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Artificial Intelligence-Enhanced Digital Storytelling: Empowering Young Creators in a Summer STEM Camp

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Overview

This lesson engages students in grades 3–6 in creating digital stories enhanced by artificial intelligence (AI), encouraging logical thinking, creativity, and problem-solving. Using a structured, project-based format, students developed multimedia-rich narratives with support from AI tools for idea generation, writing refinement, and visual content creation. The students explored STEM role models, wrote story drafts, and edited videos using WeVideo. The project concluded with the production of AI-supported digital stories, assessed through a structured rubric.

Topics: Computational Thinking, Media Literacy, Project-Based Learning, Writing

Time: Multiple 60-120 minute sessions totaling 10-12 hours

Materials

- Laptops or tablets with internet access
- Headphones with microphones
- Projector or large display screen
- WeVideo (or other video editing software)
- AI Tools:
  - ChatGPT
  - QuillBot
  - NightCafe Creator
  - Adobe Podcast AI Enhance Speech
- Google Drive (or other resource) for file sharing
- Digital storytelling lesson plan
- DISTCO rubric for assessing digital stories
- List of STEM personas for students to choose

Context-at-a-Glance

Setting
A STEM summer camp for 3rd-6th grade students in Houston, Texas, USA.

Modality
Face-to-Face combined with online AI-assisted tools

Class Structure
Multiple 60-120 minute sessions equaling about 10-12 hours of work within a flexible collaborative space.

Organizational Norms
Instruction emphasizes constructivist and experiential learning, differentiated to meet student needs.

Learner Characteristics
88 3rd-6th graders participated in the camp. They had a variety of prior experiences with AI.

Instructor Characteristics
15 undergraduate mentors with technical proficiency in AI participated in the camp. They were previously trained to integrate AI into digital storytelling.

Development Rationale
Learning was designed to promote computational thinking through AI-driven digital storytelling.

Design Framework
Project-based learning (PBL) was used in this lesson to support deep, inquiry-driven engagement and real-world application (Larmer et al., 2015).

Standards

This learning representation aligns with the International Society for Technology in Education (ISTE, 2017) standards for students, fostering essential 21st-century skills like creativity, collaboration, critical thinking, and digital fluency. The following list of ISTE standards are met within this lesson and how further described in the article:

1. Empowered Learner – Students take ownership of story development.
3. Knowledge Constructor – Students curate and synthesize digital content.
4. Innovative Designer – Students apply design thinking through iteration.
5. Computational Thinker – Students analyze structure and logic in storytelling.
6. Creative Communicator – Students express ideas clearly using multimedia tools.

Setup

Depending on your choice of instruction, the learning environment setup can be face-to-face, online, or hybrid. The authors facilitated this face-to-face to support the full experience of the training program.

Face-to-Face Setting

The face-to-face setup can either be arranged for individual work in a computer lab or the seating can be placed in small groups for collaboration. Ensure all students have access to a laptop or tablet. Set up a demonstration station with a projector for instructor-led tutorials. Provide a quiet space for audio recording. We recommend a separate room for audio recording so students can finish their audio narrations. Allocate at least 30–45 minutes for setup before each session.

Online Setting

Use a video conferencing platform (e.g., Zoom, Google Meet) with screen-sharing and breakout room capabilities. Create breakout rooms so students can finish their audio narrations in a quiet place. Provide students with access to digital resources and AI tools before the session. Use shared Google Drive folders or a Learning Management System (LMS) for script collaboration and multimedia submission. Allocate 15–30 minutes for instructor setup before each session.

Hybrid Setting

Combine in-person collaboration with online resources and AI tools. Ensure students can access the required software both at school and at home. Use discussion boards or chat tools for asynchronous support. Allocate 30–45 minutes for setting up both physical and digital environments.

Context and Setting

The ITECH-STEM Summer Technology Camp at the University of Houston provided an ideal environment for developing this AI-enhanced digital storytelling lesson. As an informal STEM learning setting, the camp encouraged exploration, creativity, and hands-on engagement with emerging technologies. Unlike formal classrooms, which are often constrained by rigid pacing and standardized assessments, this program allowed students to engage deeply with AI tools through creative storytelling, critical thinking, and multimedia production (Dogan, 2020).

