

Use of Digital Stories in Education in the 21st Century

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Introduction

Rapid developments in technology have led to change and transformation in education as occurred in many areas. The integration of the new technologies changing and developing with the necessities of the age into the learning and teaching processes has become inevitable. The methods and techniques, tools, and materials used in education have undergone serious changes from past to present. One of them is storytelling. Information transfer through storytelling was done through written sources in the past; today, it is done through digital storytelling with developing technologies.

In recent years, digital technologies have become a necessity in education, as in other fields. The use of new methods and techniques in education is gaining importance day by day to increase learning effectiveness. One of these methods is digital stories. Regarding the studies on digital storytelling, this approach was considered a powerful and effective tool in educational environments (Clarke & Adam, 2011).

Stories are a natural and effective method that bridges people and experiences from the past to the present. Digital storytelling, which is gaining a new form with the developing technology, is a natural and effective way to transfer knowledge, emotion, thought, and experience. In addition, digital stories, which appeal to both visual and auditory senses, are highly memorable and interesting and are a preferred tool in many fields, including education. The reason for preferring digital storytelling in education is that it is a suitable learning-teaching tool for almost all ages and grades (Robin, 2006).

21st Century Skills and Digital Storytelling

In the 21st century we live in, the importance of qualified human resources increases day by day. Technological and scientific developments, which are constantly changing, play a major role here. Leading countries in technology and science have reformed their education systems to raise qualified individuals who can adapt to the age's requirements. Changes were made in education following the expectations from 21st-century students. 21st-century skills refer to skills and competencies that contribute to individuals becoming good citizens and qualified workers concerning the needs of social and economic development models (Ananiadou & Claro, 2009). The digital storytelling process is seen

as an educational technology that can meet most of the skills students should possess in the 21st century (Jakes, 2006; Jakes & Brennan, 2005a; Robin, 2008; Niemi et al., 2014). Digital storytelling helps students develop multitasking skills such as 21st-century skills and contributes to education by allowing students to acquire these skills (Foley, 2013).

Regarding about 21st-century skills, today's individuals are expected to work in cooperation, be information, media, and technology literate, think independently, creatively, and be critical, solve problems, produce and learn how to learn. Using cutting-edge technology tools to be creative, taking risks, and communicating make digital storytelling a natural process reflecting 21st-century learning (Jakes, 2006). In addition, the digital storytelling process enables individuals to develop 21st-century skills such as communication and technology use.

Digital storytelling meets 21st-century skills, including digital literacy, global literacy, technology literacy, visual literacy, information literacy, creative thinking, effective communication, and high productivity (Jakes, 2006; Robin, 2008).

Regarding 21st-century competencies, computer skills, information technology, media, and information literacy skills, which should be present in the information age, are the skills we need to survive in a global society (Komalasari, 2021). In the digital age, the methods of accessing and using information have also changed. With the increasing importance of technology and the widespread application of digitalization, innovation and change occurred in education. In this age, also called the digital age, digital reform in education occurs with digital transformation and innovations.

Digitality and technology are included within the scope of 21st-century skills determined by different institutions and organizations. The 21st Century Learning Framework prepared in 2009 by The Partnership for 21st-Century Skills-P21 expressed them as Information, Media and Technology Skills (Information literacy, Media literacy, Technology literacy); EnGauge as Digital Age Literacy (Basic, scientific, economic, and technology literacy, Visual and Information literacy, Multicultural literacy, and global awareness); ATCS as Working Tools (Information literacy, Information & Communication Technology (ICT) literacy); ISTE/ NETS as Technology Operations and Concepts (understanding technology concepts, systems, and processes) and Digital Citizenship (understanding technology-related societal and cultural issues); EU as Digital Skills, Cultural Awareness, and Expression; OECD as Interactive Use of Tools (interactive use of technology); and North Central Regional Education Laboratory (NCREL) as Digital Age Literacy (basic, scientific, economic and technological literacy, visual and information literacy, multicultural literacy and global awareness). (Partnership for 21st-century skills [P21], 2006; EnGauge, 2003; Assessment and Teaching of 21st-Century Skills [ATCS], 2007; National Educational Technology Standards [NETS or ISTE], 2007; "Technological

Literacy Framework for the National Assessment of Educational Progress [NAEP]”, Organization for Economic Cooperation and Development [OECD], 2005; European Union [EU], 2002).

