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Preface

For the thirty-second year, the Research and Theory Division of the Association for Educational Communications and Technology (AECT) is sponsoring the publication of these Proceedings. This is *Volume #2 of the 33rd Annual Proceedings of Selected Papers On the Practice of Educational Communications and Technology.* This volume includes papers presented at the national convention of the Association for Educational Communications and Technology held in Anaheim, CA. Copies are available online at AECT.ORG. Volumes 1 and 2 are also available through the Educational Resources Clearinghouse (ERIC) system.

This volume contains papers primarily dealing with instruction and training issues. Papers dealing with research and development are contained in the companion volume (Volume #1).

REFEREEING PROCESS: Papers selected for presentation at the AECT Convention and included in these Proceedings were subjected to a reviewing process. All references to authorship were removed from proposals before they were submitted to referees for review. Approximately sixty percent of the manuscripts submitted for consideration were selected for presentation at the convention and for publication in these Proceedings. The papers contained in this document represent some of the most current thinking in educational communications and technology.

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Volume 2 – Selected Reasearch and Development Papers

What are the factors that contribute to ineffective and limited use of Learning Management Systems (LMS) in the schools?

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Charles M. Reigeluth

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Abstract

Data from a previous study[1] show that, although the interviewed teachers were considered to be the ones who used a Learning Management System (LMS) most in their schools, their use of features and functions of the LMS was very limited and ineffective. More importantly, they used the LMS to enhance their traditional way of teaching, which was teacher-centered and aligned with industrial-age practices. This is a follow-up study examining the factors that contribute to the teachers' ineffective and limited use of features and functions of LMSs. Based on the data from the previous study[1], a secondary data analysis of the semi-structured interviews with seven teachers and one technology coordinator was conducted to reveal the factors that contribute to ineffective and limited use of the LMS by the teachers.

Introduction

Instructional technology has become a part of our educational lives (Cuban, 1986) and an interesting area in which to conduct research since the introduction of instructional radio in the 1920s and instructional television in the 1950s. Since then, the availability of technology has increased in public schools remarkably. In 1981, there was one computer for every 125 students in the schools. In 1991, the availability increased to one for every 18 students, and in 2000, there was one for every five students in the schools (Christensen, Horn, & Johnson, 2008).

Classrooms opened their doors to the technology as early as the 1950s; however, technology is still trying to enter the classrooms because there are so many constraints between the doors of the classrooms and the educational technology. In this paper, we will focus on the Learning Management System (LMS), which is considered one of the most recent promising educational technologies used in the schools (Gilhooly, 2001). We will present the factors that contribute to ineffective and limited use of LMS among interviewed classroom teachers and the technology coordinator of the school district.

The definition of LMS might differ with regards to how it is being used or the perception of how it should be used. In a nutshell, we define LMS as an integrated educational software interface that has a number of essential educational components related to learning and teaching. Reigeluth, Watson, Watson, Dutta, Chen & Powell (2008) propose four major functions of information-age educational computing. These functions are (1) record keeping for student learning, (2) planning for student learning, (3) instruction for student learning, and (4) assessment for student learning. They also identify secondary functions of an information-age educational system as (1) communication, (2) general student data, (3) school personnel information and (4) LMS administration.

Today, most LMSs have integrated components that can facilitate some of the information-age functions mentioned above. They have many outstanding features and functions that can help teachers to facilitate and improve students' learning. However, availability of built-in information-age functions in LMSs does not mean that teachers are using all of those functions and features effectively and adequately.

In fact, research shows that teachers are using educational technology to enhance teacher-centered instruction. Russell, Bebell, O'Dwyer and O'Connor (2003) point out that computer use is usually perceived as "a special event or an add-on to the traditional curriculum" (p. 3). Moreover, Pea (2000), Christensen et al. (2008), and Brown and Green (2008) report that despite the high investments on educational technology, their use in the schools is very limited and the effectiveness of the current level of integration is an important concern.

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[1] Aslan, S., Huh, Y., Lee, D., & Reigeluth, C. M. (2010). *The Role of Personalized Integrated Educational Systems in the Information-Age Paradigm of Education.* Paper submitted to the journal: *Education Research International*.

Theoretical Framework

Hew and Brush (2007) analyzed 48 previous studies that presented empirical research findings related to barriers to educational computing in K-12 schools. Based on these studies, the authors identified 123 different barriers to technology integration. They classified these barriers into 6 categories: “resources”, “knowledge and skills”, “institution”, “attitudes and beliefs”, “assessment” and “subject culture”. The authors provided a relative frequency graph of these categories as shown in Figure 1.

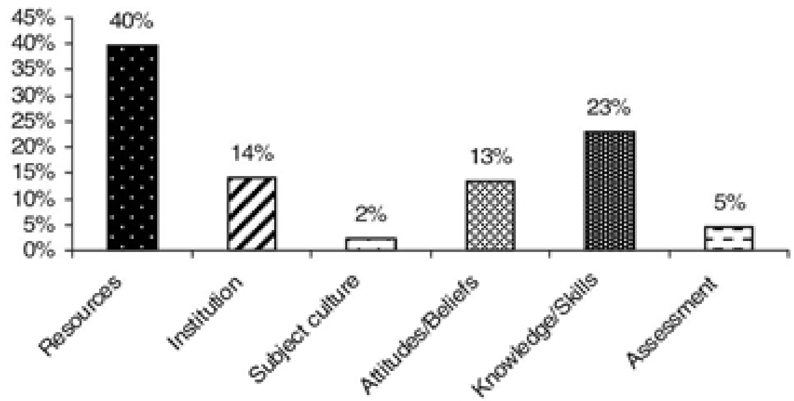

Figure 1. Relative frequency in which the barriers were mentioned in the past studies, from Hew and Brush (2007).

