

Exploring the Lived Experiences of Designing Digital Storytelling Among EFL Pre-Service Teachers: A Focus on Creative Thinking

Arining Indrasari Ahdi
(arining.ahdi@student.uns.ac.id)
Sebelas Maret University, Indonesia

Nur Arifah Drajati
(nurarifah_drajati@staff.uns.ac.id)
Sebelas Maret University, Indonesia

Kristian Adi Putra
(k.putra@psau.edu.sa)
Prince Sattam Bin Abdulaziz University, Saudi Arabia

Abstract

Creativity, one of the crucial skills in the 21st century, has become an increasing focus in language teaching as education has transformed to digital learning. There is an urgent need for educators to incorporate activities such as digital storytelling (DST) to encourage students to explore diverse perspectives and develop innovative solutions. In this study, 35 pre-service teachers (PSTs) of English as a Foreign Language (EFL) were voluntarily recruited in adherence to ethical protocols. We explored the PSTs' experiences in using their creative thinking skills to create digital storytelling. Data were collected through narrative frames, interviews, and artifacts (digital stories). The findings of this study showed that the participants generated numerous ideas for their stories. They were flexible regarding different perspectives and feedback. Furthermore, they ensured that their stories and media components were original. They also enriched their stories with many components (translation, audio, and others). This indicates that the four components of creative thinking skills (fluency, flexibility, originality, and elaboration) were evident in the PSTs' experiences. Therefore, creative learning activities need to be incorporated into teacher education programs so that teachers will be familiar with creative learning and can integrate it into their classrooms in the future.

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1 Introduction

The rapid changes in recent years, impacted by technological development and globalization, necessitate a shift away from traditional rote-focused teaching strategies. Increasing technology-integrated learning empowers students with the skills needed to thrive in this century (Chen et al.,

2023). This shift reflects the integration of technology in education and the promotion of crucial skills like creative thinking (Chaka, 2020). As stated by the Future of Jobs Report 2020 (World Economic, 2020), creativity ranks among the top five skills that will be increasingly important in 2025 (Chen et al., 2023). While creativity is widely recognized as a valuable skill, not everyone actively utilizes or strives to improve their creative thinking abilities. This is evident in the fact that only 12 countries scored higher than the average in the global assessment of creative thinking conducted by the OECD Pisa Survey (OECD, 2024). This creative thinking assessment by the OECD measured three components: producing diverse ideas, generating creative ideas, and evaluating and improving ideas. Based on that assessment, Indonesian students showed relatively low levels of creativity compared to their peers in other countries and were positioned at 115 out of 139 countries (Hafina & Fitri, 2022).

Despite the reform of the education system in Indonesia, many schools are still not ready for it. This has resulted in learning that still focuses on memorization (Ismawati et al., 2023). Considering the above issues, teachers should prepare for and students should engage in learning activities that foster 21st-century skills, such as creative thinking. The activities should be varied with defined learning goals (van der Zanden et al., 2020). Teachers must also appreciate students' creativity, give them enough time for assignments that need creative solutions, and encourage them to practice problem-solving techniques (OECD, 2024). Given the importance of fostering creative thinking skills through engaging learning activities, digital storytelling has emerged as a promising approach to cultivate these abilities in students. It enables pre-service teachers to combine technology, narrative, and multimodal inputs to design interactive learning experiences (Smeda et al., 2014). It also allows them to express their creative ideas and foster a student-centered learning environment.

Previous studies, predominantly employing quantitative methods to assess creative thinking scales, have demonstrated the potential of digital storytelling to foster creativity across various educational levels (Akyeampong, 2018; Belda-Medina, 2021; Tabieh et al., 2021; Yang et al., 2022). While much of the existing research has explored the impact of digital storytelling on creativity, few studies have examined the lived experiences of EFL pre-service teachers. This study addresses this gap by employing narrative inquiry to delve deeper into participants' experiences. It also extends Torrance's framework (1998) by demonstrating how digital storytelling fosters creativity within a specific cultural context.

This study explored the process of creating digital storytelling throughout the 16-week program and examined how participants employed creative thinking skills during the creation process. The data were collected using narrative frames, interviews, and artifacts (digital stories). The results showed that participants engaged in creative thinking when designing digital stories. This is evidenced by the aspects of creative thinking that appeared in the participants' stories. The results are discussed in connection with previous findings in the relevant literature. To explore current research practices and emerging trends, this study was guided by the research question: How do EFL pre-service teachers utilize creative thinking to design digital storytelling?

2 Literature review

2.1 Creative thinking as the theoretical framework

Creative thinking is defined as an individual's ability to generate original ideas, develop existing ideas, evaluate remaining ideas, and discuss the feasibility and appropriateness of ideas (Hernández-Torrano & Ibrayeva, 2020). Individuals have to be flexible and open to possibilities (Mednick, 1962) so that they can produce valuable ideas that are new and have not already been created before (Sternberg & Lubart, 1999; Weisberg, 2006).

