Developing High Order Thinking Skill of Junior High School Students through Creative Project of Writing Interactive Fiction

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Abstract. Creative writing is a method to enhance cognitive functioning in children. Writing serves as a means of self-expression and a tool for delving into emotions and ideas. Proficiency in language is intricately linked to the writing process, encompassing imaginative writing such as fiction or other non-scientific compositions. Creative writing serves as a valuable technique for enhancing students' creativity and language abilities. Moreover, it has been demonstrated to enhance high order thinking skills, which are beyond mere observation or memorization. The purpose of the study is to evaluate junior high school students' creative project of writing Interactive Fiction with an open-source tool for telling interactive nonlinear stories. The training program employs a participatory learning approach which involves students to actively participate in all aspects of projects and examinations. Through a series of activity of designing narrative branches, presenting the design, working in peers, and presenting their creative work in the class, the result shows that the students experience a transformative process drawing themselves to engage with all tasks in relational situation. Students collaboratively work assisting each other of how to develop narratives, writing in English and using the html software. However, the writing output still has a limited capacity, nevertheless, making it convenient to send through email or social media.

Keywords: Interactive Fiction, Creative Writing, High Order Thinking Skill, Junior High School Students.

1   Introduction

Creative writing is a genre of writing that prioritizes self-expression, imagination, and originality. Creative writing is frequently more concerned with evoking emotions, telling stories, and investigating ideas in innovative and engaging ways, as opposed to technical or academic writing, which primarily focuses on conveying information or arguing a point. The practice of creative writing plays a crucial role in enhancing children's cognitive abilities. Throughout the entire process of engaging in creative

activities, children enhance their ability to effectively express their emotions and ideas. According to Shah (2011), The cortex, which is often referred to as the "learning brain," gets highly stimulated during creative work. This correlation emphasizes the significance of creative writing regarding cognitive development.[1] Research has suggested that creative writing can enhance higher-order cognitive abilities. According to Anna et al. (2018), creative activities involve cognitive capacities that collectively have a considerable influence on overall cognitive functioning. They stimulate innovative thought, challenges, and adaptability of the mind. Engaging in the creation and exploration of narratives through creative writing is a highly impactful method for fostering intellectual development.[2]

Engaging in creative work extends beyond traditional fiction writing and includes several forms, such as interactive fiction, a genre of text-based games that includes narratives, game design elements, and other inventive characteristics [3]. This process requires the use of multiliteracy abilities, which involves the capacity to recognize, understand, and create knowledge [4]. Interactive fiction is the result of collaborative efforts using several literacies, including visual, linguistic, and digital literacy. Therefore, utilizing interactive fiction as an educational tool is considerably effective in fostering students' analytical reasoning skills. When students write interactive fiction, they participate in a dynamic learning process that involves both creating a tale and expressing themselves via language.

The narrative in interactive fiction is structured in the form of a branching narrative, allowing readers to choose their own path through the story. This interactive element not only makes the experience more engaging but also serves as an excellent medium for developing higher-order thinking Skills (HOTS). Drafting an interactive story requires students to think critically and creatively, as they must consider various narrative possibilities and outcomes. This process encourages them to engage in decision-making, problem-solving, and analytical thinking. According to Veramuthu (2020), a fun and interesting learning experience, such as creating or reading interactive fiction, could attract students far more effectively than conventional methods. The dynamic nature of interactive stories could captivate students' attention, making learning enjoyable and memorable [5]. By immersing themselves in these narratives, students are motivated to explore different scenarios and outcomes, thereby enhancing their cognitive abilities and fostering a deeper understanding of the subject matter.

The use of Interactive Fiction (IF) as a medium for learning English through multiliteracy technology can significantly enhance students' thinking skills. IF is an effective tool for teaching Second Language Acquisition (SLA) because it combines extensive reading with creative engagement, which can improve students' memory of vocabulary and grammar [6]. Creating interactive narratives demands higher-order thinking skills, as writers must develop complex, branching plots [7]. Additionally, playing and creating IF can be highly enjoyable for students, allowing them to develop their creativity while drawing inspiration from their personal interests and hobbies. Nelson (2005) notes that the process of crafting branching narratives involves active creation and writing, making it an engaging and dynamic learning experience rather than a passive activity [8].