Figure 1 illustrates that “resources” is the first ranking barrier with a rank of 40%. The second ranking barrier is “knowledge and skills” with a rank of 23%. The percentages of the other categories are pretty low in relation to these two categories. Therefore, in this study, we will focus on these two top ranking barriers to the use of technology in K-12 schools.

According to Hew and Brush (2007), without enough resources provided to the teachers, there is less opportunity for them to integrate technology into the curriculum. The researchers identified that “resources” have four different sub-categories, including “technology”, “access to available technology”, “time”, and “technical support”. Furthermore, teachers’ lack of “knowledge and skills” is an essential concern, since teachers need to have enough technology background in order to effectively use educational technology in the classrooms.

Methods

Data from a previous study[2] show that although the interviewed teachers were the ones who used the LMS most in their schools, their use of LMS features and functions was very limited and ineffective. More importantly, they used the LMS to enhance their traditional way of teaching, which had a teacher-centered focus.

This is a follow up study to examine the factors that contributed to the teachers’ ineffective and limited use of the features and functions of the LMS. Participants in this study were seven classroom teachers from different subject areas and different grade levels and one technology coordinator in the school district. All these teachers were from the same school district but from three different high schools. Two of the schools had a traditional curriculum; however, one of them had a curriculum that was highly focused on technology-based activities and project-based learning, which are aligned with the information-age paradigm of education. Use of Moodle among the classroom teachers was investigated in this study since Moodle was the predominant LMS used in the school district.

Existing data[2] from semi-structured interviews with the seven teachers and the technology coordinator were used to identify the factors that contributed to the interviewed teachers’ ineffective and limited use of Moodle. Data

[2] Aslan, S., Huh, Y., Lee, D., & Reigeluth, C. M. (2010). *The Role of Personalized Integrated Educational Systems in the Information-Age Paradigm of Education.* Paper submitted to the journal: *Education Research International*.

were gathered from seven classroom teachers and one technology coordinator using the semi-structured interviews. Each interview took about an hour to an hour and half for each of the participants. These interviews were audio-recorded and transcribed verbatim.

The primary data analysis method was secondary content analysis. A coding sheet was created using the data from the semi-structured interviews with the technology coordinator and the seven classroom teachers in order to identify the factors that contributed to ineffective and limited use of Moodle.

Results

The findings illustrate that "resources" and "knowledge and skills" were the most significant factors that contributed to the limited and ineffective use of the LMS among these teachers, which is consistent with the theoretical framework by Hew and Brush (2007).

With respect to the "resources" factor, although interviewed teachers had access to the technology (Moodle), the data show that three out of the seven teachers and the technology coordinator described a number of different technical problems they faced while using Moodle, which implies their need for technical support. In addition, the technology coordinator and five of the seven teachers pointed out that they would like to see some more integrated functions in Moodle, such as a real-time group collaboration tool (e.g. Web 2.0 technologies), a flexible rubric tool, a teacher collaboration tool, and a video conferencing tool. In addition, one of the teachers expressed teachers' concerns about time to create instructional materials using Moodle. He described some of his colleagues' hesitancy to use Moodle due to their limited time.

With regards to the "knowledge and skills" factor, the interview data illustrate that the technology coordinator and five out of seven teachers expressed the need for training to learn the features and functions of Moodle. Since most of the teachers were not familiar with all the features and functions that Moodle provides, they used the LMS in a limited manner.

The interview data also show that the teachers' use of Moodle varied based on the type of the school. As mentioned in the methods section, only one of the schools had a technology-focused and project-based curriculum, which is aligned with the information-age paradigm of education. Two out of the seven teachers were from this school. Our analysis of interview data illustrates that these two teachers used Moodle with respect to the information-age functions identified by Reigeluth et al. (2008), and their activities involved a student-centered learning environment. Data from these two teachers show that they did not have any major problems with technology skills; however, they wanted to see more features and functions in Moodle, which implies their need for a more integrated and functional educational technology.

Discussion and Future Research

Another important question emerged from the interview data. There are schools that have undergone paradigm change from the industrial-age to the information-age in the United States. In these schools, technology use is fostered and required among teachers and students in order to accomplish learning goals. In these schools, technology use is not dependent on the teachers' preferences, since the schools were designed with an educational technology focus. Therefore, educational technology is not just an additional tool to be used, but an important element of teaching and learning in these schools (Edutopia, 2010).

With reference to the adequate and effective use of educational technology in schools that have undergone paradigm change, the industrial-age paradigm itself might be the biggest factor that contributes to limited and ineffective use of an LMS by teachers in traditional schools today. In addition, as mentioned in the results section, there is an emerging need for a more integrated and functional educational technology that can facilitate all of the information-age functions identified by Reigeluth et al. (2008).

To this end, we see a great potential in Personalized Integrated Educational System (PIES) as a promising educational technology, which can meet the needs of students and teachers in the information age. PIES is a unique concept to define an educational technology which has all of the information-age functions identified by Reigeluth et al. (2008) with an open source architecture incorporating most recent emerging technologies including Web 2.0 and online resources available in order to enhance and improve students' learning. Further research needs to be conducted for the design and development of PIES in order to facilitate teachers' use of technology systems more effectively and adequately.

