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Creating Digital Stories with Saudi Arabian Pre-Service Teachers: Using the Analysis, Design, Development, Implementation, and Evaluation Model to Promote Lesson Plan Development

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CREATING DIGITAL STORIES WITH SAUDI ARABIAN PRE-SERVICE TEACHERS: USING THE ANALYSIS, DESIGN, DEVELOPMENT, IMPLEMENTATION, AND EVALUATION MODEL TO PROMOTE LESSON PLAN DEVELOPMENT

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ABSTRACT

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In this digital age, teachers need to incorporate advanced technology into their classrooms. Digital storytelling (DST) is one such skill that has been shown to be effective for learners. However, not enough teachers have adequate training to implement this strategy and interventions are focused mainly on current teachers. There is a need to train teachers before they finish their teacher training programs. However, to do this effectively, the field of teacher education needs more knowledge and understanding of pre-service teachers' perceptions, needs, and experiences in using DST as a structured teaching model.

This qualitative study examined 38 Saudi Arabian pre-service teachers' use of the analysis, design, development, implementation, and evaluation (ADDIE) model for developing lesson plans and creating a DST project following that lesson plan. Participants attended a DST workshop that included instruction on the use of the ADDIE model to create a lesson plan. Data were collected with individual pre-workshop interviews, post-workshop focus group interviews, and post-workshop checklists--both individually and as a group. Data analysis was directed at evaluating pre-service teachers' perspectives on the value of the training and use of DST for educational purposes. Also, the degree to which training in use of the ADDIE model was perceived

as supporting pre-service teachers' overall skill development in lesson planning and technology integration was assessed. Results of the study indicated participants benefitted from the workshop relative to their awareness and ability to use both the ADDIE model and DST for educational purposes. Pre-workshop interviews indicated pre-service teachers were relatively unfamiliar with the ADDIE model and the use of DST for education. Post-workshop focus group data showed substantially increased awareness and ability in the use of the ADDIE model and DST for systematic lesson planning and development. Participants also expressed positive attitudes toward integrating this technology into their lessons. Notably, pre-service teachers were enthusiastic about using the ADDIE model to solve broader problems and for use beyond an immediate educational need. The results of this study supported the importance of training pre-service teachers in the use of systematic models for lesson planning and educational technology applications. Furthermore, the usefulness of the ADDIE model specifically for lesson planning and guiding DST projects was demonstrated.

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CHAPTER I

INTRODUCTION

Integrating technology into the classroom is one of the most important aspects of education in today's technical world since advancements in technology are occurring rapidly and spreading throughout the world (Bitner & Bitner, 2002). This trend of particularly interactive Web 2.0 technologies increasingly plays an important role in education and teaching. It makes learning more interactive in line with constructivist views, is more efficient, as well as more motivating (Hung, Hwang, & Huang, 2012; Lipschutz, 2010). However, integrating this technology is presently problematic because current and upcoming students who have grown up with this technology are significantly more competent and creative in using technology tools than most of the educators and instructors teaching these students (Czarnecki, 2009). To remedy this problem and assist current pre-service teachers, programs need to be established to provide training so teachers have the tools and strategies required to integrate new technologies into their lesson plans (Lambert & Gong, 2010). At the university level, professional development programs that teach pre-service teachers skills in learning and teaching activities using computer-based tools are a means to accomplish this goal.

To successfully integrate technology into lessons, instructional designers need to use systematic approaches to solve instructional problems, thereby creating an effective lesson planning process. According to Chevalier (2011) and Davis (2013), this

systematic approach involves the incorporation of instructional technology models and theory in practical applications. This is done for the purpose of improving teaching and learning by following a standardized set of procedures arranged in logical order based on empirical research and solid theoretical foundations. Although instructional design models establish standard procedures, the models need to be adaptable for different learning contexts and responsive to complex instructional situations (Branch, 2018).

Several models for making informed and effective decisions in creating instructional design (ID) have been described including the ADDIE model--an acronym for analysis, design, develop, implement, and evaluate; the ACE model--an acronym for analyze, create, and evaluate; the IDEA model--an acronym for interview, design, embed, and assess; and the Dick and Carey model (Davis, 2013). The ADDIE model has received the most widespread acceptance among instruction designers and been the most extensively researched (Branch, 2018; Peterson, 2003). Furthermore, this model is highly adaptable and flexible, making it useful for systematic problem solving for instructional design as well as a broad range of other situations (Davis, 2013; Hsu, Lee-Hsieh, Turton, & Cheng, 2014; Peterson; 2003). Therefore, the ADDIE model has strong applicability for teacher training in the lesson planning process and the use of instructional technologies.

Learning and teaching activities in education play important roles in how students learn and teaching technologies offer modalities of learning not as easily available in traditional classroom settings (Sadik, 2008). Specifically, digital storytelling (DST) has been suggested as a successful tool both for preparing teachers to use classroom

technology and for actively engaging learners with effects that go beyond education and into later life (Chisholm & Trent, 2013; Sadik, 2008).

Digital storytelling is different from traditional storytelling due to its combining various multimedia forms including visual and audio effects. This combination makes the story more engaging and appealing to students (Chigona, 2013; Chung, 2007). Many teachers believe digital storytelling could increase students' understanding of curricular concepts as it encourages students to produce their own digital stories (Sadik, 2008). Many studies revealed how digital storytelling engages students and teachers in learning (Niemi et al., 2014; Sepp & Bandi-Rao, 2015; Smeda, Dakich, & Sharda, 2012). However, to create effective digital stories, systematic lesson planning is required (Branch, 2018; Chevalier, 2011; Davis, 2013; Reiser & Demsey, 2012; Sepp & Bandi-Rao, 2015).

To effectively integrate DST into pre-service teacher courses at the undergraduate level, the ADDIE model of instructional design is suggested as an effective guide. The purpose of ADDIE is to provide a systematic and effective reference point and guided path to the desired training solution. It is also used as a model to develop and evaluate any curriculum (Hsu et al., 2014). According to Davis (2013), the ADDIE model consists of five steps: analysis, design, development, implementation, and evaluation. Effective technological tools and designs can be created from the flexible approach of using these phases (Wiphasith, Narumol, & Sumalee, 2016).

Educators have found the ADDIE model useful in class or the educational field because the steps of the model are very clear (Davis, 2013). As an instructional design tool, the ADDIE model has found wide acceptance (Forest, 2014). Instructional

designers use the ADDIE model because of its cohesive and easy to follow step-by-step framework. It also ensures the learning is well organized and not randomly implemented. The process and benefits of the ADDIE model make it especially appropriate for use with DST projects.

Although DST has received support in the research, limitations remain in research regarding the use of the ADDIE model for DST lesson planning and creation. For instance, one limitation to widespread adoption of DST is the tools available for its use are based on short-term research studies that require further validation (Di Blas, Garzotto, Paolini, & Sabiescu, 2009). Available research is also limited with respect to specific populations since most available research has not been conducted with pre-service teachers preparing for their professional careers. This means the results from previous studies might not be easily generalizable without further experimentation and research. Furthermore, an evident lack of advanced technical skills exists among experienced teachers whose students are often more technically savvy than they are. Current research tends to focus on remediating this problem by providing in-service training to these teachers; however, researchers must also focus on providing this kind of technical training to those still in their pre-service programs so they already possess these skills when they enter the workforce.

Chigona (2013) indicated pre-service teachers should acquire pedagogical knowledge and skills to be in the teaching profession. They have to train in classrooms before they can start a career in teaching. Current learning environments rely heavily on effective instructional design and teaching technologies. So, curricula for pre-service teachers necessarily include training for systematic lesson planning and the use of various

instructional technologies (Lambert & Gong, 2010). However, to effectively add training in DST to pre-service training programs, it is important to gauge the effects of digital experiences among pre-service teachers on their levels of teaching skills, confidence, and creative potential. Furthermore, research would benefit from applying a systematic instructional design model consistently to DST training and research. Recent research suggested the ADDIE model is an appropriate design framework for use with DST (McNeil & Robin, 2012; Moradmand, Datta, & Oakley, 2014; Sepp & Bandi-Rao, 2015). The purpose of this study was to investigate the use of the ADDIE model specifically to guide the process of creating DST lessons, provide data and information for educators to use, with the long-term goal of adding DST training to teacher training programs in my home country of Saudi Arabia.

Statement of the Problem

The educational system in Saudi Arabia still faces many challenges in providing better education and improving educational outcomes; currently, there is an urgent need to integrate more learning technology and training with available technology into Saudi universities. Therefore, training pre-service teachers to use systematic instructional design processes such as the ADDIE model and DST technology would bring about much-needed progress in teacher preparation and provide enrichment opportunities for pre-service teachers (Alnassar & Dow, 2013; Colbran & Al-Ghreimil, 2013; Sadik, 2008; Smith & Abouammoh, 2013).

Currently, in classrooms in Saudi Arabia, the use of technology is limited mostly to PowerPoint. Additionally, teachers sometimes use PowerPoint in ways that are not reasonable or easy to understand for the learner, making the use of technology

ineffective. Examples include a lack of good presentation skills and flooding slides with a large amount of content. Effective teacher training in instructional design and the use of educational technology would be one step toward modernizing the Saudi university system in order to prepare pre-service teachers to teach in the modern age (Alnassar & Dow, 2013; Colbran & Al-Ghreimil, 2013; Sadik, 2008; Smith & Abouammoh, 2013).

To accomplish this, research relating to lesson planning and the use of technology in teaching was collected and analyzed. Therefore, research that specifically investigated the use of the ADDIE model for DST provided important guidelines for effective teacher training in Saudi Arabia. Data analyses provided a basis to formulate a plan or a program to integrate training on the use of the ADDIE model for lesson planning and DST into Saudi university classrooms for pre-service teachers. Currently, most of the research has been conducted in the United States where there are greater skills and knowledge related to technology in teaching. Research in other nations related to digital storytelling is in process (Niemi et al., 2014). The present study added to the body of knowledge surrounding the ADDIE model and DST in international settings.

Rationale for the Study

Advances in education at all levels are progressing rapidly in the Kingdom of Saudi Arabia (KSA) to meet the objective of establishing a knowledge-based economy. Consequently, providing the necessary training for teachers at all levels is also a priority (Alnassar & Dow, 2013; Colbran & Al-Ghreimil, 2013; Smith & Abouammoh, 2013). Currently, teachers in the KSA utilize very limited educational technology and there is an urgent need for the Kingdom to develop its ability to participate in what is now a technology-based, worldwide knowledge environment. The specific challenge is pre-

service teachers need to learn to use educational technology but those responsible for pre-service teacher training also lack skills in this area (Colbran & Al-Ghreimil, 2013). To address this skill gap, this study investigated a specific framework, the ADDIE model, as a means for teaching pre-service teachers to use a specific educational technology--DST.

On a different level, there is currently very limited research that investigates using the ADDIE model specifically for DST (in the United States or in the KSA). This study contributed to the body of research in education by applying the ADDIE model to lesson planning, in general, and as a guide for developing DST projects, specifically with pre-service teachers who have had very little experience with either lesson planning or educational technology. The rationale for this study was to contribute data that could guide educators in such a way as to equip pre-service teachers with the technology skills needed to create DST using the ADDIE model as a framework.

The significance of this study was that pre-service teachers in the KSA receive very limited, if any, exposure to frameworks for lesson planning and DST technology. However, it would greatly benefit teachers if this technology became available and they were trained to use it. Teachers could make use of this technology both for instruction and their own future professional development. Moreover, use of the ADDIE model might help teachers gain more confidence in using technological tools to deliver curricula to students. Also, pre-service teachers who receive this type of training could share their DST projects with other educators (online, classroom, and website). To this end, this study incorporated a workshop geared toward training pre-service teachers to use the ADDIE model to design and produce DST projects.

Purpose of This Study

The purpose of this study was to formulate a cohesive and attainable plan for pre-service teacher training in the use of the ADDIE model and DST to enrich the Saudi university system with more technology that could be implemented in the classroom. The Saudi educational system still faces many challenges in providing better education and improving educational outcomes; DST provides opportunities to make learning more meaningful (Smeda et al., 2012). Research about the implementation of lesson planning with the ADDIE model and the emergence of DST in Saudi Arabia could contribute to the knowledge base needed for the country to emerge as a leader in using educational technology outside of the United States. The choice of a qualitative approach allowed for deep investigation of the activity and participants' understanding about lesson development and DST as a learning tool.

One key finding in research related to teachers' developing DST skills was these skills not only had positive effects on new learners but proficiency in storytelling also increased in professionals who developed and disseminated these stories (Savvidou, 2010). In turn, this proficiency influenced teachers' attitudes and perceptions. For example, some recent research indicated a positive effect when pre-service teachers used animated cartoon storytelling to teach safety and health concepts to children (Bugis, 2009). Positive and significant statistical differences were found ($p \leq 0.05$) between pre- and post-measurement scores on pre-service teachers' attitudes before and after using animated cartoon storytelling.

Most of the research that revolved around the skills and use of DST involved professional educators. In contrast, the current study used DST technology with pre-

service teachers with the objective of determining how these skills contributed to effective job performance later. Since DST incorporates more media than traditional stories, it is important for pre-service teachers to attain knowledge and technological skills, specifically in DST, before they begin work as full-time teachers. The workshop designed for this study was based on this need. The ADDIE model was used to help generate the following research questions.

Research Questions

Q1 How does application of the ADDIE model for teachers' design process of digital storytelling curriculum support pre-service teachers' skill development in lesson planning and technology integration?

Q2 What are pre-service teachers' attitudes towards digital storytelling as a learning activity?

Q3 What are the pre-service teachers' perceptions toward integrating technology after participation in a digital storytelling workshop?

Context of the Study

This study was conducted in Saudi Arabia to improve pre-service teachers' lesson planning and technology skills, to promote appreciation for the use of educational technology, and to expand their teaching skills in the use of technological applications in their future careers (Karan-Miyar, 2009). This study investigated pre-service teachers' skills in using technology in the classroom and delivered a training workshop for the purpose of increasing lesson planning and establishing DST skills among participants. Participation in the workshop increased these teachers' skills with technology for educational purposes. This research resulted in the creation of a program that could be used to teach pre-service teachers how to use the ADDIE model for lesson planning and

to use DST for teaching. The study also investigated the usefulness of incorporating specific technological skills for current pre-service teachers.

Definition of Terms

Animation. Moving drawings of characters, things, or ideas that represent important elements for telling a story or explaining processes, actions, events, etc. (Mayer, 2001).

Analysis, design, development, implementation, and evaluation model. The ADDIE model is "an instructional design model that has become the root of many other forms of instructional design models" (Campbell, 2014. p. 140). This model is a framework of instructional design components (Moradmand et al., 2014.

Constructivism. A philosophy that posits humans construct their realities through prior knowledge and experience (Piaget, 1973). Constructivism is based on the belief that students learn from using previous experiences and knowledge obtained within their culture and society to construct new learning (Haylock & Thangata, 2007).

Digital storytelling. Defined as "the practice of using computer-based tools to tell stories" (Chigona, 2013, p. 19). Digital storytelling is "the practice of incorporating digital text, imagery, video, and audio into the presentation of a computer-mediated, multimedia story" (Chung, 2007, p. 18). According to Robin (2006), digital storytelling combines the art of telling stories with a variety of digital multimedia such as images, audio, and video.

Pre-service teacher. A teacher who is mentored during an internship period (Yayli, 2008).

Social constructivism. Theory that argues human interaction is the basis for the construction of perceived reality (Vygotsky, 1978). Social constructivism views learning as inseparable from human interaction in social contexts (Crotty, 1998).

Summary

Digital storytelling can be an effective tool for assimilating technology into other instructional methods. Since today's society is highly dependent on the use of media and technology, it is valuable to make use of educational technology as it is effective for teaching public school students as well as adults. Preparing pre-service teachers to use DST technology is important because they will be most likely be required to use this technology in their careers; to date, most research recommends pre-service teachers be trained in using DST technology before they graduate. Lesson planning is also a critical part of teaching with any modality and the ADDIE model has proven to be a useful framework for instructional design. Therefore, this study provided a workshop for pre-service teachers about how to use the ADDIE model to design and create a DST project for teaching in classrooms. Data drawn from interviews and focus groups were analyzed to assess the effectiveness of the workshop.

CHAPTER II

LITERATURE REVIEW

Instructional design is academic training that focuses on the adoption and integration of new technologies, particularly computer technologies and applications, with solid principles and strategies of learning theory to create effective and efficient academic interventions (Branch & Merrill, 2012). Davis (2013) indicated the ADDIE model is useful as a guideline for effective decision-making in instructional design and the model has received solid support (Branch & Merrill, 2012; Swanson, 2006).

The ADDIE model is "an instructional design model that has become the root of many other forms of instructional design models" (Campbell, 2014. p. 140) because it provides a systematic structure for the design, modification, and evaluation of instruction. According to Chevalier (2011) and Davis (2013), a systematic approach involves the incorporation of instructional technology models and theory in practical applications. This is done for the purpose of improving both teaching and learning by following a standardized set of procedures arranged in a logical order based on empirical research and solid theoretical foundations. The ADDIE model was applied as a model for instructional design in several studies (Campbell, 2014; Davis, 2013; Khadimally, 2015; Moradmand et al., 2014; Swanson, 2006; Wang & Hsu, 2009).

Swanson (2006) and Davis (2013) applied the ADDIE model in a library setting to help design effective learning experiences for library users. The ADDIE model was

also used to redesign medicine courses at Weill Cornell Medical College with first-year medical students who were to identify effective training, learning assignments, performance measures, and the best methods of delivering content (Reinbold, 2013). Campbell (2014) stated the ADDIE added efficiency and cohesion to the processes of instructional design and learning.

According to Shibley, Amaral, Shank, and Shibley (2011), the ADDIE model was useful to a team of professionals when redesigning a General Chemistry course using a blend of online and face-to-face instruction. The objective of the redesign was to increase student learning, engagement, and interactions with applied content. The ADDIE model proved useful to the team in making critical decisions regarding the redesign of a course process that had been used for three years. The average GPA of the students increased considerably and the rate of failures decreased significantly. These researchers concluded that using the ADDIE model could help any instructional designer solve problems because it was flexible enough to allow anyone, at any time, to reflect and improve course content.

The purpose of ADDIE is to provide a systematic and effective reference point and guided path to a desired training solution. It can also be used as a model to develop and evaluate any curriculum. Hsu et al. (2014) used the ADDIE model to develop an online patient care course for nurses in a hospital in Taiwan. Interviews were used to identify concrete caring behaviors that were then used to create instructional videos and live movies to educate the participants. Quizzes, self-evaluation, focus groups, and a measurement of caring behavior were used to evaluate the participants after the course. Patients also provided pre- and post-evaluations of participants using the measurement of

caring behavior. Nurses' self-evaluations improved but no significant change in patient evaluations was reported. The authors concluded the ADDIE model could be a useful part of implementing mandated organizational change.

According to Davis (2013), the ADDIE model consists of five phases: analysis, design, development, implementation, and evaluation. Effective technology tools and designs can be created by using these phases in a flexible fashion (Wiphasith et al., 2016). While seemingly discrete, these five phases are in reality ongoing processes and the instructional designer can recycle through the phases as needed. The cycle of ongoing processes as presented by Branch and Merrill (2012) is illustrated in Figure 1.

Figure 1. The core elements of analysis, design, development, implementation, and evaluation.

Features of the Analysis, Design, Development, Implementation, and Evaluation Model

Analysis Stage

The first phase in the ADDIE model is analysis, which includes investigative work, background research, and information collecting (Reinbold, 2013). The instructional designer first uses analysis to identify the problem, learner characteristics, motivations, technology affordance, and learning goals (Wang & Hsu, 2009). For example, analysis draws attention to the members of the audience for the project, their tasks and characteristics, and the overall instructional objective for the program (Lohr, 2008). Instructional designers need to assess the range of the learners' knowledge in order to develop learning content that best suits the needs of the course (Wang & Hsu, 2009).

Some of the key tasks to be performed during the analysis phase are (a) instructional needs analysis, (b) goal analysis, (c) learner analysis, and (d) task analysis (Koneru, 2010).

1. Instructional needs analysis. Assessing learning or instructional needs involves identifying the gap between what is and what needs to be. As Morrison, Ross, Kalman, and Kemp (2013) explained, the needs assessment process serves four functions:
    a. It identifies the requirements of a particular job or task, or the problems affecting performance.
    b. It identifies critical needs including those things that have a significant financial impact, affect safety, or disrupt the work or educational environment.

c. It sets priorities for selecting an intervention.

d. It provides baseline data to assess the effectiveness of the instruction.

2. Goal analysis. Needs analysis performed before goal analysis enables designers to recognize and examine course goals. These goals define the knowledge, skills, and attitudes to be acquired to improve learning performance and abilities (Koneru, 2010). A goal analysis begins with input suggestions to define a problem (Morrison et al., 2013).

3. Learner analysis. The learner analysis helps define instructional goals and allows the anticipated desired outcomes to be defined through analysis of learners and identification of gaps in their knowledge, skills, or abilities (Koneru, 2010).

4. Task analysis. Task analysis involves the breaking down of complex learning objectives into simpler, singular performance-based tasks. The task analysis process allows the instructional designer to design simple learning practices aimed at improving performance (Koneru, 2010).

Design Stage

The second phase in the ADDIE model is design, during which the designer writes an outline of instructional design strategies and models to select appropriate activities for learners based on the information gathered in the analysis stage. Designers decide how information should be presented including learning philosophies, performance goals and objectives, activities to help students achieve these goals and objectives, and performance context (Lohr, 2008). In this phase, the instructional designer has to answer the following questions: *What strategy will achieve the objectives,*

and what are the objectives? and *How will we know if the objectives have been met?* (Wiphasith et al., 2016).

The design stage (Hsu et al., 2014), includes four steps:

1. Identification of learning objectives*:* The instructional designer may use Bloom's taxonomy (Anderson, Krathwohl, & Bloom, 2001) as a framework for deciding on the desired learning outcomes for students.
2. Course units: Design the course and syllabus according to individual steps of learning to achieve the desired learning objectives.
3. Learning strategies*:* Identify teaching methods and the instructional design to be used for teaching students.
4. Evaluation methods and instruments: Instructional designers can evaluate the process by using reflection quizzes, rubrics, and checklists.

Development Stage

The third phase in the ADDIE model is development. In this phase, the instructional designer builds the content of the courses, assignments, and activities to support the defined learning goals and delivers workable materials for use by teachers and students (Wang & Hsu, 2009). The instructional designer makes an outline of the instructional method by identifying and selecting the most appropriate strategies and technologies that enhance the learning experience, activities to improve learners' performances, and technologies to help learners gain language proficiency. The instructional designer may include storyboards to help create a sample of instructional designs (Davis, 2013).

Implementation Stage

The fourth phase in the ADDIE model is implementation including testing prototypes of programs and management of instructional products, developing and modifying ideas, and delivering instruction (Reinbold, 2013). In this phase, learners are provided with the new instructional system and instructors have to be trained and educated on the new system as well (Koneru, 2010). This phase is where the instructional designer must take an active role along with teachers, rather than a passive role, as they did in the previous steps (Peterson, 2003).

Evaluation Stage

The final phase in the ADDIE model is evaluation—this takes place during all steps of the instructional design and delivery process (formative evaluation) and, specifically, at the end of the process (summative evaluation). Through the process of evaluation, the instructional designer collects data from the implementation of the media used to improve the project (Wiphasith et al., 2016). Formative evaluation measures the learner's progress toward the desired outcome during the instructional process and "helps determine or correct the direction of the instruction" (Reinbold, 2013, p. 252). Summative evaluation measures the final stage of the educational process to determine the effectiveness of the program. During the evaluation phase, the instructional designer carefully edits the work and discovers what needs to be changed within the program. The instructional designer then changes the performance and the objectives after gathering feedback during the program (Lohr, 2008).

