

The Impact of Digital Storytelling Applications on Enhancing Critical Thinking Abilities in Higher Education Students

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ABSTRACT

This study aims to examine the impact of using digital storytelling applications on the development of students' critical thinking skills within a learning context. It employs a qualitative approach, using observation, interviews, and document analysis to gather data. 46 students are participated in a digital storytelling project for 1 semester that required them to organize, analyze, and critically present information using digital applications such as Adobe Spark and Canva. The findings indicate that the use of digital storytelling applications significantly contributes to the development of students' critical thinking skills. These applications enable students to integrate various media – such as text, images, audio, and video – encouraging them to think critically about the most effective way to convey messages. Additionally, digital storytelling applications prompt students to evaluate information more thoroughly, develop strong arguments, and present them creatively and logically. Based on the research data, digital storytelling applications are also shown to be effective in enhancing students' critical thinking skills and hold potential for broader integration into education as innovative and interactive learning tools.

Keywords: Critical Thinking Skills; Digital Storytelling Applications; Multimedia Learning; Student Engagement.

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1. Introduction

Critical thinking is one of the essential competencies that students must possess in the 21st century. In the context of modern education, critical and analytical thinking have become more important than ever due to significant changes in the way we access, process, and use information (Benek & Akçay, 2022; Halim, 2022). Today's world is driven by rapidly evolving technology and information. In the digital era, students are flooded with information from various sources, with vast amounts of data readily available at their fingertips through the internet, social media, and other digital platforms (Xu & Zhou, 2022). According to Boczkowski (2021: 71), the digital age is marked by a phenomenon known as "information overload," where the amount of information available exceeds an individual's capacity to process it effectively. Critical thinking involves the ability to analyze, evaluate, and synthesize information from various sources systematically, while analytical thinking is the ability to break down problems into smaller parts, analyze each component, and understand how those parts relate to one another (Indrašienė, et al., 2021). In an increasingly complex world, where problems rarely have clear and simple solutions, analytical thinking has become a highly valuable skill. Students need to learn not only to passively accept information but also to

critique it, question its validity, and determine whether it can be relied upon. This skill is essential to avoid reasoning errors, misinformation, and cognitive biases that often arise in the online world (Ratnasari, Roemintoyo & Winarno, 2019).

In the past, access to information was limited and often controlled by educational authorities like schools and libraries. However, with the digital revolution, information has become incredibly easy to access, even instantaneously (Mindel, 2021). This means that students are now exposed to vast and diverse amounts of information, including content that is not always accurate, biased, or even false. Therefore, students need the ability to filter relevant information related to the topic they are studying. This involves evaluating information sources, identifying biases, and distinguishing between facts and opinions. Without critical thinking skills, students may feel overwhelmed and unable to make proper judgments about what is important and what is not (Kogila, Ibrahim & Zulkifli, 2020). Modern education must prepare students for these challenges, which can only be achieved by instilling critical and analytical thinking skills from an early age. Furthermore, technological developments in education have also changed the way teachers teach, and students learn. Learning is no longer solely text- or lecture-based; digital storytelling, interactive media, and technology-based educational apps have played an important role in providing richer learning experiences (Nair & Yunus, 2021). Digital storytelling, for example, not only serves as a presentation tool but also to engage students in the critical thinking process. When students are tasked with creating or analyzing digital stories, they are required to consider perspectives, narrative structure, and the relevance of the information they present or analyze. This encourages deeper, more analytical thinking, which is crucial in the context of modern education (Kabaran & Duman, 2021).