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The Role of Personalized Integrated Educational Systems in the Information-Age Paradigm of Education

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Abstract

Reigeluth, Watson, Watson, Dutta, Chen, and Powell (2008) identified major and secondary functions of technology for the information-age paradigm of education. Major functions include record keeping, planning, instruction, and assessment for student learning. Secondary functions are communication, general student data, school personnel information, and technology administration. Based on these functions, seven classroom teachers and one technology coordinator from three high schools were interviewed to reveal how they used technology systems with respect to these functions. The results revealed there were discrepancies between the current use of the systems and the ideal use for the information-age paradigm of education. Based on the results, recommendations are offered to teachers, policy makers and technology system designers for better meeting students' information-age educational needs.

Introduction

A shift from the industrial age to the information age has happened (Toffler, 1980, 1990) and has been changing our social and economic lives more than we may have realized. The needs and expectations of students are very different than before. Similarly, the responsibilities and roles of teachers have been changing dramatically. Changes in the needs of students and teachers require changes in the supportive technologies that they use to meet their new needs. According to Gilhooly (2001) and Watson, Lee, and Reigeluth (2007), recent developments in educational technology can help meet these needs in the information-age paradigm of education.

The information-age paradigm of education, which is currently implemented in very few schools, has a number of characteristics. First, it requires criterion-referenced assessment, which involves the assessment of student learning compared to what the student should attain or can handle with regards to the learning objectives (Knight, 2001), instead of ranking, ordering and comparing individuals with their classmates, which is an industrial-age practice (Smith, 1973). In addition, attainment-based student progress is essential in an information-age learning environment. According to Reigeluth (1995), achievement needs to be a "constant" at the competency level, but time should vary based on the progression of each individual student. This competency-based progression accommodates students' different paces of learning.

In addition, customized learning is another important characteristic of the information-age paradigm of education. In order to customize students' learning, individual data such as a student's goals, objectives, characteristics, and attainments mastered need to be kept. In this sense, each student will have a number of individualized attainments that need to be met. Since students have different interests, attainments, learning styles, and paces of learning, the role of the teacher needs to change in order to accommodate the new learner needs. Instead of being the source of information and content, the teacher is responsible for coaching and facilitating individual students' learning based on their personal learning plans in the information-age paradigm of education (Reigeluth, 1995).

Thomas (2000) promotes project-based learning as a way of creating a realistic constructivist environment where students are actively involved in an authentic learning environment and intrinsically motivated. Therefore, project-based learning can be utilized in the classroom in order to help students attain individualized objectives by doing the projects that are aligned with their personal learning plans. The teacher plays a role of facilitating and coaching students' learning rather than delivering content.

Theoretical Framework

So what functions should a technology system perform in order to meet learners' needs and accommodate these changes in the emerging information-age paradigm of education? According to Reigeluth et al. (2008), administrators, teachers, and students need a system that can facilitate and enhance four major information-age functions for student learning: record keeping, planning, instruction, and assessment. The system also needs to perform several secondary functions, such as communication, general student data handling, school personnel information handling, and technology administration (Reigeluth et al.). These functions and their sub-functions are highlighted in Table 1.

Table 1.
Four Major Functions & Secondary Functions of an Information-Age PIES Proposed by Reigeluth et al. (2008)

Record-Keeping	Planning	Instruction	Assessment	Secondary Functions
- Standards Inventory - Personal Attainments Inventory - Personal Characteristic Inventory	- Long Term Goals - Current Options & Requirements - Short-Term Goals - Projects - Teams - Roles - Contracts	- Project Initiation - Instruction - Project Support - Instructional Development	- Presenting Authentic Tasks - Evaluating Student Performances - Providing Immediate Feedback - Certification of Attainments - Developing Students' Assessment - Improving Instruction & Assessment	- Communication - General Student Data - School Personnel Information - PIES Administration

Watson et al. (2007) point out that the information-age paradigm of education requires a kind of computer system that has built-in components to support the information-age functions mentioned above. While the term Learning Management System (LMS) was initially used for this kind of information-age system, it was often confused with Course Management Systems (CMS) and Integrated Learning Systems (ILS), so the term Personalized Integrated Educational System (PIES) was adopted.

Methods

Research Question

The major research question of this study is:
1. How are classroom teachers using their technology systems with regards to the information-age functions identified by Reigeluth et al. (2008):
   a. Major Functions
   b. Secondary Functions.

Research Context and Design

This research study was a qualitative case study with semi-structured interviews. It took place in all three high schools, which we call High School A, High School B, and High School C, in a relatively homogeneous small city in the Midwestern United States. The school district had approximately 10,000 students attending elementary, middle, and high schools. In the three high schools teachers used technology systems relatively actively. At the time of this study (2008-09), High School A had approximately 1,600 students, High School B had about 1,700 students, and High School C had around 80 students (ninth and tenth grades only), but increasing one grade level each year until it includes 12th grade). Technology use and resources varied across the three high schools. For instance, the curriculum in High School C was highly technology-focused and team-project oriented.

In these high schools, Moodle was the predominant technology system used to foster student learning. Therefore, the features and use of Moodle were investigated for this study, but another system, Skyward, was also investigated. Moodle is a free system that has open-source architecture. It can be used for developing, managing, and utilizing learning sites for students' learning. It has a flexible interface, which allows teachers to customize it to meet their classes' needs. Skyward is a proprietary system used only for administrative issues, such as storing and managing the data related to student management. It is widely used for K-12 settings, being used in over 1,300 school districts around the world (Skyward, 2010).

