ATTITUDES, EXPECTATIONS AND ADOPTION
OF EDUCATIONAL TECHNOLOGY IN HIGHER EDUCATION

CURRICULUM

Presented in Partial Fulfillment of the Requirements for

The Masters of Education Degree in the

College of Education and Human Service Professions

By

Joyce A. Aarsvold

University of Minnesota, Duluth

2009

Committee Signatures:

Chair

Member

Member

Graduate Program Director
CHAPTER ONE

Introduction

Today’s millennial students expect that technology will play an important role in their college experience and these expectations naturally extend into the classroom. College professors are aware of the explosion of information and communication technology; yet, as one professor stated, “We are trained as discipline-specific specialists who teach content and research methodology. I know far too little to teach with technology” (Anonymous, 2007). The dichotomy of these two realities coming together daily in the college classroom creates a critical challenge for higher education in meeting the technology expectations of these constituencies and will greatly impact their perceptions of the quality and value of the overall experience.

Research by Partington & Stainton (2003) suggests that continuous professional development will be essential in the twenty-first century in order to ensure that these expectations of high-quality teaching with technology are met.

Purpose of the Study

The purpose of this study was to identify professors’ attitudes regarding technology pedagogy, assess professors’ skills related to technology use, and assess professors’ abilities to effectively integrate educational technology into their teaching. The results of the research informed the development of a technology curriculum for collegiate professors. The goal of the technology curriculum is to support the improvement of technology skills of professors, increase awareness of pedagogic application of technology in teaching, reduce individual anxiety about technology
infusion, and to create a core mentor system of professors to encourage dissemination and support throughout individual departments.

**Background**

Research clearly indicates that many college professors are reticent to embrace technology as part of their teaching methodologies for a number of reasons. Professors’ attitudes towards technology, limited training opportunities involving technology, little or no recognition in the tenure process for technology integration, and high student expectations all influence the measured rate of adoption of technology in the college classroom. Yet, current literature also points out the necessity of educational technology (Hartman et al., 2007; Jugovich & Reeves, 1999; McGee & Diaz, 2007; Mitra, Steffensmeier, & Lezmeier, 1999).

According to Purcell and Perritt (2008), professors need to engage in technologies that enhance classroom interactions with students, “but also to use technology in the development of some of the products student report as being helpful in their construction of knowledge” (p. 2197).

The term “digital divide” within higher education no longer focuses on economics and access to computers and technology, but instead highlights the ever-widening divide technology has created between student and teacher (McGee & Diaz, 2007). The technology curriculum presented in this paper was developed to address this critical issue and to work toward narrowing the chasm that can exist between student and professor.

**Setting**

A study was conducted at Gustavus Adolphus College, a private, liberal arts institution located in St. Peter, MN. Approximately 40 full-time professors from the
Education Division – which consists of the Education Department, the Nursing Department, and the Health and Exercise Science Department – were invited to participate in the study. Volunteers were asked to fill out a survey to identify their level of interest and availability in participating in technology workshops. Participants were also asked to indicate specific topic areas that were of interest to them. Fifteen professors responded to the survey (40%). The data collected from the survey was used to develop a curriculum, which included the most popular technologies. The same professors were then invited to participate in a pilot program that supported the technology curriculum. Eight professors participated in the pilot program and then provided feedback regarding the format, content, delivery, value, and audience. The data was used to assist in the modification of the final curriculum.

Assumptions

Although I am a proponent of effective integration of technology in the classroom, I am also very adamant in my belief that the use of technology in the classroom for technology sake is counter-productive. I believe there are many situations where technology can enhance the learning experience for today’s learners. In my opinion, the use of technology can engage students in their own learning process and make them participants in their learning.

In my 20 years in academia, I have come to the realization that many college professors do not fully utilize the current technologies made available to them in teaching and research. Sometimes, this is due to individual professors’ attitudes towards technology, but other times this is due to other obstacles that prevent forward-thinking educators from expanding their skill set to include the effective use of technology. Lack
of time, insufficient hardware or software, institutional attitudes towards technology, and limited opportunities for professional development are just a few.