This study built on Torrance's creative thinking framework (1998), rooted in Guilford's divergent thinking theory (1967). This framework is valuable for understanding and assessing the multifaceted construct of creative thinking skills and includes four creative subscales: fluency (generating numerous ideas), flexibility (using different categories of ideas and shifting different perspectives),

originality (selecting a unique and novel idea), and elaboration (enriching and expanding ideas with further details). It offers a clear and well-defined set of components and aligns well with the context of digital storytelling projects, which was one of the foci of this study. Drawing on the creativity framework proposed by Torrance (1998), this study investigated how digital storytelling could foster creativity skills among EFL pre-service teachers. It was used to analyze participants' creative processes as they generated story ideas (fluency), adapted to feedback and shifting perspectives (flexibility), crafted unique narratives (originality), and enriched their projects with details (elaboration).

Given the significance of creativity in the 21st century, as highlighted by Torrance's framework, teachers must actively facilitate learning environments that nurture these essential skills in students. They must provide students with creative zones that can encourage them to investigate, experiment with new ideas, and take measured risks (Zaremohzzabieh et al., 2024). These zones allow them to actively produce new ideas and construct meanings that have yet to be formulated (Tin, 2013). By engaging in activities in the creative zone, students can brainstorm, find new solutions, and apply them to a given context. Regarding this creative task and environment, Sun et al. (2020) mentioned that fostering divergent thinking—which requires one to provide several answers to a given problem—will enhance creativity.

2.2 Digital storytelling as a pedagogy of creativity

Digital storytelling (DST) helps individuals share stories of “what happened, why, and what might happen” because it helps them understand their past and potential futures (Sole & Wilson, 2002). It was first presented in the 1990s when people shared their pictures and memorable life experiences (Wu & Chen, 2020). It started with script-writing and storyboarding the life stories of a person, followed by producing a short and narrated video that the public could view.

Creating DST can help people train their creativity skills (McLellan, 2006, as cited in Kocaman-Karoglu, 2014) because it involves creative processes, such as ideation, execution, evaluation, and exhibition (Wu & Chen, 2020). This study followed the phases of designing digital storytelling established by Ohler (2013): story planning, pre-production, production, post-production, and distribution. The process of writing the storyline, choosing media components, and arranging them into a complete story requires individuals to think creatively about how to best convey their message.

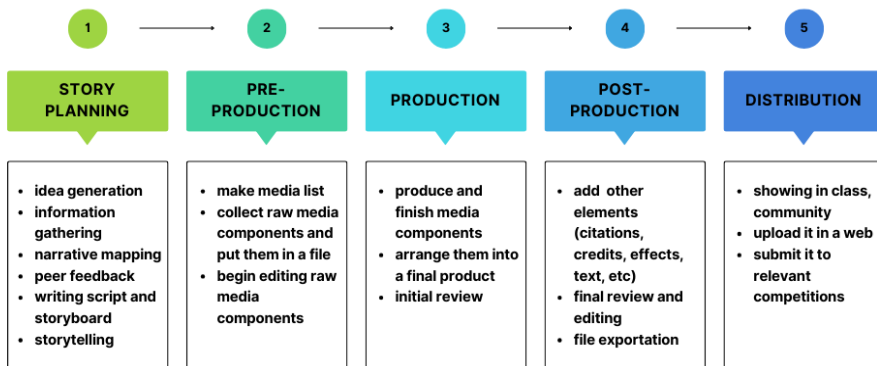


Fig. 1. Phases of designing digital storytelling (Ohler, 2013)

Numerous studies have documented the influence of digital storytelling on creative thinking skills (Akyeampong, 2018; Belda-Medina, 202; Wisnumurti et al., 2021; Yang et al., 2022). Experimental research conducted by Yang et al. (2022) investigated the positive impact of digital storytelling on improving creative thinking and found that the DST group scored higher on creative thinking, including fluency, flexibility, and originality. Similarly, Akyeampong (2018) and Belda-Medina

(2021) reported that digital storytelling significantly facilitated the creative thinking of their college student participants. While prior studies predominantly employed quantitative methods to assess the influence of digital storytelling on creative thinking, limited research has explored the qualitative experiences of pre-service teachers. This study sought to address the gap by exploring the lived experiences of pre-service teachers and offering deeper insights into how they engaged with and applied their creative thinking skills during the digital storytelling production process.

2.3 Digital storytelling in teacher education and teacher professional development

Digital storytelling has emerged as a valuable tool in teacher education and professional development which can enhance pre-service teachers' pedagogical skills, personal growth, and technological proficiency (Nuroh et al., 2025). It empowers pre-service teachers to effectively utilize this technique in their future classrooms to enhance student learning by capturing attention, stimulating curiosity, and fostering deeper engagement with new concepts (Robin, 2006). Additionally, it offers a dynamic platform for teacher professional development, fostering innovation and collaborative learning among educators. Henningsen and Orngreen (2018) mentioned that DST projects help teachers view issues from different angles and perspectives, leading to collaborative environments for teachers.

Nevertheless, several challenges impede the implementation of digital storytelling in teacher education, including limited access to resources, time constraints, and a lack of confidence among educators (Dogan & Robin, 2008; Tiba et al., 2015). The effective implementation of DST requires balancing technological proficiency, pedagogical expertise, and in-depth content knowledge (Tiba et al., 2015). The successful integration of DST in classrooms also requires the support from teachers, students, and the learning environment (Özüdoğru, 2021). Ultimately, while digital storytelling offers a promising avenue for developing teachers' digital competencies, its effective implementation hinges on careful planning and sustained support (Shinas & Wen, 2022).

