Enhancing Teaching and Learning with Digital Storytelling

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ABSTRACT

This article intends to help educators interested in technology integration in the classroom acquire a firm theoretical foundation, pedagogical applications, and step-by-step technical procedures for infusing digital storytelling into the curriculum. Through illustrations of digital storytelling projects completed in the authors' undergraduate and graduate classes, this article discusses the benefits along with the challenges for using digital storytelling as a means of engaging students in reflective, active, and personally meaningful learning.

Keywords: Digital Storytelling, Educational Technology Integration, Foreign Language Instruction, Teaching and Learning, Teacher Education

1. INTRODUCTION

Since the early days of civilization, storytelling has been important for the distribution of knowledge and preservation of heritage from generation to generation in world cultures. From the Egyptian age to the 21st century, storytelling has changed from oral fables and tales to utilizing digital images to display events/plots in multimedia ways. Regardless of the storytelling format, a common element identified in the storytelling is its educational nature—to distribute knowledge and share understanding among people across different cultures.

This article begins with a review of the traditional formats of storytelling in education, continues to introduce digital storytelling including its definition, educational advantages,

theoretical foundations, and the research findings of digital storytelling in education, and is followed by procedures of digital story production as well as tools selection. This article also shares the experiences of implementing digital storytelling in the authors' graduate and undergraduate curricula. Challenges in using storytelling as a new pedagogical tool are addressed with suggestions of balancing technical and pedagogical preparation in order to optimize this innovative tool in education.

2. TRADITIONAL FORMATS OF STORYTELLING IN EDUCATION

Prior to the advent of the writing systems, storytelling was the only tool available by which individuals within their communities could pass down their beliefs, traditions, and

historical culture to future generations. After the invention of the printing press in 1450, storytelling became even more important to society because printed stories became more available and accessible to many people who could learn from the historical stories and pass down their knowledge and heritage to future generations (Abrahamson, 1998).

As the oldest form of education, storytelling contributes uniquely to children's language and literacy development in speech and written composition, as well as language development in both reading and listening (Trawick-Smith, 2003). Therefore, as an instructional strategy and learning tool, storytelling was initially implemented mainly in early childhood education. By creating and narrating personal stories or fables, young learners can acquire content knowledge and develop language skills in the process of plotting, writing, revising, and narrating their stories. Abrahamson (1998) observed that, in addition to language and literacy development, literature also shows that storytelling, as an instructional strategy or a learning tool, has been applicable to other disciplines such as communication, social studies, and even math.

Nowadays, the power of storytelling has been widely recognized as an effective, meaningful, enjoyable, and creative way to enhance teaching and learning. Storytelling is found in all types of teaching, thus storytelling is viewed as the foundation of the teaching profession (Abrahamson, 1998). By telling stories of what happens in the world, teachers expose learners to the existing world of knowledge where learners can learn, construct, and further develop their own knowledge by organizing complex elements in a given context, and by reflecting on their learning processes and life experience.

Storytelling is not only effective in early child education, but also effective in all areas of higher education. When applying storytelling in higher education, McDrury and Alterio (2003) presented a five-stage model on Reflective Learning through Storytelling, which involves

both tellers and listeners of the stories in connecting the story with their own experiences. Each of the five stages (i.e., story finding, story telling, story expanding, story processing, and story reconstructing) engages students by encouraging them to reflect on learning processes and experiences of their lives. Through these five stages, students can improve their learning because storytelling, as a pedagogical tool in higher education, seriously takes the needs of students to make sense of experiences and seek meaning from their lives (Wells, 1986, cited in McDrury & Alterio, 2003).

