Abstract

Within the information age and the rapid growth and development of technologies schools have been acquiring these tools. Integrating technology into school settings has become the topic of much research and discussion. Developing effective ways to teach students using technology is essential for student success. While integrating technology it is important to present students with meaningful learning opportunities. One way to support learning is through narrative form and story telling. Linking this cognitive technique to make sense of new content and technology can be accomplished through digital storytelling. The following literature review focuses on how digital storytelling supports meaningful learning experiences, while focusing on constructivist theory, student comprehension, engagement, and creativity.
Introduction

Within the information age and the rapid growth and development of technologies, schools have been acquiring these tools. Integrating technology into school settings has become the topic of much research and discussion. Developing effective ways to teach students using technology is essential for student success. "Within the past 10 years, digital cameras, editing software, authoring tools, and electronic media outlets have encouraged teachers to utilize more approaches and tools than ever before to help students construct their own knowledge and ideas to present and share them more effectively. One of these powerful approaches to multimedia production is digital storytelling." (Sadik, 2008, p. 487-488)

One way in which to integrate technology productively into education is through digital storytelling. Digital storytelling can be utilized in a variety of ways in different content areas, but each digital story maintains the same fundamentals. Meadows (2003) explains digital storytelling as the process of telling stories using inexpensive digital cameras, non-linear creation tools, and computers to build and present short multimedia stories. The Digital Storytelling Association (2002) explains digital storytelling as:

"The modern expression of the ancient art of storytelling. Throughout history, storytelling has been used to share knowledge, wisdom, and values. Stories have taken many different forms. Stories have been adapted to each successive medium that has emerged, from the circle of the campfire to the silver screen, and now the computer screen."

Robin and Pierson (2005) believe digital storytelling has capitalized on the imaginations of both students and teachers while creating meaningful stories, which lends itself to effective learning.
experiences. The audiences of digital stories are not only listeners, but learners who can interact with and influence the story being told (Dorner et al. 2002).

Lynch and Fleming (2007) found that:

"The flexible and dynamic nature of digital storytelling, which encapsulates aural, visual, and sensory elements, utilizes the multitude of cognitive processes that underpin learning - from verbal linguistic to spatial, musical, interpersonal, intrapersonal, naturalistic and bodily-kinesthetic." (p. 7)

Digital storytelling supports the combination of four different student-centered learning strategies: student engagement, reflection for deeper learning, project-based learning, and the effective integration of technology into instruction (Barrett 2006).

These definitions of digital storytelling explain its effectiveness as a method of integrating technology into education. The following review will focus on how digital storytelling supports meaningful learning opportunities through critical thinking during the learning process.

**Constructivist Approach**

The process of learning through Research has shown that in order to "achieve meaningful technology integration, learning must be designed from a constructivist approach." (Sadik, 2008, p. 488) Bruner believes in the construction of one's own knowledge and that metacognition, being aware of one's own thought process, is key to a learner's success (Bruner, 1996). When learning through a constructivist approach students are encouraged to learn and work in a social environment, in which they form new knowledge independently, problem solve, think critically, and utilize their creativity. (Griest 1996; Hoffman 1997; Mergendollar 1997; Richards 1998). A
constructivist views students as beings who build their own knowledge as opposed to passively being given information from an external source (Spivey 1997). Within the constructivist learning environment students are active through interaction with peers, exchanging ideas, and discussing and explaining misunderstandings, which leads to the building of true, personal knowledge (Kafai et al 1997; Tyner 1998).