Attitudes regarding technology at the administrative level of an institution are critical in their ability to empower, encourage and support professors as they venture into the ever-changing digital playing field in education. If the administration embraces technology as an integral part of the learning process, I believe this attitude filters down throughout the rest of the institution, resulting in an environment that is open to innovation without fear of failure. Top-down support can be demonstrated in a number of concrete ways, including budgetary dollars, formal recognition in tenure process, hiring technology support personnel, and ready access to hardware and software. Equally important to these concrete efforts, is an atmosphere of encouragement, open-mindedness, and empowerment. If, however, technology is seen as an add-on or secondary to effective teaching, creative thought and experimentation is stifled and traditional teaching methodology remains the status quo.

Limitations

This study was limited in scope. The sample number of professors surveyed was small and not random. The professors were all members of the Education Division; therefore the data cannot be interpreted to be representative of all college professors.

Another limitation was that the course selections for the curriculum were not based solely on best practices for educational technology, but were influenced by the professors who expressed an interest for any number of reasons, which may or may not have included pedagogy. And although the curriculum was designed using pedagogic foundations, one cannot assume that this curriculum will support the technology teaching
needs of professors by itself or in perpetuity; as these tools are constantly changing and, as such, so must the curriculum be dynamic in nature.

Definitions

- Educational Technology: the use of a variety of teaching tools, such as software, hardware, Internet applications and activities, to improve student learning; often referred to as Instructional Technology
- Digital Immigrants: individuals who lived before technology was as pervasive as it is today
- Digital Natives: individuals who have grown up with technology; today’s students are often characterized as such
- Smart Classrooms: teaching classrooms that typically contain teaching aides such as overhead projectors, computers, DVD players, and video conferencing equipment
- Podcast: digital media files that may contain audio, video or other mixed media that are available for download via the web to computers, iPods, Smartphones, and other mobile devices
- Learning Management Systems: is a method of delivering, tracking and managing courses via a web interface, such as Moodle or Blackboard; often referred to as Course Management Systems
- Google Apps: a set of applications that are available via a web browser that allow users access to online tools for word processing, spreadsheets, chat, geo-caching, web site creation and many more
Summary

In summary, the purpose of this study is to address the call for professional development opportunities for professors in higher education in the effective integration of technology by creating a curriculum that focuses on today’s ever-growing arsenal of technologies available in the college classroom at Gustavus Adolphus College. The goal of this curriculum is to develop some of the basic technology skills that are essential in today’s classroom and to understand the pedagogy that supports the infusion of technology as it relates to learner expectations and outcomes. Upon completion of this curriculum, professors will be more confident in their abilities to use technology to engage, challenge, and connect with students throughout the learning process.
CHAPTER TWO

Review of Literature

The challenges and benefits of integrating educational technology into the college classroom is an important issue that is at the heart of numerous journal articles, research studies and white papers. A review of the literature, which focuses on the obstacles college professors face when contemplating the incorporation of technology into their traditional classrooms, identifies several key issues as critical to our understanding of the issue. Technology and teaching have been researched from many different perspectives, and at a variety of different educational levels in an effort to identify the prevalence, challenges and effectiveness of technology use in the classroom. Expectations of students, professors, institutions, and future employers have been scrutinized in order to create strategic technology plans that meet a wide range of needs. Unfortunately, efforts to assess improved learner outcomes as a result of technology integration continues to be an elusive and difficult undertaking for scholars of educational technology.

Four predominant themes emerged from the literature regarding technology integration in higher education. Professors’ attitudes about technology and pedagogy, professional development opportunities, recognition for tenure and promotion, and student expectations affect the likelihood of technology integration into the college classroom.

Professors’ Attitudes

One challenge college professors face is the anxiety that comes with change. Often times, professors are simply too anxious to try new and innovative approaches to their teaching methodology when the tried and true approach still seems to work for
them. Schoon and Weber (1999) suggest that a majority of university professors are not as computer literate as is necessary for the extraordinary opportunities that learning technologies provide in the teaching and learning continuum. This lack of literacy is often magnified on the college campus where it is not uncommon for college faculty to feel like “digital immigrants” in a community whose main inhabitants are “digital natives” – students who have spent their entire lives immersed in technology and have a natural, comfortable relationship with all things digital. This perception that they are less knowledgeable in technology than their students – real or perceived – increases anxiety levels, resulting in professors feeling apprehensive about teaching with electronic tools that they are not confident using (Mitra, et al., 1999).

