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Developing 21st Century Skills in Teacher Education through Digital Storytelling

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Much has been stated about the need for P-12 students to develop 21st century skills in order to adapt to the rapidly changing economic needs within the world. Yet and still, most colleges of education in the United States of America have been slow to revise their teacher education programs to provide pre-service teachers with adequate training and experience necessary to implement these skills successfully. The purpose of this study is to examine how pre-service teachers understand, develop, and apply 21st century skills through developing and implementing a digital storytelling assignment in a literacy methods course. Content analyses reveal that participants developed digital stories involving the following themes: popular culture, early childhood curriculum expectations, popular children's literature texts, and personal experiences.

Keywords: Digital storytelling, methods courses, literacy, early childhood

Much has been stated about the need for P-12 students to develop 21st century skills and literacies to adapt to the rapidly changing economic needs within the world (Brown, Bryan, & Brown, 2005; Partnership for 21st Century Skills, 2009; Shaffer, 2006). Yet still, most colleges of education in the United States of America have been slow to revise their teacher education programs to provide pre-service teachers with the adequate training and experience necessary to implement these skills successfully (Partnership for 21st Century Skills, 2010). As a result, little has been documented relating to how pre-service teachers understand, develop, and apply 21st century skills and literacies in their teacher education courses. The purpose of this study is to examine how pre-service teachers understand, develop, and apply 21st century learning skills and literacies through developing and implementing a digital storytelling assignment in a literacy methods course. The research questions that drive this study are:

What kinds of digital stories do pre-service teacher create using 21st century learning skills and literacies?

What themes are most common within these digital stories?

What are pre-service teachers' perceptions of using 21st century learning skills and literacies to create and facilitate digital stories?

Conceptual Framework

This study draws from the theoretical concept of multiliteracies. The concept of multiliteracies refers to a range of new literacies that are warranted for people to be literate, meaning-making, and communicating citizens within a world that has and continues to be impacted by technological, cultural and societal changes (New London Group, 1996). Notably, Anstey and Bull (2006) indicate that the texts used and produced by students to make and communicate meaning in today's society often involve several different modes (e.g. listening, reading, writing, acting, texting, and viewing). In keeping with this school of thought, three specific theoretical constructs inform and support this research: (a) multiple semiotic systems, (b) multimodality, and (c) the concept of design. As people construct meaning from paper, electronic, and/or live texts, they interpret the symbols and signs imbedded and represented in that particular text. Collectively, these symbols and signs make up what is known as a semiotic system (Anstey & Bull, 2006). People use semiotic systems in coordinated ways to construct meaning and to express thoughts. Moreover, these semiotic systems are multimodal. The five most commonly identified semiotic systems are linguistic, visual, auditory, gestural, and spatial. The present study draws from this concept as it examines the semiotic systems pre-service teachers develop to construct and represent meaning within and across their digital stories.

The concept of design, as embedded within the multiliteracies framework, refers to the idea that people simultaneously inherit conventions of meaning while actively designing new meaning in texts (The New London Group, 2006). Essentially, three elements are involved in the concept of design: (a) available designs, (b) designing, and (c) redesigning. Available designs are the resources for meaning making that are derived from the semiotic systems that are readily available to the designers (i.e., music, gesture, and film). Designing is the process of shaping emergent meaning by transforming these available designs. Finally, redesigning is a new meaning that develops through the process of designing. The present study draws from this theoretical construct as it examines the themes that develop while the pre-service teachers are designing digital stories using resources that are readily available to them.

