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Digital storytelling: An innovative teaching method for medical education

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ABSTRACT

Background: The transition from face-to-face to entirely online or hybrid teaching during the COVID-19 pandemic has been reported to reduce student engagement and lack of engagement among medical students. These changes require medical educators to try innovative teaching methods to increase student engagement and improve medical teaching. Digital storytelling can potentially improve student engagement and provide a better learning experience for medical students.
Methods: Narrative review of literature on digital storytelling and medical education.
Results: Digital storytelling is a multistep process. Planning and creating a digital story has effectively improved self-reflection, literacy, communication, idea organization, and technology skills.
Conclusion: Using digital storytelling could be a valuable addition to teaching methods in Medical schools. Adopting this innovative teaching method could provide a better learning experience for medical students.

Keywords: digital storytelling, medical education, innovative teaching method, teaching strategy, technology skill

INTRODUCTION

In March 2020, the WHO Director-General released a statement that announced the COVID-19 outbreak as a pandemic.[1] This statement marked the beginning of an era in medical education. Almost all schools and universities worldwide, including Medical schools, suspended their regular face-to-face teaching or shifted to online teaching due to the pandemic. Studies have reported the negative impact of the transition on medical education. Reduced student engagement[2] and lack of engagement[3] are among some of the issues discussed in the reports on medical education during the COVID-19 pandemic. These changes require Medical educators to try innovative teaching methods to increase student engagement and improve medical teaching.

This paper aims to describe an innovative teaching approach known as digital storytelling and its uses in medical education, as well as to describe the process of creating a digital story. This paper also provides educational resources and information for medical teachers who wish to adopt this method into their teaching practice. Many terms have been used to describe digital storytelling, such as digital narratives, web-based stories, interactive stories, digital documentaries, digital essays, and interactive storytelling. However, only the term digital storytelling will be used throughout the paper for consistency.

METHOD

This paper uses a narrative review approach. The resources for this paper were collected from SCOPUS, PubMed, EMBASE, Academic Search Complete, Google Scholar, discussions with experts in digital storytelling, and personal experience in learning and teaching digital storytelling. The keywords used for the literature search were "Digital Storytelling," AND "Medical," AND "Education".

RESULTS AND DISCUSSION

What is digital storytelling?

The term' digital storytelling' refers to the art of using technological tools to tell stories by weaving various multimedia elements, such as digital images, text, audio narration, video clips, and music audio.[4,5] More advanced elements, such as augmented reality, could also be found in a digital story.[6] Using storytelling for educational purposes is not a new practice and can be traced back to ancient times. Cave drawings, dating back to 30,000 years ago, depicted stories, myths, and life experiences.[7] The oral storytelling tradition has been used to pass down many significant mythologies, folklore, tales, holy rites, adages, and even directives. Storytellers used their voices, gestures, and various means to make their stories more memorable and engaging to their audience. Great stories make learners more open to learning and easier to remember.[8]

Digital storytelling takes advantage of the power of technology to increase the impact of the stories. This term was introduced by Dana Atchley and Joe Lambert when exploring ways to integrate the power of digital media with oral telling stories.[9,10] Typically, storytellers tell their narratives in three to five minutes-long videos by incorporating various multimedia elements. This process not only incorporates creative and artistic acts but also stimulates reflection. Thus, when used properly, digital storytelling can encourage a deeper level of engagement in education.[11]

Types of digital storytelling

Robin categorizes digital stories into three types: documentary-type digital stories, informative or instructional-type digital stories, and personal narrative digital stories.[4]

1. Documentary-Type Digital Stories
   Digital stories within this category tell a dramatic description of past events to help their viewers understand the events. A good example of a documentary-type digital story is Kindertransport: The Unknown Children of the Holocaust (https://digitalstorytelling.coe.uh.edu/video/Kindertransport1.mp4).
2. Informative or instructional-type digital stories
   Digital stories in this category are created to inform viewers about specific topics, such as health, art, and education. A good example of an informative-type digital story is You Are What You Eat (https://digitalstorytelling.coe.uh.edu/video/Fast-Food.mp4).
3. Personal narrative digital stories
   Digital stories in this category share stories of significant events in one's life. A good example of this category is The Professor with Two Hearts (www.youtube.com/watch?v=uONRTsReox8&ab_channel=uwlacrosse).

The three categories are not mutually exclusive. A personal narrative digital story can also be an informative-type digital story that documents a historical event.

