LSP International Journal, Vol. 12, Issue 2, 2025, 91–99

E-ISSN 2601–002X
DOI: https://doi.org/10.11113/lspi.v12.25999

Exploring Collaborative Writing Between Human and ChatGPT 3.5

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Submitted: 1/4/2025. Revised edition: 1/9/2025. Accepted: 1/9/2025. Published online: 30/11/2025

ABSTRACT

This study explored the purpose of collaborative writing between humans and AI using ChatGPT 3.5. The study aimed to answer two primary research questions: (1) "How effective was AI as a co-writer in a creative collaborative writing endeavor?" and (2) "How did humans perceive AI ability as a co-writer in a creative collaborative writing endeavor?" This study employed a case study and exploratory research design to investigate the effectiveness of AI technology in the collaborative writing process and to understand humans' perceptions of AI writing. The study utilized a combination of short-story evaluation from ten short stories and semi-structured interviews with three participants. The short stories were evaluated by two experienced evaluators to assess the quality of the writing, while the semi-structured interviews provided insights into the participants' perceptions of AI writing. The study also included a literature review of previous studies related to collaborative writing, human-AI collaborative writing, and perceptions of AI writing to establish a foundation of knowledge in the field. The findings and discussion addressed the potential benefits and challenges of integrating AI technology into collaborative writing processes, including sampling bias, the implementation of data collection methods, and rapid advancements in technology. Findings suggested that while AI technology serves as an effective co-writer, human perception of its contributions varies. The report concluded with recommendations for future research and the contributions of the study to both individuals and this field of study. Overall, this study provided valuable insights into the potential of collaborative writing between humans and AI and its implications for the future of writing and technology.

Keywords: Artificial intelligence, ChatGPT 3.5, collaborative writing, human-AI collaboration, perception of AI writing

1.0 INTRODUCTION

In the ever-evolving landscape of technology, artificial intelligence (AI) stood as the cutting-edge power, weaving intricate threads of innovation, and reshaping the boundaries of what's possible in our demand for intelligent machines. John McCarthy coined the term artificial intelligence during the first academic conference on the topic in 1956 (Smith *et al*., 2006). AI played an exciting and diverse role in human culture. In Aljanabi *et al*. (2023), research on ChatGPT 3.0 mentioned that ChatGPT had undergone extensive training using a vast quantity of data, enabling it to comprehend and produce writing that closely resembles human language with exceptional precision. Marzuki *et al*. (2023) mentioned that through the utilization of AI tools in collaborative writing, students could obtain prompt feedback and support, thereby enhancing their writing proficiency at an accelerated rate.

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Collaborative writing, known as the process of multiple individuals contributing to a written work, has long been recognized as an effective approach to foster creativity, enhance critical thinking, and promote knowledge sharing. With the advent of advanced AI language models like ChatGPT, collaborative writing took on a new dimension, with humans partnering with AI systems to co-create written content. This emerging trend led to a growing interest in exploring the dynamics and implications of human-AI collaborative writing. ChatGPT, as an AI language model, could generate text, suggest ideas, and aid in real-time (Li *et al*., 2022). While the integration of AI language models, such as ChatGPT, into the collaborative writing process held great promise, it also presented several challenges and raised important questions. Existing literature has explored various aspects of AI language models in writing, including their impact on creativity, productivity, and textual quality (Li *et al*., 2022). However, a critical gap remained in our understanding of the unique dynamics and implications of collaborative writing between humans and ChatGPT. Existing research either examined the general impacts of AI on writing without delving into the nuances of the interplay between humans and AI in co-creation (Brundage, 2018) or focused on isolated aspects like creativity or specific contexts like academic writing (Kavanagh, 2022). This left unexplored the fascinating territory of how human and ChatGPT strengths and weaknesses intertwined to shape collaborative writing across diverse scenarios. Thus, this study aimed to answer two primary research questions: (1) "How effective was AI as a co-writer in a creative collaborative writing endeavor?" and (2) "How did humans perceive AI ability as a co-writer in a creative collaborative writing endeavor?"

2.0 LITERATURE REVIEW

The literature surrounding AI in creative writing reveals a multifaceted landscape that underscores both the potential and challenges of human-AI collaboration. By synthesizing existing research and theoretical perspectives, previous studies provided a foundation of knowledge in the field of human-AI collaborative writing using ChatGPT.

