Integrating ChatGPT into Synectics Model to Improve High School Student's Creative Writing Skill

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Abstract: The cultivation of creative writing abilities has become more challenging, particularly with the intention of fostering creative thinking and providing learner's effective instructional support. The challenge is compounded by the present context, wherein Generative AI has seen significant advancement and plays an essential role in the field of education. ChatGPT has emerged as an important tool for offering writing recommendations. Consequently, the present study integrates the Synectic Model and ChatGPT to enhance ability in creative writing. The participants consisted of 34 high school students in the experimental group and 30 students in the control group. The experimental group reported a significant enhancement in their creative writing abilities, as well as an increased perception of the benefits of technology-supported learning.

Keywords: ChatGPT, generative AI, synectics, creative writing, language learning

1. Introduction

The development of reading and writing skills is essential for students and cannot be neglected. In addition, students must exercise and master these skills to the point where they can use them effectively and efficiently to contribute to positive learning outcomes (Chambers, 1997). However, attaining reading and writing fluency is difficult for students. First, fluency necessitates mastering skills, and the Thai language is notoriously difficult to master. Its intricate alphabet, vowel, and tone systems make decoding and production difficult. Particularly difficult is the skill of creative writing, necessitating the use of various learning methods and techniques to perpetually develop students. Integration of numerous learning methods, such as the Synectic teaching method, is one approach to this growth. Using the Synectic teaching method, for instance, facilitates the improvement of creative writing skills via various approaches. A case in point is the investigation of Free Writing Ability by Ina, Sa, and Yayah (2020), in which applying the Synectic learning model to the experimental group increased creativity and comprehension in poetry material development, thereby influencing students' poetry writing abilities.

Similarly, the application of the Synectic Model in developing short story writing, as examined by Nasrulloh and Waraulia (2022), revealed that the Synectic learning model was implemented successfully. Active student participation, positive teacher feedback, and positive student opinions demonstrated the program's efficacy. Therefore, it can be concluded that the learning mentioned above strategy substantially aids in improving learners' creative writing skills. In addition to the Synectic Model's function in developing writing skills, there is a notable incorporation of technology to promote skill development further. In the study by Song et al. (2021), the online collaborative writing platform CollaWrite outfitted with group awareness tools, was used. According to the findings, these tools can increase student engagement and improve the quality of online collaborative learning. This study contributes to

a greater comprehension of the function of group awareness instruments in computer-mediated collaborative language learning.

Evidently, the incorporation of technology into writing instruction has a possibility, particularly in the current environment where educational technology, including AI for Education, plays a significant role. Hwang et al. (2020) summarized the role of AI in education, stating that AI can serve as an intelligent tutor, instrument, or tutee and aid in educational decision-making. The paper highlights that the convergence of AI and education is a transformation of education and human knowledge, cognition, and culture. ChatGPT is a remarkably convenient tool for utilization due to its compatibility with a wide range of devices, including mobile phones, tablets, and PCs. Moreover, it possesses the ability to engage in discussions resembling those between humans, effectively giving the requested information, particularly in the areas of requesting recommendations and improving language proficiency. As witnessed in the study by Liu et al. (2021), applying AI to provide guidance and feedback on student work is particularly pertinent. This study introduced a reflective thinking promotion mechanism-based artificial intelligence-supported English writing (RTP-AIEW) approach to improve EFL learners' critical thinking and writing quality. The results demonstrated that this strategy significantly enhanced the English writing performance of the experimental group's pupils while also fostering self-efficacy and self-regulated learning and substantially reducing cognitive load. Especially the study by Su, Lin, and Lai (2023), which integrated ChatGPT with providing suggestions for argumentative writing, found that apart from aiding in grammar structuring and proofreading, ChatGPT can also assist in evaluating writing quality and offering writing suggestions.

Considering the abovementioned findings, the researchers intend to implement the Synectic learning approach with ChatGPT within guidance and instruction to fostering learners’ creative writing skills in the context of language learning.