Using the Analysis, Design, Development, Implementation, and Evaluation Model to Teach Multimodal Digital Storytelling

One possible application of the ADDIE instructional design model is to implement the five phases in creating multimodal digital stories. Digital storytelling "is defined as the practice of using computer-based tools to tell stories" (Chigona, 2013, p. 19). Digital storytelling is storytelling using computer technology. Digital storytelling is considered by many to be an evolved, relevant, and interesting form of storytelling that relates well to learners in the digital age (Smeda et al., 2012). Digital storytelling uses technological features available with the most recent multimodal innovations including mixing moving images, graphics, music, and sound together (Yang & Wu, 2012). According to Dalton (2013), "One of the biggest communication changes happening today is the shift from the printed word on a page to multiple modes of image, sound, movement, and text on a screen" (p. 334). Digital storytelling offers advantages over previous ways of conveying stories and incorporates many ways of imparting stories (i.e., computers, tablets, smartphones, etc.), creating a multi-sensory experience.

Digital storytelling can facilitate a deeper understanding of concepts than stories written in text because digital stories can include video, music, sound, links, colors, and other features that add expression and sensation to the written story, giving this technique some of the multimodal qualities of traditional storytelling (Thesen & Kira-Soteriou, 2011). Digital storytelling appeals not just to the audience's eyes and ears but evokes emotions and provides a more real-life experience compared to stories that include only text. Before discussing the application of the ADDIE model to DST, a brief overview of storytelling as a general activity is discussed.

Storytelling

Throughout history, people have experienced the importance of storytelling, which works as a catalyst to ignite the imagination and creativity of people. Through stories, people can experience the world in different ways (Foley, 2013). Stories are tools that remind people of the memories of their lives, help them make sense of their present lives, and imagine their possible futures. Sharing life stories provides an opportunity to explain experiences (Shelby-Caffey, Úbéda, & Jenkins, 2014). Stories can be explained, interpreted, and assessed through peoples' experiences. Through stories, people learn new meanings and ideas and they receive feedback by seeing how their own thoughts and behaviors compared with others (Chung, 2007; Hug, 2007; Willox, Harper, & Edge, 2012).

Humans are natural storytellers (Shelby-Caffey et al., 2014). In many cultures, people share their experiences through storytelling, explore personal beliefs and values, and discover place-based wisdom (Willox et al., 2012). Storytelling has also been used throughout history in various cultures as a vehicle to transfer knowledge and is influenced by the culture from which it arises. For example, in many places around the world not reached by globalization, a rich tradition of storytelling is meant to transfer history and social systems from generation to generation. Storytelling is an important part of life, particularly when the history of a country is told or sung rather than written because it provides an ongoing record of events.

Stories passed down from generation to generation help maintain cultural traditions. For example, in certain Arabic countries, there is a tradition in which a storyteller, usually a man who is wearing a costume, brings a big storybook to a coffee

shop. People would gather around him to listen to the story. Through the stories, the audience gathered life lessons as well as a general respect and reverence for older people. In the United States, libraries often host story hours for children in which libraries bring in different storytellers to tell stories to young children and sometimes they act out that story. These opportunities provide entertainment, socialization, and learning for those who participate. It is also likely story hours promote literacy.

Relative to education, teachers in Saudi Arabia have used storytelling to tell stories about how the country of Saudi Arabia became a kingdom and how the first king of this new country, King Abdulaziz, unified all of the Saudi states. This story helps students gain knowledge about the history as well as a sense of cultural and national pride in Saudi Arabia as a country. Many countries have their own stories about their particular cultural traditions and history and stories are also a large part of entertainment. Thus, cultural differences are an essential factor to consider when examining the act of storytelling throughout the world.

Storytelling is widely used in classrooms to enhance students' higher order thinking skills. In the United States of America, stories are used to engage students' thinking beginning in primary schools. For example, teachers sometimes give students an incomplete story and ask them to finish the story in their own way. Then these students compare their imagined ending to the story's actual ending. Students might also be directed to imagine a story without one or two principal characters. These kinds of exercises engage students' creativity, critical thinking, and improve their language skills (Lipschutz, 2010; Malita & Martin, 2010, Yang & Wu, 2012).

Starting in early childhood, stories are a pedagogical tool used by parents and teachers to introduce children to values, morals, and good behavior (Duveskog, Tedre, Sedano, & Sutinen, 2012). Stories are used by parents and teachers to give explanations to children of a natural phenomenon, which would otherwise be difficult to explain, and to teach children fables, myths, legends, folktales, and fairytales (Lipschutz, 2010; Shelby-Caffey et al., 2014). For example, parents can teach their children the disadvantages of lying through the story of "The Boy Who Cried Wolf." In this story, the child repeatedly lies about there being a wolf near the peoples' sheep and all of the people come to help him. When a wolf actually arrives in the story, the people refuse to believe the boy since he lied so many times before. However, with the rise of globalization and the availability of technology, the tradition of the storyteller is being replaced with big screen television and traditional live stories are being replaced with news channels like CNN and other forms of social media. For example, traditional narrative stories now come in many different forms, e.g., short stories, novels, films, and digital stories in today's environment (Hug, 2007).

Development of Digital Storytelling

With the development of multimedia and computer technology, traditional storytelling has undergone some new developments. Digital storytelling is now emerging as a vehicle to transmit traditional and educational stories (Czarnecki, 2009). The ability to tell stories through computers has created ways of giving new meaning to old stories (Foley, 2013). Digital storytelling has numerous technological features and the process to define, analyze, and produce it requires substantial effort and consideration.

The primary difference between traditional stories and digital stories is the former is in oral, written, or dialog form whereas the latter is in digitized form (Lowenthal & Dunlap, 2010; Thesen & Kira-Soteriou, 2011). The process of transferring a story to a digital form helps the instructional designer be more analytical in his/her thinking by listening to the needs of the audience. Instructional designers should think about the content first and then think about characteristics of the story, image, video, and the dialog with sound effects.

In the early 1980s, personal computers were introduced but they were available to only a few individuals (Ohler, 2013). These machines used only programming languages such as BASIC. People who did not know computer language needed to create codes that operated the computer were unable to use early personal computers. As such, they were not very comprehensible to most students. Students who easily adapted to technology were able to use the computers and those who did not mostly typed on typewriters.

As the digital revolution emerged, computers became more central to the classroom atmosphere; when students used computers to create something like a digital story, they found the transmission was much more personal (Miller, 2008). Through the use of digital images, cameras, painting programs, and music, students are able to transmit not only the story but also describe its in-depth meaning, their background experiences through the story, and explain feelings associated with it.

In the early 1990s, Dana Atchley was a pioneer in manipulating digital multimedia such as Apple QuickTime, Adobe Premiere, and Macromedia Director to develop the idea of digital storytelling (McLellan, 2007). Among others, he used these multimedia devices in new interesting ways such as photography, video, music, etc. to

enhance his performance as a professional storyteller. His innovative ideas would later lead to the creation of the Center for Digital Storytelling in Berkley, California (McLellan, 2007). These innovations have made the advancement of multimedia devices and technologies for storytelling a desirable and advantageous tool for people in a wide variety of professional fields.

Digital storytelling technology gives individuals the opportunity to make storytelling more personally engaging because the techniques and processes involved in digital storytelling are different than traditional text modalities (Miller, 2008). Digital storytelling engages listeners in the act of learning by connecting with listeners' points of view and personal experiences in a very visual way by using images, audio, and video that connect with the listeners' emotions on a deep level (Lowenthal & Dunlap, 2010). With traditional storytelling, the speaker is forced, due to the limitations of speech, to explain specific experiences in a more generalized way. With DST, which can be created by using tools such as PhotoStory, MoviMaker, and Flash, a much more vivid effect is created when audio stories are partnered with visual components. Like traditional storytelling, DST can also enhance students' higher-order thinking skills. According to the study results of Yang and Wu (2012), students in senior high school who used digital storytelling showed improvements in academic achievement, critical thinking, and motivation toward learning the English language.

Digital Storytelling in the 21st Century

Recently, technology and multimedia have been integrated into teaching and storytelling, becoming more frequently utilized and more individually interactive with students. The use of animation and simulation in education has had a significant effect

on teaching, particularly in the sciences (Aksoy, 2013). One example of this integration and interactivity can be seen in the increased use of DST, which creates virtual learning environments and broadens the range of opportunities for learners beyond the normal school environment (Niemi et al., 2014). Through this broadening of boundaries of learning environments, students can access information and connect to students and educational organizations around the world.

Digital storytelling is defined as "the practice of using computer-based tools to tell stories" (Chigona, 2013, p. 19). Digital storytelling is "the practice of incorporating digital text, imagery, video, and audio into the presentation of a computer-mediated, multimedia story" (Chung, 2007, p. 18). Digital stories can be used in educational settings. Lipschutz (2010) and Willox et al. (2012) explained how teachers have been using DST as an instructional technique wherein students work as a collaborative group to create short films that illustrate personal narratives including photography, artwork, music, voice-overlay, video clips, and text. This technique offers students substantial variety and ample possibilities for growth, thus enhancing the depth of their creativity and higher-order thinking skills (Smeda et al., 2012).

According to Robin (2006), there are three main types of digital storytelling (each fulfills a unique purpose and addresses content differently): (a) personal narratives, (b) historical documentaries, and (c) particular concepts. Resources the Internet provides, i.e., web videos, audio files, and photographs with the addition of text, are tools that help facilitate DST for both learners and teachers (Foley, 2013; Karan-Miyar, 2009).

Robin (2006) illustrated each of the three types of digital storytelling. Personal narratives represent a person's life story in its entirety or can focus on a specific moment

in someone's life. Viewing a personal narrative digitally could provide several benefits in a classroom. Through personal narrative, students take a look at someone else's reality. This kind of insight creates appreciation for diversity with respect to race, culture, language, religion, etc. Furthermore, experiencing someone else's narrative could create a sense of empathy for individuals leading different lifestyles. Through narrative, people are able to perceive that despite cultural and social differences, many people face the same problems and issues in their lives.

In today's educational environment, cultural sensitivity has become a much more prevalent concern. Personal narratives allow for dialogs to be opened and ideas to be exchanged to foster cultural awareness and sensitivity in the learning environment. Additionally, creating personal narratives possibly serve as catharsis, relieving tension and stress. Robin (2006) offered an example of a digital narrative involving a South Korean mother who brought her children to the United States in search of a better life with greater opportunities. The children invariably experienced culture shock and struggled to adapt to American society.

When introducing techniques such as DST, educators usually have to justify the use of new pedagogical practices in the classroom. Is the technology used for a pedagogically sound purpose or is it technology for technology's sake? In the case of personal narratives, the use of digital storytelling is beneficial to students, more so than a narrative they could read in a book (Robin, 2006). Stories presented digitally could help students learn about people with backgrounds different from their own more effectively than if these students read the same story on their own. When students watch a digital story, they can experience the feelings of the story more directly. Students can listen to

the words of the mother in the example above and find ways to empathize with her situation.

When reading written texts, we read with our own internal language and filter the story in our own way. It is not easy for a written story to include the depth of physical detail a video can provide. Traditional reading relies on the reader to filter into the story any preconceptions or biases the reader might hide, which can greatly affect the outcome or meaning of the story. Audio and visual elements of watching a video help remove the barrier between the consumer of the story and the subject of the story, allowing the message of the author to be more directly experienced by the observer (Miller, 2008, pp. 17-18).

Historical documentaries, the second kind of digital stories (Robin, 2006), give students the opportunity to experience events throughout history as a living, breathing event--not just an abstract idea in a book. Historical documentaries can bring history alive for learners who cannot understand the relevant content or who do not like history as a subject matter. Historical documentaries can illustrate parallel events found throughout history, showing the similarities among places, events, and people from history around the world.

Historical stories come from culture, mythology, historical fabrications, true facts, and daily living (Willox et al., 2012). One source for viewing existing historical digital stories can be found on the University of Houston's website (2017a), which not only has a library of stories for different subject areas but also has tabs explaining about DST, software associated with it, and even diagrams and discussions on how to create a digital story. Students can view a specific example of a digital story about President Lincoln's

Gettysburg Address (University of Houston, 2017b). With DST technology, students can learn about this period in history, about President Lincoln, and details about the Gettysburg Address; students can also access historical photos actually taken during the American Civil War along with other materials garnered from the Internet.

Particular types of DST inform or direct focus on a specific content area such as math, science, health education, and instructional technology; they are aimed at teaching, clarifying, and promoting understanding in that content area (Robin, 2006). Focusing on a particular concept allows the learner in science to understand the functions of particular organs within the human body and what purposes those organs serve. This type of DST can encourage learners to increase their knowledge in a particular area by making knowledge easier to learn. For example, a student might be instructed to focus on one organ in the body rather than on the body as a whole. This follows the idea of "chunking" information for easier learning, understanding, and comprehension of subject material (Robin, 2006).

Advantages of Digital Storytelling

Daniels (2013) asserted, "A 21st century vision of teacher quality dictated new roles for teachers in classroom and school" (p. 2). These new roles in the classroom setting can be supported by the use of DST. Several published studies provided evidence for the possible advantages of digital storytelling. For example, the iTell tool was presented by Sukovic (2014) as a form of DST that helps students improve their creative reading and gain focus in writing tasks. Students in a high school class were engaged in learning through DST by creating new ideas and conclusions to stories they were reading.

The iTell program created an environment that assisted students in becoming more engaged with the educational material.

In another study, Hung et al. (2012) compared the usefulness of DST approaches to conventional project-based learning with students in an elementary school. A pre- and post-test quasi-experimental design examined the influence of DST on learning performance. A total of 117 students were assigned to experimental (n = 60) and control (n = 57) groups. The experimental group used project-based instruction along with Microsoft's Photo Story and MovieMaker software applications for creating digital stories in their science class. The control group used only traditional project-based learning. The researchers measured science learning motivation, problem-solving competency, and science achievement to evaluate learning performance. The results of this study indicated the students in the experimental group were found to have higher motivation, problem-solving competence, and learning achievement.

Digital stories are more than photos and slideshows. Digital stories interact with students, provide different forms of media, and incorporate personal narratives (Foley, 2013). Through digital stories, people communicate with each other and share their experiences by asking questions, expressing their opinions, and constructing narratives (Smeda et al., 2012). Digital storytelling is a way to celebrate the individual through collective sharing, listening, and learning from personal narrative stories. By sharing and celebrating personal narrative stories, people have opportunities to work together (Willox et al., 2012). Through DST communicated on the Internet, students have increased opportunities to collaborate with each other (Smeda et al., 2012).

Disadvantages of Digital Storytelling

A limitation of using digital storytelling mentioned in Verdugo and Belmonte's (2007) study was the speed of digital storytelling on the Internet. Sometimes the delivery speed is faster than students' listening skills as was illustrated in Verdugo and Belmonte's research, which used digital storytelling with students who were learning a foreign language. High speeds can be especially difficult for non-native speakers; however, the instructional designer can reduce this negative impact by creating DST based on learners' needs and characteristics. Also, digital stories or specific sections of them can be replayed if students need to hear them again. Instructional designers can use instructional models for creating DST.

Many studies mentioned the problem of pre-service teachers' lack of skills in the production and use of DST (Chigona, 2013; Lambert & Gong, 2010; Sadik, 2008). Teachers' lack of skills in this area could be a limitation because unfamiliarity with DST might also limit learners' ability to use it. However, if pre-service teachers are adequately prepared and trained in technological areas such as DST, they would have the ability to effectively lead and enhance their students' learning.

Digital Storytelling in Education

According to Foley (2013), DST can be used to guide teachers in teaching, illustrate traditional storytelling with visual components, improve students' writing skills, and engage them in the writing processes. The application of DST helps students and teachers gain skills in effective communication (Porter, 2005). For example, during this researcher's master's program, she published a CD using DST in the Arabic language (Bugis, 2010). One of her friends has a four-year-old daughter struggling to speak and

understand the Arabic language. The researcher gave her friend the CD she had published, which had a great deal of instructional content for a person on how to take care of his/her own health and well-being including how to clean his/her teeth, healthy sleeping and eating habits, how to choose suitable clothes for each season, how to respect friends and older people, etc. After almost four months, the researcher's friend indicated her daughter started to use more formal Arabic vocabulary and her healthy living habits had improved. The researcher's interpretation of this improvement was that through DST, students could build organizational skills (computer program use, communication, creative thinking, problem solving, and analytical thinking) and technical skills (Bugis, 2010; Czarnecki, 2009). Students learning from DST could develop new forms of narrative to improve their own learning by taking advantage of the capabilities of digital media (McLellan, 2007).

Research Relating to Digital Storytelling

Digital storytelling contributes positively to the field of education by offering opportunities for students to improve their skills and abilities in the areas of reading, writing, and learning language; developing their identities; and acquiring 21st century skills like collaboration, peer feedback, and multitasking (Foley, 2013). Foley (2013) also found children gained recognition of textual forms and created their own knowledge from written texts. Verdugo and Belmonte (2007) examined how digital storytelling could be used for teaching Spanish students the English language. Results of their study indicated students in the experimental group performed better on a language post-test than students in the control group, indicating an increase in listening comprehension

skills. These studies provided support for the argument that students improve their learning skills by using DST.

A study conducted by Jenkins and Lonsdale (2007) showed digital storytelling encourages student creativity and reflection. The researchers used "Moon's Map of Learning" (noticing, making sense of information, creating meaning out of information gained, developing perceived meaning, and transformative learning) as a basis for instruction. The results showed the students had a positive experience with the process, which in turn encouraged them in their classroom activities. Another study with pre-service teachers by Chigona (2013) showed how digital storytelling helped pre-service teachers interact with each other by sharing experiences, problems and solutions, tools, and methodologies. Collaboration throughout the community of pre-service teachers helped them improve their knowledge and technological skills in the use of DST.

Many studies have examined the influence of DST on learning motivation, problem solving, and learning achievement, especially in learning language skills (Thang, Lin, Mahmud, Ismail, & Zabidi, 2014; Torres, Ponce, & Pastor, 2012; Yang & Wu, 2012). Thang et al. (2014) stated that DST has been shown to effectively enhance language development and is also useful for teaching specific skills related to learning languages including autonomy, collaboration, and problem-solving skills. These researchers investigated the perceptions of Malaysian teachers about DST and found that the teachers thought that DST was useful, but resistance on the part of some teachers could present a challenge to implementing this technology.

Torres et al. (2012) examined the effects of DST on foreign language acquisition among first year English as a Second Language (ESL) students in a college of education.

These researchers included DST in the framework for a didactic sequence for practicing linguistic routines (e.g., greetings). Later, students were required to create their own digital stories. Final projects produced by the students showed notable improvement in the use of linguistic routines. Furthermore, all of the participants emphasized the entertainment and creative value of DST and its potential for increasing learning motivation. According to Yang and Wu (2012), DST gave learners the opportunity to control their learning process and self-expression as well as learning confidence and learning motivation. Using this technology in the classroom challenged learners to create artifacts through DST.

Future Directions for Digital Storytelling

Future classrooms need to prepare the general population to work with increased technology and technological accommodations will be necessary for the implementation of DST. As of 2018, computer literacy is very high among adolescents; however, teachers will need professional development in the use of multimedia devices for the purpose of DST and other technological advances in teaching platforms. Pre-service teacher preparation would equip teachers with the tools necessary to help their students' learning and efficiency with technological devices (Karan-Miyar, 2009; Savvidou, 2010).

Furthermore, these innovations will guide curriculum development. For instance, in a subject area such as science, DST could show the form and function of the human cardiovascular system in action. This would engage students and possibly motivate them to learn more on their own time. One of the challenges for teachers is to foster a love of learning and a sense of autonomy in their students. Learning through DST could be a tool to motivate students and generate excitement for learning (Karan-Miyar, 2009).

Digital storytelling also has great potential for online learning. Teachers are already using digital storytelling as a way to coordinate flipped classrooms wherein students receive instruction through media devices outside of the class so class time can be used to apply newly acquired skills or knowledge. Rather than lectures in class, teachers provide short media lectures students can access at home. One advantage of this flipped format is students have the opportunity to listen to material as many times as they need in order to grasp the content (Herreid & Schiller, 2013).

Digital storytelling is helpful to teachers in other ways as well. Although a number of available lectures can already be downloaded for their students, teachers might need to prepare materials on their own. Digital storytelling could be a useful tool for teachers in this situation; teachers who have the skills to create digital stories have an advantage with regard to meeting specific needs of their students (Hoban, Loughran, & Nielsen, 2011). In addition, teachers have opportunities to share their created stories with others and can even become professional authors of digital stories. As teachers collaborate and share their digital stories, more and more of these digital stories become available for other teachers. Through DST, the collaboration process becomes more efficacious and more enjoyable (Chigona, 2013).

Teacher Preparation in the Use of Advanced Technology in Education

One factor that has been demonstrated to affect the use and incorporation of advanced technology in educational settings is teacher perceptions of and attitudes toward this technology and its value in enhancing learning. Davis (1985) addressed this issue by introducing the technology acceptance model (TAM), which has become widely accepted. The TAM has two major objectives. The first objective is to "improve our

understanding of user acceptance processes, providing new theoretical insights into the successful design and implementation of information systems" (Davis, 1985, p. 7). The second objective is "TAM should provide the theoretical basis for practical 'user acceptance testing' methodology that would enable system designers and implementers to evaluate proposed new systems prior to their implementation" (Davis, 1985, p. 7). Therefore, if pre-service teachers are exposed to new technology before entering the classroom and given ample opportunities to learn and practice their technological skills, they will most likely be more accepting of new technologies.

A major challenge to the use of DST implied by current research was not enough teachers are sufficiently skilled to employ digital storytelling effectively; interventions currently target teachers already teaching in the field. There is a need to train teachers before they finish their teacher training programs. However, to do this effectively, more knowledge and understanding of pre-service teacher perceptions, needs, and experiences regarding the use of technology and digital storytelling skills is needed (Chigona, 2013; Davis, 1985; Kearney, 2009; Sadik, 2008).

Sadik (2008) emphasized the importance of teacher preparation in creating meaningful technology integration and effective learning in modern educational environments. The findings of Kearney (2009) showed pre-service teachers who were using DST had a higher ability to present their learning experiences in their learning portfolios. Additionally, according to Van Der Valk and Broekman (1999), teacher education needs to build on pre-service teachers' previous knowledge accumulated from their learning both inside and outside the classroom. Furthermore, using DST helps pre-service teachers improve their knowledge and skills for community practice (Chigona,

2013). Lambert and Gong (2010) found technological training for pre-service teachers that focused on the value of technology for developing 21st century skills reduced participants' anxiety about computers and increased the degree to which they valued using technology for teaching. These pre-service teachers also reported higher levels of self-efficacy in integrating technology into the learning environment after training.

Although DST has proven to be useful in modern instructional design, little has been done regarding the development of a structured approach to using this technology and the training of teachers in its use. The ADDIE model has been a useful guide for instructional design in a variety of settings (Campbell, 2014; Davis, 2013; Shibley et al., 2011) so it was likely this model would be useful as a guideline in the development of successful training for pre-service teachers in the use of DST technology.

Theoretical Perspective

The study of theories underlies the philosophical foundation at the root of teaching and learning. Methodology and strategies for good teaching practices are formulated through the constant evaluation and application of theoretical knowledge. Learning theories from the framework of observations are directed by what is considered as established evidence and logical explanation. Moreover, theories aim to give an explanation of how or why people understand phenomena. Some of the learning theories that have influenced education in the 20th century revolve around theoretical approaches reflecting behaviorism, cognitivism, and constructivism (Harasim, 2012). Understandings gained from these theories serve as a guide in making decisions in all aspects of the instructional design process (starting with an initial idea, which leads to planning and developing, and observing the role of evaluation throughout the process as

well as at the conclusion). Theories can also guide the designer in solving complex situations including the incorporation of technology, units of instruction and practice activities within specific settings and aimed to specific learners, and critiques of the decisions made (Morrison et al., 2013).

Constructivist Learning Theory

In contrast to behaviorism and cognitivism, constructivists view learning not as the acquisition of knowledge using an abstract process in an artificial setting but rather as the construction and development of knowledge through active participation in learning in authentic contexts (Weegar & Pacis, 2012). Haylock and Thangata (2007) described these differences about the nature of knowledge from that which is passively received from instruction in a classroom environment and knowledge to that which is actively built by cognitive individuals in making sense and meaning from their experimental worlds. Constructivism is based on the belief that students learn from using previous experiences and knowledge obtained within their culture and society to construct new learning (Haylock & Thangata, 2007). Constructivists do not perceive knowledge as a separate entity apart from human experience; rather, they believe knowledge is individually and collectively created based on all of the experiences of that individual as he/she makes sense of the world, which is termed as attaching meaning to the knowledge. Knowledge is connected to its meaning and to the experiences that informed its construction and meaning. According to Haylock and Thangata, the inability to separate knowledge acquisition from an individual's life-long experiences is seen in the different ways the individual internalizes knowledge and makes sense of this knowledge. In discussing the reasons for students' mistakes and misunderstandings when internalizing

and making sense of knowledge, the authors said, “We cannot assume they will make sense of it in the way we intend” (p. 35). Therefore, learning is not just the acquisition of new knowledge but is the process of adding and assimilating new information within already existing structures of knowledge acquired within contexts and not in isolation (McDrury & Alterio, 2003).