Participants

The purposive sampling technique was used to select the participants from the three high schools. The criterion for selection was a high level of usage of Moodle to support student learning. A preliminary interview was conducted with the technology coordinator, who was responsible for managing Moodle in all three schools, to identify all teachers who met this criterion and also to get a general understanding of how teachers used Moodle in the school district. The technology coordinator identified eight classroom teachers from different subject areas and grade levels who actively used Moodle. While we would like to have had more participants, this was all who met the criterion in this school district's high schools, and it provided a sufficient number for triangulation of results. Invitational e-mails were sent to all eight of them, and seven agreed to participate in this study, as well as the technology coordinator. Table 2 outlines general information about these participants, their schools, and their subject areas.

Table 2
Research Participants, School and Subject Area Information

Participant pseudonyms	High school pseudonyms	Subject areas
Cody (Male)	-	Technology Coordinator
Amber (Female)	A	Math teacher
Laurie (Female)	A	Japanese & ENL teacher
Joshua (Male)	A	Math teacher
Michael (Male)	B	Math teacher
Clint (Male)	B	Language Arts
Jake (Male)	C	American History teacher
Angela (Female)	C	Software technology and careers

Data Sources/Data Instruments

Data were gathered from the seven classroom teachers and one technology coordinator through semi-structured interviews. These interviews took about an hour to an hour and half for each of the participants. All interviews were audio-recorded, and transcribed verbatim. The interview questions focused on gathering data about how teachers were using their technology systems, such as Moodle and Skyward, and whether these uses were aligned with the four major functions as well as the secondary functions of an information-age PIES. For member checking, seven of the eight participants reviewed the transcription of their interviews by email correspondences. The other participant was out of contact.

Data Analysis

The primary analysis method was content analysis. The coding sheet was prepared according to the theoretical framework of the PIES functions. Three researchers coded the transcribed data of all eight interviews independently using separate coding sheets for each interview in order to check inter-rater reliability. After completing individual coding, the three researchers discussed their results to reconcile their differences and created a final coding sheet with a 100% level of agreement. Using this final coding sheet, the researchers analyzed the data and induced emerging themes.

Results

Results for Major Functions

Based on our findings, Moodle was not used for the *record keeping* function. All of the seven teachers used Skyward to keep their students' grades for each course, but they did not utilize it to keep track of personal attainments, personal characteristics, or standards for students. In addition, there was limited evidence that suggests Moodle was not utilized for creating customized *learning plans*. Two teachers out of seven suggested that there were two major factors that constrained them. First, the central office discouraged teachers from setting individualized learning goals. Second, teachers had not found any functions they could utilize for planning in Moodle or had not figured out how to use the functions.

The third function of PIES is *instruction*, and it includes four sub-categories: *project initiation, instruction, project support,* and *instructional development*. Overall, it was found that a few interviewed teachers had used the instruction function to a small extent. For the first sub-function, project initiation, two out of seven teachers had used Moodle, however, their use of Moodle was very limited for this sub-function. In addition, evidence of using Moodle for other sub-functions of instruction such as project support and instructional development were almost entirely absent from the interviews.

In addition, use of Moodle to *assess* students' academic achievement was limited to formative evaluation, which had been used by only three teachers. Only these three teachers had used the quiz function to provide feedback on students' performance and had utilized the results to improve their instruction. However, none of them had used Moodle for summative assessment.

Results for Secondary Functions

Teachers used different tools to communicate with parents and students. They frequently used asynchronous chat to communicate with students instead of instant messaging and used Moodle to give feedback to the students. Our findings suggest that there was no use of Moodle for communication among teachers.

The technology coordinator stated that in these three high schools, they used Moodle to record each of the students' information to the database. However, these records did not include information related to the information-age components mentioned above. These records were initiated at the beginning of each school year, and then they were static during the school year.

As general student data were not kept in terms of the learner-centered approach, school personnel information was just kept for documentation. There were no data gathered about administration of Moodle. The implications of these results are discussed in the paper. The study identified the following implications:

- Discrepancies between the current use of Moodle and ideal information-age functions,
- Different uses of technology and tools for different tasks (e.g. Skyward for keeping grades),
- Different uses of Moodle in different subject areas.

Conclusion & Discussion

Research findings suggest that there were discrepancies between the current use of technology systems and the identified functions of PIES in the information age. None of the seven teachers utilized Moodle for keeping students' personalized record. Also, there was no evidence that Moodle was being utilized for creating and storing a customized learning plan for each individual student. The interviews with the teachers indicated that the standardized education system discouraged teachers from setting individualized learning goals, and they could not locate enough features that supported individualized learning in Moodle. Although the teachers frequently used Moodle for sharing resources and instruction, and utilized the discussion-forum, chatting, and glossary features for instructional purposes, evidence of project support and instructional development were scarce or nonexistent. The quiz function was frequently used to formatively assess students' knowledge, but the means of assessing students' knowledge was far from that of the information-age learning paradigm. Moodle was partially used for secondary functions. General student data and school personnel data were kept in Moodle for documentation. Instead of Moodle, Skyward was used for one-way communication with students and parents, and email was used for two-way communication.

In addition, it was found that the teachers used different types of technologies for different tasks. This was mainly because of the schools' policies on the use of technology systems and the teachers' preferences. The teachers had to use what the school district required. When they had freedom to choose, they used more familiar technologies. Also, teachers in different subject areas used different kinds of technologies. They identified useful features based on the characteristics of their subject content, and utilized those functions. For example, an American studies teacher and Japanese and ENL teacher frequently used the discussion forum and chatting functions. On the other hand, math and technology teachers found those irrelevant to their subject areas, and found other features that could be easily adopted for their subjects, such as the quiz function.