Literature Review

This study is informed by scholarship on digital storytelling (Center for Digital Storytelling, 2005; Robin, 2008) and 21st century skills (Partnership for 21st Century Skills, 2009; Shaffer, 2006). The Center for Digital Storytelling (2005) identifies seven essential elements of digital storytelling: 1) point of view; 2) dramatic question; 3) emotional content; 4) voice; 5) soundtrack; 6) economy; and 7) pacing. Studies into the use of digital storytelling in P-12 contexts suggest that digital storytelling can lead to several benefits, including: the development of digital technology skills; the development of digital media literacies; real-life application of mathematics concepts; an exploration and understanding of cultural identities; engagement of disengaged readers; increased student achievement; improvements in writing skills; increased student engagement; and finally, the development of student voice and agency (DeGennaro, 2008; Figg & McCartney, 2010; Fitts & Gross, 2010; Gould & Schmidt, 2010; Hull & Katz, 2006; Malin, 2010; Rule, 2010; Skouge & Rao, 2009; Sylvester & Greenidge, 2009; Ware, 2006; Zhou, 2008). In like manner, studies that investigate the use of digital storytelling in higher educational contexts indicate that digital storytelling can be used to increase technology

self-efficacy, communicate persuasively, assess student learning, contribute to professional development and community building, increase reflective learning opportunities, explore teachers' personal narratives, and apply theoretical concepts (Coventry, 2008; Heo, 2011; Leopold, 2010; Roby, 2010; Sandars & Murray, 2009; Skouge & Rao, 2009) Within this scholarship, little is known about how pre-service teachers use digital storytelling to understand, develop, and apply 21st century learning skills. The present study contributes to this gap within the literature, as it documents pre-service teachers' experiences using digital storytelling to understand and develop proficiency with 21st century skills.

This study also draws from scholarship regarding 21st century learning skills. The 21st century learning skills movement emerged out of an effort to create a P-12 educational system in the United States that regained its competitive position within the world while simultaneously equipping students with the information, media, and technology skills required to participate in a global economy. Unique to this movement is a shift in ideological values of education as a process of knowing massive quantities of information to education as the process knowing how to perform specific skills (Shaffer, 2006). The 21st century learning skills include: creativity and innovation, critical thinking and problem solving, communication, collaboration and information, and media and technology skills (Partnership for 21st Century Skills, 2009). The Partnership for 21st Century Skills (2010) calls for teacher education programs in the United States to be at the forefront of integration, research, and evaluation of 21st century education. Nonetheless, minimal scholarship (Carroll 2005; Graham & Benson, 2010; Sardon & Devlin-Scherer, 2010) has examined the impact and integration of 21st century learning skills in teacher education programs. The present study contributes to this gap within the scholarship, as it investigates how pre-service teachers understand, develop, and apply 21st century learning skills in a literacy methods course.

Research Design

This study involves an action research design (Mills, 2003; Sagor, 2000). While multiple iterations of action research exist, this study draws specifically from Mill's (2003) notion of action research. Mills (2003) defines action research as a spiral and dialectic research process that involves: (a) identifying an area of focus, (b) developing and implementing a plan of action, (c) collecting data, (d) analyzing data, and (e) developing a new plan of action. In the subsequent sections, I discuss each of these components of action research as it relates to the present study.

Plan of Action

In keeping with the first step within Mill's (2003) action research framework, I identified 21st century skills and literacies as the foci of this study. I altered three class sessions in my pre-service early childhood literacy methods course to integrate information on the 21st century skills, New Literacies, and digital storytelling. During the first of these three class sessions, we examined and discussed notions and examples of the New Literacies as conceptualized by multiple scholars in this newly emerging field of study. We also discussed the rationale behind teaching about and through these New Literacies in P-12 classrooms. In the second session, we defined and discussed the importance of helping students develop the 21st century learning skills. We explored various ways in which the New Literacies and the 21st century learning skills might intersect and diverge with one another. During the third class session, we examined the concept of digital storytelling and critiqued original examples from The Center for Digital Storytelling (2005). To give students an opportunity to better understand, practice, and apply the 21st century skills, I adapted one of the course assignments to require them to create an original digital story that could be implemented in a P-3 classroom. Essentially, students were required to work in pairs and create an original digital story that involved at least three different types of media (e.g.,

voice narration, music, photos, illustrations, diagrams, art, web connections, and video). Students were given a blank storyboard graphic organizer to assist them in brainstorming and organizing the events within their stories prior to designing the actual stories. Moreover, students were given several choices over the software they could use to best communicate their stories (see Table 1). Students were also encouraged to use any other software they deemed appropriate for the project that was not identified on this list. Interestingly, the majority of the students used PowerPoint to represent their stories

