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Chapter 10

Digital Storytelling and Young Children: Transforming Learning Through Creative Use of Technology

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ABSTRACT

Using Puentedura's framework for transformative use of technology for learning, and the guidelines for developmentally appropriate practice, practitioner vignettes, and practical strategies highlight the possibilities for integrating digital storytelling activities in the PK-3 classroom in support of literacy learning. The chapter explores ways in which digital storytelling can be a transformational way for young children to develop an array of literacy skills. The vignettes share examples of teachers integrating digital storytelling activities in transformative ways to enhance children's learning. The chapter provides suggestions for lesson ideas and digital tools for engaging young children in a variety of storytelling projects.

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INTRODUCTION

Storytelling has been used for centuries as a way for people to learn from, and communicate with, each other. These stories can take the form of fiction or nonfiction, and can be about any topic. Storytelling that originates in Western cultures often follows a standard format. In these stories, the creator develops their own narrative perspective on the topic as they write. The central part of storytelling is a strong script. Narrative stories often contain a recognizable story structure, or story grammar. This narrative typically has a beginning, middle and end (Ang, 2014). These stories are often familiar to the listener because they describe events they have experienced or they have knowledge of others experiencing. Early storytelling themes often included fairytales, legends, folktales, and mythology, as told through song, dance, narrative, and various text formats. These stories were passed down through generations in verbal or written formats. Modern storytelling can address these common cultural themes but more often explores personal perspectives on historical events, personal reflections, and current cultural experiences (Coggin, Daley, Snyder, & Davis, 2019).

More recently, the act of storytelling has become intertwined with using technology to share tales with a larger global audience. Digital storytelling enhances traditional storytelling with multimedia production by combining oral narration with multimedia tools (Lathem, 2005). These tools may include apps for tablets, mobile devices, and computers. Typically, these projects are not long in length. The completed projects can be shared with and viewed by a wide audience which can have greater and faster reach than they might have with traditional forms of media.

The purpose of this chapter is to support practitioners with ideas for incorporating technology in meaningful and appropriate ways during literacy instruction in the PK-3 grade levels. There are many applications, or apps, available for digital storytelling, but few are designed for young learners. The chapter includes multiple vignettes of teachers integrating developmentally appropriate digital storytelling strategies and applications in their classrooms. Significant focus is given to Puentedura's (2006) substitution augmentation modification redefinition (SAMR) model framework which supports the use of digital storytelling in the development of literacy skills in young children. The chapter concludes with lesson ideas and examples for introducing a wide range of digital storytelling projects in the PK-3 classroom. The goal of this chapter is to provide guidance to educators seeking to engage their students in meaningful literacy skill development combined with 21st century skills and technology integration.

BACKGROUND

Technology plays a major role in the lives of many children. Smartphones, iPads, interactive digital whiteboards, laptops, and the apps and software programs associated with these items, are common in both home and school settings. How should these technologies be used in the classroom when considering the cognitive and social development of children? This section addresses the importance of developmentally appropriate practice (DAP) when working with students, PK-3 through third grade, and technology.

Developmentally appropriate practice has, at its core, the idea that relationship building is essential to the learning process (Coppole & Bredekamp, 2009). Teachers must get to know their students' strengths, and areas in which they need support. Vygotsky's (1962) concept of the zone of proximal development, the idea that children, with support from a skilled partner (their teacher), can develop new knowledge

and skills, is central to this relationship building. When this skilled partner scaffolds the current abilities of the learner to develop new knowledge and skills, ultimate learning occurs.

Practitioners must know their learners well as they plan and provide intentional learning opportunities to scaffold student learning. In addition to understanding developmental milestones and what typically developing children are capable of at various ages, gathering knowledge of the learner is essential (Copple & Bredekamp, 2009). This knowledge gathering can take place through observation, assessment, discussions with the child and family, and understanding the background of the child such as diagnosed special needs and past teacher insight.

Consideration of the cultural and social backgrounds of students is another important piece of DAP. Bronfenbrenner's (1979) ecological systems theory provides a framework for these considerations. This theory explains the importance of both direct and indirect influences on the developing child in various contexts. Direct influences include caregivers, families, schools and peers. Indirect influences consist of laws, politics, and social services. These factors combine as they affect the development of the self.

As one considers these key components of DAP: relationships with learners, knowledge of learners, knowledge of developmental milestones, and consideration of culture and social backgrounds, the question arises: is technology appropriate for young children (NAEYC, 2012)? The National Association of Young Children, along with the Fred Rogers Center for Children's Learning and Early Media, have developed a joint statement on technology use in early care and education programs for children birth through age eight. The statement provides both rationale and guidance for using technology with young children.

Technology and interactive media are tools that can promote effective learning and development when they are used intentionally by early childhood educators, within the framework of developmentally appropriate practice to support learning goals established for individual children. (NAEYC, 2012, p. 5)

The position statement (NAEYC, 2012) also lists guiding principles for technology use with young learners. These principles include the following concepts regarding technology use: it must be developmentally appropriate; it must not interfere with social interactions with others; practitioners must use professional judgment when deciding if technology is appropriate; it must "empower" children and result in active and engaging learning; it should strengthen home-school connections; it should be playful; it must be used intentionally; it should support ELL children and families; and practitioners should have training on best practices when using technology. The statement acknowledges the potential for interactive media to enhance learning experiences, while cautioning early childhood professionals to base their support and use of such materials on developmental and curricular appropriate foundations.