The skills such as deciding when and how to use technology and choosing the appropriate technology for a certain job come to mind with the technology developed within the scope of 21st-century skills. Digital storytelling is one of the approaches that can meet the needs of the age in education, make learning effective, and enrich learning environments with technological tools and software.

What is Digital Story?

Stories have been a powerful communication tool with their prehistoric, intercultural and international use. Storytelling has undergone significant changes from the past to the present, allowing the transfer of the events that people have experienced or designed in various environments and ways. Paintings drawn on cave walls from the Paleolithic age, that is, 40,000 years ago, have conveyed important information about the lifestyle and culture of people in the past, which can be considered the beginning of storytelling. Storytelling can also be described as expressing opinions, revealing and presenting emotions to motivate others, conveying information, and sharing experiences (McDrury & Alterio, 2003).

The stories, which continued their existence mostly with oral literature tradition, later passed into written form. With the introduction of digital technologies into our lives, storytelling, which dates back centuries, has changed its form and content and has been transferred into the digital environment by blending with advanced technological possibilities. With the possibilities offered by digital technologies, telling and listening to stories has become easier and more accessible (Baki, 2015). Along with this, the concept of digital stories has emerged.

There is no common definition of digital storytelling in the related literature, and it is defined in different ways. Some of them are: Creating stories using digital tools, sharing stories and information through the media (Armstrong, 2003); The technological product that emerges with the integration of storytelling and technology, and the combination of the written story with digital elements such as sound, visuals, motion, etc. (Kulla-Abbott, 2006); Associating multimedia elements such as text, graphics, sound, video, and music with each other (Robin, 2006); Integrating texts, pictures, videos, and sound into an aesthetic presentation of the multimedia story via computer (Chung, 2006); Combining written, verbal, visual and animated symbols into 3-5 minute videos (Tatum, 2009). Based on the definitions above, we can define digital storytelling as the process of presenting traditional storytelling in a modern form by enriching it with digital content such as pictures, music, sound, and video.

Although digital storytelling is based on the concepts of “story” and “telling” (Hartley & McWilliam, 2009), digital storytelling is supported by the text created with the integration of Web 2.0 tools such as script, slideshow, audio, all kinds of visuals and short videos (Daskolia et al., 2015). Qiongli summarizes the main features that distinguish digital storytelling from other forms of storytelling as below (2009, pp. 230-231).

- Story-oriented: The core of digital storytelling is not technology but the story itself. The priority of digital storytelling is the story first, and then digitalization.
- Disciplined: Digital storytelling is a disciplined approach. It has a practical framework that clarifies the possibilities and controls the process’s form, quality, and efficiency.
- Authentic: “The emotions that stories bring come directly from people’s hearts.” In digital storytelling, the stories are original as they are conveyed through the storyteller’s fiction, feelings, and thoughts.
- Multimedia: Digital storytelling results with integrated multimedia in which sound, music, pictures, and videos are combined.
- Simple technology: Basic tools of digital storytelling are computers and microphones. Since the technological knowledge requirements are simple, it can be easily created by anyone.
- Found materials: A digital story can be created using pre-existing materials such as family albums, pictures, and videos; in short, it has the advantage of getting quick results with minimal preparation.
- Collaborative creativity: Joe Lambert believes that storytelling is a collaborative art. The concepts of sharing and inspiring through collaborative creativity are present in the digital story creation process.

History of Digital Storytelling

Digital storytelling began in the early 90s with Next Exit, an interactive theatrical performance, multimedia autobiography designed and performed by Dana Atchley and Joe Lambert. In this stage show, Dana Atchley understood the power of stories when the audience started to share their own stories saying, “Yes, I have such a story to tell” (Simsek et al., 2018). Dana Atchley and Joe Lambert discovered that people with little or no multimedia experience could create powerful personal stories using new digital media technology. The starting point of digital storytelling, which is still practiced today, is a series of workshops they started to popularize digital storytelling practice.

In 1994, Joe and Dana founded the San Francisco Digital Media Center with Nina Mullen. Over the next few years, the group developed a curriculum that formed the basis of a community workshop called “Digital storytelling.” They have developed a unique computer education and arts program around the Digital Storytelling Workshop. After the San Francisco Digital Media Center moved to Berkeley in 1998, it started to use the name Center for Digital Storytelling. Since 2015 the organization continues its activities under the name of StoryCenter.