2. Literature Review

2.1 Generative AI

Currently, generative AI is highly significant and performs multiple roles, particularly in education. It can be used as an intelligent tutor, tutee, learning tool/partner, or policy-making advisor, according to Hwang et al. (2020), who classified these roles into four main categories: (1) Intelligent tutor, (2) Intelligent tutee, (3) Intelligent learning tool or partner, and (4) Policy-making advisor. These responsibilities are essential for the growth of education in numerous dimensions. (Li et al., 2009) AI for Education is actively constructing large-scale learning systems intending to provide quality learning experiences to millions of students through scalable technologies. For instance, chatbots such as GPT can provide immediate support and feedback to thousands of students' inquiries. To construct deep learning neural networks, GPT models were trained on a massive-tokenized language dataset, enabling them to comprehend text data and generate human-like responses by predicting subsequent words within a given string of words. The model was fine-tuned using Reinforcement Learning from Human Feedback (RLHF) to enhance ChatGPT's ability to respond to various prompts (OpenAI, 2022). This method permits the AI model to modify its behavior and enhance its performance based on a reward model developed from human feedback. ChatGPT can also maintain conversational context, enabling it to use previous interactions to inform subsequent ones and respond to users' requests for alterations or clarifications (OpenAI, 2022).

The iterative training and refining process improves ChatGPT's ability to comprehend natural language, process lengthy inputs, provide creative responses, and maintain a natural conversational flow (Adamopoulou & Moussiades, 2020; Floridi, 2023; Kasneci et al., 2023). As a result, ChatGPT is utilized for educational purposes, particularly in the writing field. For instance, Liu et al. (2021) investigated the incorporation of a mechanism that promotes reflective thinking into artificial intelligence-supported English writing environments. The results demonstrated that this strategy not only substantially improved the English writing performance of the experimental group's pupils but also increased their self-efficacy and self-

regulated learning while reducing cognitive load. In addition, the study addressed the students' learning experiences and perceptions. In addition, Su, Lin, and Lai (2023) conducted a study on integrating ChatGPT with argumentative writing in the classroom. ChatGPT was used within the context of language education. The study found that ChatGPT helps with grammar correction and sentence structure enhancement, thereby facilitating the writing process. Argumentative writing may benefit from the structural, dialogical, and linguistic aspects of interaction with ChatGPT. As a generative artificial intelligence, ChatGPT can provide personalized responses and feedback, evaluate, and recommend a content organization, conduct linguistic analysis, and proofread text. There have been studies examining the limitations of ChatGPT, particularly in the context of creative writing; Shidiq (2023) provided insights into the usage of ChatGPT from the standpoint of fostering creative writing abilities and came to the following findings on the influence of the ChatGPT system, an AI-based chatbot, on students' creative writing capabilities. It emphasizes certain drawbacks, such as ChatGPT's inability to supplant human interaction, lack of creativity, failure to capture students' nuances and individual learning styles, and potential adverse effects on individuals' social and psychological aspects. The paper suggests that additional research is necessary to comprehend the potential and limitations of ChatGPT and other artificial intelligence (AI) technologies in education.

2.2 Synectics Model and Creative Writing

Synectics is one of several techniques used to improve brainstorming by taking a more active role and introducing metaphor and structure into the process (Gordon, 1961). In other words, the technique of synectics is defined in a practical and applicable manner. Addressing new applicative structures of teaching techniques enables instructors to become empirically and practically familiar with various teaching methods, thereby making the classroom more dynamic and interactive through modeling and simulation. In addition, the approach is used in the learning process to cultivate creative writing abilities, as Joyce (2003) described when combining the model with creative writing. One of the synectics model's strategies can be directly applied to creative writing, not only because it encourages the use of analogies but also because it helps writers "break set," allowing them to expand the range of devices they can employ to approach expressive tasks in expository, persuasive, and narrative genres. In addition, it has been applied to develop creative writing skills. For example, Ina, Sa, and Yayah (2020) applied the model to improve students' blank verse writing. They concluded that using synectic models in the experimental group increased students' creativity and comprehension in developing poetry material, which positively impacted their writing skills. Similarly, the use of the multiliterate synectic learning model improved students' capacity to write brief stories. As research by Nasrulloh and Waraulia (2022) utilized synectics to improve students' short story writing skills. Students' writing creativity was encouraged by implementing a multiliteracy synectic learning paradigm in Ponorogo, East Java, Indonesia junior high schools. The results indicated that the implementation of the multiliteracy synectic learning model was effective in enhancing the learning outcomes of students in the field of the Indonesian language, particularly in the fundamental skill of writing short stories. In addition, a research study compared the effectiveness of using the Synectics and journal techniques to enhance creative writing skills. This study was conducted by Fatemipour and Kordnaeej (2014). The findings indicated that both techniques positively impacted the development of students' creativity, with the Synectics technique showing better results than the journal writing technique.