The objective of the cognitivist model is to help learners understand what they are being taught by the instructor. Hence, it is referred to as a pedagogical model since it focuses on individualized learning and procedures just like in behaviorism (Harasim, 2012). In contrast to behaviorism and cognitivism, constructivists believe learners develop their own knowledge from their experiences by constructing meaning to create mental images. Constructivism is the belief that humans learn through active participation in learning, which helps to build the foundation of any education (Weegar & Pacis, 2012). In a constructivist setting, both the instructor and the learner play different but active roles; whereas in behavioral and cognitivist theories, the teacher plays an active role and the learner plays a more passive role (Doolittle & Hicks, 2003).

For constructivists, the best learning actively takes place in engaging in real world activities rather than in abstract classroom exercises not related to the real world. Filling out worksheets, for example, just to display or practice learning something new does not have meaning because learners do not see how this has anything to do with their daily lives or realities. A constructivist perspective puts much greater emphasis on learning within real world or simulated real world situations.

Leaders in Constructivist Theory Development

Constructivist philosophers believe learners project their own meaning on the world as they understand it and utilize their own experiences to adapt to new situations (Shapiro, 2006; Weegar & Pacis, 2012). Instead of only receiving information given by the teacher, students in a constructivist classroom are involved in the process of constructing meaning and new knowledge from their own experiences (Gray, 1997). For example, learners test their individual understanding and knowledge by constructing their own experience in a new situation (Driscoll, 2012). Learners play active roles by participating and acting in real experiments (Harasim, 2012).

An early theorist, Jean Piaget (1896-1980; cited in Pritchard & Woollard, 2010), influenced constructivist learning and seemed to have based his ideas on Kant's proposition that the mind operates as an organ that takes chaotic experiences and transforms them into orderly thought. Later theorists posited this proposition as the first formulation of constructivism. Piaget was not a social constructivist himself as he primarily focused on developing children's cognitive processes through different hypothesized stages based on extensive observations and experiments (Pritchard & Woollard, 2010). Yet, his research allowed other theorists to understand child growth as well as improvement in thinking and learning. As a result, his research served as a significant step both in cognitive theories of learning and in a modern initiative to consider knowledge as construed or constructed by individuals (Pritchard & Woollard, 2010). However, individuals are also part of a larger social context and are surrounded by a surrounding culture. Thus, society and culture have powerful influences on not only

what is learned but also how that knowledge is constructed and how meaning is attached to this knowledge, leading directly into the area of inquiry called social constructivism.

Social Constructivism Theory

Social constructivism views learning as inseparable from human interaction in social contexts (Crotty, 1998). It is a new way to look at the world, at what knowledge is, and how this knowledge is acquired (Burton, Moore, & Magliaro, 2008). From a social constructivist perspective, learning is a social activity occurring in a social context. Since the aim of learning theories is to understand how people learn, it is critical this social context be included and the influence of social groups on learning be established as an essential part of understanding how people learn. These theories were primarily generated throughout the 20th century, containing many fields, researchers, and philosophers from many countries (Driscoll & Driscoll, 2005).

Jerome Bruner (cited in Driscoll & Driscoll, 2005) expressed this social component of constructivist thought when he wrote he "believed in how culture interacts with human development and biology to define the human condition" (p. 242). As individuals physically develop, the culture they are surrounded by affects their development and growth, ultimately affecting the state of the individual's thoughts and ideas. He also believed people who come from different cultures have unique cultural experiences that differentially influence how people think and learn. Bruner showed performance differences in children, how this performance was influenced by culture, and how they applied their skills outside of school (Driscoll & Driscoll, 2005). The theory considers learning as an active and social process in which learners construct new

ideas dependent on previous information and experiences, which in turn is affected by cultural and social groups (Pritchard & Woolard, 2010).

Lev Vygotsky (cited in Driscoll & Driscoll, 2005) "considered the emergence of speech to be equally important in distinguishing humans from other animals" (p. 249). Additionally, Vygotsky posed the importance of socially organized labor activity in distinguishing the basic human condition from those of animals. He believed that understanding the historical perspective was important in order to understand human mental functioning. Vygotsky's progressive method allowed him to create a theory of how the mind is formed, focusing on the social aspects (Driscoll & Driscoll, 2005). Vygotsky argued that culture is produced as a result of the social context and learners create their knowledge based on the lives and activities of individuals within that social context (Driscoll & Driscoll, 2005). Vygotsky's instruction was based on the idea that no subject should be taught until children understand the concepts. Learning is not the ability to think; it is the acquisition of the truth of things (Driscoll & Driscoll, 2005).

Use of Social Constructivism to Incorporate Technology in Learning and Education

Since crucial components of social constructivism are that learners must work with their perceptions of reality and their previous experiences to make sense of new information being taught to them, technology can play an important role in the learning process. For a social constructivist, the integration of technology into the learning environment can be helpful because technology allows learners to access new data on their own and construct their own ideas about the material. According to Diem (as cited in Doolittle & Hicks, 2003), the challenge is how to use technology to improve learners'

skills and increase their understanding by using new techniques. Social studies was the subject area that incorporated the use of technology in the learning environment to prepare learners to be effective citizens by taking responsibility for their critical thinking and behaviors. Doolittle and Hicks (2003) emphasized that interactive technology in education could help teachers to improve their learners' skills only if the teachers applied a constructivist approach and allowed students to develop their own skills in working with the data and knowledge.

Each of us builds new information dependent upon our individual knowledge, understanding, and experiences (Pritchard & Woollard, 2010). Instructional designers might all have the same objectives or lesson plans but each of them obtained different results and outcomes from the learners because the learners could interpret the activities differently during the class. Learners call upon prior knowledge (cultural knowledge, personal knowledge, and beliefs) to use in new situations. People already have their own experiences that help them apply knowledge in different situations and in different ways.

Social constructivist theory examines how people use symbols and symbolic meanings of their culture to make meaning of the world around them. This applies to making meaning of the social world as well as the natural world. Social constructivist theory emphasizes the importance of culture and context in understanding experiences in the world and in society. A good example of social constructivism is body language, which involves eye contact, signs, and gestures. As an example of cultural influences, in Arab cultures, it is disrespectful if a child maintains eye contact with an elder for a long period of time. However, in the United States, children are expected to look at an adult when being addressed and/or scolded. Also, the learning system in Saudi Arabia is

different from the United States in terms of the role of teachers. In Saudi Arabia, teachers play a central role in teaching their students because they are in charge of ensuring activities are planned, materials are available and provided, and the students have learned something new. They also put a strong emphasis on memorization. This is different from the United States of America where learners play an essential role in constructing their knowledge (constructivism). While the teacher is still important in guiding them, the students are more responsible for their learning; they are much more engaged and active in ensuring they understand the lessons.

Pritchard and Woollard (2010) identified three aspects of social constructivism: reality, knowledge, and learning. First, reality is not separate from people and does not exist externally as an objective illustration or explanation of the world. Rather, reality is an individual perception of a meaning and interpretation of the world constructed by and through social activities. Reality does not necessarily have the same meaning for everyone but is different for others depending on experiences and interactions.

Second, knowledge and the acquisition of knowledge cannot be isolated from its context into bits and pieces called facts. Knowledge is dependent upon who is transmitting and who is receiving the information, the value of this knowledge by the individual and the groups to which he or she belongs, and the subjective impressions of this knowledge. To know something means to interpret and to apply meaning--not just to determine an objective truth, which is never possible for a constructivist.

Third, learning involves people's acquisition of knowledge about their realities. Instead of seeing learning as a skill, constructivists see it as a process involving the interaction of knowledge and reality as well as the interaction with the social world

through previous experiences. An example of learning in this way can be seen when children learn the Arabic alphabet. When learning a certain group of three letters (ح, ج and خ) where the only difference is the presence and placement of a dot, children are taught through a story where the first letter becomes a character who listened to his parents, stayed home, and nothing happened to it. For this letter, there is no dot because he stayed at home and nothing happened. However, the second letter did not listen; it went out in the street and got hit by a car in his stomach. For this letter, a dot is inserted into the "stomach" part of the letter and represented by the half circle. The third also did not listen; it ran out in the street and got hit in the head, in which case the dot is placed over the top, or head, of the letter. Children use their previous experiences of taking instructions from their parents to understand the story; from the story, they gain knowledge they can apply to learning the alphabet, sounds, and reading.

Another example of these three aspects of social constructivism can be seen when a teacher supports learners in an investigation about global warming using technological resources followed by a guided discussion, allowing students to give their input about what it is and why it might be a problem. Based on the results of the discussion, the teacher gives them the chance to create a solution using the information given in class as well as their own prior knowledge and experiences. By doing this assignment, students construct new knowledge about global warming and develop a deeper understanding of the meaning. This example is related to the real world when learners confront actual issues related to global warming in the world from their individual perspectives. The learners collect new knowledge from the teacher and different references. They apply

that knowledge using prior experiences to solve this problem, which is the learning process.

Role of Teachers in Social Constructivism

Teachers need to think about how they can integrate technology in teaching and learning and where certain forms of technology could be appropriate in achieving learning goals in their classrooms. They need to understand how pupils learn, be able to help students build upon their knowledge, and motivate learners to create their knowledge from prior experiences and use it in different situations. They need to encourage students to ask questions, build their own ideas and opinions, and acquire new information using technology (Weegar & Pacis, 2012). Instructional design provides a rich guide for learners to encourage them to create individual meanings of knowledge (Dede, 2008). Constructivism focuses on learners actively participating in learning rather than teachers disseminating information (Haylock & Thangata, 2007). In constructivism and social constructivism, learning is active mental work and not a passive reception of the information being taught. The role of the teachers is to organize the curriculum to help students understand and build their new knowledge, which is dependent on their prior knowledge (Pritchard & Woollard, 2010). Teachers have to design lesson plans with activities that include critical thinking, dialogues, explanations, questioning, and problem solving.

Teachers are expected to know and understand the backgrounds of their students and effectively use that knowledge to assist in educating their students. For example, Driscoll (2012) discussed a project called Bridging Cultures. Teachers were encouraged to discover independent stories of their immigrant and minority students and then were

tasked with applying this knowledge in their classrooms. In addition, the teachers engaged the learners in activities suitable for their learning process during the class, supported the learners' goals, provided collaboration and chances for multiple students' points of view, and persuaded them to reflect about their learning (Driscoll, 2012). Teachers gave their students support by providing them a chance to develop their ideas and give suggestions.

Role of Learners in Social Constructivism

Learners use their prior knowledge and apply their hypotheses and own ideas in new decisions and situations (Weegar & Pacis, 2012). Students recall facts, generalize the definitions, and then apply explanations that will be used in their responses to other situations, which is a process of generalization. Learners must know how to apply what they learn from prior information to new conditions in their lives (Dede, 2008). They have to take an active role as they engage in learning and today's advanced technologies enhance this active role. The learners absorb instruction and use it to create their mental processes (knowledge, concepts, skills, and attitudes; Weegar & Pacis, 2012). This means learners understand and recall the knowledge and solve problems by applying prior knowledge and experiences to a new situation (Pritchard, 2014). Each individual has a certain way of learning and understanding new ideas. Learners learn skills and develop them in a unique way to solve problems in new environments. Learners should construct their own knowledge by generalizing specific actions and activities to a wider variety of settings and use those generalizations to determine their behaviors (Duffy & Cunningham, 1996; Pritchard, 2014). They have to use self- and peer-assessments to develop their knowledge and solve any problems. Because students are asked to reflect

on the day's lessons, projects, assignments, etc., they are self-assessing their progress and determining where they need more information and assistance. Their peers are asked to assess projects, assignments, presentations, etc., thus allowing students to view their knowledge through another lens and allowing them the opportunity to improve.

Integration of Technology into Teaching Different Academic Areas

An example of the incorporation of technology into the teaching of math skills was seen in a study by Dede (2008). Middle school students in math class watched a video for 15 minutes about mathematical reasoning problems in a complex, real-world problem involving the design of architectural structures. The students applied math skills in designing safe places for children to play, challenging them to think about safe playgrounds. They used geometry, measurement, and arithmetic integrated with other social issues in related academic areas to solve actual problems, illustrating the value of social constructivism integrated with technology.

Digital Storytelling as a Learning Activity

The impact of social constructivism on learning, teaching, and the roles of learners and teachers transforms the activities that take place in classrooms to enhance learning and the format for these activities, which increasingly includes technological applications. One of these activities is storytelling--an age-old vehicle for transmitting knowledge and meaning in social contexts and uses experience to improve learning. Storytelling often reflects cultural values and causes personal growth. It is a social activity and the knowledge and meaning individuals construe from these stories link storytelling to a social constructivist theoretical perspective.

Storytelling is linked to theoretical models of social constructivism (McDrury & Alterio, 2003), which are at the root of active student-centered learning. According to social constructivism theory, storytelling can be a narrative analysis that relies on social groups to create knowledge or to expand understanding; it is at the heart of social constructivist theory (Hung et al., 2012; Lipschutz, 2010). Storytelling helps people interact with each other and share their personal experiences and information (Lowenthal & Dunlap, 2010). Through storytelling, students create their own stories and share their experiences with others (Savvidou, 2010). Students develop skills such as collaboration and problem-solving (Hung et al., 2012) and grow in critical thinking because they ask questions about and better understand factual content through storytelling (Thang et al., 2014). Storytelling helps students in many different subjects such as history, science, and religion (Malita & Martin, 2010).

Digital storytelling in an integrated multimedia class is one application wherein students research the problem they need to solve, create new ideas, choose the concepts, think about characteristics, create a storyboard, write dialogue, and think about possible sound and sound effects (Lowenthal & Dunlap, 2010). Digital storytelling "is defined as the practice of using computer-based tools to tell stories" (Chigona, 2013, p. 19). Technical tools include images, graphics, music, and sound mixed together (Yang & Wu, 2012).

Digital storytelling provides advantages compared to traditional storytelling such as increased motivation, creativity, imagination, and concentration (Duveskog et al., 2012; Lipschutz, 2010). Sadik (2008) found students thought deeply while they created

their own stories and it helped them develop communication skills. Through DST, students followed the social constructivism process by

1. Noticing--In this stage, students work with knowledge they already know.
2. Making sense--In this stage, learners have to gather their previous knowledge and experiences and put them together to make meaning.
3. Making meaning--In this stage, students consider the knowledge they already have and construct relationships with this knowledge.
4. Working with meaning--In this stage, students engage their prior experiences to apply to them to the new situation to solve the problem (McDrury & Alterio, 2003).

The DST process involves students considering their perceptions of reality and working with the knowledge they have gained from previous experiences. Both of these are important aspects of social constructivism as well. Further, students learn through previous experiences to solve problems in new situations, which is consistent with social constructivism.

Effective learning enhances learners' abilities to be part of social culture by taking part in real world activities. Using technology in learning promotes increased motivation, problem solving competence, and achievement (Hung et al., 2012). Hung et al. (2012) compared student performance from a project-based learning activity in which the intervention group's project included DST tasks and the control group experienced only a traditional non-technological project-based activity. In their study, Hung et al. divided the students into two groups of science courses to compare their performance using a learning motivation scale, a problem-solving competence scale, and a science course

achievement test. The intervention group created movies on science under the learning contact “I am the energy-saving master” using a DST program (Microsoft Photo Story) while the control group experienced conventional project-based learning. The results showed the intervention group who created their project using DST effectively enhanced the students’ learning.

Most learning takes place outside the classroom and school because any social interaction leads to learning (Pritchard, 2014). The researcher believes integrating technology in education is important for learners because it is a time saver and helps learners improve their skills. Students already use technology in other areas of their life; thus, using technology in learning increases the relevancy of learning along with the inclusion of problem-solving from other situations. Social constructivism supports the integration of technology through its theoretical concepts, which have changed the roles of students, of teachers, and in the use of both technology and social constructivist teaching methods. From the researcher’s experience in working with students with disabilities, technology helps them acquire information as well as read and write by themselves without needing another student’s help in writing an exam. Social interaction can thus be more appropriately directed at engaging in learning rather than compensating for a lack of physical skills, which is better accomplished through technologies designed for this purpose.

Summary

Historically, storytelling has been used throughout the world to convey information, to teach values and cultural heritages, and to relate personal experiences. Many nationalities and cultures have a rich oral history tradition for passing information

from generation to generation. However, these oral histories rely on an accurate memory and transmission of these stories. Today's rapid advancements in computer technology and the creation and expansion of world-wide web resources have created both the capability to store these stories permanently and the opportunity to share these stories throughout the world.

The practical use of storytelling for pedagogical purposes is based upon social constructivism theories that suggest students are able to create knowledge or expand their understanding by developing their skills autonomously. For education, DST offers new ways to present information, to collaborate with others in creating stories, and to transmit stories to each other. Along with other computer skills, DST skills can expand teachers' abilities to create new learning situations, offer collaborative opportunities for their students, customize specific content, and motivate and inspire their students.

Although the ADDIE model has been used successfully in general education settings, no current research has applied the ADDIE model in developing and incorporating DST in teacher training programs. This model provides a systematic approach to the development of instructional programs for use in pre-service teacher training in DST technology.

CHAPTER III

METHODOLOGY

The purpose of this research was to explore Saudi Arabian pre-service teachers' perceptions and experiences using the ADDIE model and DST to create digital lessons. The workshop training also served to add to the teachers' ability to integrate educational technology into the classroom throughout their careers. Therefore, qualitative research methodology was appropriate for gaining sufficient details about the perceptions and experiences of the participants to interpret meanings from the data collected. Specifically, the focus of the research was to explore the experiences of pre-service teachers who attended the workshop and understood the meaning and significance of their perceptions and experience with technology integration practices. This chapter contains a detailed description of the methodology used in this research and is organized as follows: (a) research design, (b) epistemology and theoretical framework, (c) researcher stance, (d) methodology, (e) data analysis, and (f) research trustworthiness—credibility (internal validity), transferability (external validity), and the dependability (reliability) of the research.

Research Design

An interpretive qualitative approach was used in this study because qualitative methodology is most appropriate for understanding the meaning of experience for those who live it. In qualitative research, the researcher attempts to understand how people

construct their worlds, how they interpret their experiences, and what meanings they attribute to those experiences. The key objective of qualitative research is to explore the participant's point of view in depth. Qualitative research applies an inductive approach by gathering data to build concepts or hypotheses (Merriam, 2009). The purpose of this research was to explore Saudi Arabian pre-service teachers' experiences using a systematic process model (ADDIE) and DST technology for developing lessons. The following research questions guided this study:

Q1 How does the application of the ADDIE model for teachers' design process of digital storytelling curriculum support pre-service teachers' skill development in lesson planning and technology integration?

Q2 What are pre-service teachers' attitudes towards digital storytelling as a learning activity?

Q3 What are the pre-service teachers' perceptions toward integrating technology after participation in a digital storytelling workshop?

Epistemology and Theoretical Framework

Before discussing the details of the methods that were employed, it is important to discuss the reasoning and justification behind the research method selected for this study, which provides insight into the researcher's assumptions about reality when brought into the work. In this respect, is important to discuss the researcher's epistemological perspective, or understanding concerning human knowledge, as well as the researcher's theoretical perspective (Crotty, 1998).

The epistemology that guided this research was fundamentally constructivism, particularly as storytelling was a core phenomenon experienced by the participants. Storytelling is linked to theoretical models of reflective learning (McDrury & Alterio, 2003) and social constructivism, which is at the root of active student-centered learning.

Storytelling is essentially a social activity that most frequently imparts new knowledge or understanding to the listener and is at the heart of social constructivist and social cognitive theories (Hung et al., 2012; Lipschutz, 2010). With today's advances in technology, storytelling can be accomplished digitally, thereby enhancing the sharing of these stories through the web. Social constructivism is an appropriate epistemological foundation from which to consider DST as a learning technology because social constructivist theory asserts that knowledge and meaning are constructed by individuals and groups through interactions shaped by society and culture. People use symbols of culture to make meaning of the world around them and they are taught to see the world in a certain way (Crotty, 1998). In social constructivism, individuals actively seek understanding of the world (Creswell, 2013); through storytelling, students engage in constructive learning through creating their own stories and sharing their personal experiences with others (Savvidou, 2010; Smeda et al., 2012).

In keeping with most qualitative research, this study was conducted from an interpretivist theoretical perspective where the key purpose is to understand humans and their social realities by exploring the development of a phenomenon. The interpretivist approach seeks an interpretation of the social world that is culturally derived and historically situated (Crotty, 1998). The task of the researcher from an interpretivist perspective is to unearth meaning from human input (actions, words) using inductive logic as opposed to testing a theory via deductive logic. In this study, the researcher analyzed the data and interpreted meaning from the consistencies identified in the body of data. The objective was to understand how pre-service teachers experienced and used the ADDIE model and DST for teaching. Based on these teacher's experiences, the

researcher sought to understand how best to introduce systematic models and digital technology for education in Saudi Arabia.

Researcher's Stance

From the researcher's experience in teaching, integrating technology from a social constructivist perspective has helped her explain concepts to her students better than traditional lectures. From a social constructivist standpoint, students prosper when they can integrate their background information and personal experience to newly acquired knowledge in the classroom. Afterward, students are able to build their skills and establish new goalposts or outcomes for themselves as a result. For example, the researcher incorporated DST in one lesson about respect--playing nicely with each other and sharing to improve students' classroom behavior. Each child contributed his/her thoughts about the topic with their classmates and they were able to learn new information while reinvigorating what they already knew. Another example of using DST was to teach students telephone numbers to be used for emergencies. In Saudi Arabia, the police number is different from the ambulance number and the fire station number. It would be difficult to teach them with the real situation of having a fire in the classroom so DST was used to teach them about emergency numbers. Adding animation with sound effects helped grab the children's attention so they would listen to instructions and learn the numbers. The researcher was aware of her perspective about the value of social constructivist learning and the positive impact DST lessons could have on student learning. Because of her perspective, she had expertise beneficial to interpreting the experiences of the participants in her study. As a researcher, she was also aware that

because of the value she placed on these teaching and learning constructs, she had to be careful when analyzing the data to ensure no researcher bias influenced the coding.

Methodology

This study utilized qualitative research methods to analyze and understand the meaning-making efforts of the participants. The justification for the use of qualitative methods was research that supports social constructivism is largely qualitative. This was due to the fact that social constructivism theories are centered more on meaning and subjective reasoning rather than on numerical facts and statistics. A convenience sampling technique was used to obtain a sample of participants who were accessible to the researcher (Creswell, 2013). This study explored the pedagogical benefits of DST; therefore, this research focused on pre-service skill instruction using the ADDIE model as a basis for training program lesson plan development and the educational outcomes of using DST.

The researcher established the trustworthiness of the study by consulting with other researchers in the field of early childhood education. Participant reviews or the interview transcripts established triangulation, which resulted in greater trustworthiness. Finally, the study components consisted of workshops for pre-service teachers, individual pre-training interviews, DST creation, and post-training focus groups.

Participants

The volunteer participants of this study were pre-service teachers in different academic years at King Abdulaziz University in Saudi Arabia. They were all over the age of 18. They were identified using a convenience sampling method based on their voluntary enrollment in the “Computer Utilization in Preschool” course (CHS 422).

These students were divided by the university registrar's office into two sections by taking into consideration their availability and schedule. Students also took this course as an elective for a bachelor's degree in the Early Childhood department. The CHS 422 course is a face-to-face class with 38 female students from which volunteers were solicited to participate in this study. The first section of students contained 27 students and the second contained 11. Both the researcher and pre-service teachers were required to speak Arabic as their native language. All instruction and researcher/instructor created materials were translated from English into Arabic. Pre-service teachers did not have any experience in teaching at this point in their studies and had not taken any educational technology classes as a part of their formal program prior to this workshop.