Professors also express deep concern that they may not be able to keep pace with the rapid evolution of technology itself. The field of technology is dynamic by its very nature; professors recognize that keeping abreast of current technology pedagogy requires constant updating. The time commitment necessary to keep current with technology often forces educators to choose between technology pedagogy and discipline-specific research (Grant, 1996).

Additionally, professors are often cautious about experimenting with innovative strategies that may interfere with tried and true methods that have historical merit. This resistance to change in general – whether it is institutional or individual – is not unusual; and when looking at change in the context of technology, Moore, Fowler & Watson (2007) acknowledged the challenges were even greater because of the “personal and organizational re-thinking involved in the effort” (p. 44). Despite these challenges that shape professors’ attitudes towards technology, more and more are willing to explore
new and innovative teaching methodologies; however, they still face additional hurdles that are often difficult to overcome.

Faculty Development

The researched literature suggests that professional faculty development workshops that address technology and teaching are critical in helping professors become literate in use of educational technology. Becoming literate includes both technical skills and the ability to use those skills effectively to create an active learning environment (Richey, 2008). In 2004, the Educause Center for Applied Research (ECAR) National Survey indicated that students felt technology was being used poorly when professors presented boring PowerPoint presentations, wasted time with technical difficulties, and assigned unmoderated chatrooms. Student perceptions were that technology actually made their professors less effective in the classroom (Young, 2004). These sentiments were echoed across the literature, as the digital divide of ten years ago has been redefined (McGee & Diaz, 2007). The Office of Higher Education concurs with the viewpoints of Young (2004) and McGee and Diaz (2007), identifying faculty development and skill training as key challenges to providing technology-rich classroom instruction (Higher Education, 2001).

Current research indicates that faculty development opportunities should focus on creating student-centered, interactive classrooms. These workshops should address face-to-face learning, online learning, or a combination of the two, often referred to as blended learning (Keaster, Metze & Hillegass, 2007). There is also agreement found in the literature that faculty development workshops should have a peer-to-peer structure, where professors share best practices with each other. The creation of a community of learners
provides support and encouragement, as well as an exchange of ideas regarding best practices within a discipline (Hartman, Dziuban & Brophy-Ellingson, 2007). Purcell and Perritt (2009) go one step further and suggest that seeking out hesitant colleagues is essential to the future of the profession. However, providing faculty workshops and professional development opportunities that are effective for professors is difficult to do well for a variety of reasons.

Lack of time is a major concern. Master teachers are usually immersed in their discipline, keeping current with new theories, methods, and curricula, as well as doing research and writing publications in their area of expertise. Professors across the board indicate time as being one of the biggest reasons for not broadening their knowledge of technology (Mitra, et al., 1999). An additional challenge is finding qualified instructors who can provide instruction for the technical skills, along with the technology pedagogy. In these situations, institutions must sometimes ignore organizational barriers, create new instructional support divisions and use innovative partnerships inside and outside the institution in order to provide quality professional workshops emphasizing both the technology and the pedagogy (Jugovich & Reeves, 2006).

In an effort to encourage professors to participate in faculty development that supports the use of technology, universities have offered a variety of incentives. Virginia Tech offered professors new computers in exchange for attending summer technology workshops. Addressing the issue of time, some institutions offer course release time for technology training as an incentive. A few institutions also offer financial incentives, but it is more likely that administration will spend millions of dollars on Smart Classrooms, when what is really needed is “smart teachers and smart learners” (Young, 2004).
Providing incentives for professors to attend faculty development workshops may be beneficial, but additional time to “re-think” a course is equally critical, as referenced earlier by Moore et. al. (2007). According to Purcell and Perritt (2008), the biggest challenge is in connecting with professors who have the greatest need to be “recreated.” In their experience, professors who currently seek professional development opportunities are already open to new ideas, but they need to reach out and help colleagues who are not if the profession is to be responsive to the needs of today’s digital students.

Therefore, considerations for a successful faculty development program should include incentives, emphasis on technical skills and pedagogy, a peer support structure, and qualified educational technology instructors.