Based on the findings, the following suggestions to teachers, technology system designers, and policymakers were made. Teachers need training both in instructional methods for customized, learner-centered instruction, and in use of a new technology system, and they need more time to develop instruction and tests during their first year of using a new system. In order to facilitate teachers' uses of a technology system, technology system designers should make it easier to learn and use, make it interoperable with other technology systems, as well as incorporate more functions into their system tailored to the various subject areas. Educational policymakers need to find a way to better facilitate and support the customized, learner-centered educational paradigm, including providing funding for technology systems and teacher training, and letting teachers devote additional time to developing customized instruction and assessments.

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Extending Classroom Interaction to the Cyberspace with Facebook, Moodle and Blogger

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Abstract

This case study presents how Facebook, Blogger and Moodle were used in three different graduate classes in order to enhance and support the class interaction on the Internet. Using Facebook as a social space for the class, blogger as a teacher reflection tool, and Moodle as resource repository, assignment submission and grading platform, we looked for the affordances and limitations of each tool for different educational purposes. In this paper, we intend to describe our teaching strategies for incorporating these platforms into the classes. We also include instructor and student reflections on the use of these platforms. Finally we describe instructional benefits of each tool and conclude with the guidelines of using each one of them to support face-to-face and blended courses.

Descriptors: social networking, online learning, distance education

Introduction

For more than a decade, educational institutions have been challenged to reconsider their current educational approaches in the light of an increasing popularity of social and networked Internet technologies. New media technologies have provided opportunities for users to create, share and express themselves in different media channels (Jenkins et al., 2006). Although educators are witnessing a shift in the notions of learning and teaching as shaped by social and cultural practices of social media and new digital technologies, traditional teacher-directed pedagogies still dominate online learning environments in the higher education context. Similarly, traditional learning management systems (LMS) have been widely used as course support systems to provide a place for assignment submission, grading and resource repository. The social interaction in these platforms generally has been limited to the text-based discussion forums where students and the instructors interact asynchronously. However, these platforms often lacked necessary tools and social structure to support student engagement and social connection (Dunlap & Lowenthal, 2009). It is argued that the educational philosophy that undergirds these systems guides the teachers to think and act within the defined traditional teaching paradigms lacking the flexibility to be creative and adoptive to different learning contexts (Lane, 2009). Moreover, the conversation that happens within these systems die after the semester ends and don't exist outside of the classroom.

To meet these challenges of traditional learning management systems, we have integrated social tools to our semester long graduate classes. Using Facebook as a social space for the class, blogger as a teacher reflection platform and Moodle as a resource repository, assignment submission, grading and discussion platform; we looked for potentials of each tool for our different educational purposes. This paper presents the design decisions behind the use of different teaching strategies with Facebook, Moodle and Blogger tools in three different course contexts. We also describe the instructional benefits of each tool along with their limitations; and conclude with the guidelines of using each one of them to support the interaction in blended and online courses.

Context

This study took place in the context of two blended and one online graduate course (1) Using Technology in Learning and Teaching, (2) Technology and Teacher Education, (3) Technology Assisted Project Based Learning in Curriculum and Instructional Technology program at a large research university in the Midwestern USA. The courses were offered in the fall of 2009 and the spring of 2010.

Using Technology in Learning and Teaching Course

The purpose of this course was to acquaint the students with current educational applications of digital technologies in teaching and connections of these applications to contemporary learning theory. Emphasis was placed on both the "how" and "why" of using digital technology in classrooms. Integrating digital technology to improve instruction and create student-centered classrooms was the central theme of the course. Students were encouraged to connect current learning theory to the creation of digital technology classroom activities for students. The course was structured using a combination of resources, discussion and student presentations. The course was project-based and almost every week, since the beginning of the semester, students were asked to create a project (usually a learning activity) around a particular topic. Each week, students received an agenda for the week and an assignment due at the beginning of the following week in class.

The topics covered in the course included: Overview/History of Digital Technology in Classrooms, Word Processing and the Teaching of Writing, Blogging for the Classroom, Web Resources for Classrooms, Logo and Experiential Learning, Problem Solving, Digital Images and Digital Story Telling, Wikis for the Classroom, Podcasting, Distance Education, Social Networking in Education, Ethics and Equity, Virtual Worlds and Second Life, Technology in Teacher Education and Visions for the Future. In addition to these topics and technologies introduced by the course instructors, each week of the course, students were asked to evaluate and present a technology resource that can be used in teaching and learning environments. 13 female and 2 male students were enrolled in this course.

Technology and Teacher Education Course

The purpose of the second course, Technology and Teacher Education, was to provide graduate students mentoring skills. Students mentored one or two faculty members to use new technologies or different strategies to improve their courses. Bandura (1977)'s social learning theory and Roger (2003)'s diffusion of innovations theory were elaborated during the semester and students were encouraged to think on these theories while describing their progress with their mentees. Students met with their mentees weekly and wrote all observation memos onto their blogs in Moodle. Students were also paired to give feedback to each other. 4 female and 2 male students were enrolled this course. They had various academic backgrounds such as elementary education, teaching English as a second language, archeology, Literacy education and instructional technology.

Technology Assisted Project Based Learning Course

The purpose of this interactive online course was to explore Project Based Learning (PBL) and the potential to use technology to enhance PBL for students and teachers. Course topics included an introduction to PBL procedures for creating PBL lessons and units, technology enhanced PBL, in-service ideas for PBL, research on PBL. As a culminating activity, students developed a PBL unit for use in their own teaching or training. 15 graduate students were enrolled in the course.

Data Sources

Data sources for this case study include Moodle, Blogger and Facebook contents posted on each platform either in the form of text or media such as pictures and videos. Discussions, blog entries, wall posts, student and instructor comments were also used as data sources. Additionally, a survey was sent to the students after the grades were released at the end of the semester to collect information on their perspectives on the advantages, challenges, limitations and affordances of these platforms for the classes.