Digital storytelling in education and healthcare

Digital storytelling has been widely used as an innovative tool for education and health promotion for numerous purposes. Educators have reported the benefits of using digital storytelling in the classroom. The benefits included providing more authentic learning materials using patients' original voices[12]; promoting student engagement[13,14]; and improving twenty-first-century learning skills, such as active learning, creativeness, and cross-cultural learning.[15] In healthcare, health practitioners have used digital stories to inform the community about social and health-related behaviors[16] or reduce mental health stigmas.[17] Often, the patients are invited to participate in workshops that train them to produce their digital stories. The creative and reflective process introduces information about specific topics or provides emotional and motivational support for struggling patients. For example, Guse et al.[18] used digital storytelling to inform sex education. Other healthcare practitioners use digital storytelling to allow patients to reflect on certain complex situations and find companionship from struggling peers, such as recovering substance users.[19,20]

Six phases in creating a digital story

In general, the process of creating a digital story could be divided into six phases: a) Finding the topic for the digital story, b) Writing the draft, c) Storyboarding, d) Searching or creating digital elements for the digital stories, e) Assembling the digital story, and f) Sharing the digital story. This cyclical process involves multistep and interlinked processes.[9,21] The process is illustrated in Figure 1.

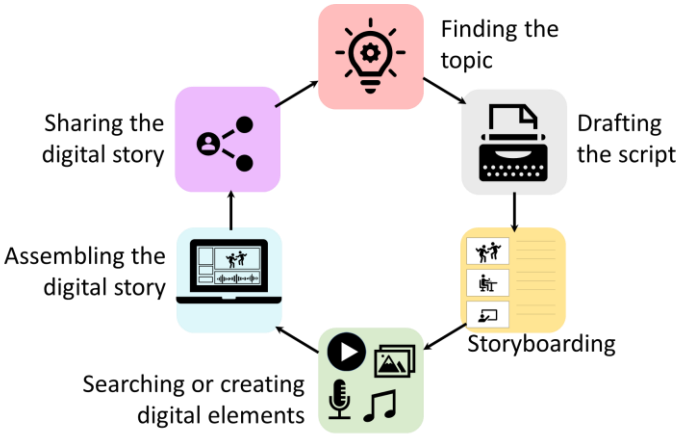

Figure 1. Phases in creating a digital story

Finding the topic for the story

Storytellers should begin by asking themselves about the topic and the purpose of their story. Answering the following prompts could be a starting point in planning for the digital story:

1. What is the story that I want to tell?
2. What do I want to inform my audience through this story?
3. Which point of view will be used to tell the story? Is it a first-person or third-person point of view?
4. Who would be the target audience for the story?
5. What changes that I want to happen to my audience after viewing my story? Is it simply learning about something or being inspired to do something?

Another strategy that could help is exploring digital stories created by other people to look for ideas and inspiration. The Educational Uses of Digital Storytelling (https://digitalstorytelling.coe.uh.edu/) and the StoryCenter (https://www.storycenter.org/) are two excellent websites that provide plenty of digital story examples. Once the topic and the story's purpose have been identified, storytellers can begin writing the draft for their story.

Writing the draft

A typical digital story is about 3-5 minutes long, or approximately 2-3 pages when typed on a letter-sized 12 pt. Times New Roman, double-spaced document. Typically, a story has three parts: the beginning, the middle, and the end. In the beginning part, the storyteller begins with something that draws the audience's attention to the story that will be told. In this part, the storyteller introduces the characters, the scene, and the story's plot. The middle part is the central portion of the story. Here, more details will arise, and conflicts will develop. This part typically ends with the climax or turning point. Lastly, the end part shows the resolution of the conflict, and the storyteller summarizes the story or tells the story's moral.

Storyboarding

Storyboarding refers to the written or graphical overview of the elements that will be included in a digital story.[4] When creating a storyboard, a storyteller breaks the script into parts and plans for their visual and audio elements. This phase allows a storyteller to visualize how the digital story will come together. It also allows storytellers to identify missing elements that need to be filled in or added to certain parts of the story. Storytellers could create a storyboard manually using papers or Post-it notes or digitally using computer programs, such as

Microsoft Word or PowerPoint. Templates for creating a storyboard can be found at digitalstorytelling.coe.uh.edu/page.cfm?id=23&cid=23&sublinkid=37.