3 Methodology

3.1 Research design

The present study employed a qualitative research paradigm and narrative inquiry design. Narrative inquiry is a design that allows the exploration of individual experiences and the meanings participants derive from them (Barkhuizen, 2016). In this study, we obtained the data from participants in the form of stories (Barkhuizen et al., 2014). Through narrative frames, interviews, and artifacts (digital stories), we explored their experiences in using their creative thinking skills and delved into their unique interpretations of these experiences. Participants shared their experiences within a creative thinking framework as the narrative frame was provided with pre-determined prompts or themes. Then they further elaborated on their experiences through interviews where the artifacts served as prompts for discussion. This enabled them to share the stories behind these stories. The narratives offered valuable insights into the diverse ways in which the pre-service teachers experienced creative thinking. They also allowed participants' voices to be heard (Barkhuizen et al., 2014) since participants could articulate their experiences through two-way dialogues.

3.2 Research participants and context

The participants in this study were 35 pre-service teachers. They were all undergraduate students aged 21-22 in the English Education Department at a university in Indonesia. In their sixth semester, they enrolled in a 16-week course built upon their background understanding of IT media in English Language Teaching. During this course, they were given the autonomy to choose an Indonesian traditional food and create stories related to it. They worked on this project in a group setting, each

comprising 5-6 members. This theme was selected due to its close connection to everyday life, ensuring that the participants had ample prior knowledge and personal experiences to draw upon. The task was directly aligned with exploring creativity among pre-service teachers by encouraging them to apply creative thinking to a familiar theme. Participants' identities were anonymized using pseudonyms to ensure that no identifiable data would be linked back to them in the final analysis or reporting of findings. For the narrative frames, participants were assigned pseudonyms PST 1 to PST 35. For the interviews, a subset of participants was assigned pseudonyms PST 1 to PST 6. Importantly, these PST 1 to PST 6 in the interview data were the same individuals within the larger group of 35 participants who provided narrative frames.

To uphold ethical research standards, written informed consent was obtained from all participants. They were consistently reminded of their rights throughout the study and were assured of confidentiality, meaning that their personal information would be kept private. They were also assured that withdrawal from this study would not penalise them or influence their academic standing. In addition, they were informed that all corresponding data would be permanently deleted in the event of their withdrawal. Moreover, a debriefing session was conducted after data collection. This provided an opportunity for participants to ask questions, clarify any concerns, and receive feedback on the research findings.

3.3 Data collection

The data were collected through narrative frames, interviews, and artifacts. Narrative frames, as outlined by Barkhuizen et al. (2014), provide a structured format for participants to construct their narratives by filling in the blanks within a pre-defined story outline. They allow participants to express their thoughts or feelings in a way that is both personal and reflective but still structured within a framework or set guidelines (Macalister, 2012). This approach was administered to the 35 participants after they had completed the digital storytelling process, ensuring that they presented their experiences in a manner that addressed the research objectives (Barkhuizen & Wette, 2008). For instance, the statement "I added some details in my story, such as ..." encouraged participants to reflect on their ability to develop and expand their initial ideas.

Then six participants were selected for individual interviews based on convenience to understand the meaning behind their behavior in detail (Seidman, 2019). We conducted three rounds of interviews, each lasting around 30 minutes. The first interview explored the participants' stories during story planning, pre-production, and production stages. The second interview was conducted to understand their experience during the post-production and elaboration stages. The third interview was carried out to ensure the correctness of the data. Following three rounds of interviews, data saturation was achieved as indicated by the repetition of existing themes and the lack of new findings. There were 20 main questions related to creative thinking skills and digital storytelling, accompanied by some follow-up questions. For example, questions like "How do you maintain the originality of your work?" or "Do you generate a new media component in your story?" helped participants reflect on the novel and unusual aspects of their work.

The data collection also included artifacts, comprising the digital storytelling products developed by the pre-service teachers. Participants' digital stories, created using Book Creator and published on the platform, were made publicly accessible with their prior informed consent. These artifacts provided valuable information on how the process transformed their thoughts and creative thinking, served as the source of data for the current study, and represented the outcome of their experiences and insights obtained over the course.

Triangulation of data sources was used in this study to increase the trustworthiness of the findings. Narrative frames, interview transcripts, and digital stories were matched to reduce any biases that might arise in this research. We also conducted member checking by giving the full interview transcripts back to the participants to be checked, ensuring that the interview results portrayed the actual conditions and experiences of the participants. Then we checked the relevant documents, such as digital stories, to ensure that they showed the same results as the narrative frames and interview

transcripts.

3.4 Data analysis

The narrative frames, interview transcripts, and digital stories were analyzed using thematic analysis. This helped us to systematically identify similarities and differences within the participants' narratives, thereby ensuring a rigorous and consistent analytical approach (Barkhuizen et al., 2014). The analysis of artifacts was integrated with the analysis of interview data and narrative frames by comparing the themes identified in the digital stories with the participants' reflections on their creative process as expressed in their narrative frames and during their interviews. We followed three phases of thematic analysis (Barkhuizen et al., 2014), which were reading the narrative frame and interview transcripts several times to familiarize ourselves with the data, categorizing the narrative frame and interview transcripts into codes, removing irrelevant information, and reconstructing the codes and relevant information into a thematic heading. Then, following Torrance (1998) framework for creative thinking, these possible codes and the relevant information associated with them were categorized into more general groups: fluency, flexibility, originality, and elaboration.

