Students' Perceptions of the use of ChatGPT during a Writing Activity Based on the Computational Thinking Process: A Thematic Analysis

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Abstract

This study adopts thematic analysis to systematically analyze qualitative data, focusing on students' perceptions regarding the use of ChatGPT during a narrative short story writing activity following the Computational Thinking (CT) process as a problem-solving approach. The study involved 27 third-year English Education majors from a public university in Thailand, who voluntarily participated in a post-activity survey with open-ended questions. The analysis revealed both favorable and unfavorable experiences with the Computational Thinking (CT) process used in the writing activity. Positive feedback highlighted clarity and educational value, while negative feedback pointed to time consumption and complexity. As for the use of ChatGPT in the writing process, students appreciated its efficiency and educational support but expressed concerns about its impact on creativity and originality, as well as technical and access issues. This study's findings provide valuable insights into EFL students' perceptions of using ChatGPT in narrative writing activities. However, caution should be exercised when generalizing these findings beyond the specific context of the study participants, in relation to the wide spectrum of linguistic competencies

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among EFL students. Overall, the study underscores the potential benefits and challenges of incorporating generative-AI tools like ChatGPT in educational settings, highlighting the need for responsible integration to ensure student learning while fostering creativity and critical thinking.

Keywords: English as a Foreign Language, Writing Activity, ChatGPT, Computational Thinking Approach, AI-assisted writing

1. Introduction

Effective writing programs significantly boost students' academic success (Şenel, 2018). Indeed, as a critical component of language education, these activities enhance students' language proficiency and critical thinking. However, students learning English as an additional language often face numerous challenges in writing, such as limited vocabulary, grammatical errors, and difficulties in articulating complex ideas (Fareed et al., 2016).

Current technological developments on the other hand, have made the use of conversational generative artificial intelligence (AI) like ChatGPT accessible to language learners. This tool showed potential in assisting the writing process. For instance, ChatGPT can expedite writing by generating ideas, and helping with language use (Huang & Tan, 2023). Therefore, this integration of technology can help students overcome their insecurities and improve their writing proficiency by providing a supportive and interactive learning environment. While there are potential benefits in using AI, these technologies did not come without warning. There is a clear call for responsible use of AI, especially as a tool in learning. To facilitate a responsible use of such tools, educators and learners must be aware of the ethical considerations, ensuring that AI is used to augment human creativity rather

than replace it, while maintaining a critical perspective on the information generated by AI systems.

To enable this responsible and sensible integration of ChatGPT in the learning process. The writing activity will follow the computational thinking (CT) process to provide a structure of the learning process'. Although CT, a problem-solving approach is commonly attributed to the field of computer science. This problem-solving approach involves constructing and analyzing processes that have applications beyond computer programming (Wing, 2006). CT as a problem-solving framework, will allow students to break down complex writing tasks into manageable steps, and scrutinize both the prompts and outputs closely. Thus, fostering critical thinking, while enabling students to approach writing from a new perspective. Additionally, CT enhances higher order thinking skills, including creativity, resulting in more engaging writing experience (Wolz et al., 2011).

Despite this potential, there is still limited research that explores how ChatGPT can be used to support students in writing tasks that follow the computational thinking (CT) process, particularly in narrative writing activities. In particular, little is known about how students perceive and experience this kind of activity in actual classroom settings. Gaining insight into their thoughts, feelings, and evaluations—especially regarding the benefits and challenges of using ChatGPT—can help educators understand how such tools influence engagement, learning, and the overall writing experience.

Finally, this study conducted a post-activity survey to enable a thorough exploration of students' perceptions of the writing activity that follows the CT process integrated with the use of ChatGPT. Understanding students' perceptions can provide valuable insights for educators (Gencoglu et al., 2021). It plays a critical role in evaluating the effectiveness of modern technologies and approaches (Han & Geng, 2023), as it directly affects their engagement and motivation (Tinto, 2022).