As with any other learning tools, how and when technology is used will determine its ultimate impact on literacy skills. Developmentally appropriate technology use (DATU) capitalizes on children's natural desire to actively and collaboratively construct knowledge, respecting the unique challenges presented by children's levels of development across all domains. DATU occurs as a result of teachers integrating the multiple dimensions of their own knowledge base and pedagogy to develop and provide technology-rich instruction and resources for young children (Rosen & Jaruszewicz, 2009). One of the easiest and most high impact ways the authors have seen teachers incorporate technology into their work with young children is through digital storytelling. In their roles as teacher educators and instructional designers, the authors have had an opportunity to impact the learning and practice of preservice and in-service teachers. Collectively, the authors have worked together over the past several years to integrate digital storytelling into teacher education courses.

DIGITAL STORYTELLING FOR LITERACY DEVELOPMENT

This chapter provides strategies and possibilities for integrating digital storytelling in PK-3 classrooms to enhance literacy development. Digital storytelling is a literacy learning tool, and is adaptable to any developmental level. The result of these projects can take many forms including: personification stories, science cycles, animal interviews, modernized fairy tales, book trailers, historical journals, visual poems, legends and tall tales, and more (Ang, 2014). Iver (2019, p.50) recommends eight steps from project conception to reflection. These steps ideally include: deciding on a topic or idea; researching the topic or idea; writing a script; designing storyboards; gathering and creating multimedia elements; project development; sharing with others; getting feedback; and reflection. Depending on the developmental and literacy level of the student and instructional goals, some of these steps might need to be modified or excluded when planning digital storytelling projects for the classroom (Coggin et al., 2019; Iver 2019).

Digital storytelling projects give young learners an authentic opportunity to develop and practice multiple literacy skills, including writing, reading, listening, and speaking (Kolk, 2016). This project is ideal for small group project based learning. Forms of digital storytelling are adaptable to any skill level. If students do not yet have writing or reading skills, the projects can be differentiated to accommodate their current abilities. In addition to being a tool for developing literacy skills, digital storytelling activities take advantage of young children's enthusiasm for using technology. Technology becomes the background focus as children work to develop their projects. The process gives children the opportunity to deeply engage with content as they create (Kolk, 2016). The activity can build confidence in their developing literacy skills as they work to prepare and revise their project over time. At the highest levels, effective digital stories combine extensive research, media literacy, organizing, idea creation, critical thinking, writing, and editing (Kolk, 2016).

Digital storytelling is a powerful way to teach children how to create, and not just consume media, as much of their day may be spent this way. When they learn how to create media, they are learning important modern communication skills. In addition, creating digital stories is a powerful way for young learners to develop confidence and self-expression skills. When expressed through a technological medium, these self-expressions form the basis for how children will interact in a digital world (Iver, 2019). Young children can be familiar with social media and the role it plays in the lives of those around them. When young children create digital storytelling in the classroom, they learn to thoughtfully plan and create a message for self-expression to share with others. They can also learn to critically consider their words, the message, and the media they include to share their ideas (Iver, 2019). When students have the opportunity to explore these tools in an educational environment, they can build the skills needed to engage globally later in their lives.

The tools used for digital storytelling can have many benefits for young children. These tools, along with other media resources, have been found to increase language development (Lankshear & Knobel, 2003). Research shows that the language development and the preparation of students for school and literacy learning varies widely (Hart & Risley, 1996). Some students arrive at school with extensive literacy experiences and others are just beginning to understand the functions of text. Access to multimedia texts can provide accessibility to books and encourage development of concepts of print, vocabulary, and comprehension (Li, Atkins, & Stanton, 2006; McKenna, Labbo, Conradi, & Baxter, 2011; Sullivan, & Baker, 2013). Furthermore, students show increased motivation for literacy tasks when technology is incorporated and are engaged with digital texts (Burnett, 2010).

Once formal schooling begins, the gap in literacy achievement between higher and lower socio-economic status students widens (Institute of Education Sciences & National Center for Education Statistics, 2016). With the inclusion of new literacies into the curriculum, there is understandable concern that the gap between these groups of students will simply become wider. Given the plethora of technology available to families and young children, and its importance in their academic lives, leaving the technology learning to chance and circumstance would certainly result in a wider achievement gap. However, by incorporating responsible choices into early childhood settings, educators may provide opportunities that would otherwise be available only to a select few.

SAMR Framework

Digital storytelling activities invite the learner to use their creativity to develop something entirely new. This type of activity is represented in the substitution augmentation modification redefinition model (SAMR) model introduced by Puentedura in 2006. The SAMR model provides a framework for gauging the impact of technology integration on teaching and learning.

The SAMR model is comprised of four levels. The four levels are, from lowest to highest, substitution, augmentation, modification, and redefinition (Puentedura, 2006). These levels designate the impact a technology can have in teaching and learning, ranging from enhancement to transformation (Hamilton, Rosenberg, & Akcaoglu, 2016). This chapter will explore ways to integrate technology at the multiple levels of the SAMR model framework. These ideas will be accompanied by brief examples of how these levels are commonly achieved when exploring digital storytelling in the PK-3 classroom.

The four levels of the SAMR framework will be described in depth in the remainder of this section, beginning with the lower levels. Substitution, the lowest level of the framework, is achieved when technology is used to enhance the learning process (Puentedura, 2006). He defined substitution as when “technology acts as a direct substitute, with no functional change” (p. 3). In the classroom, substitution often employs technology as a replacement for non-digital activities (Hamilton et al., 2016). The use of technology in this manner does not significantly change the tasks or learning outcomes. An example of substitution would be using PDF eBooks for reading. If the eBook is the electronic counterpart of the existing print version, it does not add interactivity or multimedia content to create a different experience. Another example of substitution is a scanned digital version of a print worksheet that students fill out using a word processing program. In this case, filling out the worksheet with text answers would be essentially the same learning experience for the student whether they filled it out on paper or on a computing device.

