

H Enhancing creative writing skills through Large Language Models: A systematic literature review

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Abstract

The integration of artificial intelligence (AI) into educational environments has opened new avenues for enhancing creative writing skills, with Large Language Models (LLMs) leading the charge in this technological advancement. Technologies such as GPT (Generative Pretrained Transformer) utilize LLMs to offer advanced capabilities like text generation, vocabulary enhancement, idea formation, and the bolstering of student creativity across primary, secondary, and tertiary education. The present systematic literature review explores the contribution of LLMs to the development of creative writing abilities, covering publications from January 2020 to January 2024 indexed in Scopus, including articles in scientific journals, doctoral dissertations, and conference proceedings. The findings from the systematic review indicate that the use of technological tools leveraging Pre-trained Language Models serves not only as instruments for grammatical improvement and stylistic refinement of writing but also has the potential to stimulate idea creation, plot development, and thematic exploration, thereby promoting creative forms of expression. There is evidence that through an engagement involving AI-driven prompts and feedback, individuals experience a unique interactive experience that challenges their creative limits and enhances their writing fluency across various educational domains.

Key words: Creative writing, Artificial Intelligence, Large Language Model, Systematic Literature Review

Introduction

In recent years, there has been a revolution in the field of Artificial Intelligence, particularly in Large Language Models (LLM), the so-called "chatbots." A breakthrough was the launch in November 2022 of ChatGPT, one such application developed by OpenAI. ChatGPT can rapidly generate text, interacting and adapting its responses to user prompts. Starting from this point, a framework of similar tools that can essentially radically transform the way people generate text began to gradually take shape. Indeed, it seems that these applications can produce both

poems and creative narratives, influencing the field of creative writing and creative authorship that was previously the exclusive domain of humans. In fact, it seems that the applications of AI as a whole have permeated language research in other fields, such as translation, as well as the writing of academic essays and narrative stories. Consequently, the above developments have led many to argue that LLM has the potential to change the way people write creative text (Farrokhnia et al., 2023; Kladaki & Mastrothanas, 2023; Liu et al., 2021; Liu et al., Tonic, 2020; Mastrothanas et al., 2024; Rudolph et al., 2023; Su et al., 2023; Yu, 2021). As Fang et al. (2023) point out in the introduction to their research, AI tools could overcome a number of difficulties that creative writers may face.

These difficulties may initially focus on the challenging nature of forming a fictional textual framework due to the absence of the initial inspiration or trigger for a first creative composition. Then, obstacles can be identified in individuals who have difficulty in using language, maintaining textual and narrative coherence or even creating contextual details, as in the case of multimodal texts (Bai et al., 2021; Drossinou Korea & Alexopoulos, 2022, 2023; Takacs et al., 2015; Watcharapunyawong & Usaha, 2013). Consequently, the writing process itself, despite its creative nature in the case of creative writing, can prove to be a demanding and even daunting process.

Indeed, in the context of education these difficulties could be further intensified in the case of students with specific learning difficulties. The solution to these initial difficulties could be provided by AI tools, particularly in the case of creative writing, by LLMs, as they are by definition related to language and textual production. Indeed, several such tools can be identified, some of which can also create images or tell stories, and with the advent of ChatGPT, it seems that these tools are becoming more and more numerous (Adiguzel et al., 2023; Ahmad et al., 2022; Alberts et al., 2023; Drossinou Korea & Alexopoulos, 2024a, 2024b; Farrokhnia et al., 2023; Kostas et al., 2023; Kostas & Sofos, 2017; Rudolph et al., 2023; Zervoudakis et al., 2020). In particular, such applications could help users in areas such as initial inspiration, writing segments, or even writing and transforming entire texts (Fang et al., 2023). This means that LLMs can be capable creative writing assistants to writers by simply providing some initial prompts.

Moreover, it is worth mentioning that such LLMs have even been positioned as co-authors of academic papers, a development that reinforces the finding that these applications are highly capable in text generation, offering multiple benefits. Focusing particularly on education, these applications could prove beneficial. In the literature, there are expectations for improving writing skills, critical thinking, and aiding students and teachers, but this does not negate references to the potential risks of their uncritical use. Therefore, given the positive contribution of creative writing in education and the potential positive contribution of LLMs, it is noted that there could be even more benefits to be gained from integrating these applications of creative writing in education. On the other hand, among the potential risks and difficulties, it is worth noting that these applications often make mistakes, provide untrue information, or produce disconnected texts. Furthermore, concerns are raised regarding whether these applications could simulate human expression, especially in areas such as creative writing, given that creativity and the expression of emotions are considered human characteristics (Farrokhnia et al., 2023; Rudolph et al., 2023; Su et al., 2023; Tonic, 2020).