Setting

The study was conducted face-to-face in a natural classroom setting at King Abdulaziz University (KAU) in the Midwest region of Saudi Arabia. The university is located in a large urban area. The class was held in a computer lab in the Home Economics College in the university. This university was chosen for this study because the researcher was already a lecturer at the university and had access and permission to use resources, specifically 25 computers within that department. These resources were especially important because based on a survey of university administrators, academics, and students in Saudi Arabia on the use of information technology in higher education, the key inhibitors for successfully implementing educational technology in Saudi Arabian universities included lack of adequate infrastructure, limited operational hardware, blocked websites, software issues, and limited training and support (Colbran & Al-Ghreimil, 2013). To verify the existing conditions, the researcher completed three pre-

study discussions with teachers in KAU who didn't use Blackboard or advanced technology with pre-service teachers or instructional design models for lesson planning. The remarks made by these teachers concurred with the results of the larger survey study. The researcher encountered several difficulties associated with limited technology including slow internet access and outdated or broken hardware. The Early Childhood department was chosen because the purpose of the study and the training were to provide further instruction to pre-service teachers who would be working with young children in the future.

Instruments

This study used semi-structured interviews and checklists as the primary sources of data. These included pre-workshop individual interviews, individual and post-focus group checklists to evaluate group projects, and post-workshop focus group interviews to collect perspectives of participants and establish rubrics for evaluating DST projects created by pre-service teacher participants. A semi-structured interview guide consisted of a set of open-ended questions and a flexible, non-standardized script (Remler & Van Ryzin, 2015). The questions were utilized in a semi-structured format for both data collection points. Each interview was constructed by selecting related questions following the general areas of (a) attitude toward using technology and integration in general, (b) attitude toward DST and ADDIE models, (c) personal technology skills, (d) preparation for use of DST and the ADDIE model, and (e) experience using DST (see Appendix A). Specific questions were developed in part based on a quantitative survey used by the researcher for a related study completed in the United States.

The checklist for evaluating individual projects completed in the workshop was adapted from published rubrics adapted and modified by the researcher (Barrett, 2006; Kaffel, 2017; Lipschutz, 2010; Sadik, 2008; see Appendix B). The focus groups used a checklist to control the discussion (Krueger & Casey, 2000). In addition to the researcher and the members of the focus group, a faculty member of the Department of Family and Science was present to take notes and ensure everyone in the focus group had an opportunity to participate in the discussion using the focus group checklist (see Appendix C).

Procedure

First, the researcher contacted the administration of the University of King Abdulaziz and received permission to conduct her research in the Home Economics College (see Appendix D). Then, the head of the Early Childhood Department within the university was contacted to obtain her permission. Next, after approval from the University of Northern Colorado's Institutional Review Board was obtained (see Appendix E), the teacher of the Computer Utilization in the Preschool course was contacted to obtain volunteers for the study including the initial interviews, DST workshop syllabus, and post-workshop focus groups. An email was sent to possible participants within this class. Information and a consent form was sent in this email should the members of the program wish to participate. After the participants agreed to attend the workshop, the consent forms were collected from volunteers prior to implementing the workshop; the participants were contacted face-to-face with an invitation to participate in the study and to explain the purpose and general procedures of the study. The researcher emphasized that participants did not need to have any

experience in teaching. An email was sent explaining the study as well as documents describing the procedures; the syllabus of the workshop was posted on the university Blackboard. After the prospective participants agreed to be a part of the study, the initial interview began with a signed consent form (see Appendix F)

Individual interview questions were used that investigated pre-service teachers' current technology skills (see Appendix A). Upon completion of the interviews, data from the interview questions were used to guide the workshop content and the amount of content given to study participants. Then, the researcher was provided with a schedule for the workshop and gave the evaluation checklist to the participants. The workshop was designed specifically to meet the needs of the students and an announcement was made regarding time and location of the workshop, which took place outside of the regular class and at a computer lab where each participant had access to a computer. Lastly, participants shared their perspectives of the experience in focus group discussions (see Figure 2).

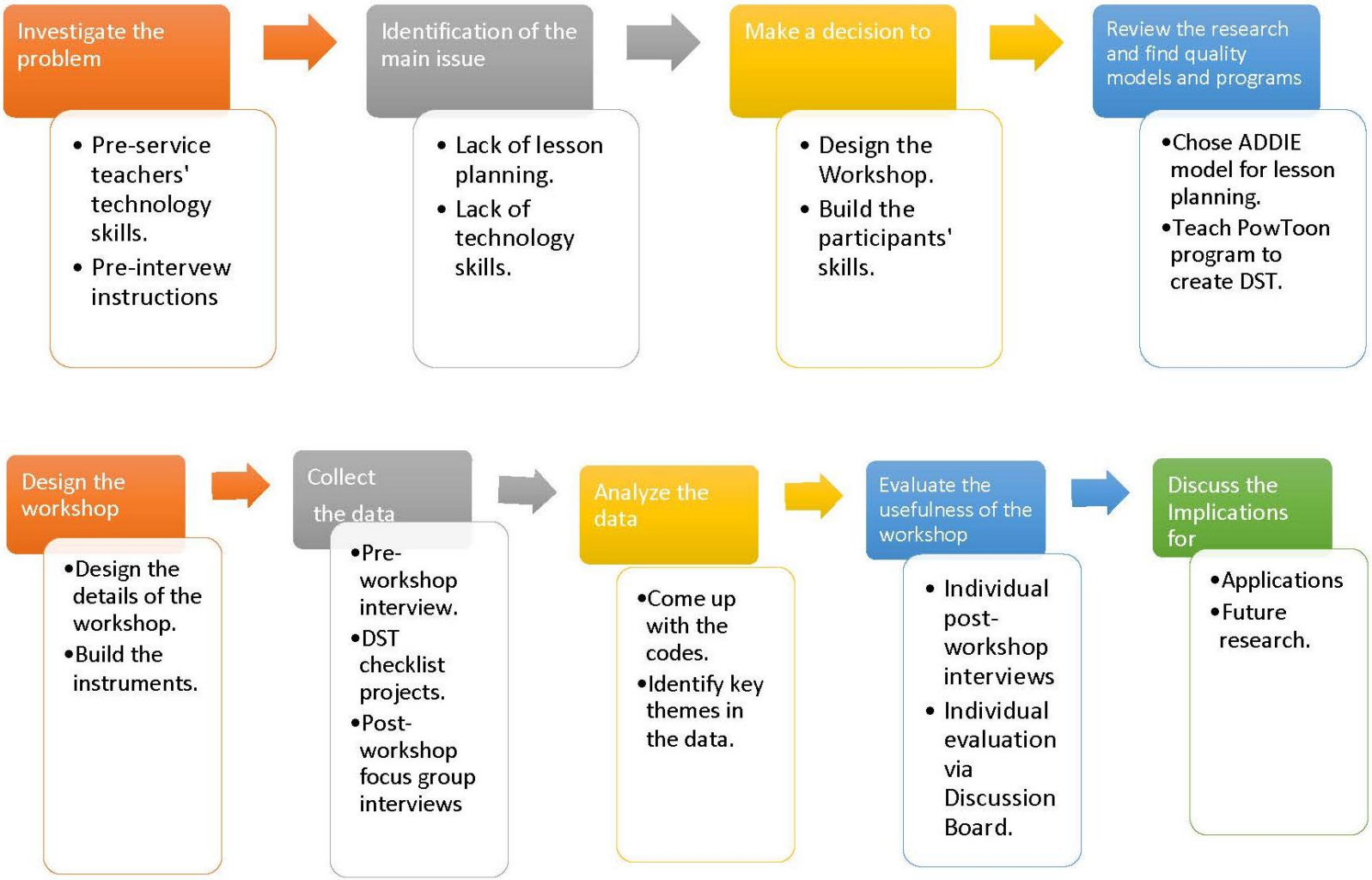

Figure 2. The process of this study.

The Digital Storytelling Workshop

The workshops took place over the course of a month and a half during the Fall 2016 semester. There were two sections of the workshop: a one-hour workshop on Tuesday/Thursday/Friday (UTR) with 27 students and the other was a one and one-half hour workshop on Mondays and Wednesdays (MW) with 11 students. All students had previously registered for either of these sections in a face-to-face setting. Some explanations about the ADDIE model were provided prior to the start of the workshops because pre-individual interviews indicated the participants were not knowledgeable about the ADDIE model. Afterward, the researcher introduced the subject of global warming the teachers would use to design their DST using the ADDIE model. With this subject, discussion boards on Blackboard were created to deeply discuss the concepts related to the ADDIE model and global warming. The participants provided their own input and feedback to confirm they understood concepts related to the ADDIE model and global warming. Finally, the participants' knowledge of the ADDIE model was assessed by providing them with a sample problem in a discussion group the participants were required to solve using the phases of the ADDIE model.

Then the pre-service teachers in the workshop were divided into 15 groups of three or four each and each group created a digital story using the PowToon program in order to focus on developing their story writing skills. The workshop process included an introduction to the steps of producing digital stories (Hoban et al., 2011; Karan-Miyar, 2009; Robin, 2006)--participation in a story circle, script writing and recording, and using video editing software to integrate images and audio. Short digital stories three-to-five minutes in length were completed during the workshop. Pre-service teachers were given

the chance to review the concept of narrative writing and information was presented on how to adapt an original written story into a digital project.

Participants in the study were given a checklist handout as a group for them to understand what was expected of them in the workshop and from their project but data were collected online using the Qualtrics survey collection website for a total of 169 individual checklists. For comparative purposes, the same checklist was used to analyze the final project from each participant in the study. The participants were divided into groups of three to four individuals who were expected to create three-to-five-minute digital stories from a story they had personally written on the topic of global warming. After the workshop was complete, focus groups were organized for the participants to analyze their feelings toward any improvements in their technology skills and whether or not the workshop was helpful to them.

The goal of the DST workshop was for the participants to design and produce a three-to-five-minute digital story. Pre-service teachers produced their own narrative stories in small groups; collected still images, videos, and music with which to illustrate their pieces; and edited their own stories (see Appendix G).

Before the workshop started, the researcher visited with each of the participants privately. During this session, participants completed pre-workshop interview questions to identify the level of their technology skills. The workshops took place for a period of a six weeks from 12:00 to 1:00 for the UTR section and from 12:00 to 1:30 on MW.

- Day One: The researcher was introduced herself to pre-service teachers and carried out activities to introduce all classroom participants by using conversation games. Then, the researcher guided icebreaker activities and

asked questions about the participants' background experiences in using technology. For the first icebreaker, participants were asked to bring a box from home with five items that represented themselves. They presented the items with a short discussion and provided a short personal introduction. Then, the pre-service teachers were told about the goals and content of the workshop and each participant was provided with a syllabus of the workshop in Arabic (see Appendix H).

- Day Two: The researcher distributed three articles for participants to read during class--one about the ADDIE model and two about global warming (see Appendix I). The researcher conducted a post-assignment discussion of the three articles and the class chose three topics to discuss how to create lesson plans using the ADDIE model: street graffiti, getting a divorce, and global warming. After this discussion, participants were divided into groups of three to five; each group of participants created a mind map about global warming at the end of the day so the researcher could confirm the participants clearly understood the discussions of the day. The reading assignment was also posted on Blackboard with several questions on the discussion board for participants to consider. Because participants were not familiar with the Blackboard learning platform, the researcher introduced the system to them and explained how to use it.
- Day Three: The third day of the workshop focused on moving from using the ADDIE model for lesson planning and problem solving to learning to use DST technology to present a lesson they had planned. The researcher

presented the seven steps of DST and showed the participants sample stories on the website. Explanations of the strategies for writing narrative stories, choosing characters, dialogue, and sound effects were given. The pre-service teachers were then introduced to tutorials on individual script work and image preparation (storyboarding, scanning, and organizing of images). The researcher distributed a checklist to participants that included criteria for identifying and evaluating the technology resource (DST) using global warming as an example. Participants were then asked to work in groups of three to five (for a total of 15 groups) to create a graphic organizer detailing the points of the articles concerning global warming. For a homework assignment, participants were asked to find additional examples of DST on topics such as global warming on YouTube and share the links in a Blackboard discussion group (see Appendix J).

- Day Four: The researcher reviewed process of the ADDIE model using various social problems as topics for discussion (e.g., divorce, encouraging student reading, managing time spent with social media presented) . The researcher incorporated open-ended questions on the discussion board to encourage the exchange of ideas.
- Day Five: Day five was focused on teaching participants to use digital storytelling programs (PowToon) and tools (inserting images and characters, video, sound, record, and creating animation). Participants practiced using the DST tools with help from the researcher.

- Day Six: The researcher reviewed the written proposals for digital stories from each of the 15 groups for approval. During reviews, the researcher noticed the participants were not achieving the level of depth required to meet workshop goals. So, the researcher reviewed Bloom's cognitive taxonomy with the class. To enhance learning, the researcher created a competitive game by dividing the class into two groups where each group gave examples of the levels of Bloom's taxonomy to be evaluated by the other group. The group that generated the most correct examples won the game. The researcher posted open-ended questions on Blackboard about evaluating learning objectives to meet them successfully.
- Day Seven: Each group submitted a proposal and a storyboard on Blackboard that detailed how they would use their digital stories (see Appendix K). After approval, each group proceeded to choose images, background, sound effects, dialogue, and other DST features for their projects. The researcher explained how to integrate narrative storytelling into DST using the PowToon program. During this session, participants learned to use voice modification programs such as Voice Changer Plus to change their narratives to children's voices.
- Day Eight: The researcher obtained more access to the PowToon program to allow students to expand for their projects. Groups continued to work on their projects.
- Day Nine: The students continued working together and recorded dialogues using the voice changer program.

- Day 10: The students continued their DST projects in small groups with the researcher present and available for help.
- Days 11 and 12: The facilitator presented and explained the evaluation criteria and checklist for DST projects they would use to review their work. Participants finalized their projects using the digital editing tutorial. Before presenting, each group used a checklist to ensure that their projects met the established criteria for the project (see Appendix B).
- Day 13: The groups presented their DST projects and shared their final project experiences. Peers reviewed each other's work. Group scripts were shared, and feedback was provided by each group via the established checklist with facilitator guidance (see Appendix B). Both group and individual evaluations were completed. The group used the paper checklist to assess their progress, and individuals submitted their progress online using the Qualtrics website (see Appendix B). The researcher also provided feedback to each group based on the checklist about the quality of their projects. All DST projects created by this study were published on YouTube under the researcher's username (see Appendix K).
- Day 14: Participants received a reflection exercise to submit to the researcher via Blackboard during this session. The researcher used Doodle to coordinate six post-workshop focus groups consisting of six to eight participants at mutually convenient times. During focus groups, the researcher collected feedback from participants about the usefulness and

potential applicability of using structured models and DST for lesson planning and teaching.

- Day 15: Participants continued to work on the reflection exercise and completed workshop feedback via an open-ended survey (Qualtrics). The survey provided additional information about participants' experiences and the researcher's effectiveness (see Appendix B). The researcher completed two of the post-workshop focus groups, at different times and in a separate classroom, while others were completing reflections. The researcher and an independent observer completed a focus group interview (Krueger & Casey, 2000) to assure quality sessions (see Appendix L).
- Post-Workshop: The researcher completed the remaining four focus group discussions.

Flow of the Analysis, Design, Development, Implementation, and Evaluation Model for the Workshop

The following steps were taken to combine digital storytelling with the ADDIE model in teaching pre-service teachers to learn multimodal DST skills. The researcher applied the five phases of the ADDIE model to develop the workshop for pre-service teachers: analysis, design, development, implementation, and evaluation (see Figure 3).

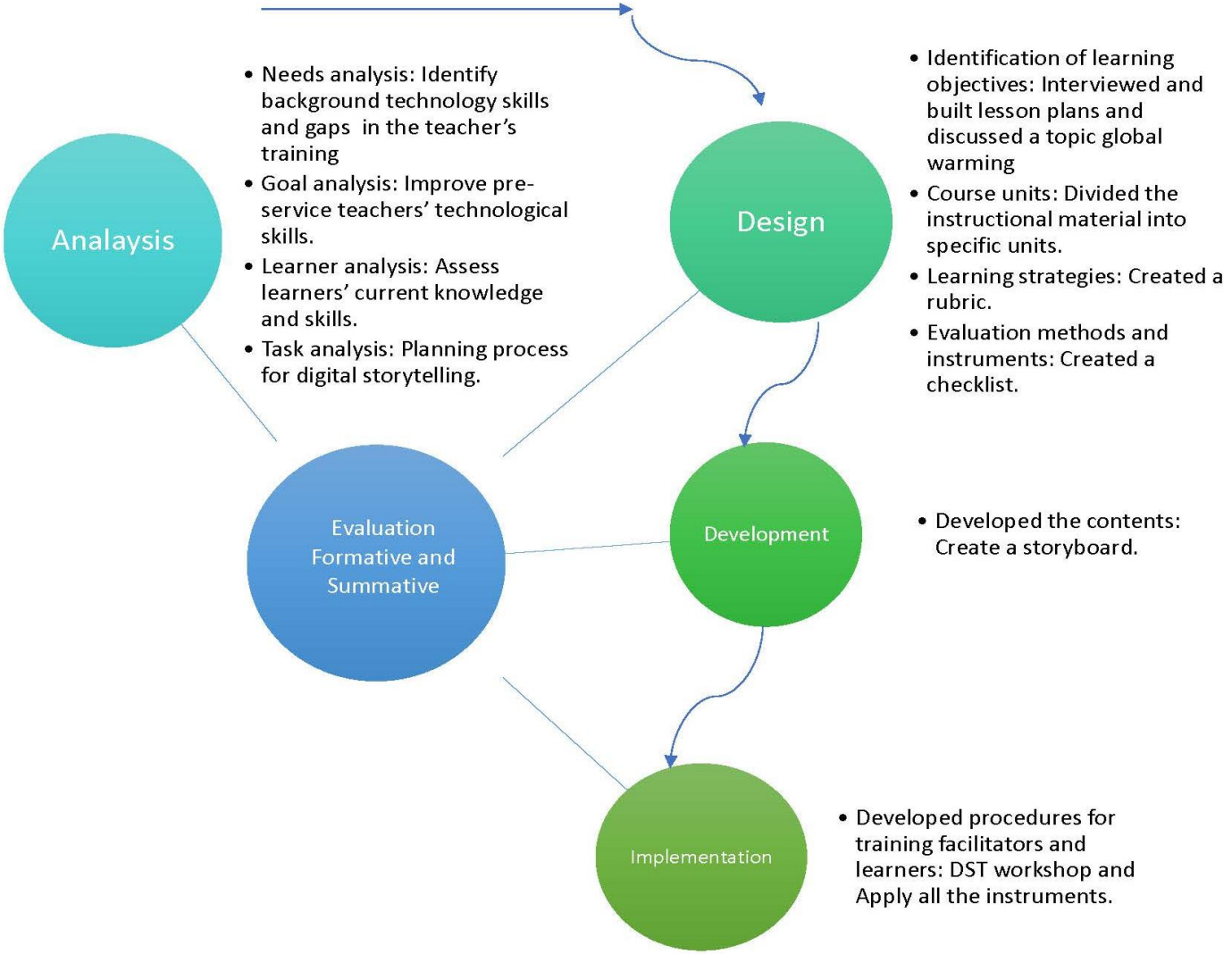

Figure 3. Visual account of the process as used by the researcher and workshop participants.

The first phase of the ADDIE model includes the following four analytical steps:

1. Needs analysis: The researcher collected data about the basic technology skills needed by pre-service teachers to use DST and assessed their familiarity with the ADDIE model, identifying where the gaps were in the teacher's training for using technology and what the pre-service teachers already knew about DST. The researcher analyzed this problem using pre-workshop interview questions about pre-service teachers' experiences with using models for lesson planning, teaching technology in general, and any specific experience they might have had using digital storytelling in particular. Participants also completed practice exercises that showed their current levels of technological skills.
2. Goal analysis: The needs analysis indicated pre-service teachers were unfamiliar with lesson planning models and had very limited experience with teaching technology. The goal was to improve pre-service teachers' lesson planning and education technology skills by teaching them to use the ADDIE model to create DST projects. The long-term goal was for pre-service teachers to be able to apply the ADDIE model and DST skills to teach a wide range of subjects in the future.
3. Learner analysis: The researcher collected information about the learners' characteristics and needs by interviewing pre-service teachers, determining the current level of the learners' knowledge and skills in using technology in the classroom, and investigating what motivated and engaged learners with interactive instruction.

The researcher also collected information on pre-service teachers to determine their backgrounds in using DST. Using information gained from this kind of analysis helped determine the pre-service teachers' training needs. The instructional designer could then pair together those pre-service teachers who were skilled in the use of technology with those who had limited technology skills so they could work together to learn effectively and reach objectives.

4. Task analysis: This step determined the individual steps pre-service teachers would need to learn to form lesson plans and transfer these plans to a DST project (e. g., phases of the ADDIE model, DST components including images, video, sound effects, text, storytelling, and characteristics).

The second phase of the ADDIE model focused on designing the instructional flow and material. In this stage, the researcher used information from the analysis phase to design specific learning objectives and strategies, workshop content (teaching instruments, exercises), and evaluation instruments to be used for teaching the ADDIE model and DST to pre-service teachers. There were several specific steps to take during the design phase of the ADDIE model:

1. Identification of learning objectives. The researcher established learning objectives based on the pre-workshop interview information. The researcher discussed a topic (i.e., global warming) with pre-service teachers to decide the concepts to include in creating a digital story. These steps were taken to improve the technological skills of pre-service teachers for the

direct purpose of DST. The instructional designer used Bloom's cognitive taxonomy to reach the final goal (see Figure 4).

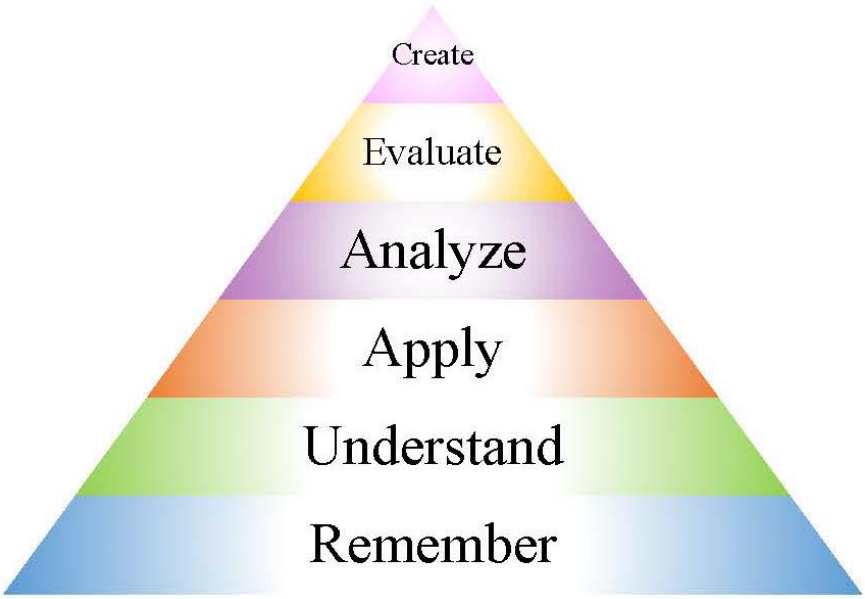

Figure 4. The levels of cognitive learning domains in Bloom's taxonomy.

The pre-service teachers would then be able to:

a. Identify the phases of the ADDIE model and main elements of the global warming issue (Remember).

b. Identify different causes and solutions of global warming (Remember and Understand).

c. Give examples on how to use the ADDIE model to create a lesson plan (Understand and Apply).

d. Use the ADDIE model to analyze the problem of global warming (Analyze).

e. Select a topic (global warming) for a digital story and describe key concepts for a lesson plan, using mind maps (Analyze and Apply).

f. Write a narrative story about a particular issue related to global warming using the main topic and dialogue (Apply and Analyze).

g. Use the PowToon program to select characters, create sounds, and so on (Apply).

h. Create a digital storytelling project on global warming using the ADDIE model that includes visual components: photos, videos, drawings, maps, charts, and graphs, which are not repetitive but are clear (Create).

i. Use concise language. The receiver should be able to understand the story from the images, even without audio (Apply).

j. Create a clear and animated narration that flows at an appropriate pace (Create).

k. Choose the sound effects. The audio track needs to include more than just voice (Apply).

l. Clearly transition between ideas, considering the use of music, sound effects, and appropriate silence (Apply and Analyze).

m. Evaluate their digital storytelling (Evaluation).