4 Findings

The findings are presented following Torrance's (1998) creative thinking framework: fluency, flexibility, originality, and elaboration.

4.1 Fluency: "I got inspiration from folk tales during the idea-finding."

The findings revealed that the digital storytelling process significantly enhanced pre-service teachers' fluency, a key component of creative thinking according to Torrance (1998). This was evident during the planning phase, when they generated numerous ideas for their stories and explored various resources to find those ideas.

I had to find some ideas before creating this story. I wanted to write a fantasy story because we could develop the plot easily. It would be great if we introduced Indonesia not only through food, but also through its folktale. I got inspiration for the illustration and portrayal of the character and situation. (Interview 1 - PST 1)

Some pre-service teachers drew inspiration from existing stories, such as folktales and fables, to generate unique ideas and enrich their narratives. PST 3, for example, cited these stories as a source of inspiration for both the story itself and the selection of media components, particularly for character and setting illustrations. While some participants drew inspiration from traditional sources like folktales and existing stories, others found creative ideas through digital platforms. The broad and diverse content available on the Internet and online platforms, such as YouTube, TikTok, and Pinterest, provided an excellent opportunity to generate fresh and innovative story ideas.

At that time, I was watching a cooking competition on YouTube, and it inspired me. Moreover, this DST's theme introduces traditional food, so we thought it was closely related. Using this theme, the plot could be developed more. (Interview 1 - PST 1)

The influence of digital media on the participants' creative process was also evident in the pre-service teachers' experiences in this study. PST 1, for instance, demonstrated how YouTube helped him find ideas for his story. After watching a cooking competition, he was inspired to develop a narrative centered around traditional food which aligned seamlessly with the project's theme.

The participants also demonstrated an excellent ability to generate numerous ideas during the production and post-production stages. At the production stage, they actively expressed their ideas

and implemented them in the creation and structure of their stories. Furthermore, at the post-production stage, they also showed good fluency, actively adding further refinements by incorporating additional elements to improve the overall coherence of their stories.

When designing, we considered that the background should match the color. The font size should be readable, and the color should contrast with the background. In addition, we also tried not to let the text cover the image because we were afraid it would be unreadable if it were above the image. (Narrative Frame - PST 3)

When asked about what they considered during the creation process, the participants showed keen attention to the media components they used in constructing their digital storytelling (see Figure 2). For example, PST 3 carefully considered each page or panel's aesthetic and functional aspects. Their purposeful choices regarding color palette, font size, and spatial arrangement of text and images demonstrated a great understanding of visual communication and its role in storytelling.

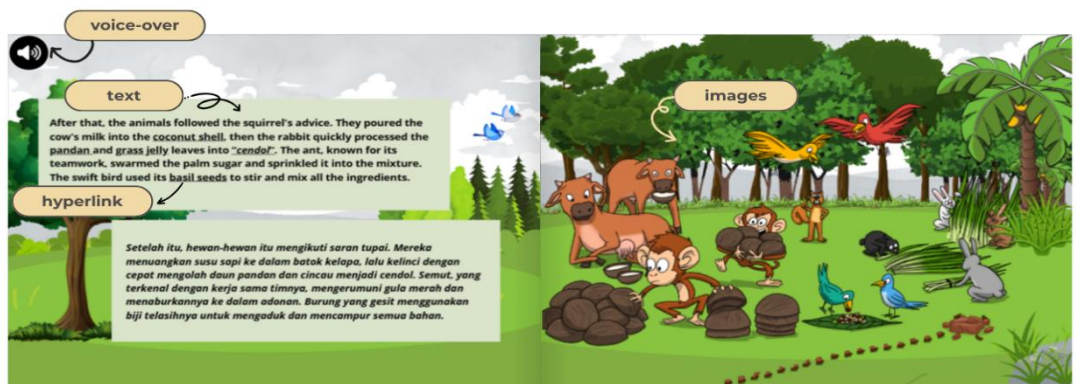


Fig. 2. Some media components used in participants' digital storytelling

I used various media components such as text, images, and audio. I designed my images through IbisPaint and Canva and recorded the sound for the voice-over through CapCut. I used these media to give the reader a more immersive experience. (Narrative Frame – PST 19)

The positioning and structuring of media components were also important since they influenced the meaning-making process. Most participants in this study used elements of interconnected multimodal components that affected one other in creating the overall meaning. For instance, PST 19 shared that she used different components, such as images, text, and audio, in her digital storytelling to immerse the readers and deliver the story better.

During the distribution stage, some participants also showed great fluency in presenting their DST creatively in front of an audience. They held a DST exhibition at their university, and they had to display their digital storytelling results. Most of them said that since the event was attended by lecturers from their university and overseas universities and students from various majors, they tried to look their best and present their work well.