Setting/Participants

This study took place at a mid-sized Doctoral Institution in the Mid-West portion of the United States of America. The focus within the literacy course is literacy assessment and instruction. The course is a required course for students pursuing an initial Early Childhood Education certification in this state. There were 21 students in the course at the time of the study. Twenty of the students in the course were White and one student was self-identified as Mexican American. All of the students were seniors. Finally, the students in the course participated in a 50-hour clinical experience in an early classroom.

Data Collection Sources and Methods

Data collection lasted 18 weeks. Data collection began one week prior to the first class session and continued one week beyond the end of the semester. Consistent with the action research design undergirding this study, four data collection sources were involved in this study. First, I used a teacher researcher journal (Lankshear & Knobel, 1994) to document observations and reflections from each of the three newly developed teaching sessions. Next, I developed and administered an open-ended qualitative survey (Fowler, 2009) to determine students' (n=21) perceptions of 21st century skills as applied within the digital storytelling project. Lastly, I collected the digital stories and any other pertinent course-related materials (syllabi, rubrics, teaching PowerPoints, and handouts) and included them in the overall analysis of this study.

Data Analysis

Data was analyzed in two phases. I began by conducting a content analysis (Ball & Smith, 1992; Bell, 2001) of the visual content in the digital stories. As such, I created a coding notebook with Microsoft Word and coded each story into this notebook. A total of nine variables were included in this coding notebook. Seven of the nine variables in the coding were derived from the seven elements of digital storytelling as outlined by the Center for Digital Storytelling (2005). These variables include: point of view, dramatic question, emotion of voice, soundtrack, economy, and pacing. I added title and media as two additional variables to attend to the students' various media choices (see Table 2).

During the second phase of data analysis, I developed six analytic categories and sorted each story into the appropriate category based on previously assigned codes. Then, I developed a frequency table and tabulated how frequently particular categories of texts were created by my students (see Table 3). Finally, I translated the data presented in the frequency table into a bar graph to further assist in this phase of data analysis (see Figure 1).