Several articles showed that collaboratively written products were better than individually written products. For instance, Pham (2021) demonstrated that students engaged in collaborative writing improved their vocabulary and accuracy more effectively than those who worked individually. In addition, human-human collaborative writing also facilitates students' participation in a community of peers who provide feedback on each other's work and collectively establish genuine social interaction and learning (Tai-Ming & Xu, 2021). Inayah (2019) found the collaborative writing technique to have a positive effect on both individual and group writing processes. Participants in this study expressed positive attitudes towards collaborative writing, considering it beneficial for improving various aspects of writing skills, second language proficiency, and confidence. Meanwhile, Chen (2019) compared students exposed to collaborative writing practice with those who were not. The findings showed that the students engaged in collaborative writing outperformed their counterparts in terms of accuracy, fluency, and quality of subsequently produced individually written texts. Chen (2019) summed up that collaborative writing fostered the development of organizational skills, vocabulary usage, and grammar proficiency.

Numerous studies have explored the collaboration between humans and AI in the domain of writing. For example, Kannan *et al*. (2016) developed a system called Gmail's Smart Reply. The system gained widespread popularity since its introduction to the public in 2017. By offering users a diverse range of suggestions that can be easily used as complete email responses with a single tap on mobile devices, Gmail's Smart Reply has transformed the way people engage in email communication (Kannan *et al*., 2016). Meanwhile, in the field of human-computer interaction, Buschek *et al*. (2021) developed a system called 'CharacterChat' that can generate 20 revisions for users writing slogans, contributing insights into the impact of suggested continuations on the user experience. Buschek *et al*. (2021) research highlighted the value of AI in supporting writers throughout the character development process, offering a new perspective on the role of AI in creative writing.

Literature has shown positive attitudes towards the use of AI-human collaborative writing. For example, Anggraini *et al*. (2020) indicated that collaborative approaches facilitated idea generation, knowledge activation, and overall improvement in the writing process. Another example was a study by Brown *et al*. (2022), which examined user attitudes towards AI-generated content and found that individuals appreciated the AI's ability to assist in generating ideas and expanding their writing. Users perceived the AI as a helpful tool that complemented their own creative abilities (Brown *et al*., 2022). Nevertheless, Schepman and Rodway (2020) examined participants' views on AI and found mixed perspectives, encompassing both positive and negative perceptions. The research suggested that individuals' attitudes towards AI-generated writing might vary, influenced by factors such as previous experiences, exposure to AI tools, and personal beliefs about AI's capabilities and limitations (Schepman & Rodway, 2020). Thus, more research on AI-human collaborative writing should be explored.

3.0 METHOD

The research design employed in this study was a mixed-methods approach, combining both qualitative and quantitative methods. The quantitative method focused on RQ1, which involves finding the mean score for each aspect of the rubric. It also aimed to gain insights and understanding of the effectiveness and perception of users using ChatGPT 3.5 as a co-writer during the creative collaborative writing process.

3.1 Participants and Context

The research involved a total of ten third-year undergraduate participants who had been using ChatGPT 3.5 for more than four months for various writing tasks. These participants also used their own ChatGPT 3.5 for the collaborative writing process. The number of participants was determined based on the time given to complete this research. All the participants were participating in this research on a voluntary basis, indicating their interest and willingness to contribute to this research.

3.2 Research Procedure

The procedure for this research followed a structured timeline to ensure systematic data collection and analysis. This research involved several key steps to address the research questions. As can be seen in Figure 1, the research procedure was presented.

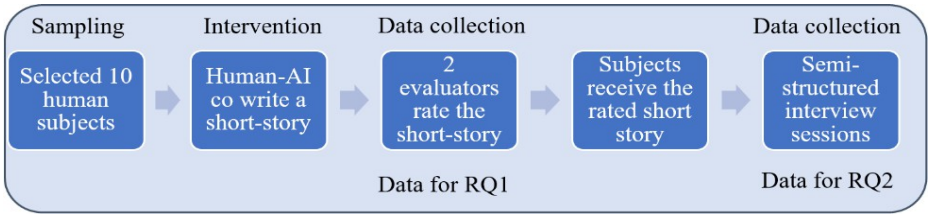

Figure 1 Overview of the Research Procedure

3.3 Sampling

The sampling approach in this research was a combination of convenience sampling and purposive sampling, referred to as purposive-convenience sampling. This approach enabled the researcher to select participants who had prior experience using ChatGPT and were accessible for data collection within the imposed time constraints. By doing so, diverse perspectives and experiences were gathered, contributing to a comprehensive understanding of human-AI collaborative writing in the context of emerging technologies.