2. Research Objective

The objective of this research is to qualitatively explore and understand students' perceptions on the use of ChatGPT during a narrative short story writing activity following the computational thinking process. To be able to achieve this aim this study explored the students' responses based on the following topics;

1. Describing experiences and thoughts while participating in the writing activity that follows the CT process.

2. Identifying advantages and disadvantages of using ChatGPT in the writing process.

These research objectives and topics are articulated as open-ended survey questions (SQ) as follows;

SQ 1. What are your favorable experiences or positive thoughts in this writing activity?

SQ 2. What are your unfavorable experiences or negative thoughts in this writing activity?

SQ 3. Can you identify the advantages of using ChatGPT in this writing activity?

SQ 4. Can you identify the disadvantages of using ChatGPT in this writing activity?

3. Literature Review

Enhancing Writing Skills through Narrative Short Story Writing

Writing narrative short stories is a great way to improve writing skills in EFL classrooms for a few important reasons. First, stories are interesting and make students think creatively, which helps them get involved and enjoy learning. Second, writing stories helps students express themselves

and imagine different ideas, making them better at telling stories. Third, practicing story writing helps students learn new words, grammar, and how to build sentences in a meaningful way. Also, reading different stories helps students understand other cultures better, which improves language skills and cultural awareness. Lastly, analyzing and creating stories helps students think critically, which is important for writing well, like developing plots, characters, and exploring themes (Pardede, 2011; Kottacheruvu, 2023).

Enhancing EFL Writing Skills with ChatGPT

The use of advanced AI in education, especially tools like ChatGPT, is gaining attention for improving writing skills in EFL students (Song & Song, 2023). This is in response to challenges faced by EFL students like limited vocabulary and grammar mistakes when expressing complex ideas during writing activities (Sasmita & Setyowati, 2021). Generative AI advancements have introduced new tools such as ChatGPT, which can give instant feedback, generate ideas, and help with language use (Liu et al., 2023). This technology also showed promise in affecting students' confidence while improving their skills. Research shows that generative AI like ChatGPT can create interactive learning environments that keep students engaged and motivated (Zhou & Li, 2023). Therefore, educators can use these AI tools to enhance writing activities, making them more structured, interesting, and effective (Alharbi, 2023).

The Role of Learner Perception in ChatGPT-Integrated Writing Tasks

Student perception, defined as learners' subjective interpretations, attitudes, and emotional responses to learning experiences, plays a central role in this study as both a research focus and interpretive lens. It significantly influences how students approach tasks and engage with content (Biggs,

2011). Perception shapes how learners evaluate the usefulness, complexity, and relevance of instructional tools like AI. Understanding these perceptions is essential for assessing the pedagogical and ethical implications of AI integration in classrooms (Chan & Hu, 2023). By examining reflections on the CT-guided writing task and ChatGPT use, this study contributes to broader discussions of student-centered innovation in EFL contexts. AI tools can support differentiated learning, especially when tailored to learners' proficiency levels; for example, less proficient students tend to use ChatGPT for vocabulary and grammar, while more advanced users engage with feedback on coherence and structure (Kıvrak, 2024). Such perception-based insights go beyond performance metrics by revealing how technology influences motivation, creativity, and ownership. This aligns with recent research that critically examines real-world student–AI interactions, such as Han et al.'s (2023) large-scale analysis of ChatGPT in EFL writing, which highlights the importance of understanding learner intentions, satisfaction, and revision behavior.

Integrating Computational Thinking in EFL Writing Instruction

In addition to understanding students' perceptions of ChatGPT-integrated writing tasks, it is important to consider the cognitive frameworks that shape how such tasks are structured. One such framework is Computational Thinking (CT), first introduced in computer science by Wing (2006). It refers to a structured problem-solving approach involving decomposition (breaking down complex tasks), pattern recognition (identifying trends), abstraction (focusing on relevant information), and algorithmic thinking (creating step-by-step solutions). While CT has traditionally supported analytical thinking in STEM education (Tekdal, 2021), its relevance is now being explored in non-STEM disciplines, including English language instruction (Merino-

Armero et al., 2022; Nurhayati et al., 2022). Within EFL writing, CT provides a strategic lens for treating writing as a process that can be organized, iterated, and refined. Applying CT enables students to navigate tasks such as structuring narratives, developing coherent storylines, and systematically revising their work. This process-oriented mindset fosters not only improved writing skills but also creativity, critical thinking, and learner autonomy—especially when paired with digital tools like ChatGPT that encourage reflective and exploratory learning.