The visual elements could include photographs, drawings, icons or illustrations, charts, or video clips. When appropriately used, the selected visual elements could help improve the overall quality of the digital story and increase the audience's engagement. Photographs and drawings are best to help visualize a story's people, location, and background. Icons or illustrations could be used to visualize concepts and processes. Charts are best for visualizing data. Video clips could be used to highlight important events. In addition to visual elements, a storyboard also describes audio elements that would be included in a digital story. The audio elements could include vocal variation in voiceover, sound effects, audio clips, and background music. The variation in voiceover could affect how the audience hears the story. The variation could keep the audience engaged, provide clues about the storyteller's feelings, or emphasize certain story parts.[22] Voiceover variation could be in pace, volume level, or intonation/pitch. Sound effects are sounds other than the voiceover or the music intended to add a more dramatic nuance to the digital story and keep the audience engaged. For example, the sound of a phone ringing could be used as an opening for a conversation in a digital story. This could be a short clip from a piece of music, someone's voice, or a conversation. These clips could be used to help set the background of a story. For example, a digital storyteller could use a short clip of the famous "I Have a Dream" by Martin Luther King, Jr. to begin a story about racial equality. When used correctly, music could increase audience engagement, evoke emotions, and add depth to the story.[23,24]

Searching or creating digital elements

Once the storyboard is completed, storytellers can begin capturing, creating, recording, or looking for the planned visual and audio elements. This process may require storytellers to use several tools and applications, such as a camera for capturing photos, a microphone for recording audio, and a computer to create or edit digital components. Recommended applications for creating or editing visual and audio elements can be found in table 1. Table 2 provides some online resources to find royalty-free visual and audio elements.

Table 1. Applications for creating and editing digital elements

Function	Application	Operating System
Image editing:	• Adobe Photoshop	Windows and Mac OS
	• Adobe Lightroom	Windows and Mac OS
	• Paint.Net	Windows and Mac OS
	• Microsoft PowerPoint	Windows and Mac OS
Audio editing:	• Audacity	Windows and Mac OS
	• Garageband	Mac OS
	• Adobe Audition	Windows and Mac OS

Table 2. Resources for royalty-free audio and visual elements

Element	Resources
Visual Elements	
Photos and Drawings:	• Wikimedia Commons (https://commons.wikimedia.org)
	• Pexels (https://www.pexels.com/)
	• Pixabay (https://pixabay.com/)
	• Unsplash (https://unsplash.com/)
Icons and Illustrations:	• Flaticon (https://www.flaticon.com/)
	• Freepik (https://www.freepik.com/)
Audio Elements	
Music:	• Bensound (https://www.bensound.com/)
	• Soundcloud (https://soundcloud.com/)
	• Incompetech (https://incompetech.com)
	• Free Music Archive (https://freemusicarchive.org/)
Sound effects:	• Soundbible (https://soundbible.com/)
	• Freesound (https://freesound.org/)

Assembling the digital story

Once all the elements have been gathered, storytellers can combine the elements using a video editing application. For a digital storyteller with minimal experience in video editing, this phase could be the most challenging in creating a digital story. For this reason, the author suggests that novice video editors begin creating a story with minimal digital elements. Once the digital storyteller has become familiar with a video-editing tool, they could begin incorporating more elements. Novice video editors could also check tutorials on video editing. Table 3 lists video-editing software and the links to their tutorials.

Table 3. Video editing software

Software	Link	Tutorial	Platform
Windows Video Editor	Included in Windows 10 installation.	https://youtu.be/t6yQwLuoO3w	Windows
iMovie	https://www.apple.com/imovie/	https://youtu.be/VF2mUJ0P3xU	macOS
Camtasia	https://www.techsmith.com/video-editor.html	https://bit.ly/camtasiads	Windows, macOS
VideoPad	https://bit.ly/videopadds	https://bit.ly/videopadtutorials	Windows, macOS
Wevideo	https://www.wevideo.com/	https://bit.ly/wevideods	Online
Lightworks	https://www.lwks.com/	https://youtu.be/gXfyXAwFfVU	Windows, macOS
Camtasia	https://www.techsmith.com/video-editor.html	https://bit.ly/camtasiads	Windows, macOS
Adobe Premiere Pro	https://www.adobe.com/creativecloud.html	https://youtu.be/ZQDGJn89uNk	Windows, macOS

Sharing the digital story

Once the video is completed, it is time to share it with the audience. Digital storytellers could use this opportunity to gather feedback from viewers about the digital story. To share their digital stories, digital storytellers could use cloud storages (e.g., Google Drive, Dropbox, OneDrive), social media, or online video-sharing platforms (e.g., YouTube, Vimeo). The feedback received can either update the content of the shared digital story or improve future digital stories.