3. DIGITAL STORYTELLING AS A NEW PEDAGOGICAL TOOL

Although storytelling as an instructional tool is not new in education, digital storytelling has become a new pedagogical endeavor that emerged from the proliferation of digital technologies including digital cameras, photo editing software, authoring tools, and Web 2.0 technologies such as Flickr and Myspace (Meadow, 2003; Alexander & Levine, 2008). As with practical applications of the traditional forms of storytelling, digital storytelling as an instructional medium has also been used by educators in many ways across the curriculum, not only in arts and humanities, but also in mathematics and science. The across-curriculum application of digital storytelling is because that this medium facilitates the convergence of four student-centered learning strategies: (1) student engagement, (2) reflection for deeper learning, (3) project-based learning, and (4) the effective integration of technology into instruction (Barrett, 2005). A comprehensive review in this paper of studies related to educational uses of digital storytelling and an illustration of the integration of digital storytelling into different classes will help educators perceive the pedagogical potentials for this new medium and learn the best practices for engaging students in reflective and active learning by producing meaningful products.

4. WHAT IS DIGITAL STORYTELLING?

According to Porter (2005), digital storytelling is the combination of the ancient art of oral storytelling with a palette of technical tools to weave personal stories using digital images, graphics, music, and sound mixed together with the author's own story voice. Different from traditionally linear narratives, digital storytelling shapes its power by integrating digital technologies, thereby giving a deeper dimension and vivid color to characters, situations, experiences, and insights (http://electronicportfolios.org/digistory/).

As with the traditional storytelling, telling stories digitally also involves plotting a personal narration about self, family, ideas, achievements, disappointments, or learning experiences. However, by using any of the available multimedia tools, including graphics, audio, video, animation, and Web publishing, digital stories may become short movies that can be made on computers with basic hardware and software by people relatively unfamiliar with high technology so as to narrate personal stories enhanced with written or spoken text, still images, video, and background music. It is the digital technology that changes storytelling into a modern form. Digital storytelling can be an instructional, persuasive, historical, and reflective action. Digital storytelling, in this paper, refers to its educational application of using the movies created in the classroom, where students use still images or video clips accompanied by narratives or music to create a movie to report their understandings and/or findings on any subject area.

5. WHY DIGITAL STORYTELLING IN EDUCATION

Educational use of digital storytelling has undergone a process from involving mainly self-discovery to sharing knowledge with learning communities. The early use of digital storytelling was to utilize a new set of digital media tools for self-reflection and for investigating issues of identity (Boase, 2008). Because of the potentials of digital storytelling for reflective, active, emancipative, and enjoyable learning, digital storytelling has been applied in the classroom as both a teaching tool and a learning tool in many innovative ways. Teachers can use digital stories to deliver instructional content, including the presentation of an idea, illustration of a procedure, reinforcement of understanding, and a review of materials. Students can create a story to share their experiences, report their findings, reflect on their understandings, and the like. Most specially, since Web 2.0 platform has been well-established and enriched with various social learning software applications, storytelling has emerged as a new genre in Web 2.0 applications in education (Alexander & Levine, 2008).

The increased interest in integrating digital storytelling into the curriculum can be seen in many theoretical and applied areas within higher education (Abrahamson, 1998). Two application forms of digital storytelling (including its innovative version of Web 2.0 storytelling) in higher education have been identified: a composition platform and a curricular object (Alexander & Levine, 2008). As a composition platform, teachers and students write in different genres (that may be shared in blogs or other Web 2.0 tools) to share personal experiences, conduct research, present ideas, and distribute knowledge in an individual and meaningful way. At an object platform, teachers and students "better communicate an important subject" (Alexander & Levine, 2008, p. 52) including arts, humanities, mathematics, and science. In addition, due to the digital features of the storytelling, the completed stories can be easily archived and subsequently made available as future learning objects. These educational practices are grounded in learning theories and encouraged by research findings in illustrating the effectiveness of digital storytelling on instruction and students' learning processes and end-products.

