Abstract
Twenty-first century technology has changed the way tools are used to support and enhance learning and instruction. Cloud computing and interactive white boards, make it possible for learners to interact, simulate, collaborate, and document learning experiences and real world problem-solving. This article discusses how various technologies (blogs, wikis, GoogleDocs, and interactive white boards) have been used at one private university in teacher preparation courses. Authors discuss the benefits and drawbacks of each tool for students and faculty and how technologies are made user-friendly for learners of different technology ability. Authors highlight tool usage and issues encountered by students and faculty and how the use of these tools can be useful for the students in their careers.

Keywords: educational technology, cloud computing, interactive whiteboards, pre-service teachers, blogging, collaborative writing

Cloud computing and interactive whiteboard technologies are 21st century computing resources. During this age of virtual simulation, real time interaction, and flexible resource use, these tools provide teachers and students the tools for creativity, innovation, and engagement. ‘Cloud computing’ refers to the large scale distributed computing paradigm...in which a pool of abstracted, virtualized, dynamically-scalable, managed computing power, storage, platforms, and services are delivered on demand to external customers over the Internet” (Foster, Zhao, Raicu & Lu, 2009, paragraph 8). Some examples include blogs, social networking sites (e.g. Facebook), and wikis. Blogs refers to web logs or online personal on-going journal reflections made available to the general public via the internet. Social networking sites are online repositories of photos, personal profiles of individuals and their friends. A wiki is an online website that houses information that is flexible and dynamic. Users who have access to the website are able to upload links, images, documents, etc, sharable as determined by the owner of the site.

Cloud computing has taken colleges and universities by storm as university professors use Web 2.0 resources to enhance education (Fernando, 2008; Thomas & Qing, 2008). It has drastically changed technology access, use, and connection both inside and outside educational settings. However, in classrooms across the US, access to many Internet resources is blocked to protect education communities from harmful web resources. Consequently, students and educators have very limited experience with virtual, online technologies.

Interactive whiteboards (IWBs) are a viable alternative to online virtual technology. IWBs offer flexibility and virtual interactivity which
mirrors cloud computing without accessing the Internet. IWBs enable the creation of electronic documents, activities, interactive calculators, maps, stopwatches, and videofiles of lessons for activity. IWB use is increasing across colleges and universities as teacher preparation programs recognize the usefulness and efficiency of the tools.

Blogs, wikis, Google Docs, and interactive white boards are some of the tools integrated into many teacher preparation graduate courses. Research touts the pedagogical implications of these on students and teachers (Albion, 2008; Norton & Hathaway, 2008; Thomas & Qing, 2008) as graduate, pre-service and in-service teachers benefit from learning about these tools and ways to integrate them into their future classrooms (Byrne, 2009; Thomas & Qing, 2008). Once students become comfortable with technology tools, exploring others becomes easier. School-age learners benefit when teacher preparation courses provide pre- and in-service teachers exposure and much-needed experience with new technology tools.

Integrating technology into graduate teacher preparation courses with a mixed group of technological abilities can be challenging. Some learners, often described as digital natives, have a tremendous depth of knowledge about the technology tools they meet. Others, often described as digital immigrants, have limited or no knowledge about technology tools introduced (Prensky, 2001; Bennett, Maton & Kervin, 2008; Guo, Dobson & Petrina, 2008; Jones, Ramanau, Cross & Healing, 2010). The purpose of this study was to clarify the benefits, and challenges of integrating cloud computing and interactive white board technology into teacher preparation courses for graduate pre-service teachers with mixed technological ability. This article reports findings from observations, focus group discussions, and conversations with university faculty justposed within the context of relevant research.

This research can be an important contribution to research on teacher preparation programs and technology integration. Findings provide insight to university faculty who seek to make research-based decisions about incorporating cloud computing and/or Interactive White Board technology into the courses they teach. It highlights the benefits and drawbacks of technology integration in teacher preparation curriculum relative to pre-service teachers’ preparation for the 21st century classroom.

This article is not specifically focused on how to prepare technology users to be socially and legally responsible. Neither does it address the issues of technology addiction and inappropriate use by school-age students. For discussions about cyberbullying, see Anderson and Sturm (2007) and Aricak, Sylahhan, Uzunhasanoglu, Saribeyoglu, Ciplak, Yilmaz, and Memmedov (2008). For discussion of electronic safety and Web 2.0 applications, see Sharples, Graber and Harrison (2009). Principles for wise use of computers is discussed by Straker, Pollock, and Maslen (2009).

Research Context and Focus

This study was conducted at Hofstra University, a mid-sized private university in the northeast United States, which offers approximately 150 undergraduate and 160 graduate programs in six schools and three colleges of study. The university has 1,180 faculty members whose average undergraduate class size is 22 students with a student to faculty ratio of 14 to 1. The School of Education, Health and Human Services currently houses three departments including 46 graduate pre-service programs and 72 full-time faculty members.

Some graduate pre-service teachers have limited experience using technology in school settings. They feel unprepared to adequately navigate technology applications as they matriculate through their teacher preparation program. In addition to learning how to use technology personally, they are intimidated about how to use it with school-age learners, without real awareness of the importance of useful integration into the school curriculum as well as the benefits and limitations to student learners (Ertmer, Conklin, Lewandowski, Osika, Selo, & Wignall, 2003). Others are quite experienced with technology use, agile with navigation of technology applications. They know how to use technology, they have an initial understanding of how to use it with school-age learners, without real awareness of the importance of useful integration into the school curriculum as well as the benefits and limitations to student learners (Ertmer, Conklin, Lewandowski, Osika, Selo, & Wignall, 2003). Others are quite experienced with technology use, agile with navigation of technology applications. They know how to use technology, they have an initial understanding of how to use it in school settings, and they recognize the importance of integrating technology into the school curriculum. This wide range of experience presents a real challenge in technology-ladened courses in teacher preparation programs.