2. Workshop Content. Guided by the learning objectives, the researcher created a special syllabus on the topic of using the ADDIE model to create a lesson plan to produce a lesson using digital storytelling. During this step, the researcher planned the specific instructional units to present in the

workshop. Basic information about the ADDIE model and DST combined with a creation project was chosen as the core content of the program. These design steps helped the researcher determine which activities would best help participants build skills, knowledge, and abilities that met the learning objectives. Instructional modules were designed to help pre-service teachers create digital stories that achieved their educational objectives.

3. Learning strategies. Reading, presentations, group discussions, activities (e.g., jigsaw discussions, brainstorming, practice with technology, and games), and a hands-on project were selected as learning strategies for the program. The researcher created a rubric for pre-service teachers to follow in creating DST projects. The DST projects were to include objectives, characteristics, storyboards, dialogues, images, sound effects, and evaluations. The researcher also planned questions to post on Blackboard to generate discussion and feedback during the workshop.
4. Step four involved the design of the evaluation methods and instruments for participants' DST projects and for the overall workshop. To provide guidelines for critiquing DST projects, the researcher created a checklist of the important factors the pre-service teachers were required to use to complete a digital story. This checklist was used to determine, for example, whether the initial concept (global warming) matched the final product of the digital story.

To evaluate the quality and usefulness of the workshop, the researcher created an online survey (with Qualtrics) that included questions about workshop benefits and

participants' perceptions of the usefulness of the ADDIE model and DST technology. The survey contained four open-ended questions about their opinions about the ADDIE model and DST and how they planned to use it for lesson plans in the future.

The third phase of the ADDIE model was the development stage where the researcher assembled the specific content, tools, and procedures for the workshop. The researcher followed details identified during the design phase and followed the syllabus to choose specific articles about the ADDIE model and DST to assign for reading. During this phase, the researcher also chose the specific technological learning tools that would be used including PowToon software, storyboard software, YouTube videos, and the Blackboard learning platform. The researcher also developed a game that would be used to teach the elements of Bloom's taxonomy. To evaluate the fit of the program contents with the established learning objectives, the researcher gathered feedback from two education experts and adjusted the contents accordingly.

In the implementation phase, the researcher applied the procedures that were developed previously. First, the researcher presented information about the ADDIE model and DST followed by group discussions using global warming and other topics as example lessons or problems for analysis. The pre-service teachers then discussed the global warming problem in small groups and each group generated a mind map detailing what global warming was using the phases of the ADDIE model. After that, they were required to write a story about global warming that included dialog, characters, and any ideas they wished to convey in the story. They were then asked to create a storyboard that included multimodal features such as pictures or images they wanted to use, dialog

for each picture, and what sound or video effects they wanted to use for each frame of their digital story.

For the DST project, the pre-service teachers also learned how to use a digital movie-making program (in this case, PowToon because it has many accessible sound effects, characters and pictures that are easy to use). The program also allowed the writers to insert video clips. The digital story was actually created using the computer program PowToon. The researcher paid an additional fee of $96 to the computer company in order to permit teachers to access more features and options. The pre-service teachers in small groups used everything they had designed and developed in their written stories and storyboards to make a multimodal digital product with the assistance of the instructional designer. During this phase, they learned how to use the program to create their own stories as well as troubleshoot any issues they might have had with the program or even their stories. At the implementation phase, they could also learn how to input sound effects, record their voices, and add music, moving images, or other multimodal features or apps to help them tell their stories better.

In the fifth phase--evaluation, the researcher determined the degree to which DST projects met project criteria as well as the effectiveness of the workshop in meeting the established learning objectives. As groups developed their DST projects, the researcher interacted with each group and evaluated each project in process. The evaluation process included two steps: (a) formative evaluation during the project to help pre-service teachers improve their multimodal digital story (the researcher evaluated the written story before it was used to create the DST and applied group evaluations); and (b) summative evaluation, which occurred after the multimodal digital story was completed to make sure

the pre-service teachers acquired the skills of creating digital stories and to identify what, if anything, they needed to improve (the researcher used a DST Checklist Evaluation for each group story). A final product that applied to the grade/age level of the pre-service teachers' initial intended audience was evaluated through a checklist.

To determine the overall effectiveness of the workshop, the participants completed the developed online survey. This survey assessed participants' perceptions about the usefulness of the ADDIE model and DST for lesson planning and teaching. The survey collected information about the degree to which participants saw benefits of the skills learned, planned to use these skills in the future, and liked using DST in the classroom.

How Pre-Service Teachers Used Analysis, Design, Development, Implementation, and Evaluation in their Multimodal Digital Stories

After pre-service teachers learned the key elements of the ADDIE model, they used the model to learn how to create and present a lesson using DST technology. This real application allowed the participants to practice using the ADDIE model for lesson planning and to learn a new teaching modality--DST. First, the work groups applied the four steps of the analysis phase of the model to create multimodal digital stories using global warming as a topic. During the analysis phase, groups collected information about the topic, identified learner needs and characteristics, specified teaching goals, and outlined the main elements of their lesson plans for the DST projects.

1. During the needs analysis, the pre-service teachers collected information about global warming. Then they explained what they believed children would need to learn about the subject.

2. The next step was goal analysis. Here, the pre-service teachers developed goals for creating a DST project that explained issues related to global warming and how they would solve this problem.
3. The learner analysis for this project was pre-service teachers had to identify the characteristics of future students (age, need, grade level, etc.), what knowledge the children had about global warming, and what they needed to know.
4. The task analysis consisted of individual steps the pre-service teachers would take to instruct their children on selected issues related to global warming.

The second phase of the ADDIE model is design. In this stage, the pre-service teachers used the information from the analysis phase to develop an instructional strategy and create the content of the global warming story. Pre-service teachers worked in small groups and followed the design steps:

1. Identification of learning objectives. The pre-service teachers used Bloom's taxonomy to create digital stories. The general learning objectives would be met if, after teaching, the students were able to:
    a. Identify the problem of global warming.
    b. Give examples of different solutions to this problem.
    c. Give examples of the effects of this problem.
2. Project content. During this step, participants created mind maps of the global warming issue and generated ideas for the main elements of their

lessons. Groups also chose activities they anticipated using with future students.

3. Evaluation method. Pre-service teacher groups designed an evaluation system for their DST lessons by creating questions about on global warming for the students to answer. For example, “Give five examples of global warming effects” or “What are some different solutions for this problem?”

For the development stage, the pre-service teacher groups chose to create a storyboard of either a selected issue related to global warming or a solution to global warming. Storyboards included multimodal features such as pictures or images they wanted to use, dialog for each picture, and what sound or video effects they wanted to use for each frame of their digital story. The pre-service teacher groups then used the PowToon program to create their stories and record the dialogue with sound effects.

In the implementation phase, the digital story was created using a computer program. The pre-service teacher groups used everything they had designed and developed in their written storyboards to make a multimodal digital product with the assistance of the instructional designer. At the implementation phase, the pre-service teachers worked on solutions for any problems that might have arisen during the implementation of the digital story.

In the evaluation phase, the pre-service teacher groups evaluated the process of applying the ADDIE model in creating their digital story about global warming. The pre-service teachers in these steps paid attention and evaluated each process in the project. The evaluation process included two steps: (a) formative evaluation: during the project, the pre-service teachers could share their digital story with colleagues for peer review to

get feedback during their projects; and (b) summative evaluation: the pre-service teachers presented their final projects in the workshop and completed the evaluation checklist. The researcher used the same checklist to evaluate the final projects against the established criteria. This helped participants improve their DST projects and address any problems they had.

At the conclusion of the workshop, participants were divided into focus groups that were formed with the Doodle website. The participants chose appointments for themselves online. Once that was complete, groups were formed consisting of individuals who chose the same appointment times. The groups consisted of no more than eight persons. Each group met with the researcher for approximately one hour in order to engage in a discussion about the use of technology, skills gained from the workshop, their final project in the workshop, and application of DST in future classrooms. Specific questions were asked that focused on the creation of the DST project using the ADDIE model.

Data Collection

Data for this study were collected in three phases using audio recordings. First, pre-workshop individual interview data were transcribed in Arabic so they could be used to develop the DST training workshop. The transcriptions were then translated into English. Second, at the completion of the workshop, a checklist was given to the participants for self-evaluation and a group evaluation of skills attained; the researcher then used the same checklist to evaluate the projects (see Appendix L). Third, qualitative data were collected in focus groups via audio recording and transcribed into Arabic before they were translated into English.

To ensure confidentiality, the researcher stored all taped interview answers, checklists, the DST projects for the pre-service teachers, and taped focus groups in a secure and locked cabinet and password-protected computer to which only the researcher and her advisor had access and/or in password-protected computer files only on the researcher's computer. These files will be destroyed after three years.

Data Analysis Procedures

Data analysis consisted of using qualitative methodologies as set forth by Merriam (2009). Initially, data analysis began in the pre-workshop interview stage and took the form of theme notes that summarized ideas, impressions, and perceptions that appeared to be consistent in the interviews. After completion of the interviews, transcripts were translated from Arabic to English. The translations were reviewed for accuracy twice by other researchers. Data from the interview transcriptions were closely examined and initial common ideas were coded. The transcripts were reviewed multiple times and general themes and categories were developed from the first coding until common themes and categories emerged that were comprehensive and mutually exclusive (Creswell, 2013). After theme categories were identified, they were verified with other colleagues; the researcher developed a narrative from this interpretation of the data in such a way as to convey the meaning expressed in the interviews and to address the research questions.

Each participant's focus group responses were compared to initial interview responses to assess participants' perceptions of the effectiveness of the workshop. The pre-service teacher groups submitted their DST for feedback on the storyboard. After the DST was created and re-submitted, the pre-service teacher groups used the paper

checklist to evaluate the quality of their DST projects. After the groups presented their finished products, the individual pre-service teachers used the same checklist online through Qualtrics to provide personal feedback. Checklist responses were also interpreted in light of the effectiveness of the workshop for teaching in general.

Trustworthiness

In quantitative research, quality is measured by using statistical procedures for establishing reliability and forms of validity (Lincoln & Guba, 1985). However, in qualitative research, data are not numerical but alphabetic; the use of statistical procedures is not appropriate in evaluating the quality of the study. Several qualitative researchers have proposed and used alternative terms and processes to establish trustworthiness, the degree of faith in the study, and its outcomes (Denzin & Lincoln, 2000; Lincoln & Guba, 1985; Mishler, 2000). These processes are called credibility, consistency, and transferability. To ensure trustworthiness during the research process, the researcher followed several recommended practices (Merriam, 2009) to strengthen the reliability and validity of the study.

To support credibility, the researcher used data from individual interviews, focus groups, and evaluation processes for triangulation to establish consistency in the themes identified as they emerged. Also, interview transcripts were sent to all 38 pre-service teachers to complete a member check to verify results but only eight of the participants returned the transcripts with responses. These participants reported no changes were needed.

Credibility and consistency were further ensured by following established qualitative research methods (Creswell, 2013; Merriam, 2009). The researcher adapted

the instruments used in data collection from those already in existence (Shenton, 2004). The checklist and interview questions were derived from instruments that had been employed successfully in other studies (Barrett, 2006; Kaffel, 2017; Lipschutz, 2010; Remler & Van Ryzin, 2015; Sadik, 2008). Therefore, the researcher felt confident in assuming these instruments would be appropriate for the purpose of this research. Also, the researcher and an independent observer who is currently a teacher completed an established checklist (Krueger & Casey, 2000) for focus groups to evaluate the quality of the sessions. These steps supported both the dependability and confirmability of the study.

Adequate engagement with the data is critical to establishing trustworthiness in qualitative studies. Saturation in the data was achieved by reviewing the transcripts until no new ideas or thoughts appeared. Emerging findings both in individual pre-workshop interviews and in post-workshop focus groups demonstrated adequate engagement in the data collection. To maximize the credibility and consistency of this study, peer review was employed as a means of confirming the congruency of findings and tentative interpretations. Colleagues familiar with the methodologies used in this research area were asked to review the transcripts and make necessary amendments to the themes. One graduate student in education reviewed approximately 10 of the individual interviews and two of the focus groups. The other graduate student in special education reviewed all of the individual interviews and all of the focus groups. These reviewers agreed with the emerging themes, suggesting only minor refinements. One reviewer refined the theme, Incorporating Technology in Teaching into the subthemes Attraction of Technology and Usefulness of Technology. This reviewer also identified limitations of using technology

as a theme. The other reviewer agreed with all of the themes but suggested combining pre-workshop interview perceptions about ADDIE and DST into one theme and added three more themes.

The transferability of this study was supported in that the researcher provided a rich, thick description of the research experience and outcomes. The use of a thick description strategy included a detailed description of participants. Also, the researcher presented quotes from the interviews and focus groups as well as copies of final projects. The findings of the study could then be likened to situations where similarity in context or population existed.

Summary

This qualitative study used individual interviews, focus group interviews, and survey data to investigate a workshop designed to teach lesson planning and educational technology skills to pre-service teachers. Pre-workshop interviews established that lesson planning and educational technology skills were limited among pre-service teachers in the KSA. Following the ADDIE model, the researcher developed a workshop that focused on teaching pre-service teachers to use the ADDIE model to develop lesson plans for DST projects. Instructional strategies were guided by Bloom's taxonomy of cognitive domains.

During the workshop, participants were divided into groups of three or four and they practiced applying the ADDIE model to developing a DST lesson about global warming. The workshop included group presentations of final projects and a peer-review process. After the workshop, the researcher facilitated focus groups of eight or fewer participants to generate qualitative data about the workshop experience and skill

acquisition. Participants also completed a survey to provide additional feedback. The researcher triangulated the data obtained from interviews, focus groups, and surveys to generate themes that related to participants' perceptions and attitudes about using the ADDIE model and DST for teaching in the future. Evaluation processes during project development and after the workshop indicated levels of skill acquisition and attitudes of the participants.

CHAPTER IV

RESULTS

This qualitative study examined Saudi pre-service teachers' ideas in creating digital storytelling (DST) using the ADDIE model to promote lesson plan development. Data were gathered in individual interviews before their course began, which were followed by focus groups and the pre-service teachers' digital storytelling projects at the end of the course. The researcher translated all the interview transcripts from Arabic to English, read and reread the data, and when saturation was reached, coding and category construction were used to ascertain themes. To address the research questions, themes that emerged from the research are described in this chapter. The following three research questions were the focus of this study:

Q1 How does application of the ADDIE model for teachers' design process of digital storytelling curriculum support pre-service teachers' skill development in lesson planning and technology integration?

Q2 What are pre-service teachers' attitudes towards digital storytelling as a learning activity?

Q3 What are pre-service teachers' attitudes towards digital storytelling as a learning activity?

Individual Interview Themes

Pre-workshop interviews with individual participants indicated they were notably unfamiliar with systematic lesson planning using any guideline and they were not trained in use of technology for education beyond standard Microsoft Office applications. The following themes were identified during the qualitative analysis: (a) lack of prior knowledge of DST and ADDIE; (b) familiarity with Microsoft Office; (c) lack of extensive lesson planning; (d) incorporating technology in teaching; (e) frequent use of social media; (f) desire for improvement; (g) advantages of DST; (h) limitations of technology; and (i) lack of Arabic programs.

Lack of Prior Knowledge of Digital Storytelling and Analysis, Design, Development, Implementation, and Evaluation Model

Very limited prior knowledge about DST and no familiarity with the ADDIE model was reported by all the participants. A common misconception was DST is just a cartoon (or animated book) for entertainment. Participants did not realize DST could be education-focused. For example, Samaher stated, “It is stories shown as cartoons for children.” Afnan responded, “It is a story book on the computer.” Furthermore, no participants were familiar with ADDIE and most did not know how to plan to make a story. Regarding the ADDIE model, Bedour proffered, “I don’t have any idea about the ADDIE model.” Also, Aisha reported, “I don’t know what the ADDIE model is.” Abeer stated, “This is the first time that I have heard about the ADDIE model.”

Familiarity with Microsoft Office

Most of the pre-service teachers had used only Microsoft Office programs for assignments (Word and PowerPoint). Several participants reported they would like to

learn more about creative ways to incorporate advanced technology into their teaching. At this point, they did not have the knowledge or expertise to do so. Norah explained, "I have skills in Microsoft Office programs such as Word and PowerPoint." Aisha added, "I am not familiar with any program other than PowerPoint." Another participant also reflected on this point: Sara reported, "I only know about Microsoft Office programs, Word and PowerPoint." Some of the participants had limited skills in using Photoshop. Rawan said, "I love the design of advertisements, and I have some minimal skills with PhotoShop, PowerPoint, and Word." Bedour added, "I have good knowledge in using computer programs such as Microsoft Office and some knowledge with graphic design programs such as Photoshop."

Lack of Extensive Lesson Planning

All the pre-service teachers agreed technology is potentially useful but they did not seem to have a plan or a systematic method for using it to create lesson plans. For example, Malak replied, "Yes, but I don't have any idea about the programs." Basmah explained, "Nowadays, I have no specific plans to incorporate technology in the future, but I think I will need it in the future." In terms of a lack of systematic lesson planning, Rawan added, "I will use the technology for my future lesson plans, but I don't have a current plan."

Incorporating Technology in Teaching

The attraction of technology. Most participants stated technology was appealing to children when compared to traditional teaching methods such as lecturing. Razaz remarked, "Sure, technology will help with teaching because it can be used to deliver content easier to children, especially this generation, because they love

technology." Fatima indicated that "children are attracted to using technology and different devices far more than they are attracted to handling books."

Several participants indicated children are most often drawn to technology because of the appealing sounds and visual effects that grab their attention. For example, Abeer described, "We are living in a technological age, and children like using technology. The PowerPoint programs are particularly useful because of the colors and sounds. This attracts children more than a blackboard."

Some participants mentioned that using technology saved time and helped with lesson planning. Safia reported, "Technology can help in teaching because it cuts down on time and effort."

The usefulness of technology for teaching. Pre-service teachers can use technology in the classroom to teach abstract or complicated ideas. Razaz agreed: "Of course. Technology will help me explain scientific concepts and letters (of the alphabet)." Wadha remarked that "technology will help in teaching. For example, we can create PowerPoint presentations, which make the lesson more comprehensible to students. This is because it combines many different things."

Pre-service teachers also expressed that technology allowed them to choose different mediums and present material in creative ways. Basmah expanded:

> It helps a lot because technology can be used in many different ways. For instance, students can either watch or listen to the materials. Hence, we should make plans to use technology if we plan to teach any concept. However, it is necessary to choose the appropriate medium, depending on the subject or task.

The future benefit of technology use. Many learning programs are already available through advanced technology and this area is growing. Asma mentioned that learning about these technologies will make these learning programs accessible for her to

use in teaching: “Technology facilitates the creation of lesson plans, and I can make a change from the traditional method of teaching where the teacher stands in front of class, talking.” Ragad shared, “If teachers use technology appropriately for specific situations, such as explaining natural phenomena such as seasons, etc., technology can be helpful. It is difficult to explain that simply by lecturing. Watching a video is much more helpful.”

Frequent Use of Social Media

The frequent use of social media was another theme. Most participants engaged with social media for several hours per day; however, their use of social media was more often for personal rather than educational use. For example, Athear reported, “In total, I spend up to eight hours daily between social media and Microsoft Office programs (when I have an assignment).” Sara responded, “I spend 10 hours using social media on my iPhone.” Nouf indicated he spent “seven hours on social media and reading my emails. I also spend a lot of time playing with modifying picture programs.” Ashwag added, “I spend most of my time on my mobile phone, mostly using social media. I use the computer only if I have an assignment.”

Desire for Improvement

All participants expressed a desire to improve their skills in using technology, particularly in using graphic programs and image technology like Photoshop. For example, Bedour explained, “I need to learn the basic steps of writing storytelling, such as storyboards and drawing using sound.” Rawan observed, “I need to improve myself in Photoshop and DST programs.” Sara A. noted, “I need to improve my skills in creating videos to produce movies and Photoshop programs.” Nouf agreed: “I need to improve my skills with improving design programs like Photoshop.” More focused on education,

Asma G. reported, “I would like to learn more about educational game programs and making stories using my iPad.”

Advantages of Digital Storytelling

Participants repeatedly expressed that DST is attractive to children, they share with their friends, and continue to learn from the experience. Safia said, “DST will encourage children to learn because it is attractive, especially if it includes colors and characters that the children love.” Fatimah B. remarked that “maybe DST can help children communicate between themselves what they are learning in class. This helps them learn from each other.” Razaz suggested, “Maybe it will help children learn from each other. If they watch cartoons and learn new information, they can tell their friends what they learned.”

Participants indicated they believed DST might help children learn effectively and retain information longer. For example, Reem reported that “DST can help me explain concepts like honesty. This medium can also help children retain information for a longer period of time.”

Limitations of Technology

One person initially claimed that technology could not be used to teach children everything, specifically lessons that require motion. Rajwa reported, “I don’t think that technology can help children learn concepts such as anything that requires motion and religion (specifically praying).” However, Bedoor pointed out that there are already existing and effective programs to teach children how to pray and show the different body positions for each part of the prayer. By the end of the interview, even Rajwa indicated that DST could be used to show students how to pray. Sara A. added, “I think

that engaging with hand-held materials and learning kinesthetically can help children learn more easily than if they were to use technology."

Lack of Arabic Programs

Most educational programs are created in the English language and few exist in Arabic. Ragad claimed,

> There are not many Arabic educational programs in our country; however, if some became available, they would be useful for teaching the children. I have seen other educational programs in different languages that can possibly help children in the classroom.

Focus Group Themes

Six focus groups responded to nine questions regarding the usefulness of the workshop. Focus group participants expressed consistent perspectives on the usefulness of the ADDIE model and DST and most found they could use both for a wide range of purposes. Table 1 provides the group themes that supported the research questions. The themes are then expounded upon using the same system of analysis outlined above.

Table 1

Inductive Relationship Research Questions and Group Themes

	Research Question	Supporting Focus Group Themes
1	How does application of the ADDIE model for teachers' design process of digital storytelling curriculum support pre-service teachers' skill development in lesson planning and technology integration?	• Increased Technological Awareness. • Increased Technological Skill. • Usefulness of ADDIE Model for Personal Organization and Lesson Planning. • Usefulness of The ADDIE Model for Teaching.
2	What are pre-service teachers' attitudes towards digital storytelling as a learning activity?	• Benefits of DST for Teaching Children. • Usefulness of the ADDIE Model. • Participants have positive attitudes.
3	What are the pre-service teachers' perceptions toward integrating technology after participation in a digital storytelling workshop?	• Usefulness of the ADDIE Model • Workshop Advantages

Increased Technological Awareness

Most participants expressed that before the workshop, they had not used technology as a tool to systematically approach lesson planning, had no plan for future use, and the use of technology for the classroom assignment was limited to Microsoft Office products such as Word and PowerPoint. Furthermore, many thought DST was very complicated and that characters had to be individually drawn by hand. After the workshop, focus group participants exclaimed they found DST to be easy to use and that DST resources were readily available. Quotes from the focus group transcripts demonstrated increased ease and comfort with technology.

Basmah reported, "I learned a lot from the workshop because, before, I just used pre-designed curriculum handouts; I didn't use any electronics. But now, I am able to use the computer to create DST and analyze any problems by using the ADDIE model." Norah added, "Prior to the workshop, I believed that in order to create DST, I had to draw all of the characters. I didn't know that there were available programs with available characters that I could use to create a DST." Also, Bedour explained, "Honestly, before the workshop, I was not aware that there were different models that function to help with instructional design to finish a project." Sarah indicated, "I thought that it was impossible to create DST and that it was too hard for me."

Increased Technological Skill

Most participants learned new technological skills during the workshop. Remarks reflected a new awareness of available technology and the ability to find information needed for lessons and DST projects. Many participants indicated the technology was

easier to use than expected. Some exemplary technical skills acquired are represented in participant comments.