6. THEORIES SUPPORT EDUCATIONAL USE OF DIGITAL STORYTELLING

Constructionism (Papert, 1993) and narrative paradigm (Fisher 1985, 1989) are the two fundamental theories supporting various and innovative uses of digital storytelling in education. Theoretically, constructionism is developed from Piaget's doctrine that knowledge simply cannot be "transmitted" or "conveyed ready make" to another person. Papert interprets constructionism in contrast with constructivism and instructionism. Constructionism, in Papert's words, is the "personal reconstruction of constructivism" that emphasizes the role of construction of knowledge in the "world" rather than purely in the "mind" (Papert, 1993, p. 142-143). Papert asserts that learning occurs "most felicitously" when learners are engaged in constructing a meaningful and sharable "public entity." One distinguishing feature of constructionism is "learning by making," which is different from constructivist "learning by doing." The notion of "learning by making" places special emphasis on the learning that takes place when learners are engaged in building external and sharable objects or artifacts (p. 3), such as creating and sharing their stories enhanced by still images, voices, and background music.

Constructionism suggests that children will be more involved in learning if they are doing or constructing something that can be seen or used by others. Through two kinds of constructions, the construction of knowledge and the construction of personally meaningful artifacts, learners can achieve the best learning. By emphasizing reflection and sharing/learning in communities, the constructionist approach supports whole processes and end-products of teaching and learning via the medium of digital storytelling (Solidoro, 2007).

In addition to constructionism, the narrative paradigm, a well-known theory in human communication, supports the use of digital storytelling in education, a lifelong learning process which takes place mainly via communications. The narrative paradigm claims narration as a theory of "symbolic actions—words and/or deeds—that have sequence and meaning for those who live, create, or interpret them" (Fisher, 1984, p. 2). Because "man is in his action and practice, as well as in his fictions, essentially a story-telling animal" (MacIntyre, 1981, as cited in Fisher 1984, p. 1), narration has relevance to his stories in the real world, in fictive contexts, in life, or in the imagination. The narrative paradigm assumes that all forms of human communication can be seen fundamentally as stories, as interpretations of aspects of the world occurring in time and shaped by history, culture, and character (Fisher, 1985). The interpretations and explanations of symbolic messages used in communication normally consist of creation, composition, adaptation, presentation, and reception.

Narrative stories are effective as educational tools because they are believable, rememberable, and entertaining (Neuhauser, 1993). Digital storytelling becomes an even more effective means of communication because narration is enhanced by visual aids, still images, music, and the authors' voice which expresses emotions. By digitally telling stories of different genres, learners may learn from, about, and through stories, and learn by reflecting on the experience of narrating and the narrating of experience (Cortazzi & Jin, 2007). Because various educational applications of digital storytelling are in compliance with how human beings learn, researchers have found that digital storytelling has played an effective role in many aspects of education.

7. STUDIES OF DIGITAL STORYTELLING IN EDUCATION

Many studies have found that digital storytelling in various ways positively affects and supports students' learning by encouraging them to organize and express their ideas and knowledge in an individual and meaningful way (Robin, 2005). Morehead, Li, and LaBeau (2007) used digital storytelling as an effective approach in teacher preparation programs for

developing personal narrative into a powerful and emotional tool for employability portfolio development. Schiro (2004) integrated digital storytelling into teaching students algorithms and problem-solving through several stages of learning in order to help them develop mathematical skills. Papadimitriou (2003) applied digital storytelling to computer science and programming. More (2008) even used digital stories to increase social skills for children with disabilities. Bull and Kajder (2004) included digital storytelling in the language arts classroom and Royer and Patricia (2009) increased students' reading comprehension with digital storytelling.

Digital storytelling has gained its popularity in foreign language classrooms where digital storytelling promotes target language development and formation of socio-cultural identities. Skinner and Hagood (2008) conducted a case study to explore the intersection of socio-cultural identities, existing foundational literacy, and new literacy practices in the form of digital storytelling of two English language learners: a 7-year old, America-born, male Mexican-American kindergartener and a 16-year old, female Chinese-American junior in high school. Data were collected from individual interviews with the two language learners and from an analysis of their digital story artifacts—*Spiderman* by the kindergartener and *Third Culture Kid* by the high school junior. The interviews revealed the two learners' textual preferences and digital storytelling design processes. The study found that digital storytelling is a promising instructional strategy for scaffolding young English language learners' development in story comprehension, decoding of print-based texts, reading fluency, vocabulary acquisition, and writing processes involving drafting, editing, and revising on the computer. In addition, digital storytelling allowed the two learners to use English to make sense of their lives as inclusive of intersecting cultural identities and literacy, thus further promoting the development of empowering critical literacies for English language learners.