Recognition

Non-tenured professors are often reluctant to devote the additional time it takes to effectively integrate technology into their courses because tenure committees rarely recognize effective integration of technology as criteria for tenure. In fact, tenured and non-tenured professors who choose to explore best practices with technology in their classrooms often put themselves at a greater risk regarding tenure and promotion because of the time it takes them away from criteria that are recognized as essential. Stated another way, “technology has the potential to affect the three “Rs”: reward, recognition, and risk” (Hartman et al., 2007, p. 68). Until the tenure and promotion system is revised to reflect the value of using technology as a tool in creating active learning environments, college professors will be less motivated to experiment with technology in their
classroom. This results in a “business as usual” approach to teaching, rather than considering the needs and expectations of students (Hartman, et al., 2007).

Student Expectations

“The gap between students’ preferences for certain technologies and faculty members’ use of those same technologies may never close…” (McGee & Diaz, 2007, p. 30). Students today have always been around technology – they have known no time when computers weren’t in existence and are truly “digital natives.” This very fact has shaped their expectations when it comes to learning from professors who are generally “digital immigrants.” They see technology as an integral part of their environment, whereas faculty members see it simply as technology (Hartman et al., 2007). This disconnect is bound to create some challenges for both professor and student learner.

Although there continues to be some debate among studies as to the affect technology has on learner outcomes, there is less controversy surrounding the expectations and desires of students when it comes to technology. Studies that compare learning experiences of students in technology-based courses with non-technology-based courses indicate that students have a preference for technology-rich courses. Reasons include a greater appreciation for the subject matter, a more active role in their own learning, interactive group activities that require critical thinking, and just feeling more connected to the course (Keaster et al., 2007). When asked what types of study tools students found helpful in the construction of knowledge, they reported the use of outlines and content organizers as being important in understanding new information. Providing students with study aides that utilize current technologies, such as Learning Management
Systems (LMS), podcasts, and Google Apps, are also among the expectations of today’s millennial student (Purcell & Perritt, 2008).

Hartman (2007) states that students’ perspective on technology in the classroom can influence faculty development, by questioning the methods professors use to teach and assess critical thinking skills (Hartman et al., 2007). Basically, by questioning the traditional methods currently used by some professors, students are encouraging professors to explore new and innovative ideas. The end result may be a change in professors’ attitudes and anxieties toward technology in the classroom – the challenge that underscores all the other obstacles to effective integration of technology into the college classroom.

Summary

“Opportunities for real change lie in creating new types of professors, new uses of instructional technology and new kinds of institutions whose continual intellectual self-capitalization continually assures their status as learning organizations” (Privateer, 1999, p. 78). The key to maintaining the rank of a learning organization may very well lie in a perceptual change from challenge to opportunity, as institutions look at their technology philosophy and how it relates to academia. Institutions wishing to affect change towards a more technology-rich curriculum should develop (or revise) and implement a technology strategic plan for the institution (Privateer, 1999). A strategic plan might identify the current technology philosophy of the institution; determine the goals and visions for technology and teaching; develop a professional development program that focuses on technology pedagogy with qualified instructional technologists; revise tenure and promotion criteria to include incentive and recognition for technology integration; and
provide a method of assessment to determine the success of the strategic plan.

Throughout the implementation process there should be a process of periodic reviews – a reminder that “the teaching and learning environment is alive and dynamic, as should be the solutions” (McGee & Diaz, 2007, p. 40).
The purpose of this study was to identify professors’ attitudes regarding technology pedagogy, and to assess professors’ technology skills and their abilities to effectively integrate educational technology into teaching. The findings were used to develop a curriculum for college professors. This chapter will first describe the setting and participants studied for this project, followed by a discussion of the research study design and the subsequent development of the curriculum. Finally, the curriculum pilot will be reviewed and summarized using the data gathered from the participants.

Setting and Participants

This study was conducted at Gustavus Adolphus College, a private, liberal arts institution located in St. Peter, MN. Gustavus has an enrollment of 2600 students, employs approximately 250 full-time professors, representing 25 academic departments. There are five academic divisions within the college: Education, Fine Arts, Humanities, Natural Science and Social Science. For this study, participants were not randomly selected, but instead targeted the 37 full-time professors from the Education Division, which includes professors from the Education Department, the Nursing Department, and the Health and Exercise Science Department. Permission was requested from the Department of Institutional Research to conduct an online survey of the Education Division professors and approval was received (see Appendix A and B).