In conclusion, Synectics is an essential technique or process that plays a significant role in fostering and developing various forms of creative writing skills.

3. An Example of Creative Writing by Synectic integrated with generative AI.

The process of fostering creative writing skills through integrating Synectic model and generative AI consists of six steps, each incorporating educational technology. In this initial phase, students are introduced to the lesson and encouraged to create basic artworks, such

as drawings or photographs, based on predetermined topics. H5P is used to facilitate classroom participation and stimulate creative output. Steps 2 through 5, Innovating Language These stages encourage students to introduce novel vocabulary and concepts using Padlet as a learning tool, thereby nurturing interaction between students. Each learner contributed actively to the growth of language proficiency. Step 6, Creative Writing - In the final stage of creative writing, students compose original verses utilizing a variety of poetic formats. The compositions must correspond to the products produced in the first step. Moreover, the assignment is subsequently evaluated and improved through consultation with Chat GPT. In summary, this approach combines the benefits of Synectic instruction with AI technology in order to improve learners' creative writing skills, as shown in figure 1.

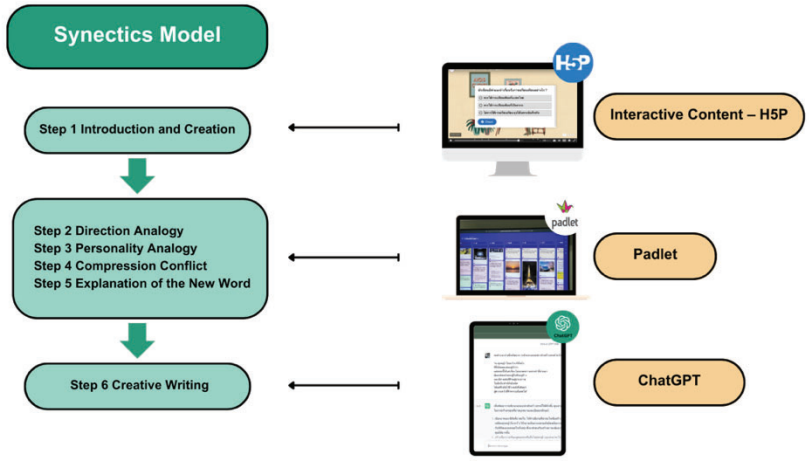

Figure 1. An example of creative writing by synectic integrate with generative AI.

4. Methodology

4.1 Research design

This research involves two groups of students. The design includes pre- and post-learning evaluations for both groups. The experimental group examines the influence of creative writing skills and students' perception of collaborative learning with ChatGPT. In contrast, the purpose of the control group is to assess the impact of creative writing skills and students' perception of lecture-based education. This study employs a quantitative research methodology to determine the research objectives using the outcomes of learning experiences, Overall Impressions, and students' creative writing abilities. As shown in figure 2.

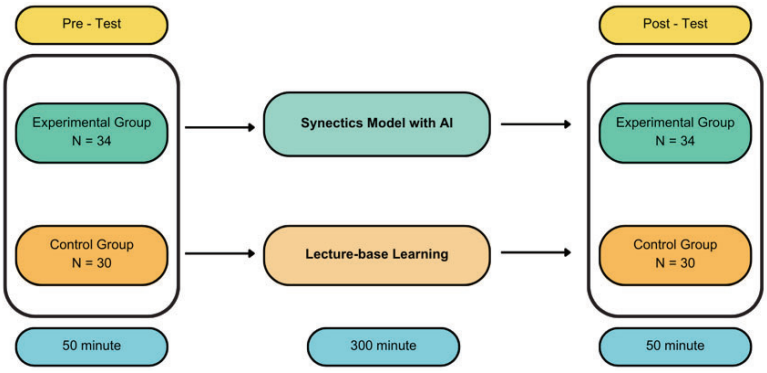

Figure 2. The research design of this Study.