Implementing interactive fiction in the classroom is typically associated with teaching language or second language acquisition. However, students often engage with interactive fiction merely as readers or players of the narrative. Despite this, interactive fiction has proven effective in enhancing students' reading fluency and comprehension skills in second language acquisition [9]. This is supported by Hausknecht (2020), who highlights how interactive fiction creates a learning environment that boosts language understanding and commonsense reasoning [10]. Additionally, interactive fiction is particularly beneficial for English language learners, as it offers more than just a narrative experience [11]. Research by Sargsyan (2015) further demonstrates that interactive fiction influences readers' cognitive processes, requiring them to simultaneously read the narrative and engage in decision-making [12]. This dual engagement promotes a deeper understanding and more active involvement in the learning process. Furthermore, research by Harshita (2022) has found that interactive fiction is a powerful tool to elevate students' creativity and collaboration through narrative [13]. By creating and playing with the narrative of interactive fiction, one could get insights from the cognitive literary activity [14]. While other research focuses on how the interactive fiction reader could elevate their reading comprehension, this program is conducted to utilize a free open-source tool to encourage junior high school students to create an interactive, a nonlinear story in visual format to develop their high order thinking skills.

SMP Ta'mirul Islam Surakarta is the target of this community service activity, as this school is one of the institutions in Surakarta that upholds the concept of *Merdeka Belajar* (Freedom to Learn). Implementing *Merdeka Belajar* means that teachers and the school must provide the systems and learning materials needed by the students [15]. By applying *Merdeka Belajar*, the target school allows students to choose what they want to learn through extracurricular activities offered by the school. This is believed to enhance students' interest in learning, considering that students can select what they wish to study themselves. Furthermore, *Merdeka Belajar* should be applied in the learning process, not just viewed from the perspective of students being free to choose the materials or classes they want to attend. The issue that arises is the lack of integration of multiliteracy skills into basic literacy in classroom learning. This can be addressed by teaching IF as a medium for learning English in the extracurricular English class available at the school. Therefore, in practice, the community service activity is conducted for the extracurricular English class, which consists of students from grades 7 to 9.

Developing students' creativity requires special attention and approaches. To initiate Interactive Fiction (IF) into the English learning process, it is necessary to introduce and change the mindset that learning does not have to be done in a conventional way. Through this, students can achieve Higher Order Thinking Skills, as they are not just passively receiving what the teacher provides. In the learning process using Interactive Fiction, students engage in learning processes that not only acquire knowledge and communicate it but also build knowledge [16].

2   Method

This research utilizes a participatory learning approach aimed at enhancing junior high school students' higher-order thinking skills through a series of training sessions focused on writing interactive fiction using Twine, a simple HTML program. A total of 36 students, who were part of an English extracurricular activity, were recruited from *SMP Ta'mirul Islam* for the program.

Conducted over eight weeks, the program included formal meetings lasting 120 minutes each week, supplemented by asynchronous meetings via a WhatsApp Group. In the formal sessions, students were challenged to design branching narratives and craft storylines using Twine, an open-source tool for creating interactive fiction. To support students in developing their initial ideas into playable interactive stories, a series of asynchronous meetings were held, utilizing chat and voice messages.

As the study adopted a participatory learning approach, data were collected from both the students' processes in designing, developing, and finalizing their interactive fiction, as well as the finished projects uploaded online. Each meeting incorporated different teaching and learning strategies. The data collection began with an introduction to a variety of interactive fiction and encouraged students to read and engage with the texts.

In the first meeting, students actively participated by selecting options to navigate different narrative branches. The second meeting shifted focus to encouraging students to present their ideas or themes for their writing projects to their peers. During meetings three through eight, students collaborated in groups to turn their initial concepts into interactive texts, with each group supervised by a researcher who guided the writing process. Representative students presented their drafts at every meeting, fostering motivation among their peers who had not reached that stage yet.