Digital storytelling is the practice of combining traditional storytelling with digital technology. It involves using various digital media, such as text, images, sound, video, and graphics, to create engaging and interactive stories (Ahmad & Yamat, 2020; Hashim, 2018). Digital narration is not just about adding digital elements to a story but also about integrating technology to enrich and expand the ways stories are conveyed and understood by the audience. In an educational context, digital storytelling can be defined as a process in which students use digital tools to create and share their own stories. Digital storytelling projects often involve the use of presentation software, video editing applications, and social media platforms to create final products that reflect students' creativity and understanding of a topic. Typically, digital storytelling consists of several key components that work together to create a rich and engaging storytelling experience (Avcı & Kasimi, 2023). The first component is the narrative text, which includes the main story or message being conveyed. This text may appear as a script read by a narrator or as an on-screen text, often combining both. The second component is visuals, which include images, videos, and graphics used to clarify the message and enhance the appeal of the story. These visuals not only capture the audience's attention but also help them understand the context and emotions being conveyed. The next component is audio, which encompasses the narrator's voice, background music, and sound effects. This audio helps set the tone, deepen the storytelling experience, and increase audience engagement. Lastly, there is the element of interactivity, where digital storytelling may include interactive features like hyperlinks, quizzes, and choices that the audience can make. This interactivity adds a dynamic layer to the story, allowing the audience to become more involved and making the storytelling experience more participatory (Sayılğan, 2023).

Digital storytelling has become highly relevant in modern learning, especially in the digital age, where technology plays an integral role in nearly every aspect of life, including education (Hartsell, 2017). Digital storytelling enriches the learning experience by offering a

more engaging and interactive way to present lesson content. In the process of creating digital stories, students learn to research, write, edit, and present information effectively – skills that are essential in an increasingly connected and technology-driven world. Digital storytelling also facilitates differentiated learning, allowing teaching to better align with students' individual learning styles and needs (Aktaş & Yurt, 2017). For example, students with a visual preference can better understand content through images and videos, while verbal learners may feel more comfortable with text and audio. This flexibility allows teachers to accommodate a variety of student abilities, ensuring that each student learns in the most effective way for them. Furthermore, digital storytelling encourages critical and creative thinking (Ramalia, 2023). Students must consider their audience, the purpose of the story, and the best way to convey their message, which requires them to think deeply and analytically, as well as express their ideas in creative ways. Digital storytelling offers a more dynamic and interactive learning method that can stimulate students' critical and analytical thinking.

Research on the role of digital storytelling in enhancing students' thinking abilities is highly significant and offers innovative contributions to the field of education. This research is relevant as it explores how digital applications can be used to enrich students' learning experiences and develop critical and analytical thinking skills, which are crucial for academic and professional success in the 21st century (Abida et al., 2023). The study focuses on two key aspects related to the use of digital storytelling applications in learning. First, how does the use of digital storytelling applications impact students' creativity in the learning process? Second, what factors influence the effectiveness of digital storytelling applications in enhancing students' creativity and analytical thinking abilities? The novelty of this research lies in its unique focus on the use of specific digital applications to enhance higher-order thinking skills, an area that has not been extensively studied. Through an interdisciplinary approach combining education theory and technology, this research provides new insights into how the collaboration of different fields can improve the learning process. Additionally, this research leverages data-driven digital applications that provide real-time feedback to both students and teachers, enabling more personalized and adaptive learning. The potential for generalizing and replicating the results of this study across various educational contexts makes it a model that can be adopted by schools in different regions, opening opportunities for continuous improvement in educational practices that align with the demands of the times.

2. Method

This study employs a qualitative approach with an exploratory case study design, which allows the researcher to examine in detail the impact of digital storytelling applications on students' creativity and analytical thinking skills in real-world settings. The research was conducted in several classrooms that used digital storytelling applications in their teaching.

Experiences, perspectives, and contexts, as well as how they interact with the phenomenon being studied (Cresswell, 2018; Heriyanto, 2018). In the context of this study, the qualitative approach enables the researcher to explore how students and teachers engage with digital storytelling applications and how these applications influence students' thinking skills. Meanwhile, the exploration design helps uncover and identify factors that may not have been previously known (Arikunto, 2010). By combining both approaches, this research provides a more comprehensive and detailed understanding of how digital storytelling applications can impact students' thinking abilities, while also suggesting areas for further research and the development of educational practices.

2.1 Research Participants

The research participants consisted of 46 first-year students from the 2024 English Literature program who have used digital storytelling applications as part of their learning. The participants were selected using purposive sampling, where subjects with direct relevance to the research topic were chosen based on specific criteria, such as active use of digital storytelling applications during the curriculum. The project took six months or one semester, during which students engaged with digital storytelling tools as an integral part of their coursework, allowing for a comprehensive analysis of their experiences and learning outcomes.