A step beyond these substitution scenarios is when technology is employed for the augmentation of a task. At this level, technology is still used for enhancement of the learning process. When technology is used for augmentation, it “acts as a direct tool substitute, with functional improvement” (Puentedura, 2006, p. 3). When technology reaches the augmentation level, it offers some features and learning enhancements to allow the learner to interact with the content on a basic level, such as highlighting and read aloud features (Hamilton et al., 2016). At the augmentation level, the technology gives learners some extra features to engage with to enhance learning. When a technology is incorporated at this level for literacy activities the technology offers more features to allow interactivity with the reader. Read&write is an example of an app at the augmentation level which can support struggling writers. This tool offers word prediction, dictionaries, and highlighting which can build the confidence of young students. The reader can interact with this tool which allows for a more interactive and scaffolded experience than if

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they read a print version of the book. However, without the creation of new content or using technology to learn in ways not previously possible without the use of the technology, the use of this tool remains at the lower levels of the SAMR framework.

The upper levels of the SAMR framework are achieved when technology is used in a way that is transformational in the learning process (Puentedura 2006). The transformational levels are modification and redefinition. To qualify as transformational, technology use must allow for entirely new learning processes and creative outcomes that would not be possible without the technology (Puentedura, 2006). Modification is achieved when “technology allows for significant task redesign” (Puentedura, 2006, p. 3). Engaging in and creating digital storytelling can integrate technology in ways that achieve these higher levels. In the context of digital storytelling, the modification level might look like students using apps to create book talks using animation applications. Digital storytelling at the modification level can be appropriate for the youngest learners who are developing their motor and literacy skills (Hamilton et al., 2016).

The highest level of the SAMR framework is redefinition. This transformational level is achieved when “technology allows for the creation of new tasks previously inconceivable” (Puentedura, 2006, p. 3). In the context of digital storytelling, the redefinition level might involve learners demonstrating their knowledge by creating short movies combining multiple media formats or by using virtual reality to tell a story in a novel way (Hamilton et al., 2016). From a constructivist pedagogical perspective, young learners will likely require scaffolding and support in the classroom to create digital storytelling at this level. For example, students in one first grade classroom worked on their writing over several weeks taking an individual story through the writing process during their literacy block. They “published” the stories online using the app Little Bird Tales. This allowed each student to create a digital book which included their own artwork. What they found most exciting was the fact that they could record their voices reading the story.

While the SAMR framework is a popular model in practical teaching environments, as evidenced by the ample exploration and discussion of this topic at PK-12 educational technology conferences (International Society for Technology in Education, ISTE) and American classrooms the editors have visited, there is a dearth of research in the literature to support the theoretical explanation of this framework (Hamilton et al., 2016, p. 435). Consequently, Hamilton et al. (2016) note the lack of systematic evidence on how to interpret, understand, and apply this model in practice. Their critique challenged several issues with the SAMR model, including absence of context, rigid structure, and the focus on product over practice. The authors of this chapter aim to provide their interpretation of SAMR in practice through suggestions and practical examples of the application of SAMR in the early childhood classroom.

Evaluating Digital Resources

How can educators determine what digital resources are appropriate for their students? Technology, and the materials used with these tools, vary greatly in quality (NAEYC, 2012). Hobbs (2010) writes about the importance of practitioners having the ability to “find(ing) and use(ing) technology tools skillfully” (p. 17). Practitioners attempting to integrate digital literacies into their curriculum may find the website Tapclickread.org helpful. This website offers many resources for the classroom teacher. Links to app reviewers is one of these resources, with sites such as TeacherswithApps.com, DigitalStorytime.com, and commonsensemedia.org/apps-list. There is also a checklist and rubric supplied to help practitioners find appropriate apps for their classrooms.

Tapclickread.org also provides a section to aide practitioners in connecting with homes and families. This section contains resources including strategies for parents to begin a conversation with children regarding the digital media they are using and why they are using it. There is also a resource which provides strategies to support ESL students and their families when using digital media. Another available tool is entitled “The Three C’s,” a quiz caregivers can complete. The quiz is comprised of questions relating to the three areas of context, content, and the child and how the digital media they are using interacts with and influences each of these areas. By completing the quiz, users can gain a better understanding of what digital media are best suited for their children.

Supporting the Use of Digital Tools

The process of integrating technology into teaching is complex because teachers need access to digital tools as well as an understanding of the educational practices that support technology integration (Baron, Kemker, Harnes, & Kalaydjian, 2003; Hew & Brush, 2007; Miranda & Russell, 2011). The good news is, school districts and policy makers are increasingly investing more money to support teachers’ use of digital tools (Ertmer & Ottenbreit-Leftwich, 2013). Often this support takes the form of professional development. Research suggests that teachers benefit the most from having hands-on experience with technology and being able to immediately apply what they learn (Jaipal-Jamani & Figg, 2015). As teachers become more comfortable using digital tools, they work to integrate technology more seamlessly into their teaching (Zoch, Myers & Belcher, 2017).

Other related factors to teachers’ use of digital tools include the school structure, resources, and support available (Glazer, Hannafin, & Song, 2005; Grant et al., 2015). Administrators can provide support with all three of these factors by giving their permission to use technology, allowing classrooms that use technology to have priority access to digital tools, and ensuring that the structure of the school is set up for collaboration and working toward the goal of implementing technology. One constant issue the authors have seen in schools is funding for technology in the classroom. Inadequate funding is often a barrier for teachers looking to integrate technology. Even when hardware is available in the schools, there is an additional cost for some apps. Many schools have funds set aside for technology related purchases. The problem is that teachers may not be aware of this funding, or they do not know what to ask for from administrators or instructional technology resource teachers (ITRT). This chapter focuses on low cost apps already in use and available in most schools.