An email was sent to the 37 members of the Education Division soliciting their participation in the online survey. Fifteen professors (40%) responded to the invitation to participate in the online survey. The participants represented all three departments of the
Education Division, with five Education professors, three Nursing professors, and seven Health and Exercise Science professors participating in the study. The gender distribution of the participants included ten women and five men, which is closely representative of the gender distribution of Education Division.

**Curriculum Development**

Professors’ attitudes towards technology use in the classroom and lack of time are often cited as stumbling blocks to technology adoption in the classroom; therefore this study attempted to give ownership of the curriculum content and schedule of courses to the professors by soliciting their opinions and preferences regarding the curriculum content and their availability. Additionally, educational experts agree that when a support network of early adopters and instructors who still need to “recreate” themselves exists, the benefit will be an institution that is nimble and responsive to the ever-changing technologies of the world. In an effort to gather the above-mentioned data, a cross-sectional survey questionnaire was designed using SurveyMonkey, a web-based product for survey questionnaire development, collection, and analysis (see Appendix C and D).

The purpose of the survey questionnaire was three-fold: to identify when faculty preferred to participate in technology courses; to determine which technology courses professors preferred to see included in the curriculum; and finally, to find who among the participants were currently using technology in their classrooms and were willing to share their expertise with colleagues. These key issues – attitude, time, and mentorships – have been identified in the literature as critical components for the success of any technology curriculum for college professors.
The professors were asked to indicate whether they would be interested in participating in technology courses held during the month of January to determine whether the college’s January Term was an appropriate time to offer professional development opportunities to professors. This was to assist in determining interest and availability. Next, they were provided with a list of potential technology topics and asked to indicate which topics were of interest to them. There was also an “Other” field that allowed professors the option of writing in a technology that had not been included in the pre-defined list. They could select as many topics as they desired. Once they had indicated their interests, they were also asked to rank their top three choices. This data was used to determine which courses held the greatest interest for the professors.

Professors were also asked two open-ended questions that were included to attempt to identify pedagogical issues they may have regarding technology. The questions provided an opportunity for professors to list specific applications of technology they would like to incorporate within the classroom, as well as a place to identify a current course that they would like to infuse educational technology strategies to replace or supplement traditional teaching methods.

Finally, participants were asked if they would be willing to share educational technology strategies with their colleagues as a means of creating a network of professionals across all college divisions who are interested in a mentor/mentee relationship. The data collected from the survey was used to develop a pilot curriculum to be offered in January. The pilot included the most popular technologies.

Using the data collected from the faculty survey questionnaire and using the backwards design principles, the pilot curriculum content was identified to include the
following possible topics based on the highest responses: Moodle, Clickers, Google Apps, Podcasting, SPSS, iMovie, Video Conferencing, Smartboards, Photoshop, and iPhoto. Because the survey questionnaire asked all respondents to identify their content preference – not just those available for the pilot in January – it was determined that a second questionnaire would be administered. The second questionnaire invited the 15 professors who responded favorably to a January workshop to register for specific sessions of interest (see Appendix E and F). Eight faculty responded and registered for five different sessions. The five sessions were spread out across two weeks, rather than all five in one week. This flexibility was helpful in increasing participation, given the professors’ atypical schedules during the month of January.

Upon completion of the data collection, learning goals were identified, participation was set and instructors were secured to teach the courses. Two-hour sessions were developed using backwards design principles. Assessment rubrics were used to create actual lesson plans that matched the content areas. This was done for each of the classes scheduled for January.

Curriculum Pilot

The pilot curriculum was offered during two weeks in January. There were eight participants attending one or more of five different courses. Instructors teaching in the pilot program included instructional technologists, web services personnel and college professors. Upon completion of the pilot, participants responded to an online survey and participated in informal interviews to gather feedback regarding the pilot curriculum.

Based on the interviews and survey feedback (see Appendix G and H), three topics were selected and developed into a Teaching with Technology curriculum that
included three six-hour sessions, rather than two-hour sessions on five different topics. Each session is designed as either a stand-alone course, or combined and delivered as a technology workshop. In addition to online resources, handouts were created for all of the courses, as participants indicated a preference for something to take home with them that covered the basics.

*Summary*

As a result of reviewing current literature that addresses technology and teaching in higher education, conducting associated research, and developing a pilot curriculum, a final curriculum was developed. This curriculum will, in part, address the current professional development needs of college professors as it relates to the skills and knowledge necessary to effectively integrate technology into the classroom.
References