As students presented their work, researchers provided suggestions to enhance the interactivity of their texts. By the eighth meeting, all students presented their final drafts, actively participating in reading their texts aloud. This collaborative strategy encouraged students to revise their work before submitting it online.

Finally, all collected data were analyzed to evaluate the program's effectiveness in developing students' higher-order thinking skills. Students' works were classified based on their interactivity and language expression, providing insights into the benefits of the program.

3   Result

This program recruited a total of 36 students from years 7 to 9, predominantly consisting of those who were already engaged in English curricular activities. Among these participants, some joined the program at the encouragement of their parents, who were drawn to the program's objective of enhancing students' higher-order thinking skills through the creation of interactive fiction. This initiative was designed not only to foster creativity and critical thinking but also to provide a unique opportunity for students to explore storytelling in a dynamic and engaging way. By focusing on interactive fiction

as a final product, the program aimed to empower students to develop their analytical skills, collaborate with peers, and apply their English language abilities in innovative ways.

This program provided the students with the opportunity to explore their creative writing by allowing them to select their story themes. In the first 30 minutes of each session, students focused on the material about creative and interactive writing, which included four key elements of interactive fiction as outlined by Monfort (2011). The main differences between interactive fiction and traditional fiction are: 1) the presence of computer programs; 2) branching narratives; 3) the simulation of the real world; and 4) a rule structure known as the game.[17]

Over the two-month period of meetings, there was a significant shift in how students approached creative writing in English. Initially, during the first two meetings, students struggled to elaborate on their ideas into more complex stories, largely due to their unfamiliarity with branching narratives. Their English vocabulary was limited to basic words they had encountered in conventional classes, primarily focusing on nouns and verbs related to themes like hobbies, jobs, and family. This limited vocabulary impacted their narrative choices, leading them to write predominantly about their hobbies and family. Consequently, their branching narratives were straightforward, often walking a simplistic line between accepting or rejecting outcomes, or happy versus sad endings, reflecting a lack of complexity due to their limited understanding of interactive fiction. However, once they learned that interactive fiction, they could encompass an unlimited number of branches and endings like a game, students began to find the process enjoyable.

After grasping the concept of narrative branching and essential storytelling elements, students were introduced to English grammar to help refine their narratives. In the fifth session, coinciding with the conclusion of midterm exams for *SMP Ta'mirul Islam* students, a light yet educational activity was planned. Students participated in a Kahoot! game that focused on listening skills. Their enthusiasm for the game, driven by a competitive spirit, highlighted their engagement. The game results demonstrated that the students had a strong ability to comprehend English phrases and sentences, indicating sufficient grammatical understanding to craft their own English stories. Incorporating games into learning is effective, as it fosters engagement and active interaction among students [18].

Following the session that involved English games, students were introduced to English expressions in the sixth meeting. This activity continued as part of the ESL (English as a Second Language) support material, with a focus on figurative language. The intention behind teaching figurative expressions was to enable students to enrich their storytelling with more expressive language. It was surprising to find that many students were already familiar with figurative language, thanks to their exposure in online games. Some students, particularly girls, easily recognized figurative expressions from webcomics and web dramas they consumed regularly. This active learning approach proved effective, as it engaged students far more than traditional passive listening. Through such a strategy, the students started to enjoy the process of writing interactive fiction. The themes that they choose are varied due to the free access of the internet that they can make use of during the writing process. Their choice of themes became

increasingly diverse, fueled by the unrestricted access to the internet that they utilized during their writing. They developed a solid understanding of how to construct branching narratives in interactive fiction and successfully applied proper English grammar in their writing. As a result, 23 out of the 36 students were able to complete their stories with varying levels of branching complexity.