4. Methodology

4.1 Design

This study adopts thematic analysis to analyze qualitative data systematically (Braun & Clarke, 2006; Clarke & Braun, 2016). This approach provides a flexible and accessible means to analyze qualitative data, allowing the researcher to comprehensively explore and understand students' perceptions regarding the use of ChatGPT during a narrative short story writing activity.

The analysis proceeded through several iterative stages:

1. Data Familiarization: Initially, all collected responses were reviewed to gain a comprehensive understanding of the content and context.

2. Initial Code Generation: Relevant segments of data were coded to capture key concepts and meanings pertaining to students' perceptions of using ChatGPT during the narrative short story writing activity.

3. Theme Search: Codes were organized into potential themes, which were further refined through continuous comparison and contrast across the dataset.

4. Theme Review: Themes were reviewed to ensure they accurately represented the dataset and were distinct from one another.

5. Theme Naming and Definition: Each theme was clearly defined and named to encapsulate its core meaning and relevance to the research question.

This methodological approach facilitated a nuanced exploration of students' experiences and perceptions, providing a robust framework for interpreting the qualitative data collected in this study.

4.2 Participants and Data Collection

This qualitative study involved 27 third-year English Education major students, recruited voluntarily from a single group of students enrolled in an English for Academic Purposes course during the academic year 2022 at a public university in Thailand. The participants are composed of 18 Female and 9 Male with an average age of 21.5 years old. The writing activity spanned two consecutive three-hour sessions as part of the focused skill component of the course and the data collection was conducted as part of the post-activity survey, involving open-ended questions, and collected using a google form.

4.3 CT-Guided Writing Task with ChatGPT

The writing activity was structured around the four core components of Computational Thinking (CT): decomposition, pattern recognition, abstraction, and algorithmic thinking (Wing, 2006). This framework served as the pedagogical foundation for two consecutive three-hour sessions, during which participants were tasked with composing a short narrative story in English, as illustrated in Figure 1. Phases 1 to 5 were completed during the first session, while the second session focused on Phase 6, which operated iteratively by revisiting and refining Phases 4 and 5. ChatGPT was used as

a supplementary tool throughout the process to support brainstorming, idea organization, and language formulation.

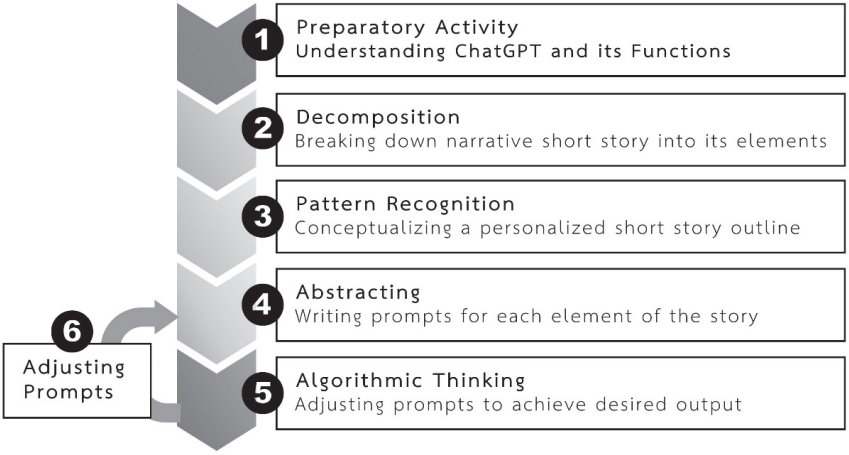

Figure 1. *Instructional Phases of the CT-Structured Writing Activity Using ChatGPT*

Phase 1. Preparatory Activity

Learning goals:

a. Understand the basic functions and capabilities of ChatGPT.

b. Explain the role of prompts in generating ChatGPT outputs.