Digital Storytelling in Practice

This section includes several vignettes which highlight classroom teachers’ experiences integrating digital storytelling into their instruction. The names in each vignette are pseudonyms and each scenario represents a composite of experiences. The authors observed these transformational uses of technology in multiple settings across various school districts in the state of Virginia within the United States as teachers provided developmentally appropriate practices for young learners.

Collaboration Creates Transformational Learning

This first example describes how a local teacher utilized school technology support to help her students create digital storytelling. Jake, a four-year-old student, is sitting by the window of his preschool

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classroom tightly gripping an iPad. It is center time and his classmates are scattered around the room exploring blocks, painting, and dressing up in dramatic play. However, Jake is captivated by what is on the screen often laughing out loud. He can tell someone is watching him and waves the adult over. Before a question can be asked, Jake jumps in and says, “Want to hear my story?” Jake presses the play button and a picture of the book *Jack and the Beanstalk* appears on the screen. All of the sudden, the beanstalk has a mouth and it starts to move with Jake’s voice ringing out loud and clear as he tells his version of this classic fairy tale.

Jake’s teacher, Miss Debbie, had downloaded the app Chatterpix to her set of three classroom iPads and with the help of the school’s instructional technology and resource teacher (ITRT) taught the children in her class how to use this app to retell stories. Unfortunately, this scenario is not the norm. Many of the teachers the authors work with in preschools, PreK and kindergarten classrooms often share that it is difficult for them to appropriately integrate technology into their literacy instruction. In fact two-thirds of teachers surveyed by Kajder (2005) reported that they felt unprepared to use instructional technology. Furthermore, when researchers look for authentic classroom practices with new literacies, they are not often observed (Hew & Brush, 2007; Stolle, 2008). Whether an educator has been teaching for years or he or she is a new teacher, chances are that although they may use technology, they don’t have a strong understanding of how that technology can support learning (Karchmer-Klein & Shinas, 2012).

In another scenario an ITRT, Stacey, serves a K-5 school as well as nine preschool classrooms. She listed her job responsibilities as: assisting teachers with new technology, planning technology-rich lessons with teachers, introducing new software to students, and managing equipment (particularly iPads). Stacey believes that technology should be used to enhance learning, build background knowledge and new skills, and give students the opportunities to express themselves and show what they know. However, her job can be challenging because as she said, “There is a lot of need and a limited amount of time and resources. Because my job is to help teachers and students, it is difficult to find time to do the work that I need to do.”

Despite these obstacles, Stacey prioritizes collaboration. One of the preschool teachers Stacey works with shared, “She is so hands-on. She comes into our classrooms and shows us and the kids different apps.” Beyond general support, Stacey tries to tailor her instruction to the weekly themes in the preschool. For example, when they were studying body parts, she created a game on the app Choose It Maker that allowed the students to practice identifying body parts. When teachers complained about not having enough time to teach writing, Stacey showed them how to use Pixie which encourages students to draw and write. She shared, “Sometimes students write more when they have a detailed picture to help them with their writing.”

One Teacher’s Journey with the SAMR Model

When the authors met Samantha, she was a fifth-year teacher working in a preschool. The expertise gained from her dual degree in early childhood and special education was evident each time the authors stepped in the classroom. However, Samantha was the first one to admit that she could not quite figure out how to incorporate technology into her teaching in a meaningful way. Her classroom was equipped with a promethean board and she had access to iPads. Yet when the authors visited, the authors never saw her or the students using these tools. When the authors asked her about this, she shared that sometimes she uses the promethean board to play clean up songs after centers and she encourages the children to sing along. “I also use it for pictures,” she added, explaining that when they have different units, such as

nature's giants, she uses the board to project images of volcanoes or glaciers. These photos would not typically be in classroom books the children have access to. This example represents technology being used at the lower levels of SAMR, substitution and augmentation, since Samantha used the promethean board simply as a way to enhance student learning.

Later in the year, after Samantha had some support from a colleague who taught in a nearby classroom, the authors saw Samantha using a few iPads as a center option. The preschool students could choose to use iPads, while sitting at a special table, but they could spend no more than 10 minutes there, unlike other centers where they could stay as long as they wished. Samantha used the locking feature of the iPads so the students had to stay on the app she chose for them to use. Despite explaining this to her students numerous times, the locking feature often caused a bit of confusion for the students who were used to being able to navigate between multiple apps on their own devices at home. Since Samantha's school district purchased several apps for the iPads at the beginning of the year, and her colleague talked about how she used them successfully with her preschoolers, Samantha was willing to give it a try. She said that her favorite app was Puppet Pals because it allows the students to pick the characters and the background for the story they wanted to tell. Then they record their voices while recording an animated video. Samantha shared how some of the backgrounds go along with the themes they use in the preschool such as "farms" and "fairytale." The use of the iPads and this particular app by the students shows that Samantha was progressing toward higher level of the SAMR model since the students were interacting and creating with the technology instead of passively observing it.