Types of Digital Storytelling

Digital storytelling works have been done on personal narratives. However, different types have emerged as the usage area has diversified and shaped by what individuals want to share. There are different classifications in the literature. Garrety (2008) classifies digital storytelling into five categories: traditional digital stories, instructive digital stories, project-based digital stories, social justice & culture-themed digital stories, and digital stories that reflect the person. Gregori-Signes and Pennock-Speck (2012) divide it into social digital stories and digital stories made in education. Robin (2006), on the other hand, grouped digital stories under three headings: personal narratives, stories addressing historical themes and events, and informative or instructive stories. In this study, the titles divided into three main groups by Robin (2006) are explained below.

Personal narratives: These are the stories that a person tells about their experiences, daily life events, or feelings through imagination and creativity. It is the most common type of digital storytelling. Personal narratives are important in conveying different events, cultures, and values from the narrator to the listener.

Stories addressing historical events: It transfers historical content or subjects from the past through digital media by reinterpreting them with individual differences. It can be used in teaching values such as independence, respect for national and cultural values, peace, freedom, and patriotism.

Informative or instructive stories: It is the type of digital storytelling in which educational content on various subjects from mathematics, science, art, technology to medical education is presented by a digital narrative.

Elements of the Digital Story

The Center for Digital Storytelling helped create the digital storytelling movement by starting a new trend in storytelling. They provided training and assistance to individuals in creating and sharing their narratives. The Center for Digital Storytelling (CDS) has also developed the Seven Elements of Digital storytelling, often cited as a useful starting point for working on digital stories (Robin, 2008, p. 223). These seven elements are

point of view, a dramatic question, emotional content, the gift of your voice, the power of the soundtrack, economy, pacing. These seven elements are briefly shown in Figure 1.

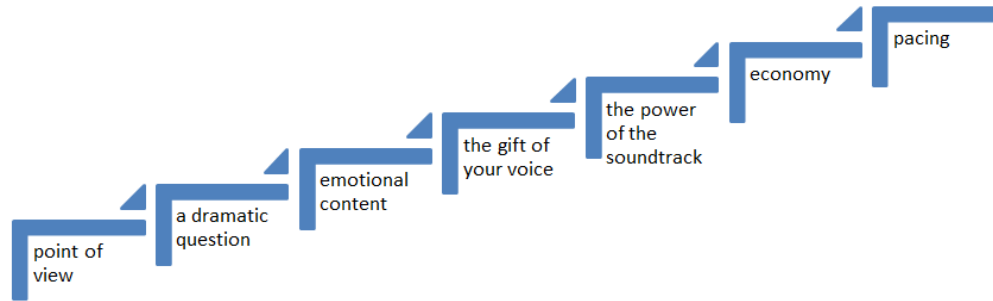


Figure 1. The Seven Elements of Digital Storytelling

These seven elements come into play in two different stages during the creation of the digital story. According to Bull and Kajder (2004), the elements of point of view, a dramatic question, emotional content, and economy are present in the *writing and planning stages of digital stories*; whereas the power of the soundtrack, the gift of your voice, and pacing elements *are included in the creation stage of digital stories*. In the first stage, the scenario is prepared and reviewed. In other words, it is decided what is wanted to be told in the story and how the story should be seen. After the scenario is completed, a digital story is created using multimedia tools at the creating stage.

Digital Story Creation Process

The digital story creation process achieves its purpose and goal with a well-planned story. Researchers working in this field have identified different stages of the digital story creation process. Lambert (2010) outlined the process as follows: determining the point of view, determining the emotions, determining the moment, seeing the story, listening to the story, combining the story, and sharing the story. Robin (2014) outlined it in seven stages; writing a story scenario, creating the story flowchart, researching the visuals, vocalizing the story, preparing the digital story, evaluating the digital story, and publishing the digital story. Barrett (2009) grouped the stages in the digital story creation process under five headings: writing story text, sound recording and editing, collecting visuals, creating and publishing stories. Jakes and Brennan (2005b) grouped the stages in the digital story creation process under six headings: writing the story, creating the script of the story, creating the storyboard, researching the multimedia elements to be used, creating the digital story, publishing or sharing the digital story.

According to Tolisano (2008), there are three stages in the digital story creation process; The first stage is the preparation stage, which includes writing the story script and selecting multimedia elements. The second stage is the digital story creation stage: a

digital story is created by combining computer programs or web-based applications with other elements such as pictures, voiceovers, and music. In the third stage, the digital story takes its final shape and is uploaded to the internet or computer. Stage 1 storyline: writing, storyboarding, scripting. Stage 2 selecting and creating media: text, audio, pictures, video. Stage 3 project: importing, editing, and exporting media. Robin and McNeil (2012) described the process of creating digital stories in seven stages. These are: Writing the story script, Creating the story flowchart, Researching the pictures, Narrating the story, Creating the digital story, Evaluating the digital story, Publishing the digital story.