Technology, when actively utilized by students, supports their construction of new knowledge (Jonassen and Carr 2000). Therefore, technology has the potential to play an integral role in students demonstrating their constructed knowledge based on personal interpretations depending on the way in which it is integrated (Wheatley 1991). It is believed by Strommen and Lincoln (1992) that the type of technology utilized in not nearly as meaningful as how it is used in a constructivist learning setting. It is argued that teachers at any level of education and within a variety of subject areas can utilize digital storytelling to effectively support student learning by helping them organize and express their ideas and knowledge in meaningful and individual ways (Robin 2005). Using digital storytelling as a teaching strategy "allowed learning content to be developed with student differences in mind". (Maier & Fisher, 2006)

**Comprehension: Creating Meaning and Making Sense of Things**

Pendersen (1995) explains that storytelling is the original way of teaching. Research demonstrates that although storytelling is simple, it is an effective way to support students in making sense of the complex world around them (Bruner 1990; Gils 2005). Storytelling is a fundamental structure that the mind utilizes to create meaning and an exercise humans perform to organize their experiences (Bruner, 1996). Bruner theorizes that making meaning of the world around us is essential to cognitive development (Bruner 1990). Within this meaning making
theory Bruner believes that narratives serve as a tool for students to create an understanding of their environment and themselves as a part of that environment (Bruner 1990).

It has been argued that storytelling is the basis of teaching because learning is making sense of new experiences and information by making connections with past events (Abrahamson, 1998). Abrahamson proposes that presenting content in a narrative form supports students’ ability to think critically and make connections, which personalizes the learning process and helps create cognitive pathways. Within this learning context, students are able to view the content from their own point-of-view as opposed to being directly instructed objectively from the teacher (Abrahamson, 1998). Presenting educational information in a narrative form increases comprehension because the use of a series of video/audio/image clips put in a narrative order increases memory (Lang and Sias, 1995). Viewers and creators of audiovisual presentations put these into a narrative form, which allows for better comprehension and increased memory (Lang and Sias, 1995) Furthermore, the more complex the narrative the more elaborate the cognitive structure is created within the individual (Lang and Sias, 1995).

Sadik conducted research utilizing digital storytelling and concluded the following:

"The findings from the analysis of student-produced stories suggests that the students-produced stories suggest that students were encouraged to think more deeply about the meaning of the topic or story and personalize their experience and also clarify what they knew about the topic before and during the process of developing and communication their stories. The well-chosen points of view, unconventional content and varied resources indicated that students did not just report facts and concepts connected to the subject, but reflected on their own
thoughts and engagement with the subject, visually and aurally. Students learned to think and write about people, places, events, and problems that characterized their individual life experiences or others' experiences." (Sadik, p. 502)

Berg suggests that "it is important for learners to be made aware of the meaning making activity they are involved in." (Berg, 2000, p. 15) This idea connects with Bruner's theory of metacognition and reflection as key components to learning and truly solidifying understanding (Bruner, 1986). Utilizing digital storytelling as a portfolio in which students collect, organize, reflect and present proof of their own learning with others effectively supports higher standards of achievement (Jonassen et al. 1999; Gils 2005). Narrative teaching and learning scaffolds students as they continuously learn and develop, and it is a resources they can revisit and utilize as they progress through school (Ferdig, 2004).

Engagement

Studies have shown that the learner engagement is paramount to students’ learning success (Herrington et al. 2003). Lim et al. (2006) reviewed a number of definitions for ‘engagement’, and concluded that “what is apparent about the definitions of engagement is that they entail some kind of mindfulness, intrinsic motivation, cognitive effort, and attention” (p. 213). Dexter et al. (1999) found that integrating technology into education effectively is measured by how well it engages students in the learning process. Trilling and Hood (1999) believe engaging students utilizing technology must be accomplished though meaningful activities that require students to construct their own knowledge in different ways, which was not available before the technology was introduced. Research done by Smart (1988) yielded students participating in problem-solving situations with technology and discussion with peers,
debating and determining a consensus, which had not been previously available. These experiences expanded students thinking and resulted in deep and sincere inquiry (Smart, 1988). Integrating cooperative learning with technology-based instruction supports students’ ability to make cognitive knowledge connections through discussion, debate, and decision making (Rysavy and Sales, 1991).