The spring brought changes for Samantha. The school's ITRT had started visiting all of the classrooms more, not just the teachers who actively sought out help. Her preschool students understood the routine of school, had matured in their ability to focus and thus were able to stay in centers longer. When the authors visited Samantha in March, she smiled for the first time when the authors walked in her classroom. "Look," she said excitedly as she waved her hand around the room. As our eyes followed the movement of her hand, the authors first noticed a student at the promethean board using an app to practice writing letters. As the authors continued looking around they also saw several students seated at a table using iPads. Next, to them was a giant sand timer to help them remember to move to another center after 10 minutes. Although Samantha might be considered a "young" teacher by some at the age of 27, her age did not dictate her comfort level for integrating digital tools into her teaching. She shared, "People might assume that because I graduated only a few years ago that I have this tech thing down, but honestly, we did not really talk that much about it in my teacher prep program." Since technology tools change so frequently, the authors often hear our colleagues in higher education say things like, "By the time they graduate, the technology will be different anyway, so why bother?" This may be true, but the authors would argue that preservice teachers need knowledge about how to integrate technology into their teaching, guided by SAMR model, rather than training them on specific tools which may be outdated once students graduate.

One Teacher's Journey Using and Evaluating Digital Tools

Becky is an enthusiastic user of everything digital. Even on a teacher's salary, she chooses to spend money on the newest tech gadgets, the latest being a "smart" watch. Becky prides herself on also using technology in her second-grade classroom. She has advocated for funding for the school to purchase apps for the iPads she has access to, attended training on how to create numerous activities on the SMART-Board, and regularly checks out teacher blogs for the "latest" websites to share with students. However,

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until Becky attended Teachers & Technology she had not thought much about actually evaluating digital tools. “The conference made me realize that I had been so worried about the quantity of technology in my classroom, I had forgotten about quality.” Becky went on to say, “The best advice I got about next steps [to evaluate digital tools] was to start small.” Since Becky did a lot of digital storytelling with her second graders, she chose to focus on the quality of the tools specific to that type of task. “The presenters shared a lot of resources on how to evaluate tools, but for me, checklists seemed to make the most sense.”

Becky decided to go through each of the apps she was using focusing on the following: 1) Relevance - Is it appropriate for my students?; 2) Customization - How much flexibility is there to meet various students’ needs?; 3) Feedback - Is there a way for me or their peers to provide comments?; 4) Thinking Skills - Does it encourage creating, evaluating and analyzing?; 5) Usability - Can students use it independently?; 6) Engagement - Are students motivated to use it?; and 7) Sharing - Can what is created be saved and/or exported?. Becky said that after going through this detailed checklist with each app, she actually deleted a few because they did not meet the new standards she had established. “The big takeaway for me is that more is not always better,” she said.

RECOMMENDATIONS FOR PRACTICE

Digital storytelling activities involving creativity and making new content can help children achieve the modification and redefinition levels of technology integration as explained in Puentedura’s (2016) SAMR model. As explored in Hamilton et al (2016)’s critique, the SAMR model framework does not elaborate practical examples or context for achieving each level. This section aims to give practitioners guidance on activities that the author’s see as transformative based on the SAMR model framework details that are available for technology integration. The authors have described some strategies as simply transformational, due to a lack of research-based consensus on what constitutes a technology integration project achieving modification and redefinition levels. This section explores multiple developmentally appropriate strategies for incorporating digital storytelling into literacy instruction, and provides practical recommendations for implementing these practices in PK-3 classrooms. The practical ideas use age appropriate applications available on a variety of devices and can be modified for success on multiple devices and platforms. Due to the often-ephemeral nature of specific apps, the focus will be on digital storytelling strategies and classroom activities instead of specific app reviews. Each strategy will include at least two recommended apps commonly used in schools. Vignettes are provided throughout in order to highlight best practice using digital storytelling.

Digital Slideshow

One digital storytelling possibility is to use pictures to create a slideshow. This activity is appropriate for young learners who are not quite ready to read and write and can be scaffolded to accommodate any young learner. This activity could also be beneficial to any learner that is developing skills in a new language. This basic activity fits into the augmentation level of the SAMR model because it is using technology to enhance the learning process. When creating a slideshow, children can use a folder of images or they can look for pictures on the internet. The teacher should be aware of copyright and fair use laws before having students use commercial search engines to find images. Children can then use these pictures to create a visual story using a slideshow application, such as Google Slides or Microsoft PowerPoint. To

further enhance this activity, the students can narrate their stories using the slideshow as a guide. This activity can be completed alone or in groups. The child will develop story writing, speaking, and basic technology skills during this activity.

Podcasts

Another possibility for incorporating digital storytelling at the augmentation level is by having students create podcast style audio recordings. The child can use any audio recording app such as Voice Memo, Audacity, or FlipGrid to record themselves telling a story. Singing can be incorporated to tell their story. This activity helps students develop their storytelling skills by focusing on planning, speaking and sharing. Incorporating songs, whether sung by the child or pre-recorded elsewhere, can add an artistic and self-expressive element to the activity. The resulting recording could be shared with the class via a classroom website or digital newsletter. The following example describes podcasting in the classroom.

In Aaron's first grade classroom, his students love to record themselves reading. Aaron uses digital recorders, checked out from the school library, when he works with students on reading fluently. One day he realized, "I should be using some type of app to have students record themselves telling stories." He learned in his graduate program that verbally telling the story to someone helps young writers, in particular, generate a stronger piece of writing once they put pencil to paper. After doing some research, Aaron decided to try out Voice Memo. "First, I had my daughter, who is ten, try it at home and she loved it." Feeling confident, Aaron downloaded Voice Memo onto the 5 iPads he had access to at school. Then he modeled for the whole class how to use the app by recording himself talking about his favorite birthday present and then playing it back. Next, he asked for a volunteer to try telling a story using the app. "When every hand went up, I knew I was on to something," Aaron said. The students continued to practice as a group for a while and then Aaron offered the iPads as an option during the "planning" stage of writer's workshop. Students could brainstorm on their own by drawing a picture, talking to a friend, or they could think through their ideas using Voice Memo. For now, Aaron has incorporated the digital tool as part of the writing process in his first-grade classroom. "I think this has so much potential to really help with oral fluency and I am excited to see how else we can use tools like this one to support students' learning."