Regarding the digital story creation processes specified by the researchers, the story’s script, that is, the scenario, is created first in all of them. Visuals that will help tell the story are identified. In the next step, the flow chart of the story is created. The identified visuals are put in this scheme. After the completion of the planning stage, the appropriate program for creating a digital story is selected. The digital story takes its final shape in the next stage by combining media elements such as pictures, sound, music, and text. This process ends with the publication of the digital story.

Digital Storytelling Tools

Robin (2008), on the other hand, stated in his study that the tools and software required for digital storytelling are cheap and accessible today and that the use of digital storytelling in the teaching environment converges (Figure 2).



Figure 2. The Convergence of Digital Storytelling in Education (Robin, 2008, s. 223).

Various tools and software are required to combine the elements such as text, picture, music, and sound, which are added while creating the digital story supported by technological tools. First of all, the technological infrastructure should be created. Afterward, it is necessary to have the competence to use technological tools. Some of the tools that can be used in the creation of a digital story are as follows (Garrety, 2008; Robin, 2006):

1. Basic tools: Computer (desktop, laptop, or tablet), smartphone, etc.
2. Voice recorders: Microphone, mp3 or mp4 player, mobile phone, etc.
3. Imaging tools: Video camera, camera, scanner, mobile phone, etc.
4. Listening tools: Headphones, speakers, etc.
5. Storage tools: External hard disk, flash memory, CD/DVD, etc.
6. Projection tools: Projector, smart board, computer, etc.

While creating the digital story, one should plan and prepare the tools such as computers, cameras, microphones, and necessary software (Robin, 2006). There is numerous software developed for the process of creating the digital story using basic tools. They can be grouped under three headings (Robin & Mcneil, 2012; Brenner, 2014; Bull & Kajder, 2005; Robin, 2006). These software programs are given in Table 1.

Table 1. Software Programs Used in Creating Digital Story

Software Programs Used on Desktop and Laptop Computers	Software Programs Used in Smartphones and Tablets	Software Programs Used in Web Environment (Web 2.0)
Microsoft Photo Story 3	StoryKit	Animoto
Microsoft Live Movie Maker	Storyrobe	Wevideo
Microsoft PowerPoint	iTalk	Creaza
Imovie	Fotobabble	StoryBird
Adobe Flash	iMovie for iPad	Toondoo
Scratch	ReelDirector	Storyjumper
Adobe After Effects	8mm HD for iPad	Slide.ly
Premiere Elements	Drawing cartoons	Powtoon
		Voicethread
		GoAnimate

Several tools and software program options are available in the creating, designing, and publishing adventure of digital story-making. Items such as text, photos, music, and video for digital storytelling can be finalized and shared through the tools and software listed above. Regarding the studies, the preferred software programs are observed to differ.

Simple technologies such as Microsoft Word and PowerPoint can be used in creating a digital story; on the other hand, a very effective program with a user-friendly interface, such as Photo Story 3, can also be preferred (Gabel, 2011; Robin, 2006). Studies have shown that the Animoto program came to the fore (Gabel, 2011; Sheneman, 2010). The programs called Audacity (Brenner, 2014; Gregori-Signes, 2008) and Voicethread (Brenner, 2014; Reinders, 2011), Garageband (Brenner, 2014) are preferred for adding audio and video in creating digital stories. In addition, Photoshop Elements, Microsoft Picture It, Picasa, and Microsoft AutoCollage (Kajder et al., 2005; Robin & McNeil, 2012) are used for editing pictures and photos.

The Use of Digital Storytelling in Education

The storytelling technique, which started after seeing the effect of traditional storytelling on learners, has changed and gained a new aspect with the digital age. Digital storytelling, which added a new dimension to the reform movements in education with the developing technology, is becoming an important part of teaching and learning. Educational institutions have investigated digital storytelling applications in the last few years (Smeda et al., 2010). Digital storytelling is an innovative approach that combines creativity and technology, offering the opportunity to integrate student-centered, interactive teaching and learning into technology-rich environments (Smeda et al., 2010). Digital storytelling is a method that helps to assimilate and structure the information by connecting it to the learned knowledge (Garrety, 2008).