Research has shown that the integration of digital storytelling is successful through active and cooperative learning groups (Maier & Fisher, 2006). They also observed and measured "students demonstrating much greater participation and performance in role-plays and decision making throughout the project then in previous years where these social issues were addressed with readings on the Web and in text books.” (Sadik, 2008, p. 190) Maier and Fisher researched digital story creation utilizing tabletop videos and concluded that once the students were comfortable with the technology,

“they quickly generate collaborative stories that have conflicts, narrative threads that run across scenes, and final scene resolutions. The largest determining factors in the successful implementation of tabletop video in the classroom are the group dynamics and ability to make the media pieces relevant to their own lives... They are having fun, they are focused on the task, there are quick exchanges of ideas in between tasks, and there is a willingness to compromise.” (Maier and Fisher, 2006, p. 188)

Sadik (2008) found that the students observed in his research were actively involved in the process and development of their own learning, supporting individual focus and engagement of creating their digital stories. Students enjoyed using a variety of technological tools to create
their digital stories, and dedicated quality time to bring audio, text, and images together on a storyboard, which students were proud to present. While actively engaged students were successful and experienced productive learning (Sadik 2008).

Creativity

Digital storytelling is multi-faceted, encouraging the creator to produce a unique result to demonstrate their learning to an audience. Mukti and Hwa (2004) explain that digital storytelling provides endless options for students to be creative. “Digital storytelling offers an enhanced level of communication flexibility, multi-medium distribution, interactivity, freshness and engagement” (Mukti and Hwa, 2004, p. 146). Students are creating stories for a genuine audience whose feedback can enhance their creativity, because changes can be easily made (Mukti and Hwa, 2004). The mediums in which the stories can be broadcast and shared, including internet, intranet, CD-ROM, DVD, VHS, computers and television, support the interactivity between creator and audience (Mukti and Hwa, 2004).

Maier and Fisher concluded that digital storytelling "allowed for and enabled students to find their voice, creativity, and productivity and, in addition, they were able to visually summarize their experiences and conclusions." (p. 190) The technology has provided students with an outlet to express themselves creatively and uniquely, which they may not have otherwise done in the past (Kaare, 2008). Utilizing technology as a tool to produce and share digital stories relates to current students who are growing up in the digital age. Having the chance to learn, create and communicate with their peers via audiovisual expression connects with youth culture today (Kaare, 2008). Digital storytelling connects with “the youth culture today, characterized by individualization, privatization, and a lifestyle dominated by leisure
activities and heavy use of the media and Information and Communication Technologies” (Kaare, 2008, p. 202).

Ware and Warschauer (2005) discuss the disconnect between the standard ways of academia and the current ways of the digital world. Digital storytelling supports the process of minimizing this disconnection. This “pedagogical approach that acknowledges and values popular culture translates in classroom practice into the admittance of a wide range of possible semiotic resources, from music and lyrics to symbolic icons and language play, which students use as they design new texts” (Ware and Warschauer, 2005, p. 439-440). Students are inspired to make connections, create individualized meanings, and produce creative multimedia narratives.

**Conclusion**

The research on digital storytelling and its application in education reveals it as an effective teaching and learning strategy. Providing students with learning opportunities in which they construct their own knowledge and take control of their learning yields quality understanding. Planning, writing, organizing, supplementing visuals and audio for enhancement, presentation, and reflection emulates the constructivist theory. Through storytelling students’ leaning is personalized, resulting in genuine and successful understanding.

While students are in control of making new knowledge for themselves they are also encouraged to be unique, creative, and reflective individuals. The experience of performing the process of digital storytelling is engaging and truly meaningful. While planning and creating students are critically thinking about how audio and visual will work together to present their story.

**Implications for Future Research**
The research demonstrates the narrative form as a way to make sense of complex concepts. However, considering the actual process of creating a story and the most effective ways to help students form effective stories. What types of planning formats work best? What are the best ways to organize ideas?

The research found addressed content areas within education. In the future possible research to consider should focus on digital storytelling’s ability to support reading and writing skills, directly focusing on understanding what they are reading and writing. Does creating digital stories aid in the development of students’ reading comprehension skills?
References