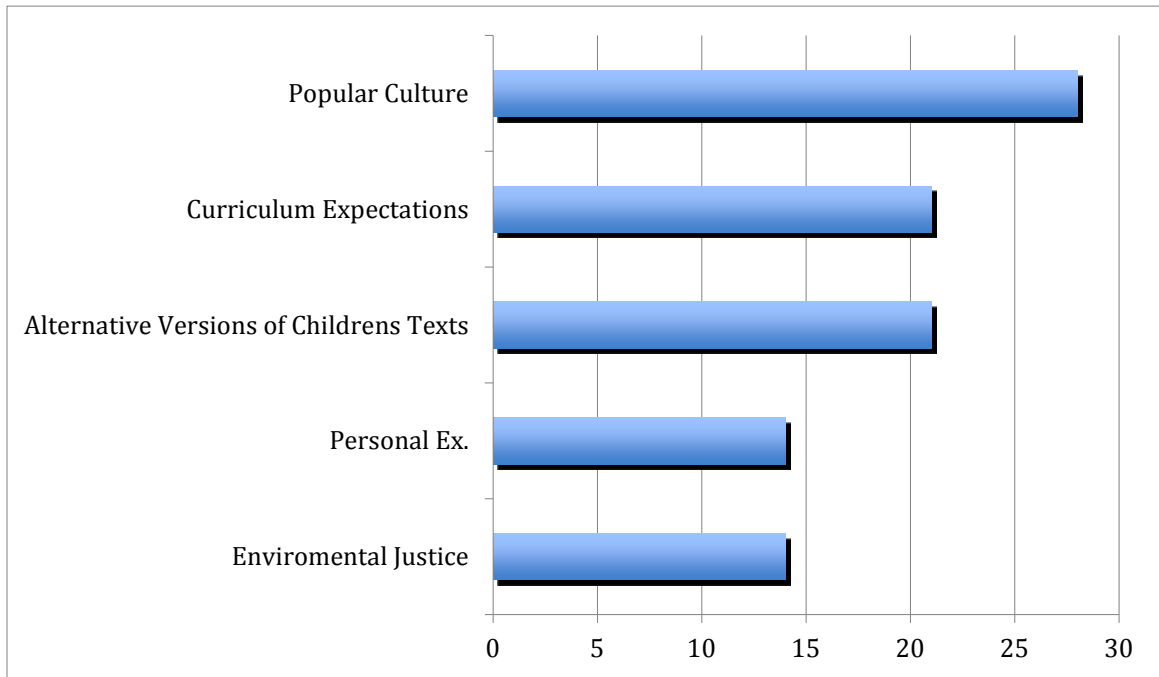


Figure 1: Percentage of Texts in Each Category

During the final phase of data analysis, I analyzed students' responses to the qualitative survey. I used a thematic analysis process (Boyatzis, 1998) to analyze the qualitative survey data.

I read through the data several times while participating in open- and closed-ended coding processes. After noting themes that emerged within the data, I developed broad analytic categories and sorted the data into these categories. Next, while closely attending to each survey question, I established assertions from the data that were supported by at least three warrants. Lastly, I selected exemplary samples from the data to represent the themes related to each survey question. Validity was established by triangulating (Denzin, 2006) the data prior to making assertions from it.

Analysis of Digital Stories

Four themes emerged in and across the digital stories the students created. These themes relate to (a) popular culture interests, (b) environmental justice, (c) alternative versions of popular children's literature, (d) early childhood curriculum expectations, and (e) personal experiences. Out of the five different themes, students most often created digital stories involving popular culture interests. In the subsequent sections, I shall discuss each of these themes in greater depth.

Popular Culture Interests

Many students in the course developed digital stories that drew from and built on elements within popular music and culture. In other words, many used actual popular culture events and figures as the content within their original digital stories. In these particular digital stories, the main characters were actual people who are commonly seen in television, music, and film. Notwithstanding, the events surrounding these characters in these digital stories were fictional in nature. A salient example of this theme is illustrated in the following excerpt from a digital story entitled, "A Day in the

Life of Selena Gomez” (see Figure 2).

In this particular digital story, students used people and events (already present) within popular culture to create completely original digital stories. Theoretically speaking, students utilized the “available designs” to create a “redesigned” (Cope & Kalantzis, 2000) story involving Selena Gomez. The students used information and photographs from popular culture to make up the content within their digital story. Yet still, rather than simply cutting, copying, and pasting these photos in way that mirrored actual events in the lives of Selena Gomez, students used this content and these photos to construct a completely new or redesigned narrative.



Figure 2: Excerpts from digital story entitled, “A Day in the Life of Selena Gomez”

Environmental Justice

A second theme that was prevalent within many of the digital stories concerned environmental justice. Several students created digital stories that revolved around conserving the environment. A salient example is seen in the following excerpt from the digital story entitled, “We Can Recycle” (see Figure 3).

In this particular digital story and the like, students communicated an ideological stance toward preserving the environment. This particular student created a story wherein she identified 26 common items that can and should be recycled. In this sense, the digital story provided an opportunity to advance a political position in favor of the recycling and preserving the environment. Essentially, the students organized and presented the signs and symbols within this digital story to connote the underlying ideology that it is better for one to recycle than for one not to recycle. Further, this embodies the notion that, as Barthes (1961) suggests, semiotic systems can be used to construct and communicate both concrete and abstract meaning within texts.