Considering that our age is the age of technology and the dependency of the new generation on technology, digital storytelling is an alternative method to be used because it possesses the digital content that will attract the attention of learners and meet their interests and needs. In order to communicate with the new generation, teachers first need a change in the methodology and then develop new content and way of thinking (Prensky, 2001).

Robin (2006) discussed the digital stories used in education under two headings: “digital stories as an effective teaching tool for teachers and digital stories as an effective learning tool for students.” In this context, digital stories prepared by teachers with rich multimedia content can increase students’ interest, attract attention, and let them discover new ideas. They can also promote lessons, facilitate discussion, and make abstract or conceptual topics more understandable. Regarding the creation of digital stories by students, seven elements of digital storytelling should be introduced first. Then, some homework can be assigned to encourage students to research. They will learn to use resources such as the internet and the library to search the content in this process. They will create their own stories using their creativity by analyzing and synthesizing. They can organize their ideas while creating a narrative in a digital story. They can improve questioning,

self-expression, and communication skills; it can help them present their ideas and knowledge to the audience in a personal and meaningful way. These developments will allow the students to share their stories with their peers by publishing their digital stories on the web, contributing to their emotional intelligence and social learning by criticizing and commenting on them. They will gain a very important experience by working as a group. As can be understood from the explanations above, digital storytelling allows both teachers and students to gain new knowledge and skills.

Related Studies

There are many studies in the literature addressing different aspects of digital storytelling. Digital stories have a wide range of uses, including history, mathematics, literature, science education, teacher education, creative writing and thinking, health education, social and cultural studies, language teaching, writing skills, and memory (Campbell, 2012; Chuang et al., 2013; Hung et al., 2012; Kuo et al., 2012; McLellan & Wyatt, 2006; Miller, 2010; Opperman, 2008; Reinders, 2011; Ricci & Beal 2002; Robin, 2008; Titus, 2012; Yang & Wu, 2012; Xu et al., 2011).

Many studies in education discuss the use of digital stories for teacher education at different levels, for all age groups belonging to preschool, primary, and secondary education and its benefits for learning (Foley, 2013; Gyabak & Godina 2011; Heo 2009; Kearney 2011; Nguyen, 2011; Verdugo & Belmonte, 2007; Yang & Wu, 2012). In addition, it has been emphasized in the literature that it contributes to students' academic success (Daigle, 2008; Dogan, 2012; Wu & Yang, 2008), attitude (Butler, 2007; Gakhar, 2007; Norman, 2011), motivation (Barrett, 2006; Liu et al., 2018; Wu & Yang, 2008), the development of literacy skills (Banaszewski, 2005; Tatum, 2009; Xu & Ahn, 2010). by affecting them positively.

Studies show that digital story development contributes to the development of 21st-century skills, including critical thinking and problem-solving (Chen & Chuang, 2020; McLellan & Wyatt, 2006; Yang & Wu, 2012), reflective thinking (Kim & Silver, 2016), communication (Al-Amri, 2020), creative thinking (Anderson et al., 2018; Wu-Yang, 2008) and creativity and critical thinking (Anggeraini, 2020; Ohler, 2008; Tabieh et al., 2021). They can make a significant contribution to the development of students' higher-order thinking.

Conclusion

The rapid progress in technology has led to various changes and transformations in education as well as in different fields. This change and transformation have also affected the learning and teaching processes. As technology advances, using digital technologies in education has become necessary, revealing the need for different methods and

techniques. Digital storytelling is one of the methods that enable the transfer of technology to educational settings. Many researchers have emphasized that digital storytelling is a powerful and effective tool that enriches educational settings. Digital storytelling is also seen as an educational technology that can meet most of the skills that students should possess in the 21st-century. Digitality and technology are the common skills included in the scope of 21st-century skills determined by different institutions and organizations. Studies have also shown that using digital stories in education positively affects many variables such as students' imagination and creativity, academic achievement, motivation, and attitudes towards the course. The digital story creation process consists of various stages - writing the story, creating the story script, creating the storyboard, researching the multimedia elements to be used, creating the digital story, publishing or sharing the digital story (Jakes & Brennan, 2005b). Several tools, including basic tools, sound recorders, video tools, listening tools, storage tools, and shows, are used in this process. In the 21st century, digital storytelling emerges as an effective tool for both teachers and students to gain new knowledge and skills.

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