Beneficial Web 2.0 Tools to Engage Learners and Maximize Learning

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ABSTRACT

Technology has certainly altered the landscape in which students learn today. The use of technology in today's classrooms is continually increasing as educators seek ways to engage learners and maximize learning potential. Incorporating Web 2.0 tools into the classroom can not only encourage collaboration among learners, but also provide a way for students to apply their knowledge. For such benefits to be gained, the Web 2.0 tools must be relevant and purposeful. In this study, researchers surveyed pre-service teachers at one institution of higher learning, whom took classes that integrated several Web 2.0 tools into the curriculum, and sought which instructional tools pre-service teachers found most beneficial, and hence, are more likely to use in their future classrooms.

INTRODUCTION

Today's students are not yesterday's learners. They have grown up with computers, search engines and electronic games, used the Internet for school, work, and leisure, and multitasked while using social technologies to collaborate and share information and thoughts (Fieldhouse & Nicholas, 2008). In fact, based on results from neurobiology research, it was discovered that digital natives are indeed different (Prensky, 2001b). The continuous stimulation, which has become part of their digitally enriched lives, changes their brain structures and affects the way they think (Lambert & Cuper, 2008). As educators of 21st century digital native learners, it is becoming more important than ever that we learn to embrace technology in the classroom, model its plethora of uses, and seek relevant and purposeful instructional strategies to engage learners and maximize learning.

THE RESEARCH PROBLEM AND PURPOSE OF THE STUDY

The purpose of this study was to use a multitude of instructional Web 2.0 tools to engage learners and maximize learning, while encouraging collaboration and providing a way for pre-service teachers to apply their knowledge. Technology has expanded exponentially and continues to impact the landscape of today's schools. That being said, it is imperative that pre-service teachers engage in the use of technology during their college experience so that they will be better able to make a more positive and meaningful impact in their future prek-12 classrooms. Furthermore, it is essential that they are fully aware of how to integrate technology to maximize student learning and see the benefits of implementation in their future classrooms.

LITERATURE REVIEW

We have witnessed extreme change and growth over the past two decades in how information is accessed and these changes are largely due to the Internet, or World Wide Web. More recently, the term, Web 2.0, which refers to the next generation of the Internet, allows users to communicate, collaborate, and contribute with one another. Samouelian (2009) suggested that Web 2.0 embraces collective intelligence and participation and currently offers the opportunity for users to engage and share, rather than exist as passive recipients of information. Additionally, Web 2.0 allows researchers to create, annotate, review, reuse, and present information in new ways (Procter, Williams, Stewart, Poschen, Snee, Voss, & Asgari-Targhi, 2010). Similarly, Thompson (2008) referred to Web 2.0 as changing and dynamic, no longer static. Conversely, he compared the old version of the web as a read-only medium, whereas today's Web 2.0 version is a read/write medium. Users are now active participants throughout the process.

Internet use and access continues to expand exponentially. Just a short time ago, it was reported that approximately 142 million Americans used the Internet. Of these Internet users, approximately 12 percent used blogs, 22 percent shared personal files, 37 percent uploaded photos, and over 20 percent created profiles on social networking sites (Samouelian, 2009). These percentages continue to rise and Internet use continues to rapidly expand. More and more, people depend upon the Internet for much more than just information; it is now a place to collaborate. This new information and communication technologies, such as Web 2.0, has impacted individual and collective access to information, knowledge, and participation (Benkler, 2006; Greenhow, Robelia, & Hughes, 2009). Furthermore, it is acknowledged that Internet connectivity in schools, homes, neighborhoods, and communities has grown substantially and continues to grow (Greenhow, et al., 2009). Interestingly, adolescents ages 12 to 17 represent the largest and fastest-growing group of users (DeBell & Chapman, 2006). These numbers certainly raise questions as to whether today's schools and teachers are prepared to engage these learners and meet their differing needs.

Because so many students are using the Internet and have been retrieving information and collaborating with others via the Web, it can be assumed that today's students learn differently and thus, have different instructional needs. In fact, as a result of the fast-paced, random-access, and graphically intensive environment provided by technology, today's students have shorter attention spans for old styles of learning, but not for games or other areas of interest (Lambert & Cuper, 2008). Web 2.0 offers teachers new methods of teaching and learning and it can certainly alter the way teachers interact with students. Admittedly, while Web 2.0 tools offer a multitude of applications and great learning potential, it is agreed that one must use them to truly reap their benefits (Thompson, 2008). Students need to learn how to apply these tools to maximize their learning potential. With increasing demands for relevant and purposeful application of technology in classrooms, preparing pre-service teachers becomes increasingly important and challenging (Lambert & Cuper, 2008). In an effort to better prepare pre-service teachers, Web 2.0 tools need to be effectively integrated into coursework and use of such tools needs to be modeled and time must be allowed for meaningful application.