2.2 Data Collection

Data collection methods included interviews, observations, and document analysis (Cresswell, 2018; Arikunto, 2010). In this study, interviews were conducted by the researcher to gain in-depth insights into the participants' experiences, views, and perceptions. Interviews were held with both students and lecturers to explore individual perspectives, providing a deeper understanding of how students and teachers use digital storytelling applications, including the benefits they experience, challenges faced, and perceived impacts on students' thinking abilities. Observation is another method that allows the researcher to directly observe and record the behaviors and interactions of participants. In this research, observations were conducted in classrooms where digital storytelling applications were used. The use of elements within the applications (such as text, visuals, and audio) in the digital narratives that contributed to the students' thinking processes was closely monitored. Document analysis involved reviewing written materials related to the research topic. In this study, documents analyzed included student works or projects that used digital storytelling applications, including the digital narratives they created, which provide insights into their understanding, thinking abilities, and creativity.

2.3 Data Analysis

Data analysis techniques are crucial steps in qualitative research for organizing, interpreting, and drawing conclusions from the collected data. Thematic coding is one of the data analysis techniques used in this study (Heriyanto, 2018). Thematic coding is a systematic process of identifying, analyzing, and reporting patterns or themes within qualitative data. This technique helps the researcher understand the structure and meaning of complex data by organizing it into more manageable categories. By using thematic coding, the researcher can systematically organize and analyze qualitative data, identify significant patterns and themes, and present in-depth and valuable findings on how digital storytelling applications influence students' thinking abilities. This technique provides a structure for interpreting complex data and assists the researcher in drawing informative and relevant conclusions.

3. Result and Discussion

The first lesson took place on Monday, January 8, 2024, from 08:00 to 10:20 AM. At the beginning of the session, the teacher introduced stimulate the students by telling a legend from East Java. From this story, the teacher explained how the plot was structured and discussed appropriate illustrations. A question-and-answer session followed to reinforce the students' understanding. The lecturer then presented an example of digital storytelling and explained the essential elements involved in creating a digital story. In the subsequent session, the teacher instructed the students to write a story based on a legend, which could be sourced from newspapers, magazines, or websites. Based on the drafts of the stories written by the

students, the teacher then directed them to summarize the stories, which became the second core activity in the digital storytelling process. While students were summarizing their stories, the teacher circulated around the classroom providing examples of storyboards. After summarizing the story into a narrative, the next activity involved students creating a storyboard column, which was used to design their digital storytelling project so that their ideas could be conveyed according to their thinking. The teacher then guided the students in designing the storyboard by creating columns for narration, images, effects, and music. The teacher explained that the storyboard could help students present their story ideas more easily, as it would align their imagination with the images provided, helping the audience understand the story's intended message. The students performed well in summarizing the stories. Furthermore, they were very active in developing their knowledge from the legends they had chosen, writing the stories, and designing the storyboards. The next step was to incorporate the story summary (narrative), images, and music into the storyboard columns they had created.

Based on classroom observations, the use of digital storytelling applications in the process of creating a legend story had a significant impact on enhancing students' creativity. Digital narratives, which combine text, images, videos, and interactive elements, create a more dynamic learning environment and encourage students to actively participate. Digital storytelling allows students to experiment with new ways of presenting information. By using applications such as Adobe Spark or Canva, students can create presentations that combine text, images, and videos (Zuana, 2018; Yuliana et al., 2023). They have the freedom to decide how to arrange these elements to strengthen the message or story they want to convey. Furthermore, in their understanding of literary works, students were asked to create a visual interpretation of a 19th-century novel. They were instructed to use Adobe Spark to create short videos that combined text, illustrative images, and background music relevant to the story's mood. Meanwhile, Canva was used by students to design posters, infographics, or visually appealing presentations. With features that allow for easy editing, students could experiment with colors, fonts, layouts, and graphic elements to communicate their messages in a unique way.