4.2 Participants

This study examined how to encourage creative writing through poetry-based teachings. The participants who are currently studying in 10th grade were divided into two groups for the investigation. The Control Group (CG) comprised 30 students, while the Experimental Group (EG) comprised 34 students. The competitors were selected from the 10th-grade cohort of the medium-sized school. Both groups of students have the same readiness and ability to use technology, and their initial learning abilities are similar, as indicated by their pre-test scores. As creative writing exercises, the CG received traditional lectures and blank verse poetry. While the EG received instruction in creative writing using blank verse poetry and Synectics, a method for creative problem-solving. This strategy was supplemented with ChatGPT. Each EG learning session lasted six periods and included group collaboration via ChatGPT.

4.3 Research Instruments

The tools in this study included a “creative writing test” and a perception questionnaire for studying the Thai language. Creative Writing exercise Three open-ended questions made up the test: question one assessed language usage and writing style; question two set comprehension of social and cultural settings; and question three assessed word meaning development and inventiveness. A total of 25 was obtained for all three things. The creative writing test was modified from the Creative Writing Marking Key by Morris & Sharplin (2013). The questionnaire on language learning perception toward technology-supported learning consists of 21 questions developed by Peng et al. (2009). It comprises two dimensions: (1) Learning Experiences and (2) Overall Impressions. The questionnaire has been translated into Thai.

4.4 Student's ChatGPT Prompting.

This research utilized various technologies tools during the implementation including interactive videos from the H5P website, Padlet, and ChatGPT. After producing inventive blank verse through a variety of processes, students then seek guidance from ChatGPT. They began by posing a query such as, "Give me suggestions on how to enhance the following creative blank verse writing”. ChatGPT then provides suggestions for enhancing their creative blank verse writing. For example, ChatGPT responses in two formats. In the first format, ChatGPT edited the creative writing from the students. They passed the feedback from the first format to enhance their writing because the objective was practicing them to produce independent writing. In the second format, ChatGPT provided suggestions to enhance creative writing in various aspects, such as word choice, appropriateness of word selection, conveying emotions, using evocative language, improving text comprehension, making the text more reader-friendly, and making simile comparisons. After receiving the suggestions, students refined and improved their creative blank verse writing. As shown in figure 3.

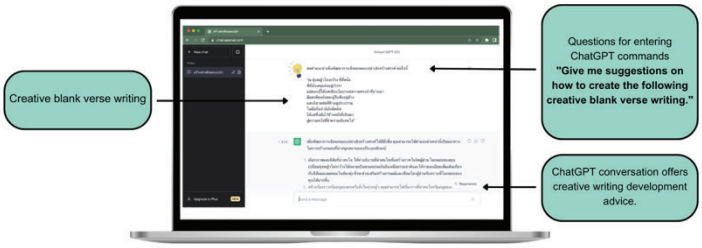

Figure 3. Collaborative work activities with chatGPT for providing suggestions to enhance creative writing development.

4.5 Data Collection and Analysis

Students were given 15 minutes to complete a questionnaire regarding to their Learning Experiences and Overall Impressions. They were then given another forty minutes to complete a pre-learning creative writing test. Upon completing the pre-learning data collection, the experimental group of students participated in a structured learning intervention designed to improve their ability to write creative blank verses. This intervention incorporated the Synectic learning strategy with various educational technologies, with ChatGPT as the focal point. During this intervention, a teacher instructed students on how to use ChatGPT and compose inventive blank verses. The students were then given a post-learning questionnaire and examination. As shown in figure 4.