Figure 3: Excerpts from digital story entitled, "We Can Recycle"

Alternative Versions of Children's Literature

In addition to developing digital stories that centered on popular culture and environmental justice themes, students also created digital stories that centered on newly developed and alternative versions of children's literature. In these instances, students used the content and characters already present in popular pieces of children's literature to create an original digital story. An example of this theme is seen below in the digital story entitled, "I Am Too Absolutely Small for School" (see Figure 4).

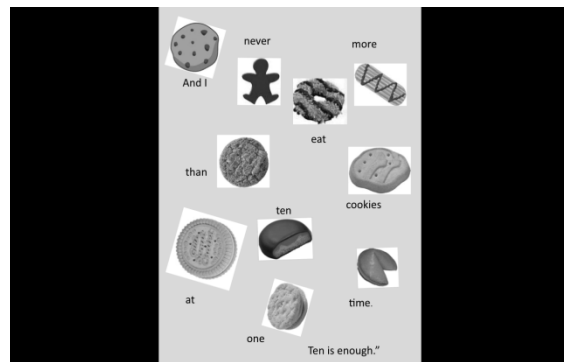
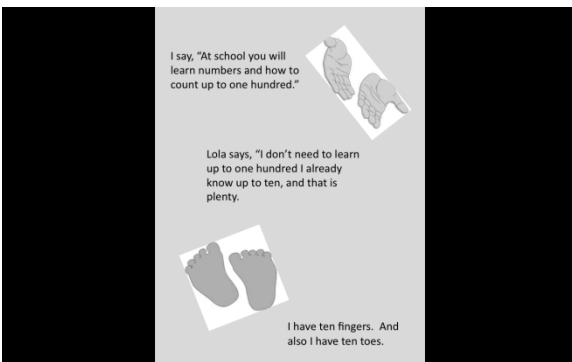
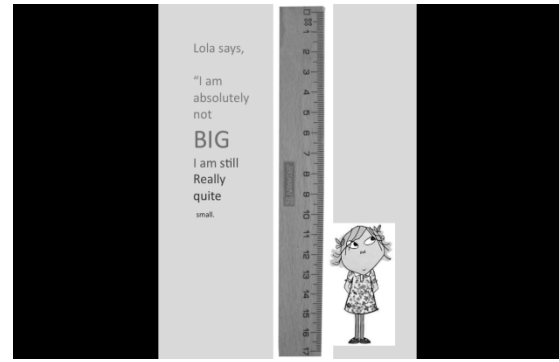
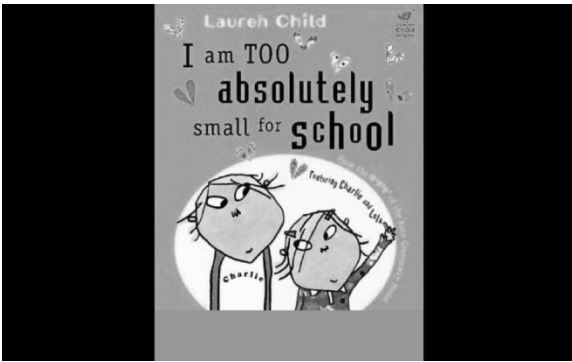


Figure 4: Excerpts from digital story entitled, "I Am Too Absolutely Small for School"

In this particular digital story, the students maintained many of the story elements from the original texts, while adding personalized narration and other minor adjustments to alter the overall nature of the story. In addition, we also see how students selected and integrated different photos and illustrations in their digital stories that were different than those presented in the original text. Essentially, the students used the available resources and signs to constitute a new textual discourse. As Halliday (1978) indicates, the students re-presented existing textual language in a new way to communicate a new meaning.

Curriculum Expectations

Some students created digital stories that centered on traditional early childhood curriculum expectations. In other words, students created digital stories that could be used to teach traditional academic and social learning objectives (such as colors, emotions, and letters). A salient example of this theme is seen in the following digital story entitled, "Today I Feel" (see Figure 5).