Data Analysis

A qualitative data analysis was conducted to analyze and present the themes emerged from the analysis of various data sources. First, the researchers independently reviewed the data sources and defined the major areas of commonality and differences. During the next phase the researchers worked together to merge the themes into a consistent whole through a back-and-forth, part-to-whole process of interpretation (Spiggle, 1994). Researchers resolved the inconsistencies through discussion and reviewing the data together. Persistent observation, prolonged engagement, triangulation and peer debriefing were used to ensure the trustworthiness in the study. This study will provide a "thick description" (Lincoln & Guba, 1985) of a case that is presented here to provide "sufficient information about the context in which an inquiry is carried out so that anyone else interested in transferability has a base information appropriate to the judgment" (Lincoln & Guba, 1985, p. 124).

Results and Conclusions

Collaboration, anytime anywhere communication and content creation have become the main activities on the Internet where users actively engage as the producers of the information rather than being the passive consumers. Some educators have used these tools in the higher education institutions, yet there is still a limited research on the educational uses of these tools with the innovative teaching and learning activities. This paper is an attempt to present cases where these tools were used extensively in three courses along with the open source classroom management system. The purpose was to understand the potential of each platform and explore the affordances as well as limitations of their use to support classroom interaction, socialization, communication and course maintenance. Accordingly, the emergent themes are presented below:

Providing a Private and Secure Online Environment with Moodle

Moodle was used as a course management platform for the purpose of resource sharing, class discussions, student blogs and peer feedback on blogs. Course agenda and materials were posted on the weekly Moodle schedule each week. Moodle provided a hub for the courses where all the other social media tools were easily integrated through the RSS feeds. Having a private and secure environment, Moodle allowed for keeping student blogs and discussions throughout the semester. Subscription to the forum option was also used extensively by the students. Moreover, third party applications and gadgets were adopted such as glossaries, wiki, chat and Wimba tools. Since Moodle had just been integrated to the college system, students and instructors had to spend some time to understand the affordances and limitations of the platform. Different than the previous course management platform, Moodle provided a weekly course design format that allowed the course content to be presented in an organized fashion. One of the students commented: *"I have never had any technical problems with Moodle like other online courses. This creates no stress or frustration and I can spend my time doing the work instead of trying to figure out the technology and why it does not work".* It seems clear that having less usability problems related to the course management platform, helped students easily adapt to the new interface.

Facebook as a Class Socialization Platform

In addition to the Moodle, a class Facebook group was created to enhance the class communication and resource sharing. Since learning new technologies played an important role in the course context, Facebook was used extensively during the semester for posting current news and resources related to technology and education. Facebook was also used as a platform for sharing the videos and pictures of the class. In the faculty-mentoring course, faculty mentees paired up with the students in this course were also invited to join to the Facebook group in order to enhance the collaboration and communication between the mentors and the mentees.

In the courses, Facebook groups increased students' interaction and involvement early in the semester, providing them a place to get to know each other, particularly in the online course. One of the students commented "*I am hoping Facebook will help me in my quest to learn everyone's name*". Another indicated "*Facebook is much more informal and user friendly*". Students and instructors also shared their pictures and news on the Facebook wall.

Increasing In-class Communication with the Facebook Group Wall

Facebook group wall provided students a space where they could post their questions about an issue after each class and get answers either from their peers or from the instructors. Facebook wall was frequently used during the semester with an increasing frequency towards the end of the semester. Students were asking their questions about the assignments, due dates, submissions and final paper topics and getting quick responses. When asked about their insights on Facebook usage in this class, one of the students commented, "*I think that Facebook should continue to be used for links, resources, discussion and troubleshooting*".

Online Discussions: Facebook or LMS?

Since Facebook group application was not designed as a learning management system; it lacked some of the features that the students needed while discussing a topic in a discussion forum. Moreover Facebook group did not allow uploading word or pdf files nor had a grading or assignment submission features. Therefore for more structured discussions LMS was preferred. One student commented on using Facebook as a discussion platform:

> *In terms of practicality, I do think the Facebook has a number of flaws, particularly dealing with discussions and wall posts. I have trouble remembering what information is posted in what area and it's really clunky when trying to reply to a particular post early in a discussion. I do think Facebook is convenient, though. I'm on it so often that it's easy to just hop onto the group page and browse around. Maybe we can use Facebook in a more focused way. Perhaps we can just use Facebook for resources that we find or something like that. Then we can have our discussions on the blog and use LMS for assignments, class information, and more formal academic kind of things. If we can just clarify the organization a bit better, then I think we can better utilize the three sites.*

This was a reply to the instructors' blog post asking students to comment on the platforms used in the class and the problems they faced. Another student stated, "*For facebook and LMS, I think they have the same function to some extent. I know it is easier and fast to post anything to Facebook but I can say that LMS is more effective for online discussions because we can reply anyone's posting but on Facebook interaction is more limited because as we talked in the class our reply to somebody's posting (for example, a post in the middle) seems at the end of the discussion which causes the interaction among members to be limited".*

Facebook introduced a new design for the group application at the mid point of the semester. Within the new interface the students and the instructors could comment on each other's wall posts and get notifications when the wall post received comments. From that point on Facebook Group wall was used more frequently especially for the class announcements and questions regarding to the class activities.