Digital storytelling not only helped promote students' learning interests in different subjects, but also helped build learning communities. Banaszewski (2002) asked his fourth and fifth graders to build a community through storytelling. He created a positive classroom environment by sharing the students' stories about an important place within the classroom where students saw themselves as authors with a purpose and an audience. According to Banaszewshi (2002), sharing a story about an important place involved many risks for students. The teacher needed to take those same risks by sharing a place story of his own. Banaszewshi shared with his students how he saw the classroom as a place where he always felt at home and showed them pictures he had drawn to help convey some of the feelings about his place. He used the digital story he created about his place in the classroom to help students practice the story-coaching model.

Many successful cases have found that digital storytelling is a promising instructional strategy. Gils (2005) summarized the advantages of using digital storytelling in education into five categories: (a) providing more variation than traditional methods in current practice; (b) personalizing the learning experience; (c) making the explanation or the practice of certain topics more compelling; (d) creating real life situations in an easy and affordable method; and (e) improving the involvement of students in the process of learning. These identified advantages further encourage more educators to utilize digital storytelling in their instructional practice.

8. HOW TO CREATE DIGITAL STORYTELLING?

In general, the creation of digital storytelling includes two steps: story composition and technology integration. Digital story composition follows the same process as any type of composition: analyzing the writing situation including considerations for audience analysis, purpose, and voice and tone; drafting to generate ideas for the story; developing the stories to connect the plot with content; and revising and editing

the stories. When the story is finalized, the story is digitized using carefully selected technology tools. Although digital storytelling differs for different educational purposes, considerations of the seven elements to a digital story help with the overall creative process (Lambert, 2002). According to Lambert, these elements include point of view, dramatic question, emotional contact, the gift of your own voice, the power of sound tracks, economy, and pacing.

Whenever creating a digital story, students have to make a story plan before they start. They need to define the purpose of the story, analyze the audience, and decide what tools are to be used. Once the purpose is defined and the audience is clear, they should plan a storyboard and write an initial script, which needs to be revised according to the images collected. Then, they should collect images and music. They can take pictures with a digital camera, scan old images, or download images from Internet. They can videotape an event and digitize it. All images and video clips as well as music should be saved in one folder. Their story project will be saved in this folder to make sure the project works properly before the project is converted into a movie. Once all materials are ready, students can start working on their stories. After importing images, video clips, and music into the software program they chose, they can create the storyboard of the project. Then, students should add effects to the slides, title to the story, give credits of images and music, and/or captions for different parts if needed. Then, they can record and save their narratives according to their scripts, which can be done to an individual slide or to the entire story. Students can always evaluate and modify their stories in the movie project mode (.MSWMM if Windows Movie Maker is used). If they are satisfied with the story, they can convert it to a movie format (.WMV) so that the movie can be viewed from a jump drive, CD, or a website. However, they can only revise their story in the project mode. Therefore, they need to keep their projects in case something needs to be changed later.

9. TOOLS FOR CREATING DIGITAL STORYTELLING

Most digital storytelling programs are designed for users with little or no technical background to make sure everybody should be able to create digital stories. In addition to the movie-editing applications, a user also needs a recording device and microphone, hardware and software to manipulate images and video, or devices to take pictures and videos.