Digital storytelling and medical competencies

When fully involved in the digital storytelling experience, medical students might benefit from some core competencies that a medical graduate needs to know or perform. Planning and creating a digital story has been found to effectively engage medical students in reflection, such as when considering the topic for their digital story or pondering why a particular digital element is used.[13,25] Self-reflection activities effectively improve learning in complex medical subjects and deepen professional values.[26,27] As students work on their digital story projects, they also gain the experience to practice and cultivate their literacy, communication, and idea organization skills by constructing a meaningful narrative.[21] Lastly, using various digital tools and applications could potentially improve medical students' technology skills, which would be helpful in their medical practice during the COVID-19 pandemic and in the future.

Table 4. Examples of the use of digital storytelling (DS) in healthcare courses

Authors	Participants	Course	Process	Project Grade	Lessons Learned
D'Alessandro et al. (2004)[12]	Pediatric residents	No course. The digital storytelling process was used in the creation of computer-based patient simulations	1. The faculty created a list of common pediatric problems. 2. Patient stories related to the problems were collected. This included informed consent, interviews, and photographs. 3. The stories were designed using a problem-based approach for evaluating a patient's problem. 4. The stories were written by a medical student and reviewed by a pediatrician and a pediatric radiologist. 5. The final stories were displayed on the hospital's digital library as an educational resource for patients and healthcare providers.	No	Medical students surveyed about the stories responded that the stories provided clues for similar cases and helped them remember some parts of the medical cases.
Sandars et al. (2009)[13]	Twelve first-year undergraduate medical students	Personal and Professional Development Module	1. Students took part in a home visit for a patient. 2. The instructor provided information on how to create a digital story. 3. The students were asked to reflect on their first experience meeting a patient and share it in the form of a digital story. 4. Students presented their stories using Microsoft PowerPoint.	No information	• Allowed students to approach learning in a different way • The process of creating a digital story was not easy yet enjoyable and engaging. • The process stimulated a more profound and meaningful reflection.
Mangadu (2014)[28]	Undergraduate health promotion students	Health Promotion Program Planning and Implementation course	1. In the second week of the course, students were given a group assignment to create a DS (7-8 students per group). 2. The instructor determined the topic scope for the digital stories. 3. The instructor monitored the project and provided timely feedback. 4. Four digital stories were created. 5. The instructor collaborated with the University and a local health department to screen the digital stories	Yes	Student reported: • Improved engagement, • Increased cultural sensitivity • Stimulate critical thinking • Learn about teamwork
Rimando et al. (2015)[29]	Undergraduate students majoring in health promotion	Health promotion theory course	1. Students were assigned in small groups (3-5 students) to create a digital story in the first month. 2. Students worked on the project while simultaneously learning about major health promotion theories and models. 3. Students signed up for a health topic and selected the target for their health promotion digital story. 4. Students were given the flexibility to apply the theories to their digital stories. 5. The instructor scheduled a meeting with each group to discuss and provide feedback for the project before the deadline. 6. The final digital stories were presented at the end of the semester. 7. Each group also shared lessons learned from the process of creating a digital story.	Yes	Instructor's reflection: • Time management plays a vital role in the success of implementing digital storytelling in the classroom • Providing feedback throughout the project is essential for the success of the project • Provide enough time for students to work on the project

CONCLUSION

Digital storytelling can be useful when applied correctly in medical education. The process of creating a digital story could stimulate the application of multiple skills that could be useful for gaining medical competencies. In the face of a pandemic, medical teachers face the task of finding quality teaching strategies to support their students in achieving medical competencies. Adopting an innovative teaching method, such as digital storytelling, can provide a better learning experience for medical students.

Lastly, despite its potential benefits, digital storytelling in the classroom is not without challenges. Computers and technology support are needed for the method to achieve its optimal benefits. Instructors' readiness is also another challenge. The writer has provided a list of resources educators can use to learn more about digital storytelling in Table 5. These resources provide various content from tutorials, examples, and lesson plans to help medical teachers incorporate digital storytelling into their classrooms.

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