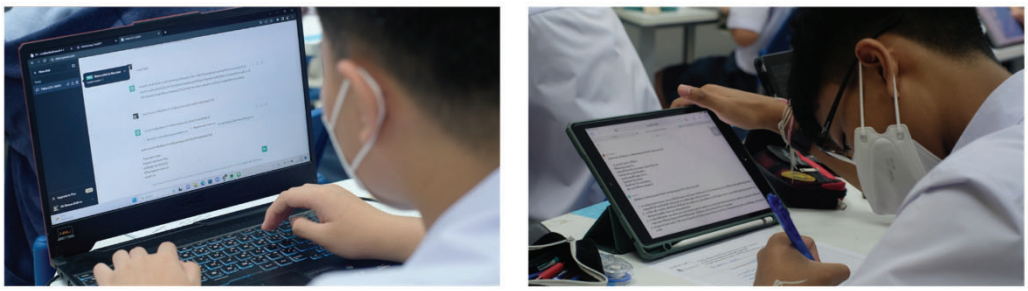

Figure 4. The activity of creative writing by synectic integrates with generative AI.

The selected statistical techniques for evaluating creative writing skills include the Mann-Whitney U test for comparing the outcomes of creative writing skills resulting from the instructional approach of creative blank verse writing incorporating Synectic learning and generative AI. In addition, MANOVA was used to compare learning students between the Synectic model with generative AI and lecture base learning on students' perception.

5. Result and Discussion

5.1 Creative Writing Skill

To examine the influence of the Creative Writing learning approach by integrating Synectic with generative AI on students' creative writing skills, the Mann-Whitney U test was employed in this study, as indicated in Table 1.

Table 1. *Mann-Whitney U result Creative Writing Skill*

Groups	N	Mean ± SD	Z	p-value
Control group	30	18.30 ± 3.659	-2.276	.023*
Experimental group	34	20.44 ± 3.268		

* p= <.05

Table 1 demonstrated a statistically significant difference between EG and CG on post-test scores regarding creative writing skills. The result of experimental group's average post-test score was significantly higher than the control group. This implied that the instructional approach by incorporating Synectic learning with Generative AI could improve the learners' creative writing abilities. The abovementioned analysis is consistent with the study conducted by Ina, Sa, and Yayah (2020), where they applied the Synectics approach to enhance students' blank verse writing. The results of the post-test analysis indicated significant differences in poetry writing ability between the experimental and control groups. Similarly, the research by Su, Lin, and Lai (2023) investigated the integration of ChatGPT in argumentative writing within the classroom. The research revealed that the utilization of ChatGPT had a

significant effect on facilitating the development of creative writing abilities among students in both experimental and control groups, as evidenced by the observed outcomes.

5.2 Students' Perception toward Technology-Supported Learning

This study utilized a MANOVA test (as shown in Table 2) to investigate the effect of the Creative Writing learning approach incorporating synthetic with generative AI on students' perceptions toward technology-supported learning.

Table 2. *MANOVA result Students' Perceptions toward Technology-Supported Learning*

Dimension	Group	N	Mean	S.D.	Sig.
Learning Experiences	CG	30	28.57	3.645	.063
	EG	34	30.09	2.778	
Overall Impressions	CG	30	41.63	6.499	.001*
	EG	34	46.88	5.881	

* p= <.05

Considering Table 2 showed that there was no significant difference on learning experiences of students' perceptions toward technology-supported learning between EG and CG. Despite differences in instructional formats, the study findings indicate that both groups share similar Learning Experiences. It is perhaps due to the student in CG using their mobile device to search for more information by themself during the learning activity. This could affect their learning experience because they could find the same information that ChatGPT provided. In contrast, there was a significant difference between the groups' Overall Impressions. The statistics mentioned above support the findings of Liu et al. (2021), who discovered that implementing a reflective thinking promotion mechanism within AI-supported English writing environments increased self-efficacy and self-regulated learning.

6. Conclusion

This study investigated the effects of students' perceptions toward technology-supported learning and creative writing skills on the approach which combines Synectic and generative AI. The findings revealed that this learning strategy affected the development of student's creative writing skills and their Learning Experiences and Overall Impressions. The primary findings of this study indicate that integrating the Creative Writing learning approach of Synectic with generative AI (ChatGPT) has a positive impact on the development of creative writing skills and the improvement of students' perceptions toward technology-supported learning. However, this research has limitations in terms of the time required for data collection because, during the creative writing teaching activities, it was found that students needed time to revise and refine their language expressions to achieve the desired quality. Moreover, qualitative data collection is suggested to explicit how the learners' improved their creative writing ability when participated with the generative AI.

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