A number of simple applications are available for free download from the Internet or come with the operation system. Avid Free DV works with both Windows and Mac operating systems. It has basic video- and audio-editing capabilities. Microsoft Photo Story 3 is a free downloading software program but it only works with Microsoft Windows XP Operating System. Users can use images and video clips to easily make a movie with Photo Story 3. Windows Movie Maker is an efficient storytelling tool because it is user-friendly and functionally effective. The software allows users to create, edit, and share movies with still images and/or video clips. Users can easily add special effects, transitions, titles/credits, background music, and narration to their movies. The most important aspect of the software is the free download which is already included in recent versions of Microsoft Windows. Apple iMovie comes as a part of the Apple OS X Operating systems. It works in a way similar to Windows Movie Maker and has many advanced features and add-ons. Unlike the free Windows Movie Maker that can be downloaded if not include in the XP Operating system, iMovie is only free when you purchase a new Mac system and cannot be downloaded from the Internet for free. There are more complex video-editing applications such as Ulead, Adobe Premiere Pro, and others, which provide more flexibility for advance users to create sophisticated stories.

The following table (Table 1) summarizes the most important and popular tools for creating digital storytelling:

Table 1. Tools for creating digital storytelling

		Use	Platform	Cost (Approx)
Hardware				
	Digital camera	Create still images	Windows/Mac	$80-$500
	Digital video camera	Create video clips	Windows/Mac	$100-$500
	Flip	Create video clips	Windows/Mac	$90-$300
	Webcam	Record and create digital images or video clips	Windows/Mac	$40-$100
	Microphone	Record narration	Windows/Mac	$20-$150
	Scanner	Digitize photos	Windows/Mac	$30-$350
Software				
	Avid Free DV	Edit videos and audios	Windows/Mac	Free
	Movie Maker	Create digital stories from still images and video clip; add audios	Windows	Free
	Photo Story 3		Windows	Free
	Image Blender 3			$50
	iMovie		Mac	Free
	Adobe PhotoShop Element	Modify images used in digital stories	Windows/Mac	$30-$60
	Goldware	Audio editor, recorder, and converter	Windows	Free evaluation version available; $45 for full version
	Audacity	Audio editor and recorder	Windows/Mac	Free
	Ulead	Video editing	Windows	$60
	Adobe Premiere Pro	Professional video editing software	Windows/Mac	$299-799
Shareware				
	CD-ROM	Share and publish stories	Windows/Mac	20 cents
	DVD		Windows/Mac	50 cents
	Website		Windows/Mac	Free site available

In addition to the above programs which are specially used for creating videos, students can also use Microsoft PowerPoint to create their stories and save the file as PowerPoint Show instead of PowerPoint Presentation. Then their PowerPoint slides will be shown automatically as a movie. This program is better for those teachers and students who do not have time to learn a new application but are very familiar with the MS PowerPoint program.

10. EXPERIENCES OF USING DIGITAL STORYTELLING IN THE CLASSROOM

The authors of this paper have been using digital storytelling over the past few years in four different types of classes with positive experiences.

The first course, *Computer Applications in Education,* was an undergraduate course

designed to help future professional education students learn how to integrate computer technologies into the classroom. The course supported the ISTE's standards for training future teachers to apply technology in the areas of student learning and student assessment. One of the assignments was to create a two-minute story with Windows Movie Maker. The purpose of this assignment was to promote students' interests in using technology in curriculum development and strengthen their technology skills. The story could be a self-intro, about family, or anything around a particular theme (e.g., nature, music, a historical event, or a book). The story movie was required to have a title slide, an ending slide, and at least five pictures on a specific theme. Students narrated the movie according to the pictures of the theme. They were encouraged to add background music while they were speaking. Most students took pictures with a digital camera while some students scanned hard copy photos and then saved them to a USB jump drive. After finishing their movie projects, students shared their completed stories with the class. Among the movies they created, most were stories about themselves, their family, their friends, and activities they attended. They were very excited about the skills they learned in this project. Many students indicated that creating stories provided them with more opportunities to communicate meaningfully with their friends and fellow students. Compared to other course-related projects required for this class, students showed the most interest in storytelling and were willing to revise the movie until they felt satisfied with their stories. They said that they felt more interested in integrating technology into their future classroom with such technology.