Figure 5: Excerpts from digital story entitled, “Today I feel”.

Here, this particular student created a digital story that communicated various emotions that people typically experience. Using both the visual and auditory modalities, the student developed a digital text that identifies the contexts in which various emotions occur. In this sense, the signs and symbols constructed and communicated within this digital story focused almost exclusively on concrete meaning.

Personal Experiences

A fourth theme that emerged in and across the digital stories centered on personal experiences. In these stories, students used their personal experiences as the basis for the textual content expressed in the stories. A salient example of this theme is seen in the following digital story entitled, “My Beach Vacation” (see Figure 6).

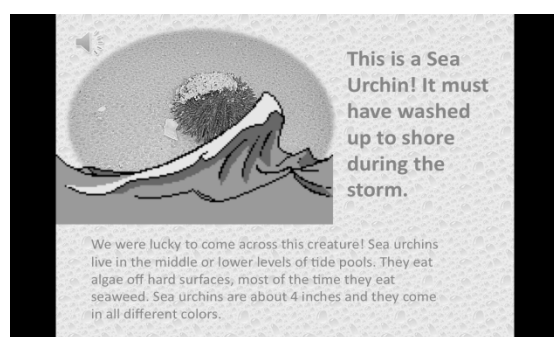
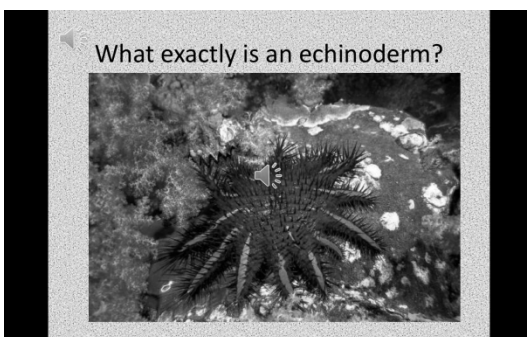
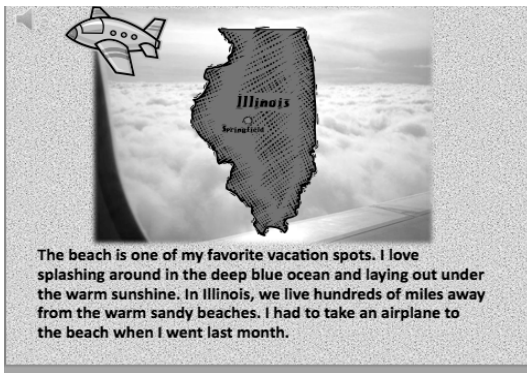


Figure 6: Excerpts from digital story entitled, “My Beach Vacation”.

Analysis of Survey Data

Analyses of students’ responses on the open-ended questionnaire revealed four notable themes: initial trepidation toward the project that was ultimately resolved, the perceived benefits of digital storytelling, the perceived challenges of digital storytelling, and the range of uses of digital storytelling. Essentially, many students experienced initial trepidation over developing the digital stories. Next, all of the students at least reported seeing the project as beneficial, and further, a number of students identified various reasons why they perceived the project to be beneficial. The majority of students reported various problems using the technology as the most challenging aspect of the project. Finally, students reported a variety of different ways they might use the digital stories in their future classrooms. In the subsequent sections, I discuss each of these findings in greater detail.

Resolved Initial Trepidation

Survey data reveal that several students experienced initial trepidation over constructing the digital stories. In spite of the information presented and discussed in the course and the examples that were explored, students still reported experiencing a significant degree of concern over participating in the project. For example, several students gave the follow responses related their initial reflections on the project:

At first I was really nervous about starting the project because I didn’t know what to write about and what program to use (Sally, 2011).

My initial reactions to the project were that I was not sure what I wanted to do for this project. It honestly took me a while to figure out what I wanted our book to be about (Tamika, 2011).

Initially, I was very worried about the project. I did not know how I would come up with a creative, useful story. I was also worried about what program I would use to create a project (Barb, 2011).

