & Bonk, 2022). More recently, generative AI (GenAI) technologies, such as ChatGPT, have emerged as powerful tools for SDL. ChatGPT, based on large-scale language models, facilitates interactive learning by offering personalized feedback, generating resources, and guiding learners in setting and achieving their objectives (Lin, 2023). Research indicates that these AI-driven systems enable learners to access linguistic input, practice conversational skills, and receive tailored feedback, enhancing both their engagement and language proficiency (Huang et al., 2022; Kohnke, 2023).

The potential of ChatGPT to enhance SDL is underscored by its adaptability to diverse learning needs and styles. By offering

personalized support and interactive learning experiences, ChatGPT fosters autonomy and encourages learners to explore topics independently. However, sustaining effective SDL requires learners to engage critically with their learning processes and reflect on outcomes to ensure depth and authenticity in their learning experiences (Ali et al., 2023).

The application of ChatGPT in self-directed learning (SDL) particularly benefits language learners by providing them with a range of interactive and adaptive learning scenarios. As noted by several researchers, ChatGPT can simulate conversation, provide instant linguistic corrections, and offer explanations in real-time, thus allowing learners to practice language skills in a contextual and meaningful manner (Chen, 2024). This immediate feedback mechanism helps to reduce the time between learning and application, which is critical for language acquisition.

Moreover, ChatGPT's capacity to generate content in multiple languages and dialects enhances cultural understanding and linguistic diversity, which are vital components of advanced language learning. This aspect of ChatGPT has been shown to significantly contribute to learners' ability to think critically about language use and engage with diverse cultural contexts (Vo & Nguyen, 2024). Furthermore, the tool's ability to pull from a vast dataset ensures that learners are exposed to a wide variety of language uses and styles, further enriching their learning experience.

ChatGPT also supports SDL through the development of metacognitive skills. As learners interact with the AI, they are prompted to consider their learning strategies and make adjustments based on the feedback they receive. This fosters a reflective learning environment where students not only learn a language but also learn about their own learning processes, enhancing lifelong learning skills (Garcia-Penalvo et. al., 2023).

In the context of writing, the use of ChatGPT as a tool in SDL is particularly transformative. Learners can draft, revise, and refine their writings with the assistance of the AI, which can suggest improvements in grammar, style, and coherence. This scaffolding support is crucial for language learners who may lack access to one-on-one tutoring or feedback in traditional learning environments (Jensen et. al., 2024). Furthermore, ChatGPT's ability to provide examples and simulate different writing styles allows learners to explore various forms of writing, thereby enhancing their versatility and creativity as writers.

Nevertheless, while the benefits of ChatGPT in fostering SDL are evident, there has been many concerns that students will become over-reliant on generative AIs. Therefore, it becomes imperative that learners are also taught to critically engage with and assess the information and feedback provided by AI. The ability to discern the relevance and accuracy of AI-generated content is crucial, especially as AI tools continue to evolve. This critical engagement ensures that learners do not become overly reliant on technology but use it as a complementary tool in their broader educational journey.

In conclusion, as generative AI tools like ChatGPT become more embedded in educational practices, their potential to enhance self-directed learning across various domains of language learning—from basic communication skills to advanced writing—cannot be overstated. It is through careful integration and guided use that these tools can truly transform educational experiences, making learning more personalized, accessible, and efficient. Further research and practice will reveal deeper insights into optimizing these tools for SDL, ensuring that learners achieve both competence and independence in their language learning endeavors.

As such, as the role of GenAI in education continues to expand, more empirical research is needed to understand its long-term impact on SDL and to address the ethical and pedagogical concerns associated with its use. Furthermore, despite the growing use of ChatGPT across academic, professional, and informal settings, empirical evidence on how learners employ the tool to support their writing development remains limited (Barrot, 2023). As Su et al. (2023) pointed out, ChatGPT has the capacity to assist students with various writing tasks, including outlining, editing, proofreading, and self-reflection. Given that learners are increasingly exploring these tools outside formal classrooms, it is crucial to understand how

generative AI, specifically ChatGPT, supports SDL in writing. Such insights would enable educators to guide students in the ethical and effective application of AI tools for their writing endeavors.

To address this knowledge gap, this study investigated whether ChatGPT had an impact on students' self directed learning if taught how to use it in the classroom. This reseach has the potential to provide insight to educators and policymakers on the impact of using generative AI in the classroom and on how it can be used effectively, specifically to foster or encourage SDL. By demonstrating the impact of generative AI on students SDL, the study offers a practical framework and strategies for integrating ChatGPT into the A Level writing classroom. Hence, the findings could be useful for language teachers in general, providing ideas on how ChatGPT or other generative AI tools can be adapted to various levels of educatonal contexts to enhance language learning outcomes.

This study also builds on a rapidly growing literature on the use of AI in language education. There is a growing and pressing need to understand how AI tools like generative AI impacts students' language learning. This research aims to provide evidence-based insights that can contribute to this growing literature. Hence the central question guiding this research is: To what extent does ChatGPT impact students' self-directed learning in the writing classroom?'.