Description:

This phase sets the foundation by familiarizing learners with ChatGPT and the role of prompts in generating outputs. Its primary purpose is to ensure participants understand the tool and its functions—serving as a prerequisite before engaging in more complex tasks.

Phase 2. Decomposition

Learning goals:

a. Enumerate the essential elements of a narrative short story.

b. Describe the importance of each narrative element.

Description:

This phase focuses on breaking down a narrative short story into its core elements: plot, characters, setting, conflict, theme, point of view, and resolution. Participants are encouraged to review and reflect on the role of each element in shaping a coherent narrative.

Phase 3. Pattern Recognition

Learning goals:

a. Examine patterns in narrative structures to outline a personalized short story.

b. Create an outline that includes all essential narrative elements.

Description:

This phase guides participants in conceptualizing their own narrative by identifying common structural patterns. They will draft an outline that integrates all key elements—plot, characters, setting, conflict, theme, point of view, and resolution.

Phase 4. Abstracting

Learning goals:

a. Develop specific ChatGPT prompts for each narrative element.

b. Elicit peer feedback to enhance prompt clarity and creativity.

Description:

Participants collaborate in small groups (three to four members) to write tailored prompts for each narrative element. Example prompt: "Help me write a narrative short story; the plot is..., the characters are..., the setting is..., the conflict is..., the theme is..., the point of view is..., and the resolution is...."

Phase 5. Algorithmic Thinking

Learning goal:

a. Assess whether the generated output aligns with the expected narrative structure.

b. Refine prompts to improve the coherence and quality of the story.

Description:

Participants evaluate ChatGPT's output based on their initial prompts. They identify discrepancies or areas for improvement and revise prompts to enhance the quality and alignment of the generated story with their narrative intentions.

Phase 6. Adjusting Prompts

Learning goal:

a. Implement the adjusted prompts in ChatGPT.

b. Generate and review the new text outputs for further refinement.

Description:

Participants input revised prompts into ChatGPT and assess the resulting texts. If outputs are still misaligned with their expectations, further prompt adjustments are made. This phase is inherently iterative, encouraging ongoing refinement until the desired narrative quality is achieved.

4.4 Ethical Considerations

Adherence to ethical guidelines and standards is paramount throughout the research process. The researcher ensures that participant confidentiality is maintained at all times, with data anonymized during the analysis and reporting and archiving stages to protect the identities of participants. The survey questionnaires were distributed at the end of the activity, and students could refuse participation. Consequently, informed consent is obtained from all participants via an online form, clearly outlining the study's purpose.

Participants are assured of their right to withdraw from the study at any point without repercussions.

4.5 Generalizability

While this study provides valuable insights into the perceptions of EFL students regarding the use of ChatGPT in a narrative short story writing activity, it is essential to exercise caution when generalizing the findings beyond the specific context of the study. It should be clearly noted that the participants are English Education majors on their third year of studies. This premise should suggest that the unique characteristics of the participant population, and educational setting, may limit the applicability of the findings to other contexts. Since, their abilities provided by these circumstances may not be inherently transferable to other undergraduate EFL students. Therefore, it is crucial to clearly delineate these limitations to accurately convey the relevance and potential implications of the findings for broader educational contexts.

4.6 Declaration Generative AI Use

In this research, generative AI, specifically ChatGPT, was utilized in grammar checking, assessing textual structure, and making suggestions for improved textual coherence. However, to ensure the integrity of the written material and to preserve the author's insights, human oversight over the generated texts was ensured. The researcher reiterates commitment in maintaining academic integrity and ensuring that ChatGPT served as a tool to support in writing, rather than replace, human creativity and cognitive processes.