These students' reservations stemmed from lack of prior experience with creating digital stories and concerns over finding appropriate topics and technologies to complete the project. Some of this anxiety stemmed from worries regarding how much effort and time would be needed to complete the project. These initial feelings of trepidation and anxiety were ultimately resolved as students actually engaged in creating the digital stories.

Importance of Practical Use and Adaptability

Many of the students perceived the practical and adaptable aspects of digital storytelling as the most beneficial aspects of the project. Essentially, many students thought the most valuable aspect of the project was the fact that they could use the knowledge they acquired related to 21st century skills in "real" classrooms. Students also saw value in the fact that these 21st century skills could be easily adapted to meet a variety of curriculum and pedagogical objectives. For example, concerning their perceptions of the most beneficial part of the project, several students wrote:

We like that this can be used multiple times and can be altered for different age groups. It is an open assignment and can be interactive, can incorporate songs, and is a fun way for children (as well as teachers) to learn (Katie, 2011).

The most beneficial part about this project is the fact that I can re-use this story with my future children to address areas of literacy if I so choose. I was also very glad to be able to familiarize myself with all the features that are available to me in Microsoft PowerPoint that I am now able to apply to other items in the future (Sally, 2011).

The thing that I found most beneficial is being able to create my own story and to see what I have learned about technology to help make it incorporate more with the students (Karen, 2011).

We see here the value students saw in completing a project that could be easily adapted to meet the needs of their future students in their future classrooms. Moreover, students seemed to value the sense of personal freedom and creativity that digital storytelling affords to teachers.

Issues Related to Story Development and Technology Usage

The vast majority of the students identified the story development process as the most challenging part of the project. Many students were challenged by the open-ended and creative aspect of the project. For example, students submitted the following:

One of the most challenging aspects of this project was coming up with a book idea. At first I wasn't sure what I was going to make the book about and I was nervous that I would not think of anything (Carol, 2011).

The most challenging part of the project was creating a story. This is something that I have never had to do before. Luckily, we were able to work with partners, which made things much easier. We were able to put our ideas together (Susan, 2011).

The most challenging part of the project was coming up with the initial idea for my story. After I looked through some pictures and videos on my computer, however, I was able to settle on an idea that I had much background on and plenty of visual support (Karen, 2011).

While some students reported story creation as being one of the most challenging parts of the project, other students reported challenges related to using technologies with which they were not necessarily proficient prior to beginning the project. For example, some students reported:

I used a lot of sounds, animations, and text in my project and it took a lot of trial and error to get the correct timing down for my story. I also really wanted to use children's voices to tell the story to make it different than other animated stories I have seen (Dawn, 2011).

It took a while to figure out the program I used, but once I did and played around with it I had no problems (Sharon, 2011).

For me, the most challenging part was working the technology because I was not familiar with the program and get frustrated easily with technology (Carol, 2011).

Essentially, some students found the open-ended nature of digital storytelling to be somewhat challenging in nature. Several students reported experiencing challenges over deciding exactly what to include in the digital stories. At the same time, other students identified a lack of technological proficiency as an equally significant obstacle they faced while developing the digital stories. Perhaps this lack of technological proficiency can be linked to the fact that many teacher education courses within this early childhood education program have a minimalist orientation toward and integration of technology. Thus, students have few opportunities to interact with multiple forms of technology in a variety of ways.

Range of Uses

Interestingly, many students reported that they intended to use the digital stories and the skills acquired throughout the project in a variety of curricular and pedagogical contexts beyond reading and writing instruction. While some students reported that they would use the digital stories to teach curriculum content and concepts in a various subject areas, other students reported that they would use the digital stories to build classroom community and social skills in children. For example, some students wrote:

I would use it to talk about the trips the students take to other countries or inside the United States as part of their cultural experience. This will give them an opportunity to express their emotions when they talk about their trips or the new experiences they encounter (Maria, 2011).