3.4 Data Analysis

In this research, there were two types of data analysis that were employed, which were content analysis and thematic analysis. This method of analysis was chosen as it is a flexible and effective approach for identifying, analyzing, and interpreting patterns and themes within qualitative data. The analysis of the data is summarized below in Table 1.

Table 1 Data Collection and Analysis Method That Addressed the Research Questions

Research Questions	Method of Data Collection	Data Analysis
RQ 1: How effective is AI as a co-writer in a creative collaborative writing endeavour?	Short story evaluation	Content analysis Writing scores
RQ 2: How do humans perceive AI abilities as a co-writer in a creative collaborative writing endeavour?	Semi-structured interviews	Thematic analysis

4.0 RESULTS AND DISCUSSION

4.1 The Effectiveness of ChatGPT as a Co-Writer of a Short Story

This section addresses RQ1: "How effective is AI as a co-writer in a creative collaborative writing endeavour?" To explore this question, a short story evaluation was conducted to assess the effectiveness of ChatGPT 3.5 as a human co-writer in the creation of short stories. This evaluation relied on marks assigned by professional raters, as detailed in Table 2.

Table 2 The Short Story Evaluation

Participant	Narrative Voice (25%)	Characterization (25%)	Writing Mechanics (25%)	Plot (25%)	Total marks (100%)	Grade
SSP1	18.75	12.50	12.50	6.25	50	**C**
SSP2	12.50	25.00	18.75	18.75	75	**A-**
SSP3	25.00	12.50	18.75	25.00	81.25	**A**
SSP4	25.00	12.50	18.75	12.50	68.75	**B**
SSP5	18.75	18.75	6.25	25.00	68.75	**B**
SSP6	18.75	12.50	18.75	12.50	62.50	**B-**
SSP7	25.00	12.50	12.50	12.50	62.50	**B-**
SSP8	25.00	25.00	25.00	18.75	93.75	**A+**
SSP9	12.50	12.50	12.50	18.75	56.25	**C+**
SSP10	18.75	18.75	12.50	18.75	68.75	**B**
Mean Score	**20.00**	**16.25**	**15.63**	**16.88**	**68.75**	**B**

**SSP = Short Story Participant*

The findings indicate that ChatGPT-assisted stories scored well overall, particularly in voice and plot, but character depth and grammar need work. The overall mean score for narrative voice 20%, characterization 16.25%, writing mechanics 15.63%, and plot 16.88% indicate that while ChatGPT contributes significantly, its output should be used in conjunction with human input for optimal results.

ChatGPT 3.5 demonstrated strong performance in narrative voice earning the highest mean score of 20% out of 25% due to its ability to analyze large text corpora and adapt to individual writing styles (Chen *et al*., 2019). While this supports deeper creative exploration, some outputs were criticized as formulaic and lacking the depth of human-authored narratives, emphasizing the need for clear guidance and careful selection of AI-generated content (Tan *et al*., 2022).

Several factors likely contributed to the lower characterization scores in the research. Chen *et al*. (2022) mentioned that a possible cause could be the limited availability of training data that encompasses intricate character development strategies for AI models in creative writing. Another challenge lies in the inherent difficulty of encoding complex emotional nuances into language models, demanding further advancements in this area (Darwin *et al*., 2023).

Writing mechanics which includes grammar, punctuation, and sentence structure received the lowest mean score of 15.63%, highlighting an area where AI can offer significant support. This low score largely reflects human error, as most grammatical mistakes in the collaborative writing were attributed to the human contributors. AI, therefore, plays a valuable role in identifying and correcting such errors, supporting the creation of more polished and accurate creative writing (Raad *et al*., 2023).

Based on the evaluation, the plot, with a mean score of 16.88% also showed promise, suggesting adequate story structure and development (Fang *et al*., 2023). However, some stories produced from the collaboration were critiqued for predictable plot progressions, lacking twists or turns that could heighten suspense and surprise (Iwata, 2009).