Throughout the writing process, students gained valuable insights into transforming their narratives into game-like experiences, enhancing their high-order thinking skills (HOTS). Writing interactive fiction requires more than just a single plot; it demands the creation of unlimited narrative branches that stimulate critical thinking. This process is akin to assembling a complex puzzle, as students must ensure that each story segment fits seamlessly into a cohesive work [19]. For their interactive fiction to succeed, students must craft each branch in a way that leads to distinct outcomes while providing a cohesive experience for the reader.

Engaging in interactive fiction writing proved beneficial for ESL students, honing their grammar and vocabulary skills in English. Beyond improving their language proficiency, this approach also encouraged students to leverage technology in their daily learning activities. Traditional English instruction often relies on textbooks and standardized testing, which can be less engaging. In contrast, incorporating the internet and interactive writing not only made learning enjoyable but also easier for students. Many reported feelings more relaxed and acquiring English vocabulary naturally, rather than through rote memorization typically associated with conventional classes. This marked a significant shift from the initial meeting, when students expressed anxiety about their writing abilities. [20].

The participatory learning activities during the interactive fiction writing process at *SMP Ta'mirul Islam* aim to shift students' mindsets regarding conventional education. The following section outlines how students' thinking evolved throughout their experience of writing interactive stories.

Table 1. The Students' Changing Paradigm of Education

Factors	Old Paradigm	New Paradigm	Students' Paradigm
Knowledge	Transfer of knowledge from teacher to student	Knowledge is constructed, discovered, transformed, and developed by students.	Knowledge is received by students from the internet, friends, and teachers. It can also be obtained from their hobbies such as reading or playing games.
Students' role	Students are passively listening to the information taught by teacher	Students can actively build knowledge.	Students do what is instructed by teachers (doing homework, studying before exams).

Ability	Students are being classified or ranked based on their score and category.	The role of teachers is only to develop students' competencies and talents.	Students are more relaxed about how their grades would turn out, they enjoy the process of learning.
Relation	The relationship between teachers and students is formal in the context of education.	Education is a personal transaction between students and teachers where there are cooperations between teachers and students.	Teachers and students can have cooperation, which can also be formal by still respecting the teacher.
Context	Maintaining a competitive organizational structure.	Teaching is assumed to be a complex application of theory and research.	Students assume that learning is a fun way to explore new things and express themselves.
Assumption	Assuming that anyone with a certain expertise can teach without training.	It requires teacher training to continuously hone skills and develop teaching procedures.	Teachers let the students doing the practical matters such as understanding the material

The development of students' cognitive abilities became evident throughout the course of this activity. Initially, during the first meeting, many students exhibited a limited attention span, primarily because they expected the session to resemble a typical conventional English class. However, as the program progressed, students began to engage more deeply with the material. They learned to use their gadgets not merely for distraction, but as valuable tools for research and exploration after several meetings. Over time, their writing skills also improved, a change that was particularly noticeable in their use of figurative language introduced earlier during the sessions. This evolution in their engagement and skill set highlights the effectiveness of active, direct learning in fostering better academic outcomes.

The shift in students' perspectives regarding English language learning before and after the activities was striking. Many junior high school students were accustomed to traditional educational systems where knowledge was predominantly transmitted from teacher to student in a passive manner. However, some were already familiar with the *Merdeka Belajar* education system, which emphasizes student autonomy and

personalized learning, as supported by the teachers and principals of *SMP Ta'mirul Islam*. This approach allowed students the freedom to select what they wished to learn beyond the basic curriculum. Consequently, the 36 students in the English Club class chose to participate based on their personal interests, revealing a desire for more engaging and relevant learning experiences.

By the end of the program, students no longer viewed English as a subject confined to the classroom setting. They came to understand that they could learn the language through various activities, including reading, writing, and even watching movies, which parallel the skills they developed while crafting their interactive fiction narratives. This integrated approach to learning enabled them to see English as a dynamic and multifaceted language that could be integrated into their everyday lives. Additionally, many students found that they could more easily remember grammar and vocabulary in English while writing interactive fiction because they learned through play and creativity rather than through rote memorization. This self-directed learning experience not only made the process enjoyable but also reinforced their understanding of the language in a practical and meaningful way.