I could use this with preschoolers who are learning beginning reading concepts such as picture cues. I could also use this to help teach students their colors (Sally, 2011).

I could use this text as a way to get students excited about learning the alphabet (Karen, 2011).

While these particular students discussed how they would use the digital stories in their future classrooms to teach specific learning goals and objectives, other students explained how they might use the digital story to contribute to children's social development in the classroom. Students wrote:

This would be great for the first day of school in Pre K or Kindergarten to help ease the children's nerves (Sandy, 2011).

For future use, we may incorporate this project if children in the classroom are having problems sharing and getting along (Maxine, 2011).

In my future classroom, I could use my text to talk to my students about emotion if it is a younger age group (Donna, 2011).

In very similar ways that traditional texts are used in early childhood classrooms to aid students in acquiring a variety of academic and social skills, the students in this study planned to use the digital stories in multiple capacities to aid students in acquiring a variety of academic and social skills. The major difference with digital stories versus traditional texts is that teachers have the ability to create texts that respond to the specific need and interests of the children in their classrooms.

Conclusions and Implications

Four important conclusions can be drawn from this research. First, digital storytelling has the potential to be used across curriculum contexts in teacher education programs to teach pre-service teachers about 21st century skills. Data from this study reveal the how digital storytelling can be used to teach a variety of academic and social academic objectives. Several of the students in this study regarded digital storytelling as a means of making connections in and across various content areas. In an effort to better support pre-service teachers in making these types of connections while developing and implementing digital stories, teacher education might consider incorporating more coursework that encourages an integrated approach to curriculum design and implementation.

The second conclusion that can be drawn from this research pertains to the level of technological proficiency among the pre-service teachers in the study. Data from the survey indicate that several students experienced some difficulty while developing the stories due to a lack of proficiency with various forms of technology. Based on the fact that we live in a technologically rich society, it is easy to assume that today's teacher education students have a great degree of proficiency and savvy with a wide range of technological tools and software. However, this may not always be the case, as demonstrated in this study. Hence, teacher educators should consider revising and redesigning their programs to provide pre-service teachers with extensive and on-going technological training and interactions in order to help them develop proficiency in this rapidly and ever-changing field.

A third conclusion that can be drawn from this research pertains to the use of digital storytelling as a means of engaging pre-service teachers in critical literacy practices. Data from this study reveal that several students used the digital stories as opportunities to advocate for issues associated with environmental justice. Ultimately, what this suggests is that digital stories have the potential to be used as a means of engaging pre-service teachers in critical reading and writing experiences. In much of the same way that many pre-service teachers in this study used the digital stories as a means of communicating their ideological positions related to environmentalism, digital storytelling might also be used to assist teacher educators in helping pre-service teachers grapple with and communicate various ideological positions associated with issues such as racism, classism, sexism, and homophobia. Therefore, teacher educators (especially those who teach literacy courses) should explore the possibilities of using digital storytelling as a means helping students assume and communicate a critical stance related to the issues of social justice within the broader society.

A final conclusion that can be drawn from this research concerns the source of textual content in the digital stories. Several teachers in this study used their personal experiences outside of school as the primary source of content within their digital stories. Moreover, many students used events and people within popular culture as a significant source of the content within their stories. This suggests that digital storytelling provides teachers with an opportunity to integrate and build upon the non-academic knowledges, languages, and literacies that both teachers and students bring to the classroom. As such, teacher educators should consider exploring the possibilities of using digital storytelling as a way to connect academic literacies with literacies that do not relate to scholastic contexts.

The economy of the United States will continue to globalize and become increasingly technologically complex as we journey through the remainder of the 21st century. Because of these changes, teachers will have to incorporate new tools, tactics, and technologies into their everyday practices to better prepare students in P-12 contexts with the knowledge, skills, and dispositions necessary to participate fully in this economy, As was evidenced by this study, digital storytelling exists as one powerful and meaningful tool to assist teachers in accomplishing these goals.

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