Animation Projects

There are many developmentally appropriate ways to create animation through digital storytelling in the classroom. Basic animation projects can be scaffolded to accommodate all skill levels and learning goals. Animation-based digital storytelling is developmentally appropriate for young children who have limited literacy skills but have basic computer-based motor skills. Animation activities can achieve the transformational levels of the SAMR model because these tools allow the learner to create something entirely new. This can be an individual, small group, or whole class project. When learners are just developing their technology and literacy skills, a class animation project might be the best option. This type of digital storytelling activity can use a variety of animation apps available on tablets, computers, and mobile devices. Two popular animation apps are Puppet Pals, available on Macintosh iOS iPad and iPhone, and Powtoons, a web based and Android mobile app. Puppet Pals is recommended for the youngest children as it accommodates beginner literacy and motor skills. This app helps children tell stories using puppet characters and background pictures. The child moves the puppet around with their

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finger and gives it a voice using the device microphone while all while recording a video of the action. This activity could also give young children practice with time management. The authors recommend advising children to keep the videos short so that they can be easily watched and shared with the class and parents. The free versions of many apps have thirty second time limits. Others go to five minutes, which is more than adequate for a student to tell a full story with a beginning, middle, and end. Powtoons is popular in elementary schools too, but based on the more complicated interface and customization options, it is recommended for upper grades.

The next several ideas will share inspiration for ways to integrate this transformational technology into learning projects for young children. One strategy is to have children create an original story using an animation app. This task can give children experience in sharing imaginative stories. They can use one of the characters already in the app, create their own, or find a picture of a favorite character online. Then they can pick from an existing background or created one on their own. It is possible to make multiple scenes with multiple characters and backgrounds in these apps. In order to keep this activity manageable for young learners to complete in the timeframe of a day or two, it is recommended that they use one or two characters and one scene. The authors have also seen success with longer-term class projects or small group projects that combine multiple scenes and characters.

Another way to integrate animation and digital storytelling incorporates favorite picture books. Using animation apps, the child can bring their favorite picture book characters to life and use their imagination to continue their story beyond the book. Using the device's built in camera, the learner can take a picture of their favorite book character to use as the puppet, and take a picture of their favorite page for the background. While they record, the child can move the characters around on the background while narrating an imaginative sequel to the original tale. This activity works well for individual projects and small groups.

A third idea for using animation apps for digital storytelling is to having the child record a story based on a personal real-life experience. This activity is a popular way for students to share something that is important to them with their classmates. The authors have seen this app used successfully in diverse classrooms where students come from many different backgrounds and are developing new language skills. In this activity, the students narrate a story from their life. Then they can narrate the story in their own voice while recording the movement of the character through the scene. Once the video is recorded, the child can share their story with the class. This use of digital storytelling can be enjoyable for children who are shy and less comfortable speaking in class. As with the previous animation ideas shared in this section, young children do not need strong reading and writing skills to be successful.

Interactive Whiteboard Screen Casting

Young children can express their creativity through the creation of short stories using interactive whiteboard screen casting applications. Similar to animation activities, this project allows children to record a video in real time while they narrate a story. The difference in using a whiteboard screen casting application is that they can create and include any type of media or existing documents into their video. This can be an individual, group, or a classroom project where each child creates a portion of the longer video. The authors have observed students enjoying the process of drawing and creating content using these apps. This activity can fit within the transformational levels of SAMR because technology is being used to create a media rich presentation that would not be fully possible without technology.

Some recommended apps for interactive whiteboard screen casting for digital storytelling are Explain Everything, Educreations, and Show Me. These iOS apps are easy to use and appropriate for young children. Explain Everything also has a web browser version so it can be used on any computing device. Children can use these apps to create slides using existing worksheets or images that have been downloaded on the device, or they can create their own slides from scratch. This type of project requires slightly more technology and motor skills than the animation projects previously discussed, so it might be more developmentally appropriate for children in grades 1-3.

Digital Book Talks

Digital storytelling can complement reading in the classroom because it invites students to share their excitement about their favorite books. This activity is developmentally appropriate for children who have not yet learned to read and for those who are advanced readers. Traditional book talks are transformed through digital storytelling because the child can use any number of apps, animation tools, media, and special effects to create a short video to share with their classmates. This activity fits into the modification level of SAMR because the technology is used to create something new that could not have been done before. The book talk will still resemble a traditional book talk in content, but the use of technology allows for deeper creativity, media use, and development. The use of animation apps that integrate with cameras and voice allow for particularly engaging experiences based on the authors' experience integrating this activity in the classroom.

While just about any video recording enabled app can be used to create a digital book talk, two apps that have been successfully used are Chatterpix Kids and Flipgrid. Both of these applications are designed for use by young children. Chatterpix Kids is available for Macintosh iOS tablets and mobile devices and lets users take a picture of a book page to animate. Then the child draws a line where they want the character's mouth to be located. When they press record, the mouth moves along with the child's narration. Stickers and filters can be added to their video. The time limit for videos is 30 seconds, which is long enough for a child to share their thoughts. FlipGrid is an app available for all devices and allows children to record themselves speaking using the device camera. Flipgrid works as a classroom video discussion board. Videos added to the class page can be watched by all the children. Both of these apps allow children to creatively promote their favorite books through use of animations and filters. These tools add a layer of excitement and engagement as they make their videos look like something they might see on social media.

eBook Authoring

Digital storytelling often results in a video, but it can also be created through other formats. eBook authoring is a way to create digital storytelling in the PK-3 classroom. This activity is transformational as related to the SAMR model because it allows students to integrate multiple media and technologies into one creative format to create something new. eBook authoring invites children to practice their artistic skills along with basic writing and reading skills, as is developmentally appropriate. The outcome for this activity for each child, or a small group of children, is to create a short eBook they can share with others. The activity is also well suited for a classroom project, where each child can make one page of the book. The completed eBooks can go on bookshelves in a digital classroom library.