Basmah described how she "acquired improved research skills to find information about photography and videos online." She continued:

> For example, in my DST, I was not restricted to the stock images that come with PowToon; instead, I can now go get new photos and modify them to fit my project. Additionally, in sound effects, I acquired how to add and modify sounds and record my own sounds for my project.

Rahaf added, "It has improved my skills a lot in using technology, especially when we learned to use sound adding programs." Abeer reported, "I thought that it is too difficult to create DST and that it was a time-consuming process. However, after the workshop, I found out that it was much easier than I expected and that it does not take a long time to create DST." Asma added, "I was glad to find that DST is much easier than I expected it to be." Bedour illustrated,

> Before the workshop started, I thought that DST was too difficult. I needed to learn how to draw and animate the characters…. I had not realized before the workshop that there were many websites and online programs for creating DST. Furthermore, I didn't know these programs were accessible.

Bedour agreed by adding:

> Yes, because when I used the voice changing programs, I improved my skills in recording. I changed my voice for each character. In our DST project, we used different characters. Each of the characters had their own unique voice. Changing my voice was very exciting for me. Finally, I learned how to be patient.

Usefulness of the Analysis, Design, Development, Implementation, and Evaluation Model for Personal Organization and Lesson Planning

Focus group participants consistently expressed that the ADDIE model was quite flexible and it was useful for a broad range of problem solving activities. They also commented that the model was easily applied to fields outside of education such as industry, marketing, or even practical projects.

Samaher explained,

> Yes…we wrote a dialogue for a DST; we used the steps in the ADDIE model. We wrote the objective first, and based on this, …we decided the method for designing our DST. We also decided on a method of evaluation for our goals, the appropriate dialogue related to our objective and the target audience. The ADDIE model helped us arrange and analyze our thoughts before completing the DST.

Aisha S. reported,

> I learned a lot from the ADDIE model because it helped me to organize or arrange my ideas before starting any project. Before the workshop, I wanted to create DST, but I did not have any technique or skill in place to actually make it. I also didn't know what clear objective I wanted to accomplish through DST. After learning about the ADDIE model, I learned how to analyze any problem or listening plan and solve the problem by following the steps.

Fatimah M. added, "I realized that the model helped me to arrange my thoughts and solve any problem. It will help me in teaching any concept for any target students that I want to teach." Basmah reported the "ADDIE model is a framework for design; I can use it in educational field. Also, I can use it if I want to do any business projects, such as marketing, because the model will help facilitate many steps making it successful." Reem remarked, "I can apply this model in many fields apart from education because it has steps such as planning, designing, applying, analyzing, and

finally developing." Asma M. suggested it could "be used to solve any problem because the model clarifies the problem. Afterwards, it is easy to solve."

Usefulness of the Analysis, Design, Development, Implementation, and Evaluation Model for Teaching

Focus group participants indicated the ADDIE model offered substantial support for enhanced teaching. They especially appreciated that the model included steps to evaluate success. The model offered substantial support to teachers in developing a systematic approach to presenting learning material. Furthermore, participants found the ADDIE model to be a helpful tool for designing DST projects. Some participants' comments were specific to teaching.

Asma M reported, "After the workshop, I realized that I need to change my approach and always plan before teaching. For instance, in my class I have to have a clear plan to reach a goal in order to complete a lesson and meet the outcomes of the day." Sarah commented,

> I will create a plan for each step of the ADDIE model, and I will choose the appropriate teaching method to explain the concept to children. I will follow the ADDIE model…and it will help me evaluate the steps and the effectiveness of the finished lesson.

Sarah M. reported, "It is easy to create DST following the steps of the ADDIE model to analyze the problem and create the lesson plan with DST to solve this problem." Fatima M. believed "the ADDIE model and DST will help me not just in educating the children, but also with the parents if I wanted to create a DST video on how to manage challenging behavior at home." Fatima B. agreed, "The ADDIE model is a good model in solving any problem and awareness. It arranges my thoughts and ideas so it has helped

me to reach my goals without faults." Samaher described, "We wrote a dialogue for a DST; we used the steps in the ADDIE model. The ADDIE model helped us arrange and analyze our thoughts before completing the DST."

Benefits of Digital Storytelling for Teaching Children

Participants were positive about the usefulness of DST for teaching children. They described how this approach could be used to present complex ideas and information in a way children could grasp. They also commented that DST offers benefits in terms of student engagement and retention.

Athear believed that "DST helps the teacher explain any concept in a way that children can absorb information faster. This is because the content is enjoyable or appealing to them." Rajwah suggested, "If I want to make a lesson plan using DST, I can imagine or predict any questions, problems, or points of clarification the children could need before I teach the lesson." Nouf added, "DST is new and a new teaching technique. For example, the student now prefers to watch animation, and they can understand the concept better because they find it engaging." Sara M. said, "DST is very short, but within the short clips, better information is contained for children, and they can retain the information in their long-term memory." Fatimah B. believed "the color in the DST will engage children, and emotional pictures are attractive to the children." Aisha S. described how "DST makes it easy to explain complex concepts to young children. One example is recycling. It is hard to understand this by only lecturing about it. However, with a DST through the PowToon program, it is easy and exciting." Fatimah "discovered that DST is not used only for entertainment. It is also used for problem solving any potential problem with the children in the classroom. It is also useful to aid in teaching

any difficult concept." Bedour provided an example: "It is good to be able to create DST in order to foster awareness on topics that are not easily understood, such as global warming. Moreover, DST can stimulate many senses such as sight and sound."

Workshop Advantages

Key advantages of the workshop were increased awareness of systems of problem solving, planning, and teaching. The ADDIE model offers a systematic approach for lesson planning, general problem solving, critical thinking, and designing specific learning modules most participants had not used before. Fatimah B. reported she was "now able to use PowToon Program in any different subject if I have to teach them any concept." Safia reported, "Before the workshop, I had no idea about the ADDIE model and DST." Ashwag added, "I thought that it would be impossible to explain global warming to children because it is difficult. However, with DST, it was easier to deliver the information a way that the children can understand." Razaz proffered, "I didn't have any idea what the ADDIE model meant. I also didn't understand what it was from the lecture. However, after using the ADDIE model to create DST, I was able to understand everything."

Workshop Limitations

The content and structure of the workshop successfully accomplished the learning objectives. Participants comprehended the reading assignments well enough to engage in active discussions and started applying the ADDIE model to problem-solving in a variety of situations. Providing the opportunity to create a real DST lesson helped participants practice lesson planning with the ADDIE model as well as learn a new technological skill. The evaluation processes included during project development ensured adequate

feedback for participants and help where it was needed. However, issues came up related to materials used within the workshop that hindered participants' learning and productivity. The main difficulty of using the DST program expressed by focus group participants was the language barrier. Most DST programs are offered only in English, which presented challenges for non-English-speaking teachers and those for whom English was a second language. A second consistent limitation was the time available for the workshop. Most participants indicated they would have benefited from more instruction time. The DST program limited frames to 20-second sound clips and required payment for additional frame time. Fatima M. reported,

> The limited time of the class was a disadvantage; I would have liked to spend more time…. The program uses the English language, and this was a disadvantage because we don't speak English. All of the tools and icons are in English so we have to translate each word in order to utilize the program.

Basmah critiqued, "The limitation of this program is it slows us to create DST with 20-second sound clips, so if the dialogue is more than 20 seconds we cannot have it all in the same scene. If we want to upload longer recordings we have to pay for an upgrade."

Summary

There were several changes in participants' technological awareness, skills, and attitudes regarding the usefulness of technology for educational purposes after the workshop. Furthermore, the ADDIE model was perceived to be a useful tool for general purposes (e.g., personal planning, lesson planning, general problem solving, and guiding the development of DST projects) in addition to being a specific tool for teaching children.

Overall, participants' general lack of technological knowledge changed to increased awareness and skills. Before the workshop, participants indicated they were willing to use technology but did not know how to use it. They were also unaware of the many available technologies. Most participants used only Microsoft Word and PowerPoint for teaching. Many thought DST was too difficult and was used only for entertainment. After the workshop, most participants indicated DST was easy, especially when they followed the phases of the ADDIE model.

Before the workshop, individual interviews indicated pre-service teachers did not use systematic lesson planning. After the workshop, many indicated they had not used a planning system before and the ADDIE model was a new and useful lesson planning tool. Preconceptions about DST shifted--it was considered a toy for entertainment before the workshop and after the workshop, it was considered a useful tool for teaching children complex concepts, maintaining their attention, and increasing retention. Comments from the focus group interviews indicated the workshop fulfilled all the intended purposes.

CHAPTER V

DISCUSSION

This qualitative study was an examination of how a workshop about using the ADDIE model to create DST projects influenced participants' awareness, ability, and comfort using technology as a framework for lesson planning and DST. A comparative analysis of individual interviews and focus group discussions yielded consistent themes regarding participants' perspectives before and after the workshop. This chapter contains a discussion of conclusions suggested by the results, limitations of the study, implications for teaching, and recommendations for future research. Throughout this discussion, findings are directly related to constructivist theory as participants actively engaged in the construction of DST projects to promote learning. Also, the findings directly related to social constructivism in that learning occurred in a social learning environment using real-world problems to create their DST projects and participants had ample opportunities for group discussion and small-group activities.

Pre-Workshop Perspectives on Digital Storytelling and the Analysis, Design, Development, Implementation, and Evaluation Model

Consistent with other studies, participants prior to the workshop were notably limited in their use of technologies in the classroom even though they spent substantial amounts of time with social media (Wake, 2012). It was also notable that participants volunteered very limited information during the pre-workshop interviews and they were

inhibited in their responses. Studies by Daniels (2013), Thesen and Kira-Soteriou (2011), and Chigona (2013) also clearly implied a general lack of knowledge on the part of pre-service teachers about technological methods for conveying complex concepts. The present results agreed with those obtained by Daniels (2013) and Chigona (2013) in that pre-service teachers had very limited skills with lesson planning and DST initially. Individual interviews indicated only one of the participants did systematic lesson planning and none of them were aware of the ADDIE model or how to use it for lesson planning prior to the workshop. These findings suggested even though pre-service teachers spent a great deal of time using social media in their daily lives, very few of them had skills in the use of advanced media for educational purposes. These results implied pre-service teachers were not adequately prepared to integrate technological applications and planning processes into their teaching activities. Furthermore, participants were apprehensive about the difficulty and usefulness of digital applications for educational purposes and this apprehension could have contributed to resistance on the part of teachers to use these tools (Lambert & Gong, 2010). This apprehension and lack of technology knowledge for application in educational spaces could be attributed to their frame of what an educational space should be. Participants' experiences in their own education were without technology or with minimal use of models such as PowerPoint-supported lectures, thus visioning an educational technology-rich space as abstract. Through experiences in teacher preparation that integrate technology with hands-on activities, they can learn new models for what technology-rich learning can be.

Given the demands of today's technological learning and career environments, the use of structured models and digital applications is critical to effective educational

processes. Students will increasingly need to be technologically competent to procure suitable employment. Therefore, pre-service teachers need to improve their skills in creating structured lesson plans and using technology with their students in their future teaching careers, congruent with conclusions drawn by Lambert and Gong (2010). The need to teach advanced technologies to future educators at the pre-service level so they can understand and meet the needs of children who have grown up with technology was confirmed in this study. These children will soon become the students of these pre-service teachers; helping these teachers attain more technological skills will enhance their ability to interact effectively with these knowledgeable students.

Similar to findings reported by Thang et al. (2014) and Hoban et al. (2011), many participants were apprehensive about using DST before the workshop. Potential resistance to technological changes was an ongoing consideration in introducing the workshop content, such as the ADDIE model and DST, as it should be to any group. Lambert and Gong (2010) indicated the perceived usefulness of any given technology is likely to influence levels of resistance such that tools perceived to be useful are most likely to be adopted. When tools are seen to be useful and pertinent, potential resistance is lowered. Additionally, through the DST workshop, participants learned through experience how to engage in a new educational space. When fears and apprehensions were addressed satisfactorily, resistance decreased, thus supporting the findings of this study.

Before the workshop, participants thought DST was complicated, meaning it required drawing skills and advanced image editing. They were unaware of available programs that made DST projects easy to do. Furthermore, they expressed they thought

DST was for entertainment--not for education. Given those erroneous perceptions, participants were initially reluctant to consider such technology. However, when they were shown just how educational as well as entertaining such technology could be, they became eager to learn about these technologies. In fact, one participant expressed her perception that some subjects simply could not be taught using these technologies and gave the example of teaching proper ways to pray in Islam. When she was shown existing programs that already did this, she was pleasantly surprised and much more open to learning about this technology. Participants indicated the colorful images and sounds DST provided were likely to be attractive to children. Overall, pre-service teachers were eager to use technology but their skills were limited to Microsoft Word and PowerPoint for classroom use because they grew up with only these applications in public school. They used social media for only personal purposes. These results were consistent with those of Rehmat and Bailey (2014) who stated pre-service teachers are eager to use technology but they simply lack knowledge and skill in using it. Although pre-service teachers in the KSA demonstrate positive attitudes toward using technology, they have had little to no exposure to educational technology in their own educations. Thus, a valid model of technology integration from early grades through college is needed both for today's students and to provide adequate training for pre-service teachers. Again, the importance of exposing future teachers to educational technology early in their training is highlighted.

One clear observation from this study was there are misunderstandings about the use of technology in education as many pre-service teachers were unaware of the available programs that could be used for educational purposes. These

misunderstandings become a barrier to teachers' exploring these programs on their own as they considered these programs were just for play or for fun. This suggested many more proactive efforts are needed to provide training for future teachers on how to use various programs in classroom settings. Increasing this exposure at the pre-service level would be one way of reversing many of these misunderstandings but this study's findings also implied current professors might also need to learn more about advanced technologies for education.

In summary, Saudi Arabian pre-service teachers take only one course that involves using computers with students. Therefore, it is not surprising these future teachers have limited knowledge about technological applications for education. Also, educational platforms, e.g., Blackboard, are new in Saudi Arabia as of 2016. It is likely students and educators will embrace these technologies quickly as they become available because they will find them useful. Their personal use of technology also provides them the capacity to use technology and transfer that use into new contexts such as the classroom for educational purposes. To be successful at integration, it will be necessary to provide enough training to develop both advanced skills with tools as well as pedagogical practices that integrate the tools into teaching and learning.

Post-Workshop Perspectives: Analysis, Design, Development, Implementation, and Evaluation Model

The focus group discussions indicated the participants benefited substantially from attending the workshop. In contrast to their relative shyness in the pre-workshop interviews, participants contributed openly and enthusiastically during the post-workshop interview. This implied they experienced an overall increase in their comfort levels with

communicating about educational technology. The workshop helped them improve their skills in instructional design and they also learned how to use a specific DST program. The results of this study supported the importance of instructional design skills, the usefulness of the ADDIE model for instructional design, and the positive effects upon student communication. The current results were in agreement with Campbell (2014) who directly stated that without design thinking (like the ADDIE model), the process of acquiring and implementing new technologies was likely to be disconnected from the overall teaching process--confusing to both students and teachers, full of problems, and less likely to succeed.

Participants reported the ADDIE model could be applied to most areas of life for problem solving, which supported the notable flexibility of the model beyond strictly instructional settings. During the workshop, the pre-service teachers chose getting a divorce and graffiti as practical problems to solve with the ADDIE model and they used global warming as a topic for the DST project. Other research on the model has not addressed the use of the model beyond educational settings. This might be a fruitful area for future researchers to explore. Most of the results in other studies agreed about the ADDIE model's usefulness for curriculum development in formal education (Khadimally, 2015; Moradmand et al., 2014; Peterson, 2003) but none of them used the ADDIE model to solve problems in daily life. However, in the present study, pre-service teachers applied the model in many different situations such as how to help children be good readers in the future by creating different activities. After the workshop, one of the participants shared her experience with her young sister, describing how she used the ADDIE model and DST to create projects for her sister's class. The sister was excited to

learn about these skills and expressed that she wanted to learn to do this herself. This kind of sharing from workshop participants to their friends and relatives signified how eager the participants were to gain this information and share with others, supporting Davis's (2013) and Peterson's (2003) observations about the flexibility of the model and emphasized the relation of these findings to social constructivism.

Another problem participants addressed related to how to help children whose parents study abroad to become familiar with their own Arabic culture and learn to speak and write the Arabic language even though they were growing up within the culture of the country where they lived. Torres et al. (2012) and Verdugo and Belmonte (2007) found DST improved learning the English language among ESL students, both orally and in writing. The pre-service teachers in this study found the ADDIE model, when applied to DST, helped to find solutions to these problems by following the model phases and creating successful DST projects. The phenomenon of children living abroad in countries with very different cultures as their parents complete their higher education is growing; in many cases, the children are even born and are citizens of these other countries. They grow up knowing more about the culture and language of the culture in which they are living than they do of their own culture to which they will return when their parents receive their degrees. For these children, moving back to their native country and culture is more like moving to a foreign country and culture. To ease the transition of these children's adjustment to their native but unfamiliar country and culture, interventions need to be developed. The ADDIE model and DST could be of real assistance in creating these interventions, thereby helping these children once they return to their country and

helping them become more familiar with their language and culture while they are still residing in another country.

In Saudi Arabia, pre-service teachers do not follow any model to create lesson plans. Each instructor has a different process and plan for lesson planning. No one follows any particular model in teaching or solving problems. One of the pre-service teachers mentioned she created lesson plans but she did not know about a process similar to the ADDIE model; if she had had this model before, the lesson planning would have been much easier for her.

Exposure to technology in pre-service programs is especially important for teachers in the KSA because they have very little access to the Internet and associated hardware or software during public school. Pre-service teachers' awareness and ability to engage in systematic lesson planning also increased after the workshop. These results agreed with findings by Lambert and Gong (2010) where exposure to technology increased pre-service teachers' confidence and willingness to use it. These authors further suggested pre-service teachers need such exposure throughout their training (from early education through college). The results of this study supported the importance of including instructional design in pre-service teacher training curricula and the value of introducing the ADDIE model to teachers in most academic content areas. Campbell **(**2014) also emphasized the importance of design consideration in any of today's teaching, finding the ADDIE model was useful for improving a course on using a library. All of participants mentioned they would use the ADDIE model in the future because they believed it helped them reach goals and avoid mistakes if they followed all of the model phases.

A study conducted by Moradmand et al. (2014) also supported the importance of instructional design, pointing out the gap between design theory and applications of classroom technology. These researchers used the ADDIE model to guide the design and implementation of an educational multimedia mathematics software and found the use of the model for instructional design produced computer-based educational applications with fewer limitations than other computer-based mathematical applications because it facilitated alignment between the technology, curriculum, and pedagogy that failed to be aligned in many other applications. Thus, the skills attained by the pre-service teachers in the current study have far-reaching implications for teachers, not only for creating digital stories on specific topics but also for enhancing lesson planning in general, saving time for the teachers while creating more effective lessons.

Post-Workshop Perspectives: Digital Storytelling

Post-workshop focus groups indicated participants believed DST is a valuable teaching tool. Participants indicated DST was helpful for teaching complex ideas and enhancing student involvement and collaboration in completing assignments and projects. These results were similar to those of other DST researchers. For example, Thesen and Kara-Soteriou (2011) and Sadik (2008) found DST projects could increase student comprehension of lessons and Sadik found teachers were willing to introduce technology to their classrooms despite the challenge of learning to implement it. Hoban et al. (2011) found "Slowmation" technology had the potential of teaching science content and the involvement of students in creating stories might increase motivation. Yang and Wu (2012) also reported that participants emphasized the educational value of DST for invigorating learning and motivating participants in collaborative efforts. Foley (2013)

found DST was useful for developing writing skills in first- and second-grade students and DST also engaged these students in the writing process. Studies conducted by Xu, Park, and Baek (2011) and Sepp and Bandi-Rao (2015) found DST was an effective learning format with college-level students. Xu et al. found DST was more effective in a virtual environment than off-line among undergraduate university students in terms of increasing writing self-efficacy. Sepp and Bandi-Rao found DST was a viable teaching tool for ESL students as both writing and oral skills improved. For teachers and students in Saudi Arabia, the strategy of increasing student involvement and collaboration is still a new idea and the introduction of workshops that teach the ADDIE model and DST could be an effective way to familiarize more teachers, and thereby more students, with these processes.

After the workshop, most of the pre-service teachers agreed that DST was a good tool to explain any complicated concept. The skills learned in the workshop increased pre-service teachers' motivation and enthusiasm as these teachers began strategizing about various ways and activities to introduce DST into their classrooms to address many different concepts or teaching targets. For example, the teachers talked about having their students act out stories or engage in discussion with open-ended questions or to introduce a story without an ending so their students could suggest and evaluate different endings and their implications. Given the opportunity to learn some of these advanced skills and learning to apply them in educational settings revealed the pre-service teachers were eager to learn and were excited about the possibilities of using these new advanced technologies--not just in educational settings but also in other life settings. These results supported results obtained in studies by Hung et al. (2012) and Yang and Wu (2012) who

advocated the usefulness of DST for relating complex concepts, improving critical thinking, and enhancing learning motivation. Furthermore, Tackvic (2012) found and this study confirmed DST facilitated creative writing efforts among elementary students. These students found access to digital images made it easier for them to jump-start stories. Furthermore, students were motivated and engaged in writing throughout the process. Overall, the results of this study supported additional advanced technology education as part of the teacher preparation program.

The pre-service teachers agreed that DST could help in addressing inappropriate behavior or facilitating the development of such skills as cooperation, teamwork, honesty, and integrity. For example, DST might help them to create characters and write stories about any particular behavior they wanted to teach children. Some of the skills learned in the workshop particularly applicable in teaching new behaviors included the selection of appropriate characters for the story, creating a storyboard as an outline, and then adding selected dialogue and other features such as animation. This strategy was particularly important to these teachers because other methods for changing behavior had not been particularly effective (Hung et al., 2012).

Current studies that tested the effectiveness of DST focused mostly on academic skill acquisition, critical thinking, and sometimes creativity. Little to no research has specifically addressed the effectiveness of DST for teaching social skills or directly addressing behavioral problems. This is likely a fruitful direction for future research.

Constraints

This study had some limitations in terms of generalizability to other populations. One of the limitations was no empirical research was found that used ADDIE specifically

for DST so it was difficult to compare the present findings with other research. Furthermore, the sample specificity of size and culture impacted the generalizability of the results to other target populations. Specific limitations relative to the sample and methodology are discussed here.

A significant limitation was the language barrier as all the participants spoke Arabic and did not understand English. The DST program (digital tool) is supported by the English language so it was difficult for participants to utilize the program tools. They had to translate everything and there was no documentation about the accuracy of this translation process. In addition, this language barrier slowed the process of learning and using the skills and tools to a significant degree. Because this is true of many learning modules from the West, there is a dire need to have reliable, accurate, and culturally sensitive translations of them into Arabic--a language used expansively throughout the Middle East.

This study was conducted with a sample of individuals from one college and one department, thus limiting the generalizability of the results to other settings and disciplines that might not have the same characteristics as the participating population. Future research could replicate this approach to other schools, departments, and geographical regions.

In addition, this study was limited in time. The researcher conducted this study in an educational field for only one and one-half months. This workshop really needed more time to apply the models and DST more extensively in different lesson plans to best understand how DST and ADDIE could be utilized by teachers in all learning contexts. Although other researchers reported a limitation of DST for education was the time

requirement (e.g., Robin, 2006) and indicated current available programs made it faster and easier to use as indicated by participants' ability to complete projects within the time allowed for the study, they did state they would have liked to have had more time. This was a perception felt by both the researcher and participants of the current study. Additionally, a single workshop had limited influence on participants' perceptions of technology in education.

Implications for Teaching

Saudi Arabia is currently undergoing broad educational reform. As Internet technology and other software applications become more available, there is an opportunity to integrate advances in educational technology into ongoing improvements in the overall system. As mentioned before, no structured models for lesson planning are currently available in Saudi Arabia and the use of computer technology in education is limited. To make reform efforts successful, teachers will need use structured lesson planning and will need to possess computer and software application skills related to teaching.

To support future teachers, new curricula must use models, such as the ADDIE model, for teaching college courses and future teachers must learn to use these models for structured lesson planning. Future teachers will also need courses that ensure they have adequate computer skills and the ability to learn and use new applications. Yet, basic skills are not sufficient; strong understanding about how to integrate technology into teaching and learning is needed. Courses for pre-service teachers must use technology and focus on teaching pedagogical practices that integrate such tools. These skills are critical to themselves and their students as they pursue careers into the future.