According to Barton et al. (2023), there is no exclusive conceptual approach to creative writing in the literature. However, creative writing does seem to be associated with providing prompts for textual writing and is often utilized in education as an 'open' pedagogical process that

engages the imagination in textual writing. Creative writing, thus, moves away from a formalistic teaching approach to language and promotes skills such as creativity and originality (Dawson, 2005; Maxwell, 2010; Pitsikalis et al., 2022; Tu, 2021; Uslu & Uslu, 2021; Wang, 2019; Wyse et al., 2013). For this purpose, Barton et al. (2023) suggest adopting an expanded definition that focuses on the production of original text based on the writer's imagination and self-expression. Accordingly, as is evident from the definition of creative writing alone, it is clear that creative writing is linked to education, where it can offer multiple benefits both in improving writing skills and students' relationship with arts and literature, and in developing important skills such as imagination, self-expression, creativity, and critical thinking (Dawson, 2005; Mastrothanas, Kladaki, & Andreou, 2023; Mastrothanas, Zervoudakis, Kladaki, & Tsafarakis, 2023; Papakosta et al., 2020; Smith, 2020; Tu, 2021; Uslu & Uslu, 2021; Vygotsky, 1978). Practices that include creative writing activities can offer an effective solution to the loss of innovative and creative practices in education by enhancing students' engagement, teamwork, and their interaction with texts (Barton et al., 2023; Geladari & Mastrothanas, 2014; Maxwell, 2010; Stock & Molloy, 2020). As creative writing goes beyond conventional ways of approaching knowledge, it conveys values and important skills to students, with imagination and freedom as the main vehicles, core values in the modern school of the 21st century (Dawson, 2005; Kladaki & Mastrothanas, 2022; Uslu & Uslu, 2021). Therefore, creative writing can offer many benefits to education, affecting students holistically from primary to higher education, essentially taking on the role of a writer or poet (Dawson, 2005; Maxwell, 2010; Mastrothanas & Kladaki, 2020; Mastrothanas et al., 2018; Tu, 2021).

1. Purpose - Research Questions and Contribution

Therefore, despite the above findings on the impact LLMs can have, there is an absence of literature reviews on the use of these applications in creative writing, especially after 2022 and the release of ChatGPT, which led to the rapid development of LLMs. The need for a mapping of the field based on a reliable core of research is what this research attempts to answer. For example, a similar effort has been made by Fang et al. (2023), but their review was limited to the period from 2018 to 2022, before the release of ChatGPT, and examined research on AI applications in narrative story generation rather than LLM and creative writing. On the other hand, Imran & Almusharraf's (2023) research investigated studies exclusively on ChatGPT and its impact on writing skills. Therefore, a review is necessary and relevant as it will reveal the trends and dynamics that are shaping the field of creative writing and LLM, especially after the arrival of ChatGPT and the changes it has brought about. Specifically, such an attempt is expected to reveal benefits and potential applications, specific literature gaps and opportunities for new research in the field, as well as to allow for comparative approaches in future research contexts. Considering the above, the research questions of this study could be set out as follows: 1) What is the emerging trend in the field of LLM and creative writing? 2) What benefits arise from the use of LLMs in creative writing?

2. Methodology

The literature review followed the Preferred Reporting Items for Systematic Reviews and MetaAnalyses extension for Scoping Reviews (Tricco et al., 2018), focusing on four sequential stages: identification, screening, eligibility and inclusion. The PRISMA 2020 criteria provided this study with the required scientific context.

2.1. Identification and preliminary screening

The review's field was limited to studies published in English from January 2020 to January 2024. The search was limited to the Scopus database only, in an attempt to map a reliable core of studies interweaving LLM and creative writing. Main keywords entered were: "*Large Language Models*" / "*LLM*" / "*AI chatbot*" / "*chatbot*" / "*Natural Language Generation*" / "*Machine Learning Models*" / "*Natural Language Processing*" / "*Deep Learning in NLP*" / "*Pre-trained Language Models*" / "*story / text generation / composition*" / or/ and "*creative writing skills*" / "*creative writing*", "*creative expression*", "*Text Generation*" / "*Creative Text Composition*" and a total of 200 records were generated. From the search process, it was found that the number of relevant articles was significantly limited and only a few studies investigated how LLMs can be used in creative writing.