The learning population was diverse with students in grades 3–6, 47% female and 53% male, with varying levels of prior knowledge which shaped the curriculum design. Some participants had no experience with digital storytelling or AI tools, while others were more technologically fluent. To support all learners, the curriculum employed scaffolded AI integration, beginning with guided use of tools like ChatGPT, QuillBot, and NightCafe Creator, and progressing to independent content creation. This ensured that students with limited writing or artistic experience could still produce high-quality stories, while more advanced learners explored deeper creative possibilities (Dogan, 2018; Mercader & Gairín, 2020).

The Project-Based Learning (PBL) framework was central to the instructional design of the sessions. Students engaged in a structured process: researching STEM personas, drafting scripts, generating visuals, and producing videos using WeVideo. These real-world tasks gave students ownership of their learning, allowing them to make creative decisions about content and structure. Collaborative elements—including peer feedback sessions and group discussions—supported communication skills and diverse storytelling perspectives, aligning with PBL's emphasis on active, student-centered learning (Dogan, 2018; Hung et al., 2012).

Design-Based Research (DBR) informed ongoing improvements to the learning experience. Student feedback, instructor observations, and performance data were used to refine lesson flow, tool integration, and instructional support (Abdallah & Wegerif, 2014). For example, early observations revealed that younger students struggled to personalize AI-generated content. As a result, additional scaffolds were added, including sentence starters, visual planning templates, and checklists to guide revisions and promote student voice.

The role of AI tools was carefully balanced to support—rather than replace—student creativity. Tools like ChatGPT and QuillBot helped students brainstorm and refine scripts, while the NightCafe Creator enabled them to generate custom visuals. These tools acted as creative partners, not final content providers. Instructors emphasized human-AI collaboration, encouraging students to adapt, critique, and personalize AI outputs. Visuals were often blended with hand-drawn illustrations or personal photos, reinforcing intentional design choices and maintaining student ownership (Gocen & Aydemir, 2020; Robin, 2008).

Instructor and mentor preparation was another critical design element. The camp was facilitated by 15 undergraduate mentors, many of whom were new to AI-assisted teaching. A pre-camp training program was implemented, including AI literacy modules, tool tutorials, and best practices for differentiation. This prepared mentors to support a range of student needs—from guiding writing with AI prompts to helping with multimedia integration—ensuring that all students could succeed, regardless of their starting point (Fernández-Batanero et al., 2021).

To maintain engagement in this informal setting, where participation relies on intrinsic motivation, the curriculum prioritized student choice and personal relevance. Learners selected their own STEM personas, ranging from historical scientists to contemporary innovators, and decided how to frame and present their stories. This autonomy, combined with the integration of familiar tools and opportunities for creative expression, made the experience meaningful and enjoyable (Dogan & Almus, 2017; It's About Time, 2015).

The decision to embed AI in a creative storytelling context was driven by the need to introduce AI literacy in an accessible and engaging way. Traditional approaches often rely on coding or technical exercises, which can alienate less tech-inclined students. By integrating AI tools into narrative creation, students explored real-world applications of AI in a way that felt relevant and approachable (Dogan & Itani, 2024). This not only supported skill development in media and digital literacy but also encouraged ethical reflection on AI-generated content.

Learning Representation

This learning experience follows a structured workflow, where students research STEM personas, script narratives, create multimedia elements, and produce digital stories. Through the integration of AI, students develop computational thinking, problem-solving, and digital literacy skills while engaging in creative self-expression across several different phases of instruction. *In this lesson, italic text identifies questions or prompts provided to learners.*

Tools and Functionality

Students in this learning experience used multiple tools. WeVideo was used for digital story creation, but any collaborative video creation software would work. Similarly, any large language model (LLM) chatbot and art generator would work for AI tools.

ChatGPT is an AI LLM chatbot used to help students brainstorm, develop plots, explore character creation, and overcome creative blocks through prompts and iteration. Natural language processing makes it a versatile tool for experimenting with different writing styles and genres.

QuillBot is an AI LLM chatbot that refines written narratives by suggesting improvements in grammar, structure, tone, and clarity, enhancing the overall quality of digital stories. In this learning experience, it aided in paraphrasing, summarizing, and improving coherence to ensure the story flowed smoothly.

NightCafe Creator is an AI art generator that creates custom visual art based on text prompts. This allowed students to create characters, settings, and symbolic elements that enhanced their digital storytelling and aligned with narrative themes.