Based on the outcome of this study, it is likely that once Saudi Arabian teachers are exposed to technology and planning models, they will embrace them. After the workshop, some of the participants used what they learned to create a DST project for a different course (Psychology) and sent them to me. Also, it is likely that traditional teachers will be willing to learn new technology if they find it to be useful.

One of the most compelling issues this study reinforced was that educational software programs need to be developed in the Arabic language. These applications need to be developed by professional educators with a clear understanding of the end-user. Now that technology is becoming more available worldwide, educational technology products need to be developed that are multilingual and globally accessible.

Future Research

The current research raised several potential areas for future efforts. First, teachers emphasized the flexibility and usefulness of the ADDIE model for general problem solving. Therefore, research is needed that addresses the use of the model beyond educational settings. Additional research could investigate the effectiveness of DST for teaching social skills or directly addressing behavioral problems. Another promising direction would be for researchers to use the ADDIE model to create digital stories to teach new applications. Finally, developing a specific DST application in Arabic is needed for implementation in Arabic teacher training programs.

Summary and Conclusions

The range of applications in using the ADDIE model and DST technology is wide; making additional courses, exposure, and practice in pre-service programs available could be particularly valuable in enhancing pre-service teachers' skills to

include more students with special needs within educational settings, which is especially important as educational policy is changing in Saudi Arabia. Based on the findings of this study, enhanced technology-focused courses in teacher preparation are needed as well as instruction in structured lesson planning. Additionally, there is a clear need for translation of many fine software programs from English into other languages of the world, particularly Arabic. Many Middle Eastern countries are developing and expanding their educational services to match existing levels in more-developed countries; translation of these services would help speed this development and, at the same time, help teachers in Middle Eastern countries more effectively reach their students.

The ADDIE model could be used in practical problem-solving in non-student populations and in real-life settings. It is really a conceptual model that teaches the processes of critical thinking and good planning and is applicable in a broad range of settings. For example, social service workers could teach people how to use the model to solve problems. If this model were to be used, it would not only change teacher practice but also expose students to the process within the model and better prepare them for authentic problem solving beyond graduation. More research into the effectiveness of ADDIE in lesson planning and other teacher-required activities, particularly in conjunction with DSL, would add to the research base and support and expand the findings of the current study. The results of the current study also suggested the pairing of ADDIE with other specific technological applications, potentially helping students master these applications more effectively. Finally, tests of the usefulness of ADDIE and

DST for teaching Arabic and Arab culture would provide useful information about the effectiveness of the model for broader educational purposes and cultural problem solving.

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APPENDIX A

DIGITAL STORYTELLING INTERVIEW QUESTIONS

Digital Storytelling Pre-Workshop Interview Questions

Attitude toward using technology in general

- Do you think it is useful to use technology for teaching? Why?
- Do you think technology can encourage you to create a lesson plan? Why?
- Do you believe that technology can function as an effective tool for helping students? Why?

Attitude toward DST and ADDIE models

- Are you familiar with the ADDIE Model? If so, what do you know?
- Do you think the use of digital storytelling and the ADDIE model will help students to understand complex ideas? Why?
- Do you think the use of digital storytelling will help students share their knowledge with others? Or what is the benefit of using digital storytelling?
- Do you believe technology could help students understand the concepts of any curriculum?

Personal technology skills

- What kinds of technology skills are you good at and what kinds of technology skills do you need to improve?
- How often do you use technology?
- What forms of technology do you use?

Preparation for use of digital storytelling and ADDIE model

- How do you plan on using technology in your future classroom?
- Will you use technology to create digital story projects?
- Do you think the use of digital storytelling and ADDIE model will help students research any subject matter deeper?
- What kind of preparation or training do you need to feel prepared to implement DST in your classroom?

Experience using digital storytelling

- What does “digital storytelling” mean to you?
- Have you previously used the ADDIE model to create a lesson plan? If so, in what way?

- Do you feel prepared to use digital storytelling to integrate previous knowledge from different contexts (i.e. school and home)?
- How do you think you can incorporate digital storytelling to help you teach a lesson?
- How do you think digital storytelling can engage students with the curriculum?
- Do you think digital storytelling will help you develop instructional activities? In what ways?

APPENDIX B

DIGITAL STORYTELLING CHECKLIST AND QUALTRICS ONLINE SURVEY AND CHECKLIST

Student Name: Date:

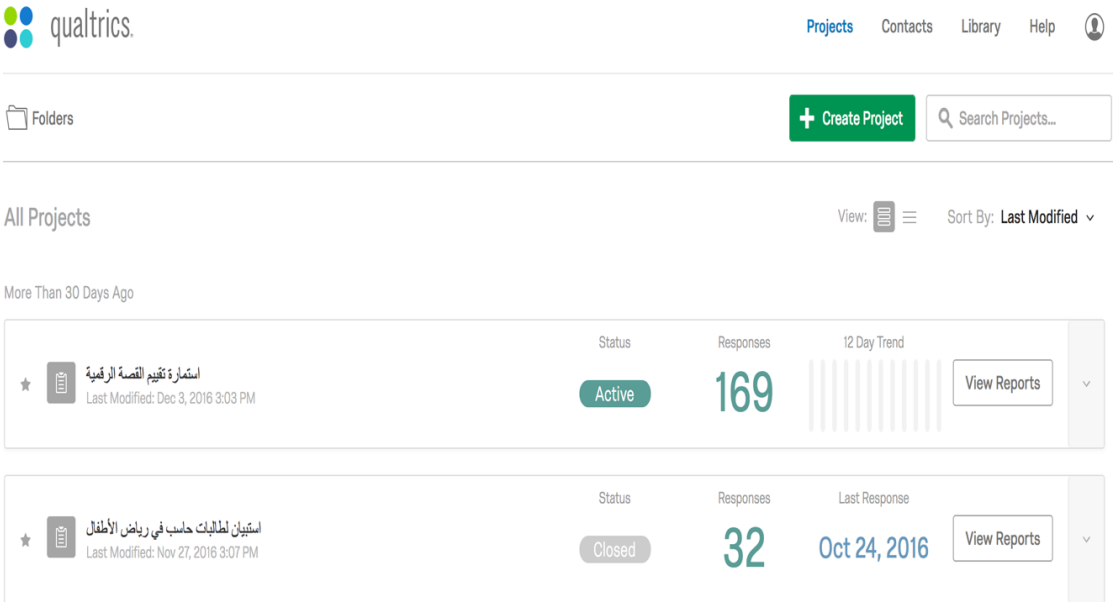
	Criteria	Excellent 5	Good 3	Average 2	Poor 1
1	Purpose of Story	Establishes a purpose early on and maintains a clear focus throughout.	Establishes a purpose early on and maintains focus for most of the presentation.	There are a few lapses in focus, but the purpose is fairly clear.	It is difficult to figure out the purpose of the presentation.
2	Choice of Content	Contents create a distinct atmosphere or tone that matches different parts of the story. The images may communicate symbolism and/or metaphors.	Contents create an atmosphere or tone that matches some parts of the story. The images may communicate symbolism and/or metaphors.	An attempt was made to use contents to create an atmosphere and tone but it needed more work. Image choice is logical.	Little or no attempt to use contents to create an appropriate atmosphere and tone.
3	Storyboards	Complete and detailed evidence of planning throughout entire storyboard including sketches, sequencing, pacing, and consistent storytelling	Evidence of planning through 2/3 of storyboards including sketches, sequencing, pacing, and storytelling.	Evidence of planning through up to 1/3 of storyboard including sketches, sequencing, pacing, and storytelling.	Little to no evidence of planning including minimally completed sketches, sequencing, pacing, and storytelling.
4	Videography	Strong use of quality videography, including camera angles, framing, and lighting used to add to the overall impact of presentation	Some elements of videography, including camera angles, framing, and lighting used to add to the overall impact of presentation	Very few elements of videography, including camera angles, framing, and lighting used to add to the overall impact of the presentation	Little to no elements of videography, including camera angles, framing, and lighting used to impact the overall presentation

5	Clarity of Voice	Voice quality is clear and consistently audible throughout the presentation.	Voice quality is clear and consistently audible throughout the majority (85-95%) of the presentation.	Voice quality is clear and consistently audible through some (70-84%)of the presentation.	Voice quality needs more attention.
6	Quality of Images	Images create a distinct atmosphere or tone that matches different parts of the story. The images may communicate symbolism and/or metaphors.	Images create an atmosphere or tone that matches some parts of the story. The images may communicate symbolism and/or metaphors.	An attempt was made to use images to create an atmosphere and tone but it needed more work. Image choice is logical.	Little or no attempt to use images to create an appropriate atmosphere and tone.
7	Grammar and Language Usage	Grammar and usage were correct (for the dialect chosen) and contributed to clarity, style and character development.	Grammar and usage were typically correct (for the dialect chosen) and errors did not detract from the story.	Grammar and usage were typically correct but errors detracted from story.	Repeated errors in grammar and usage distracted greatly from the story.
8	Transition and effects	Transitions, effects, audio, and edits are appropriate to the subject matter, add to the flow of the video, and most importantly, do not distract from the video.	Most transitions, effects, audio, and edits are appropriate to the subject matter, add to the flow of the video, and most importantly, do not distract from the video.	Some transitions, effects, audio, and edits are appropriate to the subject matter, add to the flow of the video, and most importantly, do not distract from the video.	Little to no transitions, effects, audio, and edits are appropriate to the subject matter, add to the flow of the video, and most importantly, do not distract from the video.
Total score					

Total Score: points out of 40 possible points.

Teacher Comments:

Qualtrics Online Survey & Checklist



APPENDIX C

FOCUS GROUP CHECKLIST

Checklist for Focus Group Interviews

Advance Notice
___ Contact participants by phone two weeks (or more) before the session.
___ Send each participant a letter confirming time, date, and place (using Doodle).
___ Give the participants a reminder phone call prior to the session.

Questions
___ Questions should flow in logical sequence.
___ Key questions should focus on the critical issues.
___ Use probe or follow-up questions as needed.
___ Limit the use of "why" questions.
___ Use "think-back" questions as needed.

Logistics
___ The room should be satisfactory (size, table, comfort, sound, etc.).
___ Arrive early.
___ Check background noise so it doesn't interfere with tape recording.
___ Have name tents for participants.
___ Place a remote microphone on the table.
___ Place the tape recorder off the table near the assistant moderator's chair.
___ Bring extra tapes, batteries, and extension cords (using phone).
___ Plan topics for small-talk conversation.
___ Seat experts and talkative participants next to the moderator.
___ Seat shy and quiet participants directly across from moderator.
___ Serve food.
___ Bring enough copies of handouts and/or visual aids.

Moderator skills
___ Practice introduction without referring to notes.
___ Practice questions. Know the key questions. Be aware of timing.
___ Be well rested and alert.
___ Listen. Are participants answering the questions?
___ Know when to probe for more information and when to move on.
___ Avoid head nodding.
___ Avoid verbal comments that signal approval.

Immediately After the Session
___ Check to see if the tape recorder captured the comments.
___ Debrief with the research term.
___ Prepare a brief written summary of key points as soon as possible.

APPENDIX D

KING ABDULAZIZ UNIVERSITY APPROVAL

Kingdom of Saudi Arabia
Ministry of Education
King Abdulaziz University
Faculty of Home Economics

قسم دراسات الطفولة
Department of Childhood Studies

المملكة العربية السعودية
وزارة التعليم
جامعة الملك عبدالعزيز
كلية الاقتصاد المنزلي

يهديكم قسم دراسات الطفولة أطيب تحية وتقدير،

بالإشارة إلى خطابكم (الرغبة بموافقة قسم دراسات الطفولة على إجراء جزئية من خطة البحث حول عنوان "***تدريس الطالبات المعلمات لرياض الأطفال على نموذج ADDIE لإنتاج دروس تقنيات التعلم***").

وعليه تم الموافقة للطالبة **يسرى محمد بوقس** أن تقدم ورشة عمل للطالبات مدتها ثلاثة أسابيع لمادة الحاسب الآلي لرياض الأطفال على أن تتفق مع استاذة المادة بأي اسبوع يمكن لها أن تبدأ بتقديم تلك الورشة.

وتفضلوا بقبول وافر الاحترام والتقدير ...

رئيسة قسم دراسات الطفولة

د. امال بنت عبدالعزيز مسعود

APPENDIX E

INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY OF
NORTHERN COLORADO

Institutional Review Board

DATE:	May 11, 2016
TO:	Yosra Bugis
FROM:	University of Northern Colorado (UNCO) IRB
PROJECT TITLE:	[896731-3] Creating Digital Stories with Saudi Arabian Preservice Teachers: The Phenomenon of Using the ADDIE Model to Promote Lesson Plan Development
SUBMISSION TYPE:	Amendment/Modification
ACTION:	APPROVAL/VERIFICATION OF EXEMPT STATUS
DECISION DATE:	May 11, 2016
EXPIRATION DATE:	May 6, 2020

Thank you for your submission of Amendment/Modification materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

Thank you for adding the letter from King Abdulaziz.

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Sherry May at 970-351-1910 or Sherry.May@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.

APPENDIX F

CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH

UNIVERSITY of NORTHERN COLORADO

CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO

Research Title: Creating Digital Stories with Saudi Arabian Pre-service Teachers: Using the ADDIE Model to Promote Lesson Plan Development
Researcher: Yosra Bugis (UNC, Education Technology Program).
Phone: (217) 974-0117 **Email:** Bugi5449@bears.unco.edu
Instructor: Dr. Mia Williams (UNC, Educational Technology).
Phone: (970)-***-**** **E-mail:** mia.williams@unco.edu

The purpose of this study is to explore the perceptions of and knowledge of skills, including concepts, preparation, experience and workshop, of digital storytelling concepts with pre-service teachers by using ADDIE model. The study will be conducted in the "Audio Visual Aids" course (FSE 331) face-to-face class in King Abdulaziz, Saudi Arabia with pre-service teachers who are at least 18 years of age. This study is a follow-up to a previous qualitative study and is designed to explore pre-service teachers' skills in using digital storytelling concepts.

You are being asked to participate in an individual interview and focus group interview as part of the course workshop, and is estimated to take about 30 minutes to complete. This interview will measure attitudes towards digital storytelling related to digital storytelling concepts, preparation, experience, and workshop, with each of these areas measured by interview questions.

No identifying information will be collected about the participants such as address, telephone or phone number. The emails for the participants will not be disclosed in any part of the study; therefore, privacy is protected. Since this study is voluntary, participants can choose to share or skip any question in the interview that they are uncomfortable answering. There are no foreseeable risks to being in this study as the risks are no greater than those normally encountered during regular classroom participation. This research is voluntary. Attending the workshop and answering the questions should not negatively affect participants, and might actually yield positive effects by increasing the participant's awareness and sharing of digital storytelling project or ideas. You may also benefit from your participation because your own digital story project and ideas are being sought and respected. Participants will also have an opportunity to develop more insight into digital storytelling.

All documents will be destroyed by the end of Fall Semester 2019; until that time, all interview answers and data will be kept by the researcher in a locked file cabinet in the advisor's office for at least three years. Participants' individual identities will not be gathered so they cannot be disclosed. Although I cannot guarantee confidentiality of your responses, I will make every effort to maximize confidentiality by storing your responses on a password-protected computer to which only I have access. Also, all interview responses will be reported in aggregate form only so that no individual participants can be identified.

Participation is voluntary. You may decide not to participate in this study and if you begin, you may still decide to stop and withdraw at any time. Having read the information above and having had an opportunity to ask any questions, you understand that completion of the answering interview questions indicates consent to participate in the study. You may keep a copy of this form that will be given to you to retain for future reference. If you have any concerns about your selection or treatment as a research participant, please contact Sherry May, IRB Administrator, Office of Sponsored Programs, 25 Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-1910.

Subject's Signature	Date
_____	_____
Researcher's Signature	Date
_____	_____

APPENDIX G

INSTRUCTIONAL DESIGN

ADDIE Model and Digital Storytelling Workshop

Global Warming

Concept: To teach pre-service teachers to use lesson planning and educational technology.
General Goal: Provide instruction to pre-service teachers so that they are able to create a digital storytelling lesson about global warming, using the ADDIE model as a lesson planning framework.
Specific Objectives:
Pre-service teachers are able to:

- Identify the phases of the ADDIE model and main elements of the global warming issue (Remember).
- Identify different causes and solutions of global warming (Remember and understand).
- Give examples on how to use the ADDIE model to create a lesson plan (Understand and apply).
- Use the ADDIE model to analyze the problem of global warming (Analyze).
- Select a topic (global warming) for a digital story and describe key concepts for a lesson plan, using mind maps (Analyze and apply).
- Write a narrative story about a particular issue related to global warming using the main topic and dialogue (Apply and analyze).
- Use the PowToon program to select characters, create sounds, and so on (Apply).
- Create a digital storytelling project on global warming using the ADDIE model that includes visual components: photos, videos, drawings, maps, charts, and graphs, which are not repetitive but are clear (Create).
- Use concise language. The receiver should be able to understand the story from the images, even without audio (Apply).
- Create a clear and animated narration that flows at an appropriate pace (Create).
- Choose the sound effects. The audio track needs to include more than just voice (Apply).
- Clearly transition between ideas, considering the use of music, sound effects, and appropriate silence (Apply and analyze).
- Evaluate their digital storytelling (Evaluation).

Teaching methods:

- Brainstorming.
- Discussion.
- Reading Assignments and Presentations.
- Games.

Required Materials: articles/ storytelling/ computers/ audio-visual sound system
Essential Questions on Global Warming:

- What are the key concepts in biological climatology (study of how global warming affects life)?
- Why are there weather changes in the world?
- What are the reasons for dryness in the world?

- What are the reasons for global warming?
- Do we have to include this issue in our curriculum?
- What laws relating to global warming would you institute if you had the chance?
- What are the most important issues in the study of global warming and life?
- How will climate affect our future life in the immediate future? In the distant future?

Essential Questions on DST:

- What do you need to learn about digital storytelling in order to help students tell their stories?
- How do you convince students that they have some interesting stories to contribute to the world's stories?
- What impact do multimedia tools have on the understanding of literature?
- How can technology be integrated in the classroom?
- How can content area instruction be delivered in a meaningful and engaging way to meet the needs of a wide variety of learning styles?
- How can digital media be incorporated into a professional development plan that will help instructional coaches improve their coaching skills?
- Why do technology and collaborative skills for pre-service teachers matter for their future careers?
- How do you utilize animation to increase student learning?

Workshop Daily Outline

<table>
<tr><th colspan="3">Day One</th></tr>
<tr><td colspan="3">1. The researcher introduces herself to pre-service teachers and carries out activities to introduce all classroom participants, using conversation games.
2. The researcher guides icebreaker activities and asks questions about the participants' background experiences in using technology.
3. For the first icebreaker, participants are asked to bring a box from home with five items that represent themselves. They present the items with a short discussion and provide a short personal introduction.
4. The researcher tells the pre-service teachers about the goals and content of the workshop, and each participant is provided with a syllabus of the workshop in Arabic.</td></tr>
<tr><th colspan="3">Day Two</th></tr>
<tr><td colspan="3">Discussion of three articles about the procedure of the ADDIE model for creating lesson plans and the phenomenon of Global Warming.</td></tr>
<tr><th>Concept</th><th>Teaching Procedure</th><th>Pre-service Teacher Activities</th></tr>
<tr><td>• Introduce and identify the ADDIE model.</td><td>• Ask: "What is the ADDIE model?"
• Hand out: Article about ADDIE model.
• Initiate: Group discussions about the topic.</td><td>• Group discussion about ADDIE model using article.
• Working in small groups to create a concept map about the definition of the ADDIE model.</td></tr>
<tr><td>• Identify the ADDIE model phases.</td><td>• Ask: "What are the phases of ADDIE model?"
• Show: Presentation.
• Initiate: Group discussions about the three articles.</td><td>• Draw a cognitive map about the phases of the ADDIE model.</td></tr>
<tr><td>• Identify the steps for each phase of the ADDIE model.</td><td>• Ask: "What steps complete each phase of the ADDIE model?"
• Ask the group to generate some social issues that can be used as problems to solve with the ADDIE model.</td><td>• Discuss the detail of all ADDIE model phases.
• Discuss lesson planning for three problems: street graffiti, divorce, and global warming
• Create groups choose global warming as a final topic for the workshop</td></tr>
</table>

		• Each group creates a mind map for the global warming problem.
• Effects of using the ADDIE model for creating lesson plans.	• Ask: "What do these articles tell us about the effects of using ADDIE model to creating lesson plans for teaching?"	• Small group answer the questions.
The Phenomena of Global Warming, the Ozone Layer, Greenhouse Effect, and Climate Change.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Identify Global Warming.	• Ask: "What does Global Warming mean?" • Hand out: Article about Global Warming. • Show: DST video about Global Warming. • Initiate: Group discussions about the topic.	• Group discussion about Global Warming using article and video content. • Working in small groups to create a concept map about the definition of Global Warming.
• Identify effects of Global Warming on the environment.	• Ask: "How does Global Warming effect the environment?" • Show: YouTube video. • https://www.youtube.com /watch?v=wa58h4IJ6Hk	• Draw a cognitive map about the effects of Global Warming as a group.
• Identify reasons for Global Warming.	• Ask: "What are the reasons of dryness in the world?" • Show: Pictures of global warming.	• Debate (informal) on Global Warming issues between two groups.
• Identify solutions for global warming.	• Ask: "How will the world's climate change over the next 100 years if humans don't do anything to limit this problem?" • Hand out: Article about solutions.	• Write a list of ideas related to these questions in a group. • Assignment discussion on the model and global warming posted on Blackboard.

Day Three		
Presented the seven steps of Digital Storytelling including storytelling narrative writing and digital storytelling tools.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Introduction about integrating technology in classroom.	• Ask: How can you integrate technology to teach Global Warming class? • Show: different programs that are used to create DST.	• Discuss the elements of creating DST as a group. • Jigsaw activity.
• Identify Digital Storytelling steps.	• Introduce: storytelling project.	• Student construction of diagrams, charts, or graphs. • Class discussion.
• Present process of digital storytelling and narrative writing on Global Warming. • Digital storytelling tools.	• Ask: "What is the process used to create storytelling?" • Show: DST project. • Initiate: Group discussions about Global Warming digital storytelling. • Ask: "What are the main DST tools?" • Show: DST tools. • Distribute checklist or criteria for DST projects. • Assign homework: participants are asked to find examples of DST projects to share in class.	• Participants divide into 15 groups of 3 to 5 people. • Groups create graphic organizers that identify key points from articles about global warming. •

Day Four		
Review the ADDIE model and social problems.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Review the ADDIE model using various social problems.	• Ask: "Can you give an example of social problems using the ADDIE model?" • Initiate: Group discussions about the topic in class and on Blackboard.	• Group discussion about ADDIE model, using social problems. • Working in small groups to give solutions. • Answer open-ended questions in class and on discussion board.
Day Five		
PowToon digital storytelling program.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
Focus on applying PowToon digital storytelling program.	• Ask: "What is the process to create digital storytelling?" • Show: Example DST project. • Initiate: Group discussions about teaching about global warming using digital storytelling. • Ask: "What are the main DST tools?" • Show: DST tools.	• Practice using DST tools. • Choose characteristics, dialogs, and sound effects. • Choose images or pictures, or individual script work. • Picture critique. • Work on storyboarding, scanning, and organizing images. • Draw; insert image, video, sound, record, and animation.

Day Six		
Review Bloom's Taxonomy to Write Effective Learning Objectives.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Review Blooms taxonomy.	• Researcher reviews DST proposals for each group. • Ask: "How do we write goals and objectives?" • Researcher posts Blackboard discussion questions for evaluating learning objectives.	• Groups play a competitive game, writing examples for each level of Bloom's cognitive taxonomy. • Participants respond to open-ended questions on Blackboard.
Day Seven		
Groups submit proposals and work on DST projects.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Gain project approval and proceed with creating DST projects.	• Researcher reviews and approves group proposals. • Research instructs on integration of narrative with PowToon and voice modification programs.	• Groups proceed to choose features for projects and experiment with Voice Changer Plus.
Days Eight--Ten		
Groups create Global Warming storytelling using PowToon.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Create Global Warming digital storytelling projects.	• Researcher increases access to PowToon.	• Groups continue working on DST projects.