OVERVIEW OF THE STUDY

This qualitative study investigated the use of instructional Web 2.0 tools in higher education classrooms for pre-service teachers, which sought to address the following questions:

Research Question 1: Which types of Web 2.0 tools are beneficial to pre-service teachers' learning process?

Research Question 2: Which Web 2.0 tool(s) do you plan to apply in your future classroom?

The most purposeful and relevant instructional Web 2.0 tools were chosen by the researchers and were delivered during the Spring and Summer 2014 semesters. Students enrolled in the researchers' courses responded to an anonymous survey instrument, created by the researchers, at the conclusion of the semesters. Data analysis provided insight into students' learning experiences and reflections on the benefits of integrating Web 2.0 resources and their potential use in future classrooms.

METHODOLOGY

This study was intended to provide information regarding which instructional Web 2.0 tools used were most beneficial to better prepare pre-service teachers for future classrooms where technology is integrated and emphasized throughout the standards. Prior to the start of this investigation, researchers prepared relevant and purposeful learning experiences to engage pre-service teachers in course content that integrated technology. Participants were exposed to 15 weeks of instruction that incorporated Web 2.0 tools such as Blogs, Storybirds, WebQuests, online interactive modules, multimedia, student response systems, and other types of technology resources. At the conclusion of the semester, pre-service teachers enrolled in the researchers' courses responded to an anonymous survey instrument (see appendix), created by the researchers to report their opinions and reflections regarding the use of the Web 2.0 tools. Qualitative data was analyzed and evaluated, which lead to the discovery of which Web 2.0 tools pre-service teachers found to be most beneficial and were more likely to use in their future classrooms.

The sample population consisted of 79 pre-service teachers who were classified as Junior and Senior students, with at least 60 semester hours completed. Survey information was obtained from 85 participants; however, six surveys were incomplete and were not included in the data analysis. Data was collected from pre-service teachers enrolled in the following courses:

- Teacher Education: Diagnosis and Evaluation
- Teacher Education: Applied Mathematics and Science
- Teacher Education: Children's Literature
- Teacher Education: Classroom Approaches to the Teaching of Reading in the Elementary School
- Teacher Education: Reading Instruction and Assessment for Upper Elementary Grades

Several students were enrolled in multiple courses; however, they only completed one survey to avoid biased sample results.

DESCRIPTION OF TECHNOLOGY TOOLS

Blog

Offer an online world of journaling, a place where people share thoughts, experiences, pictures, videos, and instructional strategies, to name a few. Blogs are structured in chronological order by date, with the most current at the top of the blog. All older posts are archived and can be found by month and year (Lambert & Cuper, 2008). Blogs are interactive in that, visitors can post comments and also participate in polls, if applicable.

Virtual Math Manipulatives

"An interactive, web-based visual representation of a dynamic object that presents opportunities for constructing mathematical knowledge" (Moyer, Bolyard, & Spikell, 2002, p. 373).

Storybird

Web 2.0 tool created by Mark Ury that promotes the creation of online stories and can be used individually or collaboratively. Storybird allow individuals to enhance their writing skills while using the artwork provided to tell a story. Furthermore, it allows the learner to structure their writing as well as use appropriate images to enhance meaning (Ramirez, 2013).

Visual Presentations

The use of visual images to enhance instruction and learning, which offers students a picture of their learning and a context to expand their understanding. Hattwig, Bussert, Medaille, & Burgess (2014) noted that students must develop the necessary skills to find, interpret, evaluate, use, and produce visual materials in a scholarly context and these skills are essential for twenty-first century learners.

WebQuests

A Web 2.0 tool that allows students to interact within the site while gaining access to other valuable resources. According to March (2008), "a well-designed WebQuest uses the power of the Internet and a scaffolded learning process to turn research-based theories into dependable learning-centered practices."

DATA ANALYSIS

Research Question 1: Which types of Web 2.0 tools are beneficial to pre-service teachers' learning process?