Using Blogger as an Instructor Reflection Platform

The course instructor used Blogger extensively in her previous courses to reflect on the class experiences. Being familiar with the platform, she setup a class blogger site and posted a blog post each week to write about her reflections on the class, issues that she felt remained unanswered and to share the pictures from the class session. She also gave feedback to the students who did presentations during that week. Each week her post received comments from the students addressing the issues in the class. One of the students commented on instructor's blog " *I think it is effective because you can get immediate feedback from students and having an archive at the end of the semester is a another good part of it*". Another student commented, *"to me the blog seems more personal and less confusing. The conversations are clear whereas on Facebook the conversations are posted all over. I find the blog easier to read and find myself reading it first and no so much Facebook."*

Conclusions, Implications and Future Works

The results of this study indicate that the use of these tools are context dependent and requires careful analysis of learner's characteristics and needs. Getting students' input at the very beginning of the semester, the instructors devoted first week's class on the design of these platforms with the students, asking them about their previous experiences, dislikes, likes, suggestions and critiques. Getting their feedback early on the semester and incorporating more feedback throughout the semester, forms an understanding that these platforms were created for and with them to answer their needs. This way, students may take the ownership in these platforms and interact in a more active way.

Using different tools in a class might be overwhelming for the students and the instructors. However since the context for the courses was technology in teaching and learning, students not only experienced the tools as students but also explored potentials for their classrooms as educators. Moreover instead of depending on a single tool, which may not support all the interaction and collaboration in a course, different tools can be incorporated into the classroom activities with a careful planning. For instance, instructors can use Facebook's real time web capabilities for informing students about the updates and news on another platform. Additionaly, instead of solely depending on one platform, presenting students different tools may help them to be better prepared for the workplace where they would interact with variety of technologies.

In conclusion, analysis of the observations and the students' opinions indicated that each platform has different affordances and limitations. Convenient communication platforms are easy to use but privacy issues and simplicity of the communication tools may create challenges. Traditional learning management systems may be easy to access for the instructors, yet they may not provide the collaborative and social features that social tools present. Newer and more dynamic learning management systems may have innovative features, but they may require a learning curve for the instructors and additional time for technical training if an institutional support is not provided. One of the students commented, "*I have enjoyed this week's online communication a lot. Having so many possibilities for interaction outside of the classroom is so good.*" Recognizing this potential, instructors may incorporate social tools into their classrooms with innovative uses of learning management systems to develop pedagogically sound and sustainable learning environments.

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T3: Technology, Tools and Techniques
Evaluating a Project-Based Educational Technology Course

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According to Dick, Carey and Carey, "the best framework for the design of a formative evaluation is the instructional strategy." (2009, p. 259). The instructional strategy best informs the purpose of conducting a formative evaluation for discovering errors or inconsistencies in teaching and learning that are limiting student clarity and motivation and in turn impacting achievement. Within the formative evaluation framework there are several areas that can be evaluated including type of learning, content, clarity, motivation and management. (Dick, Carey & Carey, 2009, p. 260). This formative evaluation will investigate instructional clarity and student motivation and perception of course relevance as judged by the target learners and the instructors.

Today most students enrolling in a required undergraduate computer literacy course have some previous experience using software to solve education and business problems. (Kalman, 2007, p. 24). The instructional strategies used to teach new software have remained virtually unchanged for the past twenty years. Strategies such as demonstration and practice have been proven to be effective in assisting students in developing new skills and improving previously developed skills however teacher-led demonstrations greatly reduce individualized student learning and become "very difficult to implement with heterogeneous skill sets and experience." (Kalman, 2009, p. 25). The purpose of this formative evaluation was to investigate the use and effectiveness of technology-based instructional design strategies related to student practice and assessment activities. These instructional design strategies, software tutorials and simulations, were intended to improve student practice and project selection and increase motivation and engagement as well as transfer of skills.

As most Universities now require an undergraduate course in Computer Literacy, this formative evaluation contributes to building knowledge of the principles and instructional strategies being employed to provide students with opportunities to practice and learn using what they report as the best instructional strategies for building on their existing knowledge and continuing to improve their Computer Literacy.

Based on the results of this formative evaluation, the course designers continued to make improvements to the course to better meet the needs of the wide-variety of undergraduate students who enroll. The recommendations were intended to assist designers of introductory and advanced educational technology courses. Other course creators that are seeking to help students be more computer literate in a variety of teaching and training settings could also benefit from this evaluation. The terminal goal of this evaluation was to assist course instructional designers to tailor course content, materials and instructional strategies to be attractive, useful and applied in academic and work scenarios by the target students.

Program Description

EDT 321: Computer Literacy is an undergraduate course administered by the Educational Technology program at Arizona State University. Graduate teaching assistants serve as instructors for the 11 face-to-face and 6 online sections of the course, serving nearly 500 students. The course underwent a significant redesign for the Spring 2010 semester. The core curriculum came from Pearson Education's myitlab products. These products include a textbook and access to an online learning management system, myitlab.com. myitlab.com features a library of content including presentation slides, simulation and file-based activities and a test question bank. Additional course curriculum was updated and adapted from past iterations of EDT 321.

The course consists of three primary units: (1) Microsoft Word, (2) Microsoft PowerPoint, and (3) Microsoft Excel. Students completed training and projects within myitlab related to each of the three primary units. Students also completed three original unit projects in which they demonstrated their mastery of unit objectives. Students also completed a group final project incorporating Word, PowerPoint and Excel to create an effective proposal for a fictitious educational technology grant. Course requirements not directly related to the three primary units included creating an e-portfolio and participating in educational technology related research studies.

Evaluation Method

Participants.