2.2. Inclusion and exclusion criteria

For study selection, a number of inclusion and exclusion criteria were applied. These related to a) the type of publication, b) the language of the text, c) the type of research and, finally, the quality of the publication. In particular, with regard to the type of publication, the criterion was set to select publications in journals, conference proceedings, doctoral theses and book chapters in English. Regarding content, it was considered necessary that the studies apply qualitative, quantitative or mixed methodology regarding the use of LLM in creative writing activities. Two independent reviewers assessed the identified studies and approved the publications that met the criteria, according to Kmet et al.'s (2004) assessment of publication quality, at an acceptable agreement value of ≥ 0.55 .

3. Results

Following the inclusion process, 17 studies focusing on the use of LLM in creative writing activities were finally selected after a careful review of 60 records. The process up to the final inclusion of the 17 studies is described in brief figures in the PRISMA 2020 flow diagram (Figure 1).

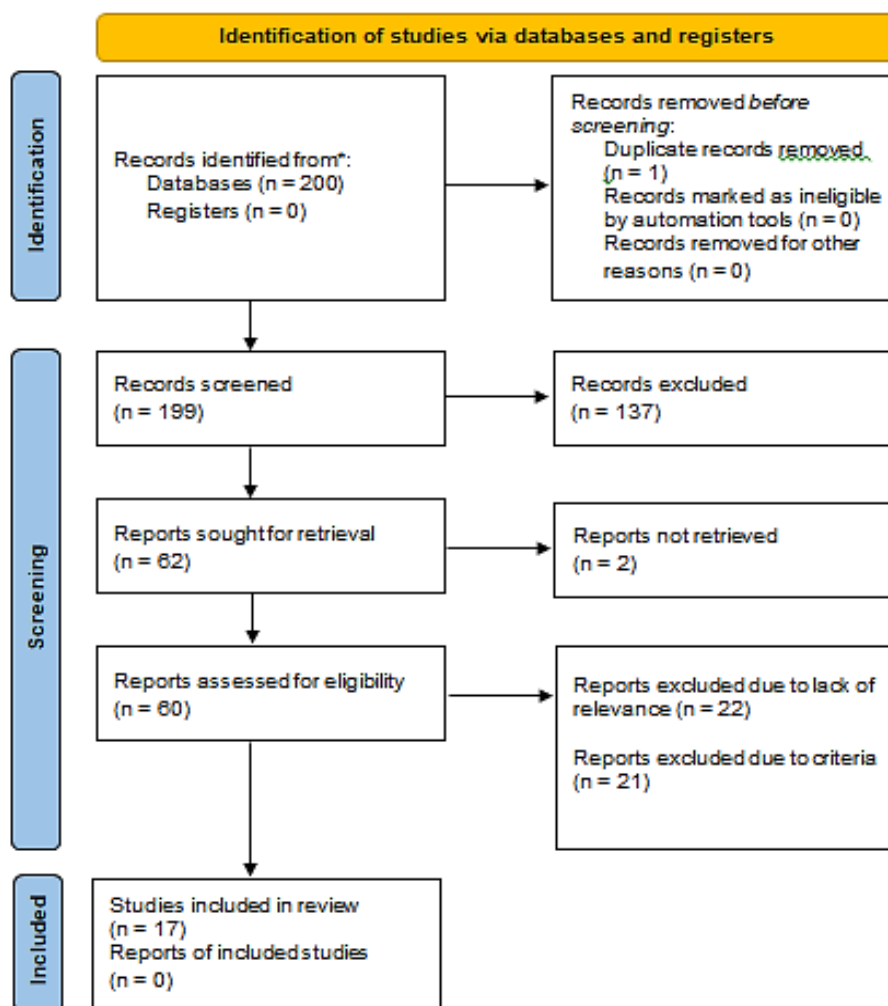


Figure 1. Systematic review flow diagram according to PRISMA 2020

3.1. What is the emerging trend in the field of LLM and creative writing? (RQ1)

Regarding the type of publication, of the 17 studies, 15 (88.24%) were publications in conference proceedings and only 2 of them were publications in peer-reviewed journals (11.76%). It should be noted that none of the studies that were finally included were PhD theses or book chapters (Table 1, utilizing N frequency and relative N% frequency to present the results).