Another course was *Computers in Education.* This was a 3-credit hour online graduate course. This course not only provided students with theories of teaching and learning with technology, but also created a technology-enhanced learning environment where they experienced how these technologies could help them learn. In addition to reading and researching, students were asked to finish eight technology projects according to a teaching scenario: to report the students' learning activities to their parents in a parent meeting. One project was to create a movie about the kids in class, an activity, or anything which they thought would help the parents understand what the students did in class. The purpose of this assignment was to provide students with opportunities where they could master technology skills and apply these technology skills to the real life practices.

Some students created a story describing how he/she taught in class or the activities he/she conducted to teach the subject content. For instance, a student took pictures of the activities conducted in his math class to demonstrate how he taught math. Another student told her audience how she taught her language arts class. After creating their stories, all students indicated that this assignment was fun and beneficial. Most of them stated that they would "use this feature for parent nights and end-of-the-year parties throughout my career." All in-service teachers wanted to teach their students Windows Movie Maker program so that their students might use storytelling for class projects and presentations. Some students mentioned that they would use this program to stream together many of their old vacation photos or family photos. As one student indicated in her reflection, "I just cannot say enough how grateful I am for knowing that this program exists and how easy it is to use."

In-service teachers appreciated the opportunity they had when collecting materials for their stories. As one student described the experience in creating her story with her class,

Including my students in that project brought us to a different level in our relationship. When I asked them to give me their permission to take pictures and include them in my own class project, they understood that I knew where they were coming from when pressured with school work. Most of them were "camera hogs" and delighted in being photographed and videoed. They also could not wait to see the end result. When I showed them the final project they were

astounded at my technological abilities. Using this tool introduced me to a wide arrange of possibilities for future use in the classroom. In the coming semester, I am going to video them doing their class projects and make copies for the students to keep for themselves. As I teach seniors, it is a component they can include in their senior memory books and be able to enjoy for years to come.

Most students mentioned that digital storytelling was especially a useful tool for online classes because students were able to get to know their peers, to put a person's name with a face, and to see what others were doing. Through this project, they shared personal experiences of what worked and some things that did not work. Students learned from each other and gained confidence in using technology.

Digital storytelling was used as a reflection and assessment tool in *Networks in Education.* This course was a graduate course providing students with an overview of classroom electronics, computer hardware, software, and networking. The emphasis was on understanding classroom electronics, how computers work, and how they interface with other computers as well as with peripheral devices. Topics covered included selecting computers and peripherals for personal and school use, network topologies, upgrading hardware, operating systems, diagnosis and troubleshooting, network specifications, and applications of networks in school settings. In the previous years, students had mid-term and final exams to be evaluated. Students were tired of remembering technical terms and their functions. They also forgot those terms easily after the exams. Instead of having the regular examinations, students were asked to create a reflective story in which they showed their audience how to install a computer from scratch. They took pictures for each part and explained the term and usages in their narratives. According to these students, this project was meaningful and memorable because it provided opportunities to examine and learn from complex and professional situations. Every

student was satisfied with their stories. Compared with the standard tests, students felt that storytelling helped them remember the content in a meaningful way that they could use in the future. After sharing different stories they had created, they asked for each others' permission to keep a copy of their project because they thought those stories would help them review what they learned in class.

Digital storytelling was also experimented in a second year mandarin Chinese course, *Mandarin Chinese IV.* This course was an undergraduate course emphasizing the students' development in the basic communicative abilities in listening, speaking, reading, and writing for real communication purposes. In this course, students were required to create an artifact to demonstrate their target language proficiency. Students were allowed to select topics of their own interest for their stories, but they were required to use learned Chinese vocabulary and sentence structures in the stories. Students were also encouraged to explore new words and structures by themselves to compose a meaningful and coherent story. During the creation process, students started writing the story scripts in the target language. Then the instructor met each student individually to help the student revise the scripts in ways such as clarifying meanings, correcting wrong characters and word usage, and improving sentence structures. The individual instructor-student conferences, which involved students in listening, speaking, reading, and writing, provided an opportunity for students to practice all four language skills in an authentic way when students were working on the project. After the script was finalized, students assembled still images or video clips that could be reflected in the stories. Before recording, students practiced reading the scripts over and over again, so their pronunciations and intonations would be at their best. Students became more fluent in using the vocabulary and sentence structures that they practiced in their stories.