5. Results

The survey gathered 66 responses (totaling 655 words, with an average of 8.9 words per sentence). Through reflexive thematic analysis, we identified key themes reflecting students' perceptions of the writing activity that followed the Computational Thinking (CT) process and their experiences using ChatGPT. These findings are presented per research objective, enriched with descriptive interpretation and cross-thematic insights.

Research Objective 1: Describing experiences and thoughts while participating in the writing activity that follows the CT process

SQ1: What are your favorable experiences or positive thoughts in this writing activity?

Theme 1: Clarity and Understanding through Structure

Students consistently emphasized that the CT process brought clarity to writing by segmenting the story development into manageable steps. This structural guidance helped them visualize the story arc and organize narrative components effectively.

"It breaks down the parts of the short story clearly and helps me see and analyze story parts clearly."

This suggests that the CT approach scaffolded students' thinking, enabling them to approach writing with analytical awareness rather than relying solely on intuition or prior models.

Theme 2: Educational Value and Systematic Thinking

Participants valued the pedagogical utility of CT. They saw it not just as a writing aid but as a learning framework that encouraged organized and purposeful storytelling.

"It helps create stories and answer questions quickly and can be used to teach short stories in class."

In combining these themes, we observe that the CT process was appreciated for both its immediate functional clarity and its broader educational potential.

SQ2: What are your unfavorable experiences or negative thoughts in this writing activity?

Theme 3: Time Consumption and Extended Effort

Students frequently expressed that CT introduced additional workload due to its stepwise breakdown, which made the writing process longer than expected.

"It consumes more time compared to just assigning the writing task."

Theme 4: Perceived Complexity and Cognitive Load

Several students found it cognitively demanding to recall and apply each CT component. This sometimes interrupted their creative flow.

"There are more parts that I need to remember."

These unfavorable themes reflect a tension between structure and spontaneity—while CT offers scaffolding, it may burden students with rigid expectations, limiting their flexibility in idea generation.

Research Objective 2: Identifying advantages and disadvantages of using ChatGPT in the writing process

SQ3: Can you identify the advantages of using ChatGPT in this writing activity?

Theme 5: Writing Efficiency and Task Support

ChatGPT was widely recognized as a time-saving tool that supported grammar correction, spelling, and quick generation of content.

"Saves time in writing and helps with correct spelling and grammar."

Theme 6: Learning Aid and Immediate Guidance

Students highlighted ChatGPT's role in providing real-time assistance and offering guidance when they were unsure about content or structure.

"Helps find information we don't know and creates good writing quickly."

These two themes interrelate: ChatGPT was not only a productivity tool but also a personalized tutor. Students saw it as an accessible guide that made the writing task more manageable and less stressful.

SQ4: Can you identify the disadvantages of using ChatGPT in this writing activity?

Theme 7: Creativity Suppression and Dependency Risk

Students expressed concern that relying too heavily on ChatGPT reduced their initiative to think independently and inhibited the originality of their narratives.

"It makes us lazy to find the answer ourselves and doesn't promote creative thinking."

Theme 8: Unwanted Alterations to Creative Intent

Some users found that ChatGPT produced content that diverged from their envisioned storyline, affecting ownership of their creative work.

"It changed the ending of the story, very different from what I wanted."

Theme 9: Technical and Accessibility Issues

Connectivity issues and high server load occasionally hindered access, and the lack of offline availability was flagged as a barrier.

"Sometimes we can't log in to the system due to too many users."

Summary of Thematic Links

The findings illustrate a nuanced view of the CT process and ChatGPT use: students appreciated the clarity and support these tools offered but also reported concerns over reduced autonomy and increased complexity. While CT promoted systematic learning, it could feel constraining. Similarly, while ChatGPT enhanced efficiency, it risked undermining creativity. The themes form a spectrum—from empowerment to dependence—shaped by how students balanced structure, autonomy, and technological mediation.