Publication type	N	N%
Articles in conference proceedings	15	88,24
Articles in scientific journals	2	11,76
Total	17	100

Table 1. Types of publication

Moving on to examine the publication year, it was found that most of the studies (N=6) were written in 2023 (35.29%), but also in 2022 (29.71%), as shown in Table 2. A total of 4 studies had 2021 as the year of publication (23.53%), while only 1 study had 2024 (5.88%) and 1 study had 2020 (5.88%) as the year of publication.

Publication year	N	N%
2023	6	35,29
2022	5	29,71
2021	4	23,53
2024	1	5,88
2020	1	5,88
Total	17	100

Table 2. The years of the studies

Furthermore, it was found that the majority of studies on LLM and creative writing skills have been done in the USA, where a total of 10 studies (58.82%) were identified, while fewer studies (N=2) had been carried out in Japan (11.76%). Finally, 1 study (N=1) was detected from Egypt (5.88%), Germany (5.88%), Ghana (5.88%), Canada (5.88%), and China (5.88%) (Table 3).

Country	N	N%
USA	10	58,82
Japan	2	11,76
Egypt	1	5,88
Germany	1	5,88
Ghana	1	5,88
Canada	1	5,88
China	1	5,88
Total	17	100

Table 3. The countries where the studies were carried out

Finally, concerning the educational level, among the 17 studies, all of them involved human participants, either in text writing or text evaluation, and AI tools were utilized, including writers, readers, students, and child learners. Regarding the participants' characteristics, it is noted that out of 17 studies, 9 (52.94%) involved writers, 3 studies involved students (17.64%), 2 studies involved adults as text reviewers (11.76%), and 1 study involved

participants with writing difficulties (5.88%). Additionally, 1 study (5.88%) involved both writers and readers (so, in total, 10 studies used writers, 58.82%), while another study (5.88%) involved adults as text reviewers (thus, in total, 3 studies used adults as reviewers, 17.64%), as well as children-students aged 7-9 years (5.88%). Therefore, if we attempt to group them by educational level, two subcategories could be created. The first category could include studies that involved adults ($N=16$, $N\%=94.11\%$), of which 10 included writers (62.50%), 3 higher education students (18.75%), 2 adult text reviewers (12.5%), and 1 study involved adults with writing difficulties (6.25%). In other words, the 16 surveys in the first category could be divided into studies involving adult education (81.25%) and higher education (18.75%). Finally, the second level of education ($N=1$, $N\%=5.88\%$) could include children's involvement (1 primary school survey, with 7-9-year-old students). Among the 17 studies, 2 were clearly quantitative, 9 were qualitative, while 1 was described as an experimental approach, and 5 were mixed studies.

3.2. What are the emerging benefits of using LLMs in creative writing? (RQ3)

To address the second research question of this review, the focus was on the benefits gained from using LLM in creative writing activities, as summarized in the results of each of the 17 studies included in the review. As shown in the results (Table 4), the majority of studies ($N=14$, $N\%=82.35\%$) reported that LLMs could serve as capable assistants for creative writing activities, engaging in a process of co-authoring texts rather than replacing human creativity. For instance, in Schmitt & Buschek's (2021) study of 30 writers, it was found that LLMs could effectively collaborate during text production, as reported by the writers themselves. Furthermore, several studies ($N=11$, $N\%=64.71\%$) found that the use of an LLM tool can enhance the final creative text overall by providing guidelines for maintaining coherence and character delineation. For example, the four authors who participated in the Calderwood et al. (2020) study found LLM responses to be beneficial in improving their texts. Almost as many studies ($N=10$, $N\%=58.82\%$) reported that LLMs can enhance the overall level of text creativity or produce text of comparable creativity to human-authored text. For instance, the study by Orwig et al. (2024) found that ChatGPT-4 texts did not significantly differ in creativity level from human-authored texts, unlike ChatGPT-3 texts. Additionally, in 10 studies ($N\%=58.82\%$), it was noted that unexpected application responses can increase the originality of a text. Indeed, as Chung et al. (2022) typically emphasize, even seemingly "incoherent" and disjointed responses in the field of creative writing can stimulate innovative textual creations.