Pre-service teachers were asked to complete a survey, which sought to determine which instructional tools they found most beneficial as an instructional aid and they were asked to explain their reasoning. Responses varied, as represented in Figure 1. Results indicated that approximately 78% of pre-service teachers' found visual presentations (25%), blogs (24%), virtual math manipulatives (23%), and Storybird (16%) to be the most beneficial Web 2.0 tools. Responses were varied as to which tools were beneficial; however, reasoning patterns of participants were similar, regardless of the application that was chosen. Three primary themes emerged as follows:

Theme 1: Participants noted the value of providing options for multiple learning styles by integrating each of the technology applications.

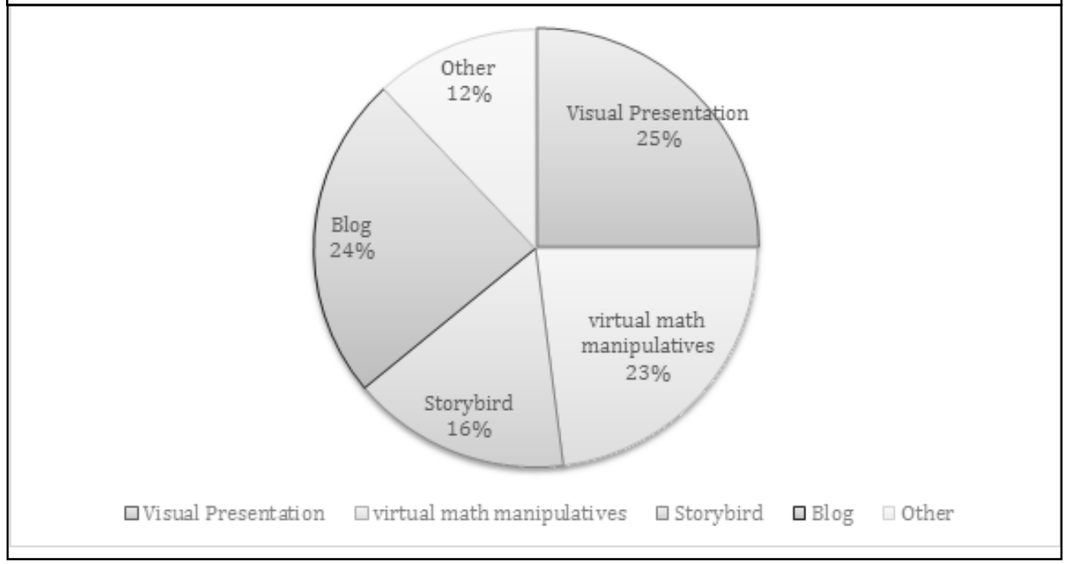
Theme 2: Each of the technology tools selected was free and accessible from any location.

Theme 3: With the exception of the virtual math manipulatives, pre-service teachers expressed the value of having tools that could be used in multiple curriculum areas to aid in content presentation. The virtual math manipulatives would only be integrated in a mathematics classroom. All participants who chose this as the most beneficial technology tool did so because of the potential to actively engage students and provide a visual representation to help them gain a conceptual understanding of mathematics.

Research Question 2: Which Web 2.0 tool(s) do you plan to apply in your future classroom?

Investigators delved further into pre-service teachers' attitudes towards technology by asking the following question: "Which instructional tool(s) do you plan to apply in your future classroom? Explain why." Students in today's educational system are accustomed to a technology enriched world and researchers wanted to establish if the practices incorporated into the teacher education program would transfer to pre-service teachers' future classrooms. Table 1 illustrates the tools that pre-service

Figure 1
Results of Most Beneficial Web 2.0 Instructional Tools for Participants in the Study



teachers plan to use in their future classrooms. Again, participants wanted to engage students, make learning fun, and provide multiple modalities for learning with the aid of free and mobile applications.

Table 1
Participants' Planned Use of Web 2.0 Tools in Future Classrooms

Web 2.0 Tool	Response Frequency	Percentage
Virtual Mathematical Manipulatives	26	33%
Blogs	24	30%
PowerPoint (Visual Presentations)	27	34%
Prezi (Visual Presentations)	24	30%
Storybird	21	26.5%
WebQuest	13	16.5%
Other	13	16.5%

Note: n=79 participants; Respondents were asked to list all instructional tool(s) they planned to apply in their future classrooms.

DISCUSSION

The majority of participants in the study recognized the value of integrating technology into classroom instruction. For example, one student stated, "The children we are teaching are growing up in the age of technology and there is so much out there online to utilize to enhance your lessons." Another student emphasized the value of technology by stating, "Students learn best when they can create something with the knowledge they've gained. Students deal with technology on a daily basis and educators should tap into that form of learning." Other students referenced the value of differentiating and meeting the needs of today's twenty-first century learners. Unfortunately, data also revealed that some students do not see a value in integrating Web 2.0 tools into the classroom.