METHOD

To provide insight into the impact of ChatGPT on students' self-directed learning, the study used a quasi-experimental design, specifically a pretest-posttest control group format. At the beginning of the study, ethical consent was sought from the participants and their legal guardians, ensuring participation was voluntary and data was to remain confidential and anonymous.

Participants
This study was conducted in a 6th form college in Brunei Darussalam. 47 students were involved in this study and were divided into two groups: 24 students were in the experimental group and 23 students in the control group. All the students were enrolled in an English Language Cambridge International A Level class, with a majority of them being bilingual having Malay, Chinese, or Tagalog as their first language and English as their second language. The course aimed to enable students to enjoy the experience of studying the English Language and develop a critical and informed response to texts in a range of forms, styles and contexts, produced for a variety of audiences (CIE, 2024). Signifcantly, for the both Paper 1 and Paper 2 component, students are expected to "explore and experiment with a similarly extensive variety of genres, styles and contexts in their writing." (CIE, 2024). Hence, students were not only producing pieces of written text, they also required to comment critically on the form, structure and language of given written texts.

Experimental procedure
To ensure the groups were equivalent, baseline characteristics sucah as English language profiency, current usage of ChatGPT and familiarity with ChatGPT were compared using a standardized pre-test. The pre-test confirms there were no signficiant differences between the two groups in terms of language ability, current usage of ChatGPT and familiarity with ChatGPT.

The experimental group (N=24) underwent the intervention in which the students were introduced to ChatGPT 3.5 including training on its usage, how to use it effectively and ethical considerations when using ChatGPT. Lessons of the intial two weeks of the intervention included prompt formulation, identifying reliable responses, and strategies for using ChatGPT for writing such as using it to create essay outlines and asking for feedback and to grade their essays. During the next four weeks of lessons, this group receive ChatGPT-integrated instruction and was allowed to use ChatGPT for planning, to seek for feedback and gradings. The intervention lasted 6 weeks overall.

The control group (N = 23) were not exposed to this treatment. Although the control group did not receive the ChatGPT intervention, measures were taken to ensure they were provided with comparable learning opportunities and resources to avoid any possible disparities between the two groups.

Instrument

A questionnaire was distributed to both groups of students to collect their insights and self-directed learning. Questionnaires have been used widely in research, including in second language writing research. Questionnaires are able to provide valuable insights into participants' experiences, priocesses and preferences (Creswell, 2021). In this studey, the questionnaire required students to answer each statement using a five-point Likert scale, with 1 (strongly disagree) to 5 (strongly agree). The questions were adapted from Guglielmino (1977) Self-Directed Learning Readiness Scale (SDLRS) measuring students' SDL on six components: openess to learning opportunities, self-concept, intiative and independence in learning, informed acceptance of responsibility of one's own learning, love of learning, and ability to use basic study and problem-solving skills. The researcher adapted the questions to suit the students context and the questionnaire was sent to educational experts to assess content validity and clarity. The questionnaire was also piloted with 20 other A Level students in the same cohort not involved in the study. This produced a reliability score of 0.92 indicating satisfactory reliability. To measure changes in participants' self-directed learning, the survey was given at the beginning and end of the 6 week intervention period.

The results of assumption checks indicated that the data were generally normally distributed and homogenous in terms of variance between the two groups. Therefore paired samples t-test was used to analyse changes to the participants' self-directed learning scores between the pre- and post-questionnaires in order to answer the research question.

FINDINGS AND DISCUSSION

The findings of this study indicate that the intervention had a varying impact on the different components of SDL. Most notably, the component "Initiative and independence in learning" showed a statistically significant improvement in the experimental group, with mean scores increasing from 2.39 pre-intervention to 2.94 post-intervention ($t = -2.04$, $p = 0.045$). The results indicate that using ChatGPT helped to nuture students' initiative and independence in learning. Students were seeking feedback from ChatGPT on their writing on their own accord, and used ChatGPT as their personal 24/7 tutor. This result suggests a meaningful enhancement in the students' proactive engagement and their autonomous capabilities in learning, aligning with the literature that emphasizes the importance of independence in the SDL process (Zimmerman, 2002; Deci & Ryan, 2000).

This finding contributes to the existing body of knowledge on the facilitative role of AI assistance in the writing classroom. The findings align with Li et. al., (2024) which found that the use of ChatGPT had a significant impact on students' self-directed learning behaviour, along with higher levels of research skills, motivation, and engagement. This study also supports Van Horn (2024)'s study that studied the impact of ChatGPT on English language classes among korean university students. The study found that ChatGPT helped to promote autonomous learning amongst students, with students integrating ChatGPT into their study routines and crediting the tool for improvements in their vocabulary and grammar.

Furthermore, although not statistically significant, this current study showed there were modest increases in mean scores of the experimental group in the following components: self-concept as an effective learner, informed acceptance of responsibility for one's own learning, and love of learning. This suggests that using ChatGPT in the classroom helped to provide subtle improvements in these areas, increasing SDL behaviours.