We generated a QR code, printed it, and distributed it to the audience. Now, they can read our digital storytelling directly instead of waiting for us to look at it. They can also save the QR code and see it again later. (Narrative Frame – PST 14)

The participants demonstrated proficiency in presenting their digital story products. For instance,

PST 3 enhanced audience engagement by integrating QR codes, thereby enabling convenient access to their digital story. While they still used a conventional setup involving a laptop, the addition of QR codes introduced a more interactive and technology-driven presentation approach. Overall, the findings showed that digital storytelling facilitated pre-service teachers' ability to generate ideas. They demonstrated their ability to generate ideas regarding the storyline, media components, DST creation, and DST presentation.

4.2 Flexibility: “The feedback helped me prepare my story.”

The second indicator of the creative thinking framework (Torrance, 1998) is flexibility, which deals with flexibility in receiving and shifting perspectives. In the story planning phase, participants in this study showed their flexibility as they were able to accept suggestions from their lecturer or friends that differed from what they originally planned. The lecturer often provided suggestions regarding their work in designing the story, including preparing the idea, dialogue and narration, media components, and others (see Figure 3).

This feedback helped me prepare my story. Since this is my first time creating digital storytelling, I'm still confused about what to do. It was such a relief when the lecturer guided us through the process. (Interview 1 - PST 6)

At first, we wanted to create a folktale combined with traditional food, Klepon. But my friends thought we should add some moral value and a little problem to make our story tense and exciting. (Interview 1 - PST 3)



Fig. 3. Lecturer and student feedback during the design process of DST

The importance of feedback and diverse perspectives in digital storytelling was particularly pronounced for students. PST 6 exemplified this by attributing her initial concept development and narrative planning to insights gained from lecturer feedback. She realized that the feedback given by the lecturer guided her in designing the DST. Similarly, PST 3 faced challenges in plot development, which were overcome through a friend's suggestion of an alternative perspective. They added problems that could trigger tension in the story.

During the production and post-production phases, the participants also combined their experiences with the lecturer feedback to add learning activities. They could use any quiz platform and create questions about their stories. One of the participants, PST 11, said that her experience in class taught her what kind of questions to develop and what platform to use. They packaged these questions as interestingly as possible to increase student participation and engagement.

I got feedback from my lecturer about adding learning activities to my DST. As students are

familiar with online learning applications, such as Kahoot, Quizizz, Wordwall, and others, I want them to have fun learning, not dull. Students will be more motivated because they can have fun and compete with their friends. (Narrative Frame - PST 11)

As illustrated in the excerpt, PST 11 showed openness to her lecturer's suggestions and combined them with insights from her online teaching experience. This collaborative approach led to a digital storytelling project that went beyond narrative creation, aiming instead to foster active student participation through the integration of online quizzes. Some participants reported limited audience feedback beyond initial reactions and inquiries, indicating a reduced opportunity for further development based on audience input. The excerpt below showed that PST 6 did not get any feedback that could improve and enrich her story.

Instead of receiving feedback, we got positive appreciation from the audience. They appreciated our DST results and even wanted to make it too and try it in their class. They did not give feedback, such as whether we should add this or change it during the exhibition. (Interview 3 - PST 6)

The overall finding of this study was that digital storytelling facilitated pre-service teachers' ability to be flexible with regard to other perspectives. The pre-service teachers in this study demonstrated flexibility in incorporating different perspectives and even utilized their prior experiences to create their stories.

4.3 Originality: "I don't want to merely retell existing stories."

Creative thinking skills often correlate with how individuals can generate unique and uncommon ideas. Originality is positioned as the third aspect of the creative thinking framework proposed by Torrance (1998). In planning their stories, participants in this study were aware of the originality of their ideas. They recognized that the uniqueness of ideas was essential for creating stories as they did not want to produce stories that had been published before.

I tried to develop new ideas, such as combining folktales in Indonesia and adding our ideas. Some DSTs might retell the story with their version, but we added different plot details. (Narrative Frame - PST 19)

The excerpt above shows that PST 19 and her team members combined two popular Indonesian folktales and added their ideas. In her DST, she wrote plot details that were different from various published stories, such as Timun Mas and Batu Belah Batu Bertangkup. Some participants were also inspired by preexisting stories and added plots or other details that were unique to the story.

The difference might be that most DSTs only paste elements in Canva or generate pictures from AI, but our group made our DST from Ibis Paint so we could create what we wanted without being confused about what kind of command prompt to make in AI tools. (Interview 2 - PST 4)

The same thing happened in the pre-production and production phases, during which they prepared and used media components for their stories. Despite being exposed to technological tools, participants showed resistance when they chose to draw on their own rather than generate from the AI picture generator. This can be seen in the experience of PST 4, in which he decided to draw by himself because the AI drawing was inconsistent despite the same prompt being entered. He said the AI results were inconsistent, did not depict expressions in detail, and were soulless.