WeVideo is a cloud-based platform that enabled students to create multimedia stories by combining audio, music, visuals, and effects—providing polished and engaging content.

Phase Summaries

This experience was separated into six phases:

Phase 1

In this five-hour phase, pre-service teachers were equipped with the knowledge to guide students in AI-enhanced digital storytelling. They learned key concepts, explored AI tools, and engaged in hands-on training to support students' creative projects.

Phase 2

In this 45–60-minute phase, STEM camp students were introduced to the fundamentals of digital storytelling and its connection to STEM learning. They explored key concepts, drew inspiration from previous projects, and began selecting a STEM persona for their own storytelling projects.

Phase 3

In this 90-minute phase, students developed a structured script for their digital story with AI tool assistance. They brainstormed ideas, drafted their narrative, and refined their script using AI-powered tools to enhance clarity, coherence, and grammar.

Phase 4

In this 2-3-hour phase, students developed multimedia skills by creating and editing their digital stories. They used video editing tools, generated AI-enhanced visuals, and incorporated voice narration and music to assemble their final projects.

Phase 5

In this 90-minute phase, students refined the audio and video elements of their digital stories. They recorded and enhanced their narration, then finalized the editing by synchronizing visuals and audio to produce a polished final project.

Phase 6

In this 60-90-minute phase, students presented their final digital stories, reflecting on their creative process and learning journey. Their projects were assessed using a detailed rubric, followed by a final reflection and feedback session to highlight strengths and areas for improvement.

Phase 1: Inquiry (5 Hours)

In Phase 1, mentors engaged in inquiry by exploring the concepts of digital storytelling, AI tools, and pedagogical applications. The focus was on equipping mentors with the foundational knowledge they needed to guide students through the PBL process, including understanding copyright compliance and how AI tools can support storytelling.

Objective

Equip pre-service teachers with the knowledge and skills to effectively guide students in AI-enhanced digital storytelling.

Activities

The instructional phase began with self-study materials and online sessions (2 hours total). This included an overview of digital storytelling concepts and benefits (Dogan & Almus, 2017), an introduction to AI tools for education and their pedagogical applications (Fernández-Batanero et al., 2021), and copyright compliance training focused on finding and citing royalty-free media.

Following this introduction, participants took part in a hands-on training workshop (2 hours total). During the workshop, they practiced using WeVideo for digital story creation, engaged in AI-assisted script writing with ChatGPT and QuillBot, and explored NightCafe Creator and Canva AI Image Generator for AI-powered visuals.

Assessment of Teacher Readiness

Phase 1 concluded with the completion of an AI-enhanced digital story prototype using the provided tools. Mentors then participated in a peer review and feedback session (1 hour), evaluating one another's sample projects using the provided rubric that would later be used to assess the students' digital stories.

Phase 2: Ideation (45-60 Minutes)

In Phase 2, a 45–60-minute phase, the 3-6 grade students began the ideation process by exploring digital storytelling fundamentals and brainstorming ideas for their own projects. By selecting a STEM persona and researching their achievements, students initiated the creative process, making connections between storytelling and STEM learning.

Objective

Introduce students to digital storytelling fundamentals and its connection to STEM learning.

Activities

This phase began with an overview of digital storytelling (10 minutes). During this time, students were introduced to the definition, purpose, and impact of digital storytelling (Dogan, 2014). They viewed sample digital stories from the DISTCO Gallery (Dogan, 2020) and examined the key elements of effective digital stories, including originality, visuals, emotional music, and narration. Next, students were given a project overview and inspiration session (15 minutes). This included a presentation of previous student digital stories and an explanation of the project expectations.

Following that, students began selecting a STEM persona (20–30 minutes). They chose an influential scientist, engineer, or innovator from a pre-curated list and conducted brief research on the chosen persona's achievements, contributions, and significance. As part of this activity, students answered the following questions: *What did this person accomplish? Why do you find them inspiring? How does their work relate to your interests?*

Phase 3: Iteration (90 Minutes)

Phase 3 allowed students to iterate on their initial ideas by developing a structured script in 90 minutes. Using AI tools like ChatGPT and QuillBot, students refined and revised their narratives, ensuring logical flow and clarity. This iterative process helped them move from initial brainstorming to a more refined, structured script.