Days Eleven and Twelve		
Participants learn the process that will be used to evaluate students' use of the ADDIE model for digital storytelling on the global warming issue and finalize projects using an evaluation checklist.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Finalize DST Project.	• Explain the evaluation checklist.	• The pre-service teachers record scripts using the evaluation checklist. • Record DST sounds. • Add all sound effects.
Day Thirteen		
Groups present final projects and review each other's work.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Complete final presentations. • Review each other's work.	• Provide facilitator guidance. • Researcher provides feedback using criteria checklist.	• Peer review based on the checklist evaluation. • Group script sharing and feedback. • Groups complete paper checklist to evaluate their progress. • Individuals submit evaluations of their progress online, using Qualtrics. • DST projects are posted on YouTube.

Day Fourteen		
Reflection exercise.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Complete reflection exercise about workshop and DST.	• Assign reflection exercise • Researcher starts organizing and completing post-workshop focus groups.	• Complete reflection exercise and submit via Blackboard.
Day Fifteen		
Reflection exercise. Complete workshop feedback.		
Concept	**Teaching Procedure**	**Pre-service Teacher Activities**
• Complete reflection exercise and workshop evaluations.	• Researcher facilitates Blackboard discussion and online workshop evaluations. • Researcher completes two post-workshop focus groups.	• The pre-service teachers discuss the project on the blackboard. • Fill out the online evaluation.
Post-Workshop		
The researcher interviews up to eight pre-service teachers in focus groups and collects feedback from them about the usefulness of the ADDIE model for creating DST to teach their students. All participants will participate in small discussions on their projects and experiences and post comments on Blackboard.		

APPENDIX H

WORKSHOP SYLLABUS IN ARABIC

مخطط ورشة عمل

تحضير الدروس باستخدام نموذج ADDIE لإنتاج القصص الرقمية

أ. يسرى محمد بوقس

Email: ybogas@kau.edu.sa

أوقات المحاضرة	الساعات المكتبية
شعبة VAR ح-ث-خ: ١٢-١ شعبة IVR ن-ر: ١-٢:٣٠ كلية الاقتصاد المنزلي مبنى 41 غرفة 220	كلية الاقتصاد المنزلي أيام الأسبوع من 9-11 الزهراء - الدور الأول غرفة 223

الهدف العام من ورشة العمل:

تهدف ورشة العمل إلى تدريب الطالبات المعلمات على تحضير الدروس باستخدام نموذج ADDIE وإنتاج القصص الرقمية التي تتناول مفاهيم الاحتباس الحراري وأثره على البيئة المحيطة، حيث تعتمد الورشة على تدريب الطالبات/المعلمات على معالجة قضايا المجتمع المحيطة وحماية البيئة من خلال استخدام التقنيات الحديثة لتنمية التفكير الابتكاري لديهم بإنتاج العديد من القصص الرقمية المختلفة لمعالجة هذه القضايا. كما سيتم من خلال ورشة العمل توضيح دور تقنيات التعليم لمرحلة ما قبل المدرسة وابتكار العديد من الأنشطة التي تساعد الطالبة/المعلمة لمرحلة رياض الأطفال على تدريس المفاهيم المختلفة لتلك المرحلة.

قسم دراسات الطفولة
الحاسوب في رياض الأطفال CHS 422
الفصل الأول 1437/1438هـ

بنهاية ورشة العمل تكون الطالبة/المعلمة قادرة على أن:

1. تعرّف مفهوم نموذج ADDIE وأهمية استخدامه في تحضير الدروس.
2. تعرّف مفهوم الاحتباس الحراري وأثاره على البيئة وإيجاد الحلول لهذه المشكلة.
3. تطبق نموذج ADDIE في تحضير درس الاحتباس الحراري.
4. تعالج مفهوم الاحتباس الحراري من خلال نموذج ADDIE.
5. تكتب قصة حول مشكلة الاحتباس الحراري أو حول الحلول المناسبة لها.
6. اختيار الشخصيات المناسبة للقصة مع الألوان المناسبة والتأثيرات الصوتية.
7. تطبيق القصة الرقمية باستخدام جميع الشخصيات المختارة عبر برنامج PowToon.
8. ابتكار الأصوات المختلفة وإضافتها للقصة الرقمية.
9. إيجاد قضايا مجتمعية مختلفة وابتكار علاجها من خلال النموذج لتحضير الدروس المختلفة.
10. ابتكار أنشطة مختلفة باستخدام القصص الرقمية لمعالجة المفاهيم المختلفة (علمية، اجتماعية) موجهة لطفل الروضة.
11. تقيّم إنتاجها وإنتاج زميلاتها للقصص الرقمية بما يتوافق مع معايير انتاج القصة الرقمية.

المهارات والخبرات المطلوبة:

1. الإلمام بمبادئ استخدام الحاسب الآلي وبرامجه المختلفة.
2. القدرة على البحث عن مصادر المعلومات عبر مواقع الانترنت المتخصصة للأطفال.
3. القدرة على تصميم وابتكار الأنشطة المختلفة لمعالجة القضايا.

المراجع ومصادر المعرفة المرتبطة بورشة العمل:

1. صالح، ماجدة محمود (٢٠٠٢م). الحاسوب في تعليم الأطفال. القاهرة: دار الفكرالعربي.
2. عبدالرحيم، هناء محمد (٢٠٠٦م). دمج التكنولوجيا في أنشطة رياض الأطفال. القاهرة: دار الكتاب الحديث.
4. الفار، إبراهيم عبدالوكيل (٢٠٠٠م). تربويات الحاسب. العين: دار الكتاب الجامعي.
5. محمد، مصطفى عبد السميع وآخرون (٢٠٠٧م). برامج الأطفال المحوسبة. القاهرة: دار الفكر.

الإطار التفصيلي:

الأسبوع	اليوم	التاريخ	المحاضرة
1	الأحد	12/17	حذف و إضافة
2	الأحد	12/24	توزيع خطة المقرر التعرف على الطالبات وإجراء مقابلات فردية حول مهاراتهن في تقنيات التعليم مناقشة مقالات ذات علاقة شرح كيفية استخدام لوحة المناقشة (Discussion board) والخاص بجامعة الملك عبدالعزيز.
	الثلاثاء	12/26	مناقشة المقالات مع شرح مفهوم النموذج التصميمي (ADDIE) وعلاقته بالتصميم التعليمي. التدريب على صياغة الأهداف التعليمية بمختلف مستوياتها
	الخميس	12/28	تابع شرح النموذج التصميمي (ADDIE) وعلاقته بالتصميم التعليمي معالجة عدة قضايا اجتماعية مقترحة باستخدام النموذج ابتكار أنشطة مختلفة لاستخدام القصص الرقمية
3	الأحد	1/1	اختيار مواضيع الاحتباس الحراري المراد تصميمها. تصميم الخرائط المعرفية حول الحلول المختلفة للاحتباس الحراري إعداد السيورة القصصية للقصة الرقمية.

قسم دراسات الطفولة
الحاسوب في رياض الأطفال CHS 422
الفصل الأول 1437/1438هـ

			توزيع الطالبات على مجموعات للمناقشة والتصميم.
	الثلاثاء	1/3	شرح برنامج انتاج القصص الرقمية PowToon وأدواته
	الخميس	1/5	متابعة انتاج القصص الرقمية. إضافة التأثيرات الصوتية واستخدام برامج تغيير الأصوات.
4	الأحد	1/8	تقييم انتاج الطالبات/المعلمات للقصص الرقمية انهاء لقاءات ورشة العمل
	الثلاثاء	1/10	
	الخميس	10/12	
5	الأحد	1/15	المقابلات على مجموعات متفرقة
	الثلاثاء	1/17	
	الخميس	1/19	
6	الأحد	1/22	إكمال المقابلات الجماعية
	الثلاثاء	1/24	
	الخميس	1/26	

APPENDIX I

ARTICLES AND MIND MAPS

Articles

القائمة الرئيسية
الرئيسية
كلمة العدد
ضيف العدد
مقالات
بحوث
أراء و قضايا
قرأت لك في هذا العدد
تعلم...احترف
مصطلحات تعليمية
احداث واخبار
مواقع مفيدة

الرئيسية / قرأت لك في هذا العدد

نموذج التصميم التعليمي ADDIE وفقاً لنموذج الجودة PDCA

تاريخ العدد APR-2016-01

بقلم أ.د/ نبيل جاد عزمي
الوظيفة أستاذ ورئيس قسم تكنولوجيا التعليم بكلية التربية جامعة حلوان.

لم يعد في وسع المجال التربوي إلا أن يستجيب لتيار التقدم العلمي والتكنولوجي، ولذلك ظهر إتجاه حديث أشبة بهندسة تربوية أخذت تتجلى معالمها كعلم يهتم بإختيار المادة التعليمية، وتحليلها، وتصميمها، وتنظيمها وتطويرها، وتقويمها بما يتفق والخصائص الإدراكية للمتعلم، وهذا هو ما يطلق عليه علم التصميم التعليمي.

ماهية التصميم التعليمي:

كلمة **"تصميم"** مشتقة من الفعل "صمم" أي عزم ومضي على أمره بعد تمحص دقيق للأمور من جميع جوانبها وتوقع النتائج بأنواعها المختلفة وبدرجات متفاوتة من تحقيق للأهداف المنشورة ورسم خريطة ذهنية متكاملة ترشد الفرد إلي كيفية التنفيذ والسير قدماً بخطوات ثابتة فيها مرونة نحو الهدف، وتوحي بتحمل عواقب الأمور، أما مفهوم "التصميم" اصطلاحياً يعني هندسة للشئ بطريقة ما وفق محكات معينة، أو عملية هندسية لموقف ما أو الرسم والمواصفات التي يجري العمل على مقتضاها.

Mind Maps


تأثير الغازات الدفيئة
على تغير المناخ
CO_2

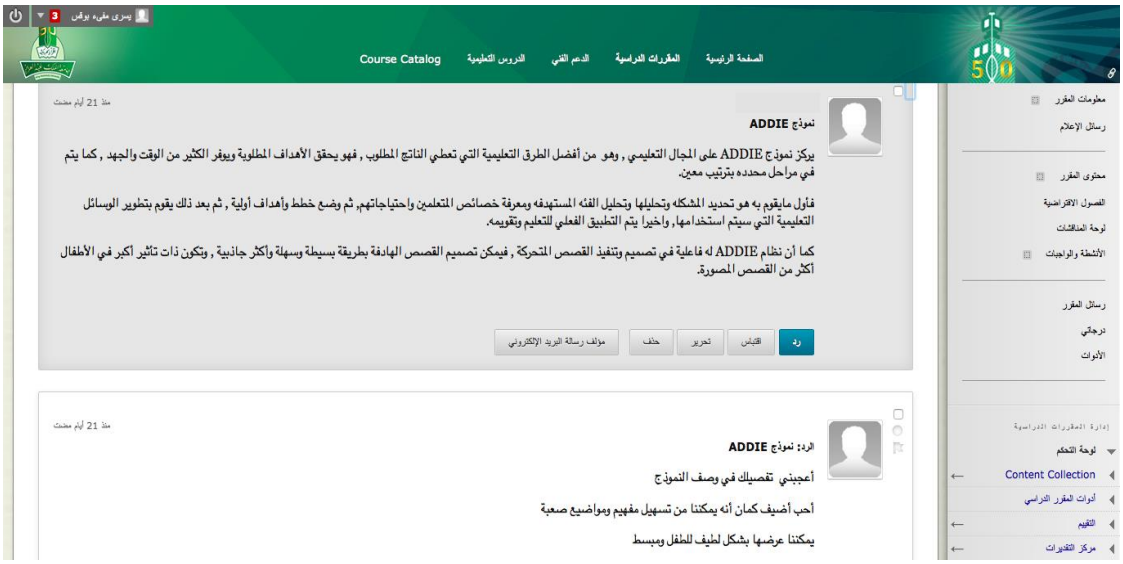

الاحتباس
الحراري.
حلول للحد من الاحتباس
الحراري
كثرة زراعة الأشجار
إعادة التدوير


تأثير الاحتباس
الحراري على الحيوان
زيادة انقراض
الحيوانات
في البيئة الجليدية..

APPENDIX J

DISCUSSION BOARD AND TRANSLATION

Discussion Board



Translation of the Blackboard Discussion

- Question on the Blackboard: Where can we use ADDIE model?
- Participant 1: The ADDIE model focuses on Educational field. It is one of the instructional methods that result in good outcomes. Following the steps of the model, successfully saves time and effort.
- The first step is focusing on the problem, followed by conducting an analysis of the audience and their needs. The second step is forming the objectives and draft plans. The third step is choosing the teaching method and materials and developing them. The final step is applying these steps and evaluating them.
- Furthermore, the ADDIE model is effective in creating digital storytelling. It can easily create an educational story that is attractive and has more impact on children.
- Participant 2 ask: I like your detailed description of the model. I would like to add that this model helps making complicated concepts and topics sampler for kids to grasp.

APPENDIX K

STUDENTS' STORYTELLING

Storytelling on YouTube

حلولي لبيئتي قصة عن الاحتباس الحراري

280 views • 11 months ago

لنزرع شجرة قصة عن الاحتباس الحراري

92 views • 11 months ago

الطاقة المتجددة قصة عن الاحتباس الحراري

46 views • 11 months ago

من ينقذني؟ قصة عن الاحتباس الحراري

178 views • 11 months ago

كوكبنا الحزين قصة عن الاحتباس الحراري

114 views • 11 months ago

الأرضُ الحزينة قصة عن الاحتباس الحراري

1.3K views • 11 months ago

الأرض دودي قصة عن الاحتباس الحراري

429 views • 11 months ago

أين جدي يا أبي؟ قصة عن الاحتباس الحراري

138 views • 11 months ago

وسيم والشجرة قصة عن الاحتباس الحراري

1.3K views • 11 months ago

إعادة التدوير قصة عن الاحتباس الحراري

75 views • 11 months ago

كوكب الأرض مريض قصة عن الاحتباس الحراري

9.6K views • 11 months ago

قصة نجاح المدرسة العربية بولاية كولورادو في حفل استقبال وفد الملحقية

121 views • 2 years ago

بيئتي مسؤليتي قصة عن الاحتباس الحراري

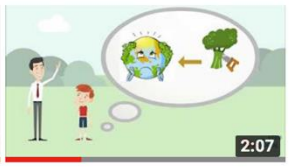
75 views • 11 months ago

تأثير الاحتباس على صحتنا! قصة عن الاحتباس الحراري

237 views • 11 months ago

حاوياتي السعيدة قصة عن الاحتباس الحراري

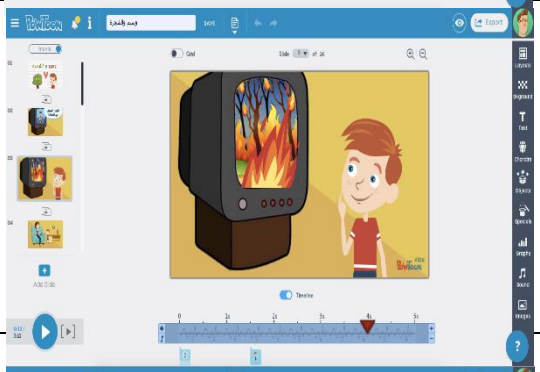
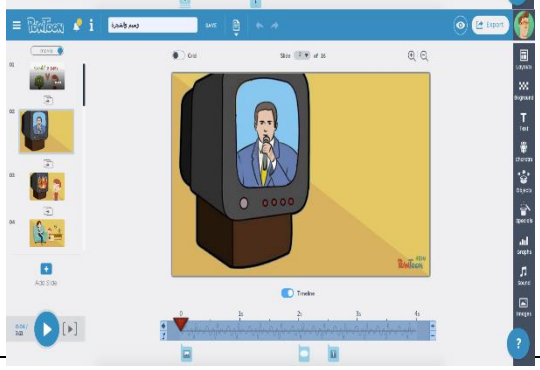
396 views • 11 months ago

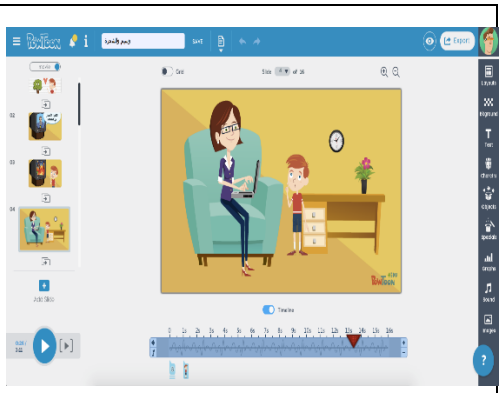


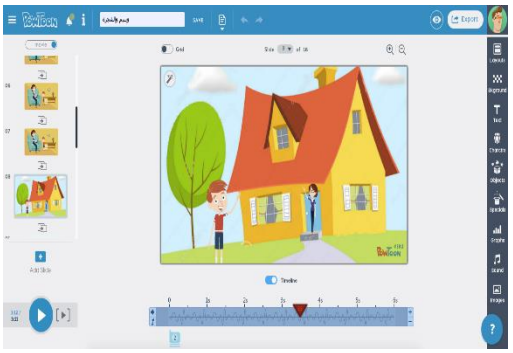
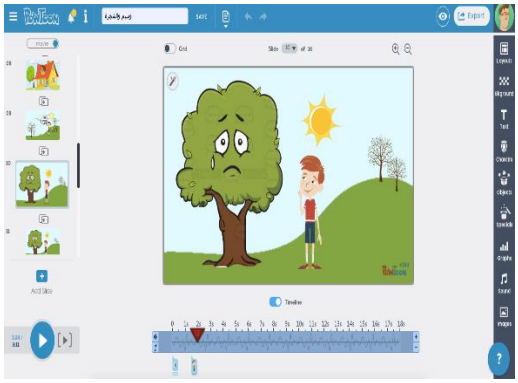
لماذا ذاب الإيسكريم؟ قصة عن الاحتباس الحراري

108 views • 11 months ago

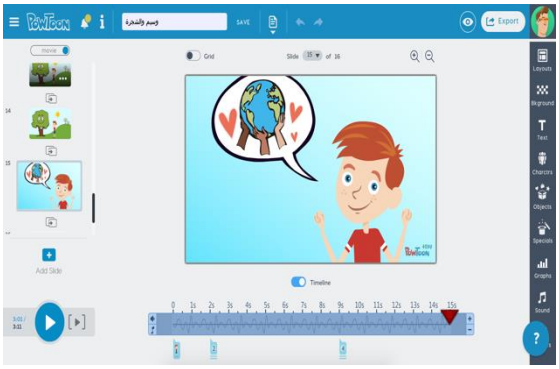
On PowToon Program

Dialogue of the story	Pictures
قصة وسيم والشجرة Waseem and The Tree	
يشاهد وسيم خبرًا في التلفاز والمذيع يقول: "أنقذوا الأشجار من الهلاك" Waseem saw the forest fire on the news. The TV reporter said that we needed to protect the trees from the damage.	
المذيع يتحدث (ظاهرة الاحتباس الحراري أثرت على المناخ خصوصًا في فصل الصيف مما ساعد في ازدياد الحرائق في الغابات) The TV reporter said that global warming affects the climate, especially in the summer, and that this makes more forest fires.	

وسيم: أمي! أمي! ما هو الاحتباس الحراري؟ Waseem: Mom! Mom! what does global warming mean? الأم: هو مشكلة كبيرة يا وسيم، ومعنى ذلك أن الأرض قد أصبحت شديدة الحرارة بسبب احتباس أشعة الشمس داخلها. Mom: It is a big problem Waseem. The is increasing in the earth because it keeps the sun ray in it. وسيم: وما علاقة الاحتباس الحراري باحتراق الغابات؟ Waseem: Why is global warming connected to forest fires? الأم: بسبب كثرة قطع الإنسان للأشجار يا بني وإحراقها في المصانع لإنتاج الوقود مما يسبب في ارتفاع غاز ثاني أكسيد الكربون في الجو وهو المسؤول عن تغير درجات الحرارة والاحتباس الحراري. وعندما تقل عدد الأشجار فلن يتوفر لدينا هواء نقي. Mom: People cut down trees and that increases CO2 in the air and increase global warming. Also, when the trees are processed in factories, smog is created which pollutes the air. And we have less trees to create fresh air. وسيم: هل هذا يعني أنه لن يصبح هناك أشجار؟ Waseem: Does that mean that we won't have trees in the future? الأم: انها موجودة في الوقت الحالي، ولكنها ذبلت وأصبحت مصفرة الأوراق، وإن استمرت هذه المشكلة سوف تختفي جميع الأشجار في المستقبل. Mom: We do have many trees now, but they are getting sick because of the hot weather. If we don't take care of them now, we may not have any trees in the future.	

وسيم: يا إلهي! أمي أريد أن أذهب إلى الحديقة لأطمئن على الأشجار. Waseem: Oh my god mom! I want to go to the park to talk to the trees.	
وسيم: مرحبًا أيتها الشجرة، ما بالك حزينة؟ Waseem talked to the tree. He said, “Hi tree! Why are you so sad?” الشجرة: إني متعبة بسبب حرارة الجو الشديدة التي أدت إلى جفاف أوراقي وقلة خصوبة تربتي، وكل ذلك لأن الناس تؤذي الأشجار. The tree told him: “I’m so tired. The hot weather dries up my branches and leaves, and that is because people hurt trees. وسيم: بسببنا نحن؟ وما علاقتنا بذلك؟ Waseem: “Because of us? How come?”	
الشجرة: تسبب الانسان في الاحتباس الحراري بسبب عدم حمايته للبيئة، فدخان المصانع وعوادم السيارات والكثير يزيد من غاز ثاني أكسيد الكربون في الجو. فالناس لا يقومون بتدوير مخلفاتهم، كما أنهم يقطعون الأشجار كل يوم والتي يمكن لوجودها المساهمة في تصفية الجو والحصول على أوكسجين نقي. Tree: “Humans create global warming because they do not do enough to protect the environment. Their factories and cars release a lot of CO2 into to air. They don’t recycle their trash, and they cut down more trees each day. This affects the weather because trees help clear the air and create fresh oxygen.”	

وسيم: وما الذي يمكننا فعله لمساعدتك أيتها الشجرة؟ Waseem: “How can we help you?”	
الشجرة: يجب عليكم حماية بيئتكم عن طريق خلق عادات أفضل. أولاً قم بتدوير نفاياتك، ثم قم بزراعة الأشجار بدلاً من تقطيعها للتقليل من ضرر الاحتباس الحراري والذي يساعد في جعل حياتنا صحية أكثر. Tree: ‘You have to protect the environment by building better habits. First, recycle your trash. Then, plant more trees. Finally, avoid cutting down so many trees. This will help reduce global warming and make our life healthier.	
وسيم: حسنًا أيتها الشجرة أعدك بأن أساعد في الحفاظ على البيئة وسأشجع أصدقائي على فعل ذلك أيضًا فنحن نحب كوكب الأرض فكلنا نعيش فيه ومن واجبنا حمايتها جميعًا. Waseem: “I promise you that I will help protect the environment and I will advise my friends to do the same because we love the earth and we all live on the same planet and it is all of our responsibility to keep the Earth healthy.”	

وسيم: وأنتم يا أصدقائي هل ستساعدونني في الحفاظ على كوكبنا من الاحتباس الحراري؟ لنتعاون معالخلق بيئة أفضل. Waseem: “How about you, my friends? Will you help me protect the earth from global warming? Let’s work together to protect the environment!”	

APPENDIX L

FOCUS GROUP INTERVIEW QUESTIONS

Interview Questions

- Has your outlook on digital storytelling project changed after the workshop? How?
- Did the digital storytelling project help you improve your teaching skills? How?
- Did the digital storytelling project help you improve your skills in using technology? How?
- Do you think a digital storytelling project will engage your students in learning? If so, how? If not, why not?
- How is (or is not) digital storytelling useful for teaching and learning?
- How is (or is not) digital storytelling project useful for explaining a curricular concept?
- Do you think you are able to create different storytelling projects? Explain.
- How is (or is not) the ADDIE model helpful to you in creating digital storytelling and lesson plan?
- Do you feel after this workshop you are prepared to implement the ADDIE model and DST in your future classroom?