In my opinion, our DST is different because we provide learning activities that align with the

story. This enhances students' motivation and engagement. (Interview 3 – PST 2)

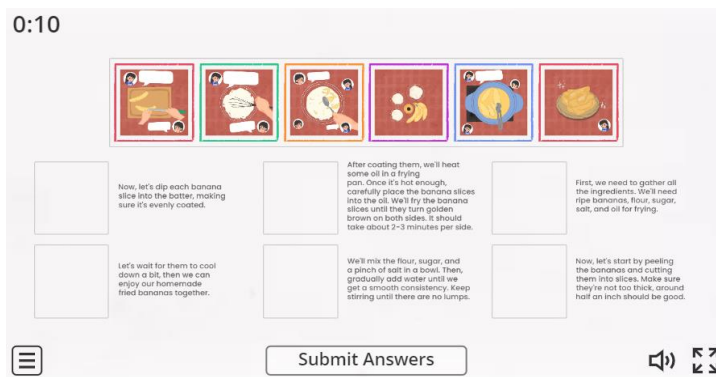


Fig. 4. Learning activity in Wordwall created by participants

Adding extra components in the post-production stage introduced exciting things, such as learning activities. As stated by PST 2, he and his group members added learning activities during the post-production stage (see Figure 4), which was rarely done in other DSTs, as they would usually only focus on the story, not the learning activities. This approach allowed pre-service teachers to express their creativity and encouraged students to think creatively.

Pre-service teachers maintained their unique ideas especially during the distribution phase when they were presenting their digital storytelling products to the audience. Instead of just uploading them online like most DSTs, they created a DST exhibition where various DST works were on display. For instance, PST 10 mentioned that this DST exhibition was more interactive than usual because the audience could walk around, look around, and interact with the DST makers.

The unique thing about this DST exhibition is that it used digital media to tell the story. Most exhibitions show physical media, such as paintings, sculptures, and installations. This exhibition was more interactive than other art exhibitions because we could communicate. (Narrative Frame - PST 10)

In general, the participants in this study maintained the originality of their work from the story planning stage to distribution. Creating digital storytelling made them more aware of a work's uniqueness, and they could produce unique and uncommon works by combining ideas, media components, and presentations rarely used by others.

4.4 Elaboration: “Enriching the story is not as easy as I think.”

This research also sheds light on Torrance's fourth aspect of creative thinking (1998), elaboration. It relates to the ability to enrich stories by adding details. This study found that participants demonstrated their ability to improve their initial concepts of digital storytelling to make them better and more enjoyable.

For the storyboard, we made it as detailed as possible. We wrote down what each panel and scene would be. That helped us develop the story because we could see what was missing and what needed to be added to our original plan. (Interview 3 - PST 3)



	<p>Suatu hari mereka nemuin telur itu</p>	<p>They decided to bring the egg home and were shocked when it hatched, revealing a child inside.</p> <p>Initially, they were taken aback as the child had a dark skin, unlike anything they had seen before. However, they considered this child a blessing and decided to take care of it.</p> <p>As the child grew, the villagers started to grow suspicious about its existence. They wondered why the child looked so different from its parents. Yet, the couple remained unfazed, providing the child with love and care, oblivious to the whispers and curious glances.</p>
	<p>Mereka kaget pas menetas isinya anak</p> <p>Mereka awalnya shock kalau anak itu warnanya hitam</p> <p>Tapi mereka anggep anak itu berkah, akhirnya dirawatlah</p>	

Fig. 5. Storyboard created by participants

During the story planning stage, all of the participants developed a storyboard that had several panels, each of which contained characters, dialogue, and narration. This storyboard helped them develop the story in more depth and detail. As described by PST 1, the storyboard enabled them to see the sequence of scenes in the story and made it easier for them to identify whether scenes were missing or needed improvement. It could enhance the development of the story and make it better.

Media components such as text, images, audio, and hyperlinks were very helpful in enriching the story because the story felt more alive and real. Moreover, there is feedback to add to the background sound, making the atmosphere even more vivid and more like entering the fairy tale world. (Narrative Frame - PST 12)

Other than developing storyboards, participants in this study actively engaged in the pre-production and production stages by preparing and using media elements that would elevate and deepen their narratives. For example, PST 12 shared her experience that media components helped her create natural nuances that immersed the readers in the story. Although she had to find suitable media components that could complement each other, she believed that images and audio supported the text so that the depiction of the narrative would be more pronounced.

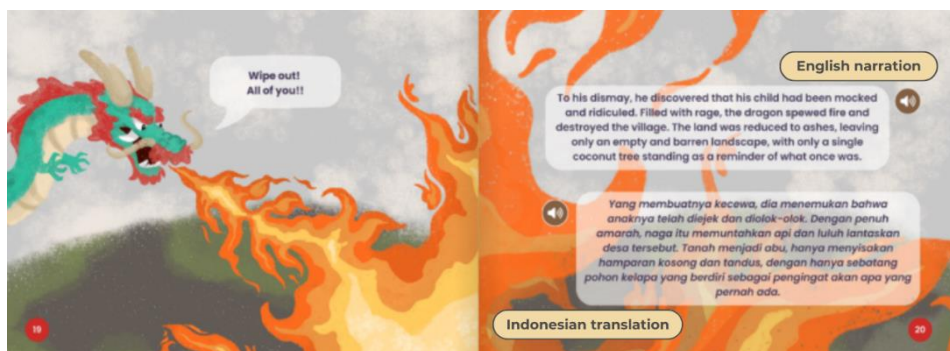


Fig. 6. Indonesian translation for narration in the DST

Some participants also added translations in the post-production stage (see Figure 6). While the original instruction focused solely on producing English narration, pre-service teachers in this study

incorporated translations to facilitate vocabulary learning. PST 2 added an Indonesian translation to his story because he wanted everyone to enjoy and understand the story. He said that the additional translation made it more convenient for people to understand the story if they were not fluent in English.