Objective

Guide students through the process of developing a structured script with AI assistance.

Activities

Phase 3 began with brainstorming and research (30 minutes), during which students used ChatGPT for idea generation related to their selected STEM persona. They documented the AI-generated responses and worked with mentor support to refine and develop their ideas further. Following the brainstorming session, students moved on to drafting the script (30 minutes). They created their narrative structure in Google Docs, which included two main parts: the STEM persona's achievements and significance, and the student's personal connection and aspirations.

The final part of this phase involved script refinement using AI tools (30 minutes). During this time, students used QuillBot to enhance the clarity, grammar, and coherence of their written narratives.

Assessment

At the end of this phase, students submitted a first-draft script that included AI-assisted revisions. Instructors then provided feedback focusing on clarity, structure, and logical sequencing.

Phase 4: Iteration (2-3 Hours)

In this 2–3-hour Phase 4, students continued the iteration process as they developed multimedia elements for their digital story. They used WeVideo and AI-generated visuals to build and refine their project, experimenting with different edits, visuals, and sounds to create a polished final product.

Objective

Develop multimedia storytelling skills through video editing, AI-enhanced imagery, and voice narration.

Activities

This phase began with an introduction to WeVideo (30 minutes), during which students participated in a hands-on tutorial covering timelines, inserting media, and adding transitions. They then practiced assembling sample clips to become familiar with the platform. Next, students moved on to generating AI-enhanced visuals (30–45 minutes). Using NightCafe Creator and Canva AI Image Generator, they created a range of images and selected 20 AI-generated visuals to include in their digital story.

The final segment of this phase focused on editing and assembly (60 minutes). Students imported their selected images and videos into WeVideo, adjusted display times, added transitions and animations, and layered background music from WeVideo's royalty-free library to enhance the storytelling experience.

Phase 5: Finalization (90 Minutes)

This 90-minute Phase 5 allowed students to finalize their digital stories through the iterative process of voice recording and editing. They refined the synchronization of their visuals and narration, adjusting their work to achieve the desired emotional and narrative impact. This final round of iteration ensured the story was coherent and professionally presented.

Objective

Ensure students refine audio and video elements for final production.

Activities

This phase began with voice recording (30 minutes). Students recorded their narration in a quiet space using WeVideo, and Adobe Podcast AI Enhance Speech was used to improve the clarity of the audio as needed. Following the recording session, students proceeded to final editing (60 minutes). During this time, they synchronized visuals with narration, adjusted volume levels, trimmed clips, and finalized transitions to complete their digital stories.

Assessment

After submitting their digital stories, students were evaluated using the DISTCO rubric's criteria on 'voice consistency,' which includes voice quality being clear and audible throughout the presentation and 'voice pacing,' which refers to rhythm and voice punctuation that fits the storyline.

Phase 6: Reflection (60-90 Minutes)

In Phase 6, 60-90-minutes, students engaged in reflection by presenting their completed digital stories to peers and mentors. They assessed their own work and received feedback from others, using structured evaluation criteria. The final reflection allowed students to evaluate their learning journey, and the effectiveness of the AI tools used in their projects.

Objective

Evaluate student work and celebrate creativity and learning achievements.

Activities

This phase began with a classroom viewing session (30–45 minutes), during which students presented their final projects to peers and mentors. They discussed the challenges they encountered, the inspirations behind their stories, and their key takeaways from the experience.

Following the presentations, students' projects were assessed using the DISTCO rubric (30–45 minutes). The evaluation criteria, as outlined by Dogan and Almus (2017), included purpose and originality, script coherence and creativity, image and video quality and relevance, voice consistency, pacing, emotional engagement, and copyright compliance.

Final Reflection & Feedback

To conclude the phase, students wrote self-reflections on their learning experience and their use of AI tools throughout the project. Mentors then provided structured feedback, highlighting each student's strengths and identifying areas for growth.

Assessment Alignment

This learning scenario incorporates the DISTCO rubric as an evaluation tool. Below is how the DISTCO rubric categories were utilized in this lesson.

Digital Literacy Objectives and Evaluation

During Phases 2, 3, 4, and 5, students engaged in various digital literacy practices and digital literacy objectives were assessed using specific categories from the DISTCO rubric. The *Purpose & Script/Story* category addressed the learning objective that students will create coherent digital narratives with a clear purpose (Phase 3). Evaluation in this category focused on the students' ability to establish and maintain focus while developing original content.