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The theme and content of the book can be personalized depending on instructional goals or a topic that the child is interested in exploring. The children can create their own fictional story, or share information they learned in class. This project might combine pictures the students draw themselves, either on paper or using the authoring tools inside the eBook application. Depending on the literacy level of the child, the book might include text, voice narrative, or even videos. Any authoring software that has a simple interface and allows for easy eBook creation could work for this activity. The authors have seen years of success with young children using the app Book Creator to create multimedia eBooks. This app can be used on all devices and is also available as a Chrome browser add on. The following example describes eBook authoring in the classroom.

In many schools across the U.S., students learn about their state including things such as the state flower, motto, bird and famous people who impacted the state. Joleen had been teaching fourth grade for “a long time” and honestly, she was “a bit bored.” Looking for something to create interest on the state unit in social studies, Joleen came across the idea of using Book Creator. “Our school recently went 1:1 with laptops so I figured this was a good time to try having students share what they learned about our state in a new way.” Joleen chose the app Book Creator because she liked how students could combine text, audio, images and video. “Instead of boring posters about this or that, what the students were able to create was amazing.” Some may think of using this digital storytelling tool only to create fiction, but Joleen’s experience highlights that when students create informational texts, it can be equally as engaging.

Stop Motion Claymation

Certain types of digital storytelling projects can integrate physical play and motor skill development with technology. These projects can create an authentic environment where children can develop their teamwork, collaboration, and problem-solving skills. The authors have seen young children become highly engaged in the process of creating stop motion videos. The students enjoy this activity so much, then they want to make these videos every day for months. These short videos can take the form of claymation with characters made from manipulating playdough, Legos, action figures, or dolls with opposable limbs. These short videos can be about any topic, depending on classroom curriculum goals. Popular topics include the retelling of a favorite book story, original tales featuring new or existing characters, scientific lifecycles, historical recreations, and fairy tales. This activity is transformative because it allows children to yet again create something new through the aid of technology.

Stop motion videos typically feature one or more backdrops on which the characters move in front of as they act out their story. These backdrops can take many forms. They might be child-created using craft supplies found in the classroom, student created drawings, picture book pages propped up as a background, or toy buildings and accessories. The decision on what characters and backgrounds to use should be based on the time being devoted to the project, the artistic interest and skill level of the children, and the storytelling goals of the project. There are multiple stop motion apps available. The authors recommend iMotion and ohSnap for Macintosh iOS tablets and mobile devices, and ClapMotion on Chromebook. The device used for recording needs to have a camera. This activity is enhanced from having a tripod or a stable object for holding the device in one spot as photos are taken. The following example describes stop motion claymation in the classroom.

Kimberly’s first grade class was learning about the water cycle. The students read a picture book and watched a BrainPOP video on the topic. Kimberly considered having the students complete a worksheet as an assessment. This topic was an important part of the curriculum, so it was vital that all students truly

understood the water cycle. Kimberly decided that a hands-on project would best allow her students to deeply explore and show their knowledge of the topic. She connected with the ITRT for assistance in her class and reserved the school's classroom set of iPads. She had ample playdough and craft supplies in her room, and she knew her students responded well to creative projects.

The day of the activity, Kimberly created teams of four students in each group. Each team created their own water cycle claymation project, with the guidance of the ITRT. She taught the students how to use a basic storyboard for planning. As the students began building their background sets, she noticed that the students naturally engaged in collaboration, teamwork, and troubleshooting. The children became highly motivated and excited as they built their sets, and then started building their characters. The ITRT taught them how to use iMotion on the iPad to take pictures. The children were surprised by how many pictures it took just to get a few seconds of video. They worked as cohesive teams, each child with a different role, to shoot their videos using books as a stand to keep the iPad steady. Kimberly overheard them talking in depth about the water cycle as they planned each segment of their movie. After each group made a project that ended up being about 15 seconds long, they shared them with the class. Even though each group was demonstrating the water cycle, all of the projects were unique. At the next parent teacher conference, multiple parents told Kimberly that their children enjoyed the projects so much, they wanted to make claymations at home for fun.

Green Screen Movies

Digital storytelling can allow students to immerse themselves in any place and situation they choose. Children can pretend to explore new places and tell stories with green screen movies. They can pretend they are in any environment. Green screen movies are exciting experiences for young children who are just beginning to develop literacy skills. This project is exciting for children because oftentimes they are familiar with the green screen technology via television weather forecasting or current movies. The process of creating a green screen movie is simple and can be easily accomplished by the youngest children. The videos can be about any topic, depending on the curriculum and instructional goals. Popular topics include extreme weather reports, world travels, animal interviews, and interviews of historical figures.

This project works well with groups of two or more. The children appearing in the video stand in front of a green screen on the wall. The green screen can be a solid colored bed sheet hung on a wall or it can be a solid colored wall with no decoration. This background does not even have to be green, it just needs to be a bold color that is not skin toned. The supplies needed include a video camera and a green screen app. Green Screen by DoInk is a simple and popular Macintosh iOS tablet and mobile app used in schools. Another choice is WeVideo, which can be used on any device through the web browser. This app offers a more robust video editing interface, so children might need more assistance.