Additionally, it was found that several studies ($N=8$, $N\%=47.06\%$) mentioned an additional advantage: using a particular LLM can make the process of creative writing even more exciting, increasing the interest and engagement of writers. For instance, the 13 theatre writers surveyed in Mirowski et al.'s (2023) study found using LLMs to be a fun experience. Reinforcing this finding, several studies ($N=7$, $N\%=41.18\%$) also highlighted the user-friendly interface of these applications, making them particularly attractive for creative writing activities. Finally, in seven studies ($N=7$, $N\%=41.18\%$), the possibility of providing personalized answers was mentioned as an advantage. It was found that these applications can tailor their responses to the user's level, requirements, and even preferred dialect. This finding can be useful in education. For instance, as cited by Essel et al. (2023), and in Booten & Gero's (2021) research, the participating poets found the app's ability to adapt to their writing style and produce a stylistically coherent poem beneficial.

Benefit	Study	N	N%
Co-author - assistant (collaborative relationship, not a replacement)	Roemelle (2022), Mori et al. (2022), Osone et al. (2021), Schmitt & Buschek (2021), Mirowski et al. (2023), Singh et al. (2023), Sun et al. (2021), Booten & Gero (2021), Peng et al. (2023), Chung et al. (2022), Yuan et al. (2022), Biermann et al. (2022), Gero et al. (2023), Calderwood et al. (2020)	14	82,35%
Improving text quality (consistency, character profile, etc.)	Orwig et al. (2024), Mori et al. (2022), Osone et al. (2021), Mirowski et al. (2023), Singh et al. (2023), Biermann et al. (2022), Gero et al. (2023), Roemelle (2022), Peng et al. (2023), Calderwood et al. (2020), Booten & Gero (2021)	11	64,71%
Increasing the level of textual creativity	Orwig et al. (2024), Roemelle (2022), Essel et al. (2023), Osone et al. (2021), Schmitt & Buschek (2021), Mirowski et al. (2023), Singh et al. (2023), Booten & Gero (2021), Chung et al. (2022), Yuan et al. (2022)	10	58,82%
Innovation - originality (unexpected writing choices)	Orwig et al. (2024), Roemelle (2022), Calderwood et al. (2020), Mori et al. (2022), Mirowski et al. (2023), Singh et al. (2023), Booten & Gero (2021), Peng et al. (2023), Chung et al. (2022), Yuan et al. (2022)	10	58,82%
Fun - increasing engagement/ interest	Calderwood et al. (2020), Essel et al. (2023), Osone et al. (2021), Bolock et al. (2023), Booten & Gero (2021), Osone et al. (2021), Peng et al. (2023), Storyfier	8	47,06%
Usability - attractiveness	Calderwood et al. (2020), Schmitt & Buschek (2021), Mirowski et al. (2023), Singh et al. (2023), Bolock et al. (2023), Yuan et al. (2022), Peng et al. (2023)	7	41,18%
Customization to the user's requirements, level and prompts	Essel et al. (2023), Singh et al. (2023), Bolock et al. (2023), Sun et al. (2021), Booten & Gero (2021), Peng et al. (2023), Biermann et al. (2022)	7	41,18%
Providing inspiration to overcome difficulties ("stuck")	Roemelle (2022), Calderwood et al. (2020), Schmitt & Buschek (2021), Mirowski et al. (2023), Singh et al. (2023), Gero et al. (2023)	6	35,29%

Save time - reduce workload (text generation speed)	Singh et al. (2023), Peng et al. (2023), Yuan et al. (2022), Biermann et al. (2022), Gero et al. (2023), Chung et al. (2022)	6	35,29%
Improving skills (writing - memory skills, critical thinking, etc.)	Calderwood et al. (2020), Essel et al. (2023), Schmitt & Buschek (2021), Mirowski et al. (2023), Bolock et al. (2023), Peng et al. (2023)	6	35,29%
Usage in other activities (e.g. existing text evaluation, translations - paraphrases)	Orwig et al. (2024), Essel et al. (2023), Sun et al. (2021), Biermann et al. (2022), Gero et al. (2023)	5	29,41%
Educational benefits (e.g. involvement, experiential - indirect learning)	Essel et al. (2023), Bolock et al. (2023), Peng et al. (2023)	3	17,65%
Accuracy - validity	Bolock et al. (2023), Sun et al. (2021)	2	11,76%

Table 4. The benefits of using LLMs in creative writing activities

Moreover, six studies (N%=35.29%) concluded that LLMs can be particularly useful in providing inspiration to help writers overcome potential writing blocks or to inspire novice writers. Another advantage identified in the review results focuses on saving time and reducing workload, as LLMs produce creative text quickly (N=6, N%=35.29%), while also improving subjects' skills (N=6, N%=35.29%). Specifically, it was found that LLMs can enhance writing, language, and mnemonic skills, as well as critical thinking skills through the process of evaluating and selecting the responses provided. For instance, Peng et al. (2023) discovered that utilizing LLM in creative writing improved the vocabulary and mnemonic skills of the 28 second-year students who participated.