The human-AI collaborative writing with ChatGPT 3.5 yielded stories with overall satisfactory quality, demonstrating particular strengths in narrative voice and plot, but with room for improvement in characterization and writing mechanics. This aligns with past research highlighting the tendency of AI-generated text to exhibit grammatical inconsistencies and stylistic awkwardness (André *et al*., 2023).

4.2 Participant's Perception of ChatGPT as a Co-Writer of a Short Story

Three participants had been selected to attend the interview session. The selection was based on their short story performance, which included one participant with the highest marks, 93.75% (SSP8), one participant who gained middle-range marks, with 68.75% (SSP5), and one participant with the lowest marks, 50% (SSP1). Besides that, the participants also possessed different experiences, whereas SSP1 had six months of experience, SSP5 had five months of experience, and SSP1 had four months of experience using ChatGPT. The medium of communication during the interview was a combination of Bahasa Melayu and English, depending on the interviewee's preference.

4.2.1 Positive Perception

Based on the participant response, the ChatGPT 3.5's ability to capture the writer's intended tone aligned with previous research by Yang *et al*. (2022), who highlighted AI's potential to enrich creative writing through "the generation of unique and original narrative voices." Moreover, Washington (2023) posited that AI excelled at mimicking and adapting to individual writing styles,

seamlessly blending its contributions with the human author's voice. SSP8's experience aligned with this, indicating a subtle interaction where AI enhanced, rather than supplanted, the writer's distinct style.

SSP1 highlighted the ability of ChatGPT 3.5 to generate characters that effortlessly blended into the narrative and served as an influential catalyst for further development. This was parallel with findings by Dwivedi *et al*. (2023) who argued that AI characters acted as "narrative catalysts," injecting fresh perspective and conflicts that helped with the storylines. Furthermore Woo and Guo (2023) suggested that AI could become a collaborative character developer, where participants could grasp ideas from what were suggested by AI.

For students like SSP1 and SSP5, who grappled with grammar hurdles, the AI tool became a supportive tutor, subtly refining their written choices. This supported Biermann *et al*.'s (2022) study, which mentioned that students often utilized AI writing assistance tools to automatically check spelling, grammar, and style. These tools offered satisfactory support for revising grammar, punctuation, or even spelling (Biermann *et al*., 2022).

4.2.2 Negative Perception

SSP1 and SSP8 had the same thought that mentioning that ChatGPT seemed to influence them to follow its flow in the story writing. Their worry could be justified by the opinion of Biermann *et al*. (2022) that stated writers wanted to establish a sense of ownership over their writing by controlling the process of expressing their ideas in stories. The domination of ChatGPT 3.5 over the storyline sometimes causes frustration by failing to capture the writer's intent and personal writing style (Biermann *et al*., 2022).

In addition, SSP5 mentioned that ChatGPT 3.5 introduced a new character that detracted from the coherence of the narrative. Adding a new character that was not related to the story resonated with concerns raised by Biermann *et al*. (2022), who cautioned against the potential of AI-generated characters veering off course, introducing elements that clash with the original story.

5.0 CONCLUSION AND IMPLICATIONS

The study concluded that ChatGPT 3.5 was an effective co-writer in the creative collaborative writing process, demonstrating strengths in generating engaging narrative voices and plot structures while highlighting the necessity of human input for character depth and grammatical refinement. These findings suggested that integrating AI tools in writing education can enhance students' creative capabilities and provide valuable support in the writing process. However, the mixed perceptions of participants regarding AI's ability to capture their unique ideas indicated a need for further exploration into the dynamics of human-AI collaboration. The writers believe that future versions of

ChatGPT will become more intelligent and potentially match human creativity and cognitive abilities. It is essential to monitor this development closely and examine its impact on human-AI creative collaboration.

Further studies should focus on the long-term impacts of AI-assisted writing on individual creativity, the ethical implications of authorship, and the potential for AI to adapt to diverse writing styles across various genres. Additionally, research could focus on developing more sophisticated AI tools that better understand and reflect the nuances of human storytelling, thereby fostering a more seamless collaborative experience.

ACKNOWLEDGEMENTS

We gratefully acknowledge the participants who contributed their time and insights to this research as well as LSP committees for their helpful feedback and support.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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