I added an Indonesian translation for the narration so the story becomes more accessible to a broader audience. This opens up opportunities for more people to enjoy and learn from the story, and they can learn English at the same time. (Interview 3 - PST 2)

However, the distribution stage, where the participants presented their products to the public, did not enrich or deepen their stories. Apart from the absence of in-depth feedback from the audience, the participants had also finalized their stories. Nevertheless, some said that this stage helped them reflect on their stories and develop them for future stories.

This exhibition did not help me deepen and enrich my story because the time was limited, and no feedback from the audience could help me identify weaknesses in my story and find ways to improve it. (Narrative Frame 3 – PST 16)

In conclusion, pre-service teachers used their creative thinking to enrich and deepen their digital stories. The elaboration aspect was visible during the story planning, pre-production, production, and post-production stages, but was less visible in the distribution stage.

5 Discussion

The ensuing discussion is structured around the four primary components of creativity (Torrance, 1998): fluency, flexibility, originality, and elaboration.

5.1 Fluency: Generating numerous ideas

In the story planning and pre-production stages, participants mentioned that existing folktales and technology platforms, such as social media, the internet, and others, inspired them. By searching for information related to the storyline and media components, they were able to create their own stories. These findings underscore the role of the Internet as a valuable tool for providing a rich source of inspiration for storytelling (Aboo Bakar, 2019; Li et al., 2022). It also aligns with Zaremozhzabieh et al. (2024), who stated that fluency is highly influenced by technology, showing that the use of technology is very high when students are looking for ideas or inspiration.

Moreover, the participants actively expressed their ideas in their stories during the production and post-production stages. Some also used Indonesian translations for the narration to enhance students' understanding of the story. Such practices align with Alonso et al. (2013), who mentioned that bilingual narration can draw the viewer's attention to important points. Some participants used several media components, such as text, images, and audio, to deliver the story better. This corresponds with Serafini (2015), who stated that different parts of multimodal components are connected and work together to create the overall meaning.

In the distribution stage, the participants in this study demonstrated good fluency in presenting their digital storytelling. They held an exhibition to present and display their works so that the audience could look around and observe their digital storytelling. This showed that the participants could generate ideas from the beginning until the end of the digital storytelling process, which is consistent with prior research (Akyeampong, 2018; Belda-Medina, 2021; Tabieh et al., 2021; Yang et al., 2022).

5.2 Flexibility: Obtaining and shifting different perspectives

During the story planning phase, most participants found the feedback from teachers and friends

to be constructive and helpful in improving their stories. This finding aligns with Scott-Barrett et al. (2023), who stated that feedback helps people shift from their initial creative ideas to new and elaborated ideas. The participants also showed their openness to feedback during the pre-production phase. It corresponds to Gan et al. (2021), who mentioned that the impact of feedback depends not solely on the quality of the feedback itself, but also on the student's mindset and behavior towards it.

In the production and post-production phases, the participants used their past experiences to help them understand what elements they should put in their digital storytelling to make it enjoyable. Moreover, they also received suggestions on adding online quizzes. They could choose the platforms they wanted to use and the questions they wanted to ask. These online quizzes were expected to increase the students' active participation. This finding is in line with Zainuddin et al. (2020), who stated that digital quizzes can increase students' engagement and create a creative learning environment.

Although flexibility was evident in the previous four phases, it was reduced in the last phase, distribution. Participants mentioned that instead of getting feedback that could enhance their stories, they mostly got positive appreciation from the audience. Overall, this study shows that participants' flexibility is visible in all stages except the distribution stage. This finding is consistent with prior research indicating that digital storytelling can facilitate flexibility (Belda-Medina, 2021; Yang et al., 2022; Zaremozhzabieh et al., 2024). However, it contrasts with Tabieh et al. (2021), who found that digital storytelling did not have a notable impact on this aspect of creative thinking.

5.3 Originality: Producing a unique and uncommon idea

During the story planning phase, some participants combined existing stories that were already familiar in Indonesia. They did not want to retell stories, so they incorporated different aspects into their stories. This finding corresponds to Sternberg & Lubart (1999), who mentioned that using existing ideas in novel and innovative approaches is also considered creative. Moreover, in the pre-production and production phases, in which they had to plan for media components and use those media components, the participants also showed their creativity. Instead of using AI or online generator websites, they preferred to draw the illustrations and record the voice-overs by themselves.

They also added extra components in the post-production phase that were initially their ideas. Some included learning activities as they were rarely used in other digital storytelling since most of them only consisted of stories. When creating online quizzes, they also used their creativity to ensure that the questions were suitable and could make students utilize their thinking. This observation aligns with Mee et al. (2020), who suggested that game-based learning, including quizzes on online platforms, contributes to developing creative thinking skills among pre-service teachers and their students. Moreover, pre-service teachers need to develop a strong understanding of digital technologies and their pedagogical applications to enhance their learning (Drajati et al., 2023).