In five studies (N%=29.41%), other benefits in areas such as translation, paraphrasing, and text evaluation were also mentioned. It is noteworthy that only three studies mentioned pedagogical benefits. Among these, an increase in student engagement leading to an experiential relationship with learning was noted. Particularly, in the study by Bolock et al. (2023), where five children aged 7-9 years were asked to interact with texts generated by an LLM, which presented information indirectly, it was found that the effectiveness of learning increased, as pupils were learning without being directly aware of it. Additionally, two studies (N%=11.76%) reported in their results the accuracy of the applications in terms of both language expression and compliance with user prompts as an advantage. Finally, upon examining the LLMs mentioned in each benefit (Table 6), it can be observed that ChatGPT was mentioned in all benefits, in addition to the benefit regarding the accuracy in providing answers.

4. Discussion

The aim of this systematic review was to explore the impact of LLMs on creative writing by mapping relevant research conducted between 2020 and 2024. Essentially, the study had two main objectives: to highlight the contribution of LLMs to the field of creative writing and to identify areas where gaps exist in the literature. Specifically, the first research question of the review focused on trends in research concerning creative writing and LLMs, as indicated by the countries where the studies were conducted, the years of publication, and the educational level of the participants. As the results showed, the majority of studies originated from the USA, with only two from Japan and one survey each identified from Egypt, Germany, Ghana, Canada, and China. Moving on to the years of publication, it was found that most studies were published in 2023, followed by 2022 and 2021. Only one study each was published in 2020 and 2024. Finally, the vast majority of the studies focused on adults, either in the context of adult education or higher education, while only one study was related to primary education.

Finally, the second research question focused on the contribution of these applications to creative writing. As shown, most of the studies reported their use as an aid during writing, qualitative improvement of the final text, increased degree of creativity, and originality of the text. Furthermore, some studies found that these applications are highly entertaining and increase user engagement in creative writing activities, are easy to use, and can provide personalized responses appropriate for each level and requirement of the user during a creative writing activity. Additionally, six studies reported providing inspiration to overcome creative difficulties, saving time, and improving participants' skills. Finally, five studies found that LLMs can successfully engage in other writing activities such as translation, while only three studies focused on their pedagogical benefits in the field of creative writing, and two studies found that such tools can provide high accuracy in their responses.

Turning to a critical discussion of the findings, it is worth noting that the clustering of studies coincides with the release period of ChatGPT, which reignited research interest in LLMs. Studies appear to cluster in 2023 and 2022, aligning with ChatGPT's release in November 2022. Furthermore, the research was confined to English-language surveys, possibly due to the majority of surveys originating from the USA. A gap in the literature was identified regarding the impact that LLMs can have on creative writing in students. Specifically, nearly all studies involved adult writers or focused on higher education, with only one from primary and none from secondary education. Overall, it is noteworthy that this review was limited to the Scopus search database only, in an attempt to map a reliable core of research. Broadening the search bases might have yielded more research involving students. However, the trend captured by this search reveals a gap in research on creative writing and LLMs in both primary and secondary education, as well as in education as a whole. Additionally, the fact that only 2 out of 17 were journal articles and the remaining publications were included in conference proceedings highlights the absence of relevant research. Furthermore, of interest are new tools, which can also provide images during creative writing activities. Finally, the findings of this review showed that LLMs can offer multiple benefits to creative writing, not only in grammatical and stylistic improvement but also in generating new ideas and developing innovative narratives.

5. Conclusion

As shown, creative writing with LLMs can be an experience that pushes the boundaries of human creativity. The positive benefits found from the research in the review align with the literature regarding benefits derived from applications such as ChatGPT, in areas such as providing assistance, increasing engagement, personalization, saving time, and improving writing skills in the context of education (Farrokhnia et al., 2023; Rudolph et al., 2023; Su et al., 2023; Tonicic, 2020). For example, Dwivedi et al. (2023) refer to the usefulness of such applications for developing initial user thinking, while Haleem et al. (2022) report their use for an initial brainstorming session to provide ideas around a topic. However, despite these early encouraging results, there is a gap in the existence of studies examining the long-term impact of these applications on specific creative writing skills, compared to studies limited to investigating effects or opinions after short trials.

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