To create the green screen movie, the child picks a background image. This can be something they import using the camera on the device, or it can be a picture they find on the internet. This image serves as the background of their movie. If the children have the ability to write a script, and the teacher wants to practice those skills, children can prepare a script before beginning the acting portion. Then a teammate can hold up the script for them to read as they appear on camera. Young children or those with developing literacy skills can share their passion on the topic by speaking extemporaneously. The resulting videos can be shared with the class. This allows children to learn from each other and share their passions. The following example describes green screen use in the classroom.

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Ian is a kindergartner at a university campus lab school. As part of his class's project on a study of the campus community, his teacher asked each student to create a Green Screen by DoInk story relating to campus landmarks. The teacher, Mr. Lincoln, has stressed to his students the importance of having a beginning, middle, and end to their stories. Each child works to create a story web, identifying characters, setting, and plot. Once this visual is complete, Mr. Lincoln conferences with each author to determine if any changes are needed to the story web and what materials they will need to complete their green screen story. For example, Ian's story focuses on an alien that has just arrived on earth and has landed on the school's campus. Ian will need photos of the campus landmarks in his story, as well as a costume and a laser gun, all part of his story.

Mr. Lincoln gives students some time each day for the next week to work on creating their story props, as well as collecting the visuals for the green screen app. The students spend a few hours one day touring campus and taking photos of the landmarks that they will feature in their green screen story presentations. In addition, each student continues to refine and complete their stories during the daily writer's workshop.

Once this work is completed, the students spend the next week creating their stories using the Green Screen by DoInk app. Ian's story of the newly arrived alien on campus tells the tale of this visitor and his adventures as he discovers various campus buildings and the individuals living and working there. After a brief mishap involving the laser gun and a school mascot (the mascot is only stunned), Ian's alien becomes friends with the campus community. The final products are enjoyed by families during a literacy night at the school.

Virtual Reality

Cutting-edge technologies are enabling new formats for digital storytelling in the PK-3 classroom. Virtual reality is a technology that can be used to enhance digital storytelling projects. Currently, there are limited virtual reality apps that are developmentally appropriate for young children, due to the industry's focus on entertainment games for adults. One educational and developmentally appropriate way to engage children with virtual reality, is through virtual field trips.

As a digital storytelling activity, children can create virtual field trips and develop a story to go along with their journey. As they direct their classmates around in their completed fieldtrip, they can narrate their creative tale. Their stories could be about historical events they are learning about, experiences in their lives, or completely fictional tales. Google Expeditions is an app that allows users to easily create virtual reality field trips. These field trips are best viewed on a mobile device using a Merge headset or a Google Cardboard viewer. This activity can be modified if the class does not have access to virtual reality devices. Google Expeditions can be accessed using a web browser where the child could then tell their story aloud to the class as they navigate through their tour.

RECOMMENDATIONS

The purpose of this chapter is to highlight how digital storytelling can be a transformational way for young children to develop an array of skills. However, this is not possible, as the NAEYC (2012) position statement suggests, without practitioners receiving training on best practices when using technology. Looking to the future, it is imperative that preservice, as well as classroom teachers, have opportunities

to not only learn about digital tools but also experiment with them in various settings. Several successful partnerships between classroom teachers and ITRTs have been showcased in this chapter. The authors argue that this same type of collaboration is necessary at the university level between faculty and technology specialists. For example, inviting professionals in the field to guest lecture in university classes while providing hands on opportunities to explore tools they discuss, could potentially support preservice teachers' implementation of digital storytelling in their future classrooms. The authors have seen success when bringing the multiple strategies explored in this chapter to preservice teacher in their university classes. When students have the opportunity to practice new skills in a low pressure setting, the authors have observed that they are more likely to use these strategies in their future classrooms. Faculty may be uncomfortable or not current on the latest apps, so reaching out to those who are experts removes that burden and acts as a model for the preservice teachers they work with in terms of asking others for assistance.

CONCLUSION

Technology is playing an increasingly significant role in every dimension of our lives. Debating from a developmental or ideological perspective whether or not young children should be exposed to experiences with technology no longer seems worthwhile or practical. As educators, our job is to help students not only learn how to use technology, but when and why. Technology impacts many facets of literacy education, including how stories are told. Digital storytelling, which combines oral narration with multimedia tools, allows children and their teachers to harness technology to foster children's unique interests and emerging capabilities. Developmentally appropriate technology use, partnered with the strategies and tools highlighted in this chapter, can also be a powerful way to help children understand how to create, and not just consume media. Relying on frameworks, such as the SAMR model (Puentedura, 2006), further assists educators in gauging the impact of technology integration on teaching and learning. Practitioners must continue to grow in the understanding and use of technology as it continues to evolve.

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KEY TERMS AND DEFINITIONS

Apps: Abbreviation for digital application tools used on mobile computing devices. This term includes website versions of digital tools.

Developmentally Appropriate Practice (DAP): Framework for connecting the research on learning and child development with knowledge of educational effectiveness to promote optimal development and learning in young children.

Digital Storytelling: The process and result of telling a story using technology tools.

Literacy: The ability to read and write.

Mobile Device: A small personal computer that allows the installation and use of apps. Common types include smart phones, computer tablets, and iPods.

Multimedia: A combination of digital content that may include pictures, text, sounds, videos, websites, virtual reality, or interactive content.

SAMR: Substitution, augmentation, modification, and redefinition educational framework model for gauging impact of technology use in transforming learning.

Young Children: The age range of children who are typically age four to eight and are enrolled in school grades of pre-kindergarten through third grade in school.