From our own experiences of integrating digital storytelling into these four classes, we thought that incorporating storytelling into

learning and assessment processes not only helped our students learn the subject and master technology skills but also motivated their learning interests and practice their problem-solving skills. Undoubtedly, educators are using storytelling to stimulate students' critical thinking skills, encourage self-review, and convey practice realities across and within disciplines (McDrury, 2003).

11. CHALLENGES IN USING DIGITAL STORYTELLING

Although younger students are technology natives and younger educators are capable users of technology, using digital storytelling as an effective learning strategy and pedagogical strategy is still challenging because this type of storytelling involves many different skills, both creative and technical, some of which may also be new to "older" students and teachers.

Neither the graduate nor the undergraduate students in our classes had problems in mastering the skills of creating digital stories with Windows Movie Maker; however, they did have problems involving such as the large image file size, fuzzy images in the movie, losing image files in the project storyboard, and incorrect file format. Several students used images directly downloaded from a digital camera. Those images had very high resolutions so that the file size was very large. A 2-3 minute movie (with 5-10 images) might gain 80 – 190 MB in file size due to the high resolution images. As a result, some students encountered pauses and stops while playing their large file size movies to the class. One student could not even download her movie from the server. When checking her file size, her movie was 186 MB, which caused her movie downloading time to be much longer than others. Once they reduced their image size and recreated their stories, they did not have the same problem. In contrast, some other students used images downloaded from the Internet, which had low resolution. The story file size was small, but the pictures in the movie were fuzzy and blurred. Therefore, making the right

resolution and dimensions of the image was important to creating a good movie.

Narrative recording was a second problem for some students, who did not like their voices when played on the computer. If there was a choice, they would use music and text to replace their voices in the movie. The third problem was how to use music properly. First of all, students used music that matches the content of the story. Then, students had to make sure the length of the music fit the length of the story. A few students complained that their story did not stop after all images were displayed and their file size was larger than expected. Checking their stories, they found that the story was 2 minutes but the music was 5 minutes. They solved the problems by cutting the music to fit their stories. The last problem students encountered was that their projects would not display correctly if they reopened the movie projects on another computer. This problem was caused by students' inexperience with technology. Although they were told to save all the images, narration, and music in the same folder with their movie project and take the whole folder to other computers if they could not finish the project and/or did not have time to convert the project into a movie in class, some students only saved the movie project to their USB drives. As a result, the images on the storyboard in their project did not show when they worked on other computers. The storyboard was only a placeholder for the images which would not show if the whole folder did not go with the project. The same thing happened when students submitted their movies. Instead of submitting their movie files (.WMV), some students submitted their projects (.MSWMM) which meant that the project was not converted to a movie. Therefore, the movie (in fact, the project) did not play on the instructor's computer.

All problems mentioned above were related to the basic knowledge of technology usages. These problems were easy to solve once students were experienced. To use digital storytelling effectively in the classroom, teachers should be well-prepared technically and pedagogically. We agree with Boase (2007): "the challenge that

digital storytelling in education poses is how to harness the massive potential of the story form, with its possibilities to inspire, engage, transform, through a process that will endow it with opportunity for reflection, critical thinking, and problem solving" (p.10).

12. CONCLUSION

This article provides an overview of digital storytelling in education and how the medium can be integrated into the curriculum. Some functional samples were discussed to help educators understand how digital storytelling can be used in instructional settings. Overall, digital storytelling is a valuable learning tool and plays an important role in education, and thus should not only be considered as a multimedia element separate from the actual teaching and learning processes. Educators are discovering that digital storytelling has the potential to become a valuable educational tool for students when taught in an effective manner (Royer & Richards, 2007).

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