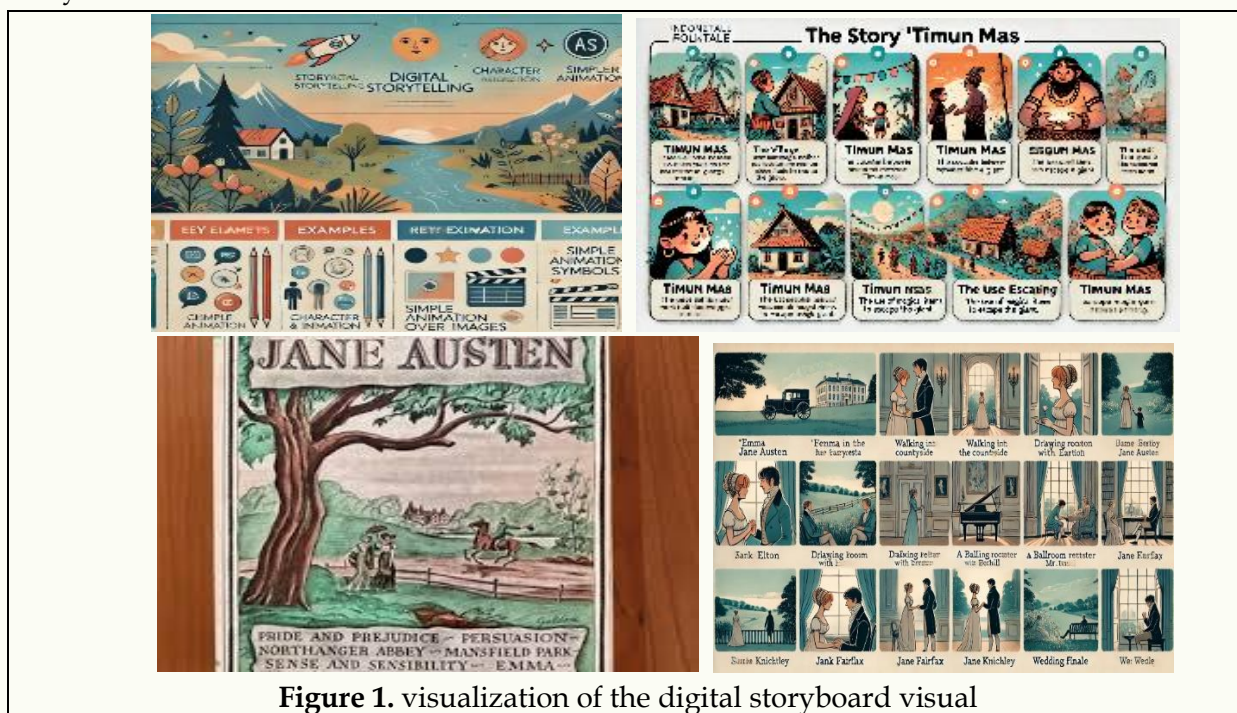


Figure 1. visualization of the digital storyboard visual

Here is a visualization of the digital storytelling created by the students using the Canva application. This digital storytelling demonstrates how students combined illustrations, brief narratives, colors, and animations within Canva to convey a traditional story with a visually appealing approach. It serves as an effective presentation method to engage the audience, especially children or young readers, in understanding folklore in a livelier way. Based on student interviews, they selected colors that aligned with the theme and mood of the story. In the example above, the students chose green for the peaceful village scene, red and orange to depict the tense atmosphere when the giant appears, and soft colors for the happy ending. Each slide composition maintains focus on key elements, making the story easy to follow. The text is designed with a simple, easy-to-read font. For titles or important text, the font is larger and gives effects or contrasting colors to make it stand out. This helps the audience quickly grasp the main message. Each scene is accompanied by a brief narrative describing the key event, such as "The giant returns to claim the promise" or "Timun Mas escapes with her magical pouch." These narratives complement the visuals and help the viewer follow the story clearly.

This project allows students to express their personal interpretation of the story content in a creative and free manner. Furthermore, this activity process forces students to think creatively about how to simplify complex information into a visually engaging form. It encourages them to reflect on the narrative, plot, and how visual elements can be used to convey emotions and themes. Students must think about how to distill events into an engaging and relevant narrative for a young audience, while also sharpening their creativity through animation visualization. Below is the class activity in Introduction to Literature, representing the draft creation of the story before it was applied to dynamic tools like Adobe Spark and Canva to create visual projects.