Visual elements could also effectively enhance digital storytelling by conveying emotions, cultural nuances, and additional information that spoken words alone cannot capture (Alonso et al., 2013). Moreover, the participants maintained their original works until the distribution phase. They mentioned that DST exhibitions were unique and rare because most exhibitions would display sculptures or paintings. Ultimately, creating digital storytelling and presenting it publicly could enhance participants' creative thinking skills. This finding is consistent with Akyeampong (2018), who stated that creating stories that resonate with their experiences allows people to produce original content that reflects their creativity. Additionally, pre-service teachers were able to create a unique narrative with diverse experiences and viewpoints, which is supported by Belda-Medina (2021).

5.4 Elaboration: Elaborating stories to make them rich and deep

In the story planning stage, the research participants designed storyboards consisting of sketches, an overview of scenes, and narration. This helped them in elaborating and enriching their stories

because they could develop aspects that they felt were lacking. The finding corresponds with Wisnumurti et al. (2021), who mentioned that storyboards help one to organize thoughts and outline the sequence of events. It improves creative thinking as one can analyze and decide which images and dialogue to pair with their scripts (Akyeampong, 2018). The participants also had to choose media components in the pre-production phase. They carefully chose the media by considering whether they could enhance their stories. Akyeampong (2018) also suggested that selecting appropriate images, sounds, and music will complement the scripts and contribute to the storytelling experience.

When producing their stories, the participants began to collect the component media they used in DST. For example, they used drawing apps to draw illustrations and visually enrich their stories. In contrast, Zaremohzzabieh et al. (2024) mentioned that elaboration is an aspect that is negatively affected by technology. Technology also played a role in helping them to draw and create other media components. We found that distribution did not help participants enrich their stories. Since they did not get feedback from the audience, they could not elaborate their stories further. Overall, digital storytelling can facilitate participants' elaboration of their ideas. This finding concurs with some prior studies (Akyeampong, 2018; Belda-Medina, 2021; Wisnumurti, 2021) which suggested that participants elaborate on their stories by incorporating rich details and multimedia elements that enhance the storytelling experience.

6 Conclusion

This study has highlighted the potential of digital storytelling in facilitating the fluency, flexibility, originality, and elaboration skills of pre-service teachers. It showed how pre-service teachers demonstrated their fluency by generating numerous ideas from diverse sources, showed flexibility by being open to feedback and considering different perspectives, maintained the uniqueness of their stories, and inserted additional details and components to enrich and deepen their stories. These findings underscore the need to implement creative learning activities, such as digital storytelling, in teacher education programs. Such activities will equip the pre-service teachers with the skills and confidence to effectively utilize this innovative approach in their future classrooms in order to foster creativity among their students.

While this study has provided valuable insights into the interplay between creative thinking and digital storytelling, it has some limitations and needs to be further explored. Firstly, the use of a convenience sample may limit the transferability of the findings to other groups of pre-service teachers. We suggest that future research include participants from diverse demographic groups, such as different age ranges, genders, and socioeconomic backgrounds, to better understand the potential influence of these factors on the relationship between digital storytelling and creative thinking. Secondly, the sole reliance on narrative inquiry as the research method may not fully capture the breadth of experiences and perspectives. We suggest that future studies consider employing a mixed-methods approach to provide a more comprehensive understanding of the phenomenon. The triangulation of qualitative and quantitative data may strengthen the validity and reliability of the conclusions. Overall, this study contributes to the growing body of knowledge demonstrating the potential of digital storytelling to foster creative thinking.

This study suggests that policymakers in Indonesia and beyond, such as in Southeast Asia, should integrate creative thinking into teacher education programs, as teachers play a vital role in fostering creativity in the classroom. Teachers with creative thinking skills can model innovative teaching methods and encourage students to think creatively. Moreover, they would be prepared not only to teach academic content, but also to encourage critical thinking, problem-solving, and imaginative expression in their students. Additionally, creating "creativity zones" in schools would provide dedicated spaces for innovative learning, encouraging students to explore and experiment. These zones would also foster interdisciplinary connections, allowing students to integrate their knowledge, think critically, and develop unique solutions to real-world challenges.

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About the Authors

Arining Indrasari Ahdi (<https://orcid.org/0009-0008-8238-5376>) earned her B.Ed. degree in 2022 and her M.Ed. degree in 2024, both from the English Education Department of Universitas Sebelas Maret, Indonesia. Her research focuses on English as a Foreign Language (EFL), Informal Digital Learning of English (IDLE), and fostering creative thinking within language education. She is dedicated to exploring innovative, technology-integrated approaches to support English language learning.

Nur Arifah Drajadi (<https://orcid.org/0000-0001-5828-5107>) is an Associate Professor at Universitas Sebelas Maret, Indonesia. She earned a BA in English Education from Universitas Sebelas Maret (UNS), Indonesia. She completed her MA in 2008 and her PhD in 2013. With more than 25 years of experience teaching in high school and at UNS, her research interests include technology-enhanced language learning and literacy.

Kristian Adi Putra (<https://orcid.org/0000-0002-4451-3778>) is an Assistant Professor at Prince Sattam Bin Abdulaziz University in Saudi Arabia. He previously taught at the University of Montana, USA, and Universitas Sebelas Maret, Indonesia. He earned his B.Ed. from Universitas Lampung, Indonesia, and obtained his MA and PhD from the University of Arizona, USA. His research interests include critical discourse analysis, L2 teacher education, and language planning and policy.