The *Economy & Duration* category supported the objective that students will demonstrate effective digital communication through concise storytelling (Phases 2, 3, 4, and 5). This was evaluated by measuring the students' ability to create appropriately timed content that conveyed the necessary level of detail.

Finally, the *Image Relevancy & Quality* category aligned with the objective that students will select and create visual media that enhances the meaning of their narratives (Phases 4 and 5). Evaluation focused on students' visual literacy, specifically their ability to match images to the narrative content and to create an appropriate atmosphere that supports the story.

AI Fluency Objectives and Evaluation

During Phases 2, 3, 4, and 5, students engaged in various AI fluency practices which were also evaluated using the DISTCO rubric. The *Creativity & Script/Story* category addressed the objective that students will use AI tools to enhance rather than replace creative thinking (Phases 3 and 4). This was evaluated by assessing the originality and creative contributions evident in their work, even when AI-assisted production was involved.

The *Voice & Language* category aligned with the objective that students refined AI-generated content to maintain an authentic voice (Phases 3, 4, and 5). Evaluation in this category focused on the students' ability to adapt and personalize AI outputs, considering aspects such as voice quality, pacing, and the appropriateness of language.

Finally, the *Copyright Issues* category addressed the objective that students navigate ethical considerations when using AI-generated content (Phases 2, 3, 4, and 5). This was evaluated by assessing their understanding of attribution and their ability to use AI tools ethically and responsibly.

Critical Reflection

The AI-enhanced digital storytelling learning representation was implemented during the ITECH-STEM Summer Technology Camp at the University of Houston, using a Design-Based Research (DBR) approach for iterative improvements in the summers of 2023 and 2024 (Hall, 2020). The program successfully introduced students to AI-assisted storytelling, with most achieving the intended outcomes of enhanced logical thinking, digital literacy, and creativity. Evidence from student reflections, mentor observations, and final projects indicated growth in narrative structure, tool usage, and multimedia integration.

A key challenge involved selecting the right AI tools. Some image-generation platforms had limited free credits, restricting experimentation. This was resolved by switching to NightCafe Creator, which offered more accessible features. ChatGPT was introduced to support brainstorming and scriptwriting, but many students used it primarily as a search tool rather than for drafting narratives. For example, students often generated lists of STEM topics but didn't use the tool to develop dialogue or scene structure. This revealed a need for more explicit instruction on how AI can be used throughout the storytelling process.

To address this, future iterations will include structured guidelines showing how AI tools can support brainstorming, outlining, drafting, and revision. These models will emphasize that AI should support, not replace, original storytelling. Mentor supervision was also critical for guiding ethical use. Students submitted AI-generated content for review before integrating it into their stories. Mentors encouraged students to revise and personalize content, ensuring their voice remained central. In one case, a student who relied entirely on AI for a script was guided to restructure and infuse the story with personal elements, reinforcing ownership.

Student engagement was notably high when learners selected their own STEM personas. This autonomy led to greater investment, as students chose figures they admired—such as medical researchers, astronauts, or engineers. This choice-based approach supported differentiated learning and aligned with the project's goal of promoting creativity and relevance. To further build engagement, future implementations will expand peer review activities to support collaboration, feedback, and iteration.

Based on these insights, several enhancements are planned. A structured AI-use framework will be introduced, outlining best practices and examples for using tools like ChatGPT and NightCafe Creator across different storytelling phases. Pre-project training will be provided to both mentors and students, focusing on ethical AI use, effective prompting, and creative adaptation. Exploring additional AI tools will also increase flexibility and mitigate limitations from tool access or availability.

Overall, the program demonstrated that AI-enhanced digital storytelling can foster key 21st-century skills, including creativity, computational thinking, and digital literacy. With scaffolded instruction, student autonomy, and guided mentorship, students balanced AI support with authentic content creation, resulting in meaningful learning experiences. Future research could examine how AI integration affects not just the efficiency of storytelling, but also its impact on student creativity, engagement, and narrative quality. Comparing traditional and AI-supported storytelling methods may offer valuable insights into how emerging technologies influence learning outcomes in informal STEM education.

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