6. Discussion

This study aimed to explore students' experiences and perceptions of a writing activity guided by the Computational Thinking (CT) process (Research Objective 1), and to identify the advantages and disadvantages of using ChatGPT during this activity (Research Objective 2). Through reflexive thematic analysis, several key themes emerged that illuminate how these pedagogical and technological tools affected students' learning processes.

Regarding Research Objective 1, students' favorable experiences centered on the themes of Clarity and Understanding through Structure and Educational Value and Systematic Thinking. These themes reveal that the CT process helped students break down story elements into manageable steps, facilitating better organization and analytical comprehension. This finding reinforces previous research on the instructional benefits of structured writing approaches (Lu & Fletcher, 2009; Nouri et al., 2019). However, themes of Time Consumption and Extended Effort and Perceived Complexity and Cognitive Load highlighted challenges; students found the CT process demanding and sometimes obstructive to their creative flow. These difficulties resonate with literature on cognitive overload in highly structured learning environments (Moore et al., 2020; Rottenhofer et al., 2021), suggesting a need for educators to simplify or scaffold CT steps more effectively.

For Research Objective 2, students identified several advantages of using ChatGPT, captured in the themes Writing Efficiency and Task Support and Learning Aid and Immediate Guidance. ChatGPT was valued for streamlining the writing process and offering real-time help with grammar, spelling, and content generation. These benefits align with research documenting the educational potential of AI writing tools (Nazari et al., 2021; Kim & Kim, 2022; Javaid et al., 2023; Opara et al., 2023; Rahman & Watanobe,

2023). Nevertheless, concerns emerged in the themes Creativity Suppression and Dependency Risk, Unwanted Alterations to Creative Intent, and Technical and Accessibility Issues. Students worried that reliance on ChatGPT could hinder their originality and that AI-generated text sometimes diverged from their intended narrative. Technical challenges such as connectivity problems further complicated their experience. These insights deepen understanding of the nuanced risks associated with AI in education (Ivanov, 2023; Chen & Lin, 2024; Kitamura, 2023; Teubner et al., 2023; Hacker et al., 2023; Israel & Amer, 2022; Pedro et al., 2019).

Together, these themes highlight a complex balance between the empowerment offered by CT and ChatGPT and the constraints they impose. Pedagogically, this calls for instructional adaptations such as simplifying the CT process with visual aids and scaffolds to reduce cognitive load, while integrating reflective activities to promote student autonomy and creativity alongside AI support. Technologically, ensuring reliable infrastructure and designing AI interfaces that preserve students' creative intent will be critical for effective adoption.

What distinguishes this study is its dual focus on the interplay between a structured pedagogical process and an emerging AI writing tool. By examining this dynamic interaction, the findings offer new insights into how such integration can both empower and challenge students, thereby expanding current knowledge beyond studies that treat CT or AI tools in isolation.

7. Conclusion

This study offers important insights into students' experiences engaging with a Computational Thinking (CT)-based writing process supported by ChatGPT as a technological tool. The findings reveal that the CT framework helped students gain clearer understanding of narrative structure and enhanced their analytical skills. However, students also noted that the process was time-consuming and required considerable mental effort to follow each step, highlighting challenges related to its complexity. ChatGPT was recognized for improving writing efficiency and providing immediate guidance, yet concerns about reduced creativity, unintended modifications of their original ideas, and technical difficulties were also prominent.

By analyzing students' perceptions of both the pedagogical structure of CT and the technological mediation of ChatGPT, this research highlights the complex dynamics involved in combining these approaches. The results underscore the need for educators to simplify the CT steps or offer visual supports to lessen cognitive load, while also encouraging autonomous use of AI tools through clear guidelines and reflective activities. From a technological standpoint, improving infrastructure reliability and creating AI interfaces that better respect student intent will be crucial for effective implementation.

Overall, this study expands current understanding of how structured pedagogical processes and AI technologies interact to shape students' writing experiences, offering actionable recommendations to enhance narrative writing instruction in technology-rich learning environments.

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