Conversely, the control group results indicated no significant changes across all SDL components. The p-values were well above the 0.05 threshold, indicating that without the intervention, participants did not exhibit any statistically significant change in their SDL capabilities over the same period. These findings underscore the potential effectiveness of the targeted intervention in facilitating specific aspects of SDL compared to natural variations in learning behaviors observed in the control group and emphasizes the importance of additional teacher attention

as students may not be competent in using new technologies (Morris & Rohs, 2023). The narrative the teacher's role will be redundant or diminished in the near future due to the emergence of generative AI tools seems to be false as this study and other studies (Yildrim et. al., 2023; Wang et. al., 2024) have recurrently showed that the teacher plays an important role in the learning process. The teacher's or instructor's presence is still needed to assist with many aspects of the learning process, for example developing critical AI literacy and guidng students to make use of AI tools wisely, and help overcome any potential challenges that impedes students learning.

The significant improvement in "Initiative and independence in learning" within the intervention group versus the stability observed in the control group reinforces the notion that deliberate, well-structured educational interventions can significantly impact learners' SDL capabilities. Notable significant improvements post-intervention were seen in the question "If I have a great idea, I can develop a plan for making it work" and "If I discover a need for information that I don't have, I know where to get it". These areas showed a substantial increase in mean scores post-intervention, indicating a positive change.The contrast in outcomes between the experimental and control groups highlights the impact of ChatGPT on this component of SDL, suggesting that targeted activities and strategies such as teaching students how to use ChatGPT effectively for independent learning can foster essential skills required for self-directed and lifelong learning.

However, the non-significant changes across other components in both the experimental and control groups suggest more nuanced methods might be necessary to effect noticeable improvements in these areas. It may also reflect the complexity of modifying deeply embedded educational behaviors or the inadequacy of the intervention duration to produce tangible changes in these SDL components.

This suggests that while AI and technology-based interventions, such as the one used in this study, show promise in enhancing certain aspects of SDL, they cannot replace the nuanced and adaptive human interaction provided by teachers. As

mentioned earlier, although teachers role may shift as technologies develop, teachers will still play a critical role in motivating students, adapting resources to fit individual learning needs, and providing emotional and cognitive support that AI currently cannot replicate. The teacher's role in scaffolding student learning—providing support as needed and gradually removing it to promote student autonomy—is vital for the effective realization of SDL.

The findings of this study have implications fo practise and research on teaching and learning. Firstly, there is a requirement for framework, training and guidance on how to best incorporate generative AI in institutions of learning. It is evident through this study that without providing students' with the training on how to use generative AI, the impact on their learning and SDL is insignificant or very minimal. Hence, To maximize the impact of AI technology on student learning and development, it is crucial to consider factors such as students' digital literacy, as well as the implementation of effective learning strategies and measures for utilizing generative AI.. There might be a need to address the educators' evolving role in education with the intergration of generative AI in teaching and learning. Specifically, the role of the teacher in the SDL environemnt shifts towrads a facilitator of generativeA. Lastly, for students, futher research is required to discover the extent to which the benefits of generative AI have on their learning experience and learning outcomes.

Nevertheless, When analyzing the findings of this study, certain limitations should be considered. Firstly, the data were gathered through self-reported surveys, which may not comprehensively reflect the full scope and complexity of the measured constructs. Future research could include collective qualitaitve data to triangulate findings. Secondly, to provide a more dynamic picture of the impact of ChatGPT on students, longitudinal data can provide a more dynamic picture. Lastly, the limited sample size in this study may reduce the applicability of the findings to diverse cultural settings..

Table 1. Results of paired samples t-test

No	Component of SDL	Pre-test Experimental Group	Post-test Experimental Group	t-statistics	p-value	Pre-test Control Group	Post-test Control Group	t-statistics	p-value
1	Openness to learning opportunities	2.29	2.17	0.66	0.515	2.79	3.14	-1.60	0.126
2	Self-concept as an effective learner	2.14	2.32	-1.30	0.199	3.43	3.45	0.28	0.786
3	Initiative and independence in learning	2.39	2.94	-2.14	0.040	3.19	3.34	0.0	1.0
4	Informed acceptance of responsibility for one's own learning	2.83	3.13	-1.11	0.273	4.19	4.09	0.61	0.552
5	Love of learning	2.77	2.91	-0.53	0.600	3.67	3.91	-0.59	0.561
6	Ability to use basic study and problem-solving skills	2.33	2.26	0.24	0.814	3.62	3.64	-0.37	0.716

CONCLUSION

In conclusion, this study underscores the nuanced impacts of using chatbots such as ChatGPT on SDL. The study wishes to highlight the importance of training students with the knowledge of how to use generative AI effectively for their learning. Teachers and instructors need to model to students how to use generative AI meaningfully and ethically. While technology, including AI, can augment certain aspects of learning, the human element provided by teachers remains irreplaceable. The findings advocate for a balanced approach that leverages technology to support and complement, not substitute, the relational and deeply human aspects of teaching that are critical for fostering comprehensive learner development. Furthermore, there are still gaps in understanding the long-term impacts of generative AI on SDL outcomes and there is still a need for longitudinal empirical studies.

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