Figure 2. shows activities conducted in the class where students were observed

In the class, students were observed to be at the initial stage of creating a visual literary work. They were developing their story ideas by considering the plot, characters, themes, and atmosphere they wanted to portray. After finalizing their story drafts, the students prepared to translate the stories into visual formats using Adobe Spark and Canva. Both applications are popular and user-friendly for creating various graphic designs, including presentations, posters, and short animations. Through this activity, students were trained to think creatively about integrating literary elements with visual design. The use of digital storytelling applications provided students with a broader opportunity to create multimedia elements. This differs from traditional methods that rely solely on written or oral forms of expression. In the context of digital storytelling, students can use a combination of text, images, videos, music, and sound to create more dynamic and engaging stories (De Natale, 2008; Hashim, 2018).

This process provides an in-depth learning experience, where students not only focus on content but also on how best to communicate their messages. Through visualizing stories, students deepen their understanding of literary elements such as plot, characters, and themes, while also developing a portfolio that reflects both writing and design skills. These skills are highly relevant in the digital age, where visual communication and creativity are highly valued. Therefore, this activity not only enriches the literary learning experience but also prepares students for the challenges of the increasingly complex job market. Overall, the use of digital storytelling applications in education significantly impacts students' creativity, as it integrates various technological elements into an educational process focused on free expression and collaboration. Applications like Adobe Spark and Canva allow students more freedom to express their ideas through combinations of text, images, video, and sound. This gives them room to develop creativity visually and conceptually in ways that traditional methods like writing or oral presentations do not. This freedom of expression allows students to experiment with different ways of conveying their ideas, giving them more autonomy in selecting narrative forms that best align with the ideas they wish to communicate.

In practice, students were also required to work in groups to complete digital storytelling projects, where they shared ideas, solved problems together, and innovated in creating content. This collaboration not only enhances social and teamwork skills but also helps students learn from each other, enriching their creative thinking process through diverse perspectives. Furthermore, digital storytelling applications also promote critical thinking. In the process of constructing narratives, students must consider how best to organize information, filter relevant data, and choose the most effective media to convey their message. This ability trains students to think deeply and analytically, ultimately fostering the development of critical thinking skills essential for both academic and professional life (Triningsih, 2021). With the combination of freedom of expression, collaboration, personalization, and critical thinking, the use of digital storytelling applications makes learning more dynamic and interactive. It boosts student motivation to innovate, makes learning more enjoyable, and provides students with opportunities to create meaningful and relevant works in their academic contexts.

During classroom observations, the researcher found that the first factor influencing the effectiveness of digital storytelling applications was the readiness of technology and infrastructure at school or educational institutions. Adequate computers, tablets, or smartphone devices, along with stable internet access, are crucial for ensuring that these applications can be used optimally. If technology is not available evenly or the internet quality is poor, the digital storytelling learning process could be disrupted, resulting in underutilization of the application's features. In the Introduction to Literature class at

Universitas Negeri Surabaya, the program's facilities included well-equipped computer labs with strong technological infrastructure. Additionally, students typically had standard laptops that could run simple multimedia applications, allowing the digital storytelling process to proceed smoothly. Thus, the availability of technology becomes a key factor in enhancing students' creativity and analytical thinking abilities. Next, the teacher's role in implementing digital storytelling applications is also crucial. Teachers with good digital literacy are more capable of guiding students in using these applications creatively and effectively. Teachers must have a strong understanding of how these applications can be used to construct narratives that foster creative and analytical thinking skills (Kompasiana.com, 29 May 2023). Furthermore, the teacher's attitude toward technology greatly influences the success of using digital storytelling applications. Teachers who are open to innovation and willing to learn new technologies are more effective in motivating students to participate actively in the learning process. On the other hand, teachers who are less confident or reluctant to use technology may become barriers to the successful implementation of digital storytelling applications.