Enrolled students participated in three phases of the evaluation: the attitude and perception phase, the open-ended focus group phase and the performance phase. A total of 280 students enrolled in EDT 321 in the Spring semester 2010 responded to an attitude and perception questionnaire. From the useable data we retrieved 236 student responses, including 93 male (39%) and 143 (61%) females. The majority of them (92.4%) are under the age of 32. Seventy-eight students from the four randomly selected sections participated in guided open-ended discussion-board focus groups. A total of 94 students were administered three tests to provide further evidence of the effectiveness of the myitlab simulation tool to teach Microsoft Office skills.

Other participants involved in the evaluation were nine course instructors who collectively taught 17 sections of the course during Spring 2010.

The current course students were a valuable source for measuring understanding of the course's strengths and weaknesses. Students described their technology skill level, satisfaction with the course and expectations of the course. The students also provided learning outcome data through scores on a multiple choice and two skill-based tests of the course objectives.

The course instructors assisted with the implementation of the evaluation activities by facilitating discussions using the discussion board in Blackboard and providing students the link to the course evaluation survey. Instructors also served as a data source by participating in a modified version of the course evaluation survey.

Attitude/perception questionnaire.

A 13-item questionnaire was made available through an online survey tool. The instructors of each EDT 321 section provided the link to the questionnaire and explained its purpose during regular class time. By recruiting the instructors to administer the questionnaire during class time, the response rate was very high. Data from the attitude/perception questionnaire was used to provide data on course effectiveness and recommendations for course improvements in the Results and Discussion sections of this report.

In-class discussion board focus groups.

Using the discussion board function in Blackboard, instructors conducted a focus group activity during class time. Students responded to open-ended questions designed to elicit more detailed and personal experiences with the course and technology. The purpose of using the focus group format was to encourage student interactivity to illuminate unanticipated issues, expectations or needs. Again, participation rates were very high since the instructors administered the focus group activity during class. Student feedback provided in the focus group interview activity was used to provide data on course effectiveness and recommendations for course improvements in the Results and Discussion sections of this report.

Performance.

Student performance in EDT 321 is measured throughout the course through activities in myitlab that are scored automatically by the mitlab system and original student projects which are graded by instructors using rubrics. Because multiple attempts are allowed for the myitlab activities and projects are graded by multiple instructors, the grades provided on these artifacts were not consistent student performance measures.

Student performance was measured using a multiple choice knowledge test and two skill-based assessments delivered through a simulation in myitlab. The assessment questions were taken from the myitlab test bank to ensure objective/assessment alignment. The multiple-choice test contained 20-multiple choice questions to measure student understanding of the Microsoft Office features covered in the course. Each of the skill-based assessments included 20 skills for students to complete in a simulated Microsoft Office environment. Student performance on these assessments was used to provide data on course effectiveness in the Results section of this report.

Results

Attitude/Perception Questionnaire Results

A total of 280 students enrolled in EDT 321 in the spring semester 2010 responded to the course evaluation survey. Due to technical problems, we were able to retrieve data from 236 students' complete responses. Among these 236 students, there were 93 male (39%) and 143 (61%) females. The majority of them (92.4%) were under the age of 32.

This student composition reflects that EDT 321 is an undergraduate level course. One-sample chi-square test was conducted to assess whether the proportion of each class level was statistically different from .25, which assumes equal proportion of each class level. The results were non-significant, χ^2 (3, N = 236) = 4.12, p = .25, indicating that the proportions of each undergraduate level were statistically equivalent. The effect size was .005, which was calculated using the formula *effect size* = χ^2 / (total sample size) * (degrees of freedom). We need to note that there were two graduate students reported in this survey. Considering these two graduate students only accounted for .8% of the total students, they were not included in the one-sample chi-square test, as they were treated as outliers.

In terms of enrolled students' major, 116 majors were reported from the raw data entered by students on a survey open-response question. We divided them into two categories—education major and non-education majors which yielded 151 enrolled non-education majors students and 85 enrolled education major students. Our hypothesis was that the education major and non-education major students were equivalent in terms of proportions. One-sample chi-square test was conducted to assess this hypothesis. The results were significant, χ^2 (1, N = 236) = 18.46, $p <$ .001. The effect size was .08.

Examining students' responses on the question "On which of the following types of software/technology have you received previous training (select all that apply)?," students had most previous training experience on Word (179 responses accounting for 79%), PowerPoint (153 responses accounting for 68%), and Microsoft Office Basics (147 responses accounting for 66%). In addition, students had previous training experience on Excel with 110 responses accounting for 49%. Only a small percentage of the students had previous training on Web design and computer programming, with 17% and 11% respectively.

The following tables describe highlighted student responses from the questionnaire.

Table 1
Reasons Student Enrolled in EDT 321

Reason	Percentage
Required Course	81.7%
Improve my technology skills	42%
Time course was offered	23%
Easy class	16%
3-hour block option	9%
Online	31%
Advisor's Recommendation	19%
Computer Science General Studies	25%

Table 2
Usefulness of Course Materials

Material	Not at All Useful	Somewhat Useful, Useful or Very Useful	Don't Care
Textbook	29%	70%	.9%
myitlab exercises	8%	92%	0%
myitlab graded projects	5%	95%	0%
Class discussion	24.1%	75.9%	1.8%
Research participation	26.3%	73.7%	7.1%
Customizing their project topics	4.5%	95.5%	0%
Retrieving information from the Internet	12.9%	87.1%	3.6%

Table 3
Student Attitudes toward Learning Opportunities

Learning Opportunity	Percentage Favoring	Percentage Not Favoring
MS Office at Intermediate to Advanced Level	76%	24%
New software (i.e., Gmail or Google Docs)	68%	32%
Internet as a learning tool	65%	35%
Using software to analyze data	45%	55%
Building websites	61%	39%
Using graphic design software	