4   Discussion

The findings clearly demonstrate that the number of students who successfully completed their interactive fiction stories highlights a transformative shift in their learning process. Each student chose themes that resonate with their personal backgrounds and hobbies, allowing them to express their individuality in their narratives. This freedom to select their storylines fostered a sense of authenticity, resulting in a more engaging and enjoyable classroom environment. As students explored complex story structures in ways that aligned with their own interests, the overall mood in the classroom noticeably improved. Consequently, the characteristics of their writing and language use varied significantly, reflecting the unique perspectives and conditions each student brought to their work.

Although students exhibited varying levels of English proficiency, an analysis of their vocabulary and language styles indicated a clear influence from the games they play. As noted by Shaffer (2006), children often remember and apply concepts learned through gaming, and this observation extends to their use of English in real-world contexts [21]. By integrating gaming into their educational experience, students began to perceive language learning as an enjoyable and dynamic activity, rather than a monotonous task centered around rote memorization [22].

Further supporting this perspective, Rees (2011) outlines that a narrative qualifies as Interactive Fiction when it incorporates elements of game design. Such design can be analyzed through four distinct levels: the overarching plot, user-interactive scenes or events, puzzles that require resolution, and the integration of text with programming language. These four levels serve as valuable benchmarks for evaluating the students' interactive fiction works.[23]

The overall process of writing interactive fiction has significantly reshaped students' attitudes toward learning English. The playful and creative nature of this approach has

sparked a heightened interest in the language, as students draw upon vocabulary and expressions they encounter in their favorite games and movies. Those students with regular access to gadgets and the internet have demonstrated noticeable advancements in vocabulary and idea generation. They could report acquiring new words and narrative inspiration from their entertainment sources, including webcomics, online games, and streaming platforms. This exposure to digital content provides students with the opportunity to gain experience in engaging ways, provided they exercise moderation in their screen time and use technology wisely.

The interactive fiction produced by the students of *SMP Ta'mirul Islam* exemplifies effective game design, highlighting their ability to engage in complex thinking processes throughout the eight meetings. According to Rosiani (2022), students who navigate intricate thought patterns through game simulations demonstrate creative thinking skills, which are essential in today's digital landscape [24]. Furthermore, the incorporation of interactivity and technology not only enhances engagement but also significantly develops students' higher-order thinking skills [25]. Overall, the findings underscore the capacity of interactive fiction to revolutionize English language learning by blending creativity, technology, and personal interests.

5   Conclusion

Utilizing interactive fiction and creative writing as tools for English language learning has proven to be an effective and enjoyable method for reshaping students' perceptions of their educational experiences. By engaging in the storytelling process, students can have the opportunity to explore varied narrative branches and intriguing themes that resonate with their individual interests.

Despite varying levels of English proficiency, the collective spirit of the students has been remarkably high, demonstrating their eagerness to engage with the material. This activity not only supports the development of essential writing and language skills but also significantly enhances their higher-order thinking abilities. As students navigate the complexities of crafting their interactive stories, they are challenged to think critically, solve problems, and make creative choices, all of which contribute to their cognitive growth.

A particularly notable aspect of this initiative is the substantial shift in students' paradigms regarding learning. By the end of the sessions, there is a clear and measurable increase in their creative expression and the complexity of their writing. This progression illustrates the effectiveness of interactive fiction in promoting a deeper understanding of the English language and its narrative structures. As students move away from traditional, rote learning styles, they embrace a more dynamic and engaging approach that not only enhances their current abilities but also prepares them for future writing endeavors and English language use.

Considering these findings, the potential for growth in students' writing and language skills is significant. With the foundations laid through interactive fiction and creative writing, students are better equipped to tackle future challenges in both academic and real-world contexts. This paradigm shift not only transforms their learning experiences

but also nurtures their creativity and critical thinking skills—essential assets in today's fast-paced, information-driven world. Thus, the integration of interactive fiction into English language learning proves not only beneficial in enhancing language proficiency but also in cultivating the next generation of innovative thinkers and effective communicators.

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