The effectiveness of digital storytelling applications in enhancing students' creativity and analytical thinking also depends heavily on the level of student engagement and motivation. Motivated students are more likely to explore various features of the applications and use them to create more innovative work. Another factor influencing the effectiveness of digital storytelling applications is how well the learning content presented through the application aligns with educational goals (Jones, 2022). The application must be used with relevant materials to train analytical thinking skills, such as providing projects that require problem-solving, critical evaluation of information, or in-depth analysis. If the learning content is irrelevant or too simplistic, the application may be used merely as a presentation tool, without challenging students to think critically. On the other hand, if the projects in the digital storytelling application are well-designed and require higher-order thinking skills, such as comprehensive analysis or constructing logical arguments, the application can be a highly effective tool for developing analytical thinking.

Collaboration among students when using digital storytelling applications is also an important factor in the effectiveness of this tool. When students collaborate to create digital storytelling projects, they not only share ideas and solutions but also develop communication skills, problem-solving together, and teamwork. This collaborative process enriches creative and analytical thinking, as students are exposed to different perspectives and new ideas. For example, when students work in groups to develop a digital narrative about a historical topic, they must exchange information, discuss, and make decisions together regarding which elements to include in their narrative. This helps students develop critical and analytical thinking skills through dialogue and interaction.

The success of using digital storytelling applications is also influenced by the features offered by the application. Applications with rich features, such as the ability to add multimedia elements (text, images, video, and audio), flexible editing capabilities, and options to share projects digitally, are generally more effective in stimulating students' creativity and analytical thinking. For example, with applications like Adobe Spark or Canva, students can experiment with different visual elements and designs to present their narratives. With these extensive feature choices, students can create more complex narratives and consider various aesthetic and logical aspects in their creative process. This requires them to think more deeply about how to deliver information effectively and visually appealingly. To ensure that digital storytelling applications are effective in enhancing creativity and analytical thinking, students must be given enough time and opportunities to experiment. Rushed learning or time

limitations often hinder students from fully exploring their creative potential. Teachers need to provide sufficient time for students to explore the various features of the applications and try different approaches to narrative creation. This process requires stages involving experimentation, feedback, and revisions. Thus, adequate time and process-focused learning (not just the final product) are essential to optimize the use of digital storytelling applications in enhancing students' creativity and analytical thinking.

Based on this analysis, the key factors affecting the effectiveness of digital storytelling applications in enhancing students' creativity and analytical thinking include technological readiness, teacher support and digital literacy, student motivation and involvement, alignment of learning content, collaboration, application features, and time available for experimentation. All these factors must be considered comprehensively to optimize learning outcomes through digital storytelling applications.

4. Conclusion

Critical thinking is paramount in the 21st century, and digital storytelling emerges as a powerful pedagogical tool to cultivate these essential skills. By integrating technology into the learning process, students are not only engaged in creative expression but also actively develop critical thinking, analytical abilities, and problem-solving skills. The findings from this study demonstrate that the implementation of digital storytelling applications in an Introduction to Literature class significantly enhanced students' creativity. By utilizing platforms like Adobe Spark and Canva, students were empowered to experiment with various multimedia elements, transforming their literary interpretations into dynamic and engaging visual narratives. This approach not only fostered creative expression but also encouraged critical thinking as students meticulously planned their presentations, considering factors such as plot, character development, and the most effective use of visual and auditory elements to convey their message.

Furthermore, collaborative projects fostered teamwork and enhanced the creative process through the exchange of ideas and diverse perspectives. However, this study has certain limitations. First, the sample size was relatively small, consisting of only 46 students from a single academic program, which may limit the generalizability of the findings. Second, the study was conducted within a specific subject area 'Introduction to Literature' meaning that the results may not fully capture the potential impact of digital storytelling in other disciplines. Third, the availability of technological resources and students' familiarity with digital tools varied, which could have influenced their engagement and overall performance. Additionally, the study relied primarily on qualitative observations and student reflections, which may introduce subjectivity into the findings. For future research, it is recommended to expand the study to a larger and more diverse student population to enhance the reliability of the results. Comparative studies across different disciplines could provide deeper insights into the effectiveness of digital storytelling in various educational contexts. Moreover, incorporating quantitative measures, such as performance assessments and pre- and post-tests, would offer a more comprehensive evaluation of the impact of digital storytelling on students' critical thinking and creativity. Future research could also explore the long-term effects of digital storytelling on learning retention and student engagement, as well as investigate the role of artificial intelligence and emerging technologies in further enhancing digital storytelling experiences in education.

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