Researchers expected math manipulatives to be found as one of the most beneficial tools because they were targeted specifically to a mathematical methods course. Likewise, blogs were seen to be most beneficial due to their addition to a children's literature course, which emphasized the integration of reading, writing, and technology. These tools were the primary Web 2.0 tools used consistently in the researchers' courses, therefore, the data supported the anticipated findings. Additionally, research supports providing a variety of technology resources to allow teachers concise integration of technology resources that meet student needs. (Recker, Dorward, & Nelson, 2004). Participant responses were varied as to which technology practices they planned to implement in their future classrooms, supporting the need to provide multiple technology applications so future teachers have a variety of tools that can be successfully incorporated into their classrooms. Varied technology practices, integrated throughout teacher preparation programs, allow pre-service teachers to choose those resources they are most comfortable with and those which will be more valuable to their students, based on varied learning styles and student needs.

Participants were asked to use a Likert scale response, ranging from strongly disagree to strongly agree to demonstrate their view of the following statement, "Twenty-first century learners are influenced by a digital world and such advancements have created the need for educators and pre-service teachers to analyze current teaching practices to ensure students are meeting the changing needs of today's world." Results indicated that approximately 90 percent of participants recognize a changing digital world for students and the need to evaluate existing teaching practices. Therefore, one can infer that the other ten percent of participants are content with the "status quo." Technology is a non-negotiable in today's society; therefore, how can one justify not incorporating these resources? If these future teachers have this stagnant view of education, then one might question how many practicing teachers share this view. Successful implementation of technology may be best summarized by Hardy (2010) as follows:

> Critique technological resources, plan technology-infused lessons, and use a variety of technological resources to explore problems and topics pertinent to education. ... These activities are all of practical value to instructors striving to incorporate technology into their repertoire of teaching methods, and the critiques have the added benefit of requiring consideration of what constitutes an effective technological resource for a given purpose. (p. 82)

LIMITATIONS

The primary limitation of this study was the sample population. All participants were enrolled in the researchers' courses and were exposed to the Web 2.0 tools, which were part of that course curriculum. Although all participants were exposed to multiple resources, they may not have explored all technology applications, which may have altered the study outcomes. Additionally, the virtual mathematics manipulatives are specific to one course; therefore, all participants may not have been exposed to this type of technology. Finally, prior experiences with technology resources may have altered student opinions, either in a positive or negative manner.

CONCLUSION

New teachers entering the field must be equipped with an abundance of resources that will challenge today's twenty-first century learners. Results from this study provided insight into pre-service teachers' views towards technology; however, replication on a larger scale is needed to ensure continued support is provided for our future educators. Web 2.0 tools provide a basis for teachers as they transition from a traditional lecture format to an integrated technology environment. Unfortunately, the majority of teachers will teach in the same way they were taught. As institutions of higher learning, we must model the expectations for pre-service teachers who will be exiting our doorways as former students and entering classrooms as educators of twenty-first century learners.

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APPENDIX
Integrating Web 2.0 Tools to Engage Pre-Service Teachers

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1. Which of the following instructional tools did you use this semester in your courses? Please check all that apply.

Virtual Math Manipulatives	
WebQuest	
Blogs	
Storybird	
Visual Presentations (PowerPoint, Prezi, Animoto)	
Specify	

2. Please complete the following Likert scale to demonstrate your views.

	Very Ineffective	Ineffective	Average	Effective	Very Effective
Virtual Math Manipulatives					
WebQuest					
Blogs					
Storybird					
Other:					

3. Which of the instructional tools did you find most beneficial? Please explain.

_____
_____
_____

4. Which of the instructional tools did you find least beneficial? Please explain.

_____
_____
_____

5. Which instructional tool(s) do you plan to apply in your future classroom? Please be sure to explain why.

_____
_____
_____

6. Do you feel that you are adequately prepared to employ Web 2.0 tools into your future classroom? Please explain.

_____
_____
_____

7. Do you believe that using technology can enhance learning? Please explain.

_____
_____
_____

8. Please complete the following Likert scale to demonstrate your views.

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Twenty-first century learners are influenced by a digital world and such advancements have created the need for educators and pre-service teachers to analyze current teaching practices to ensure students are meeting the changing needs of today's world.					
University instructors, seeking to maximize pre-service teachers' efficiency as future educators must model and demonstrate the effective use of technology as resources to enhance student learning.					

9. Any additional thoughts or comments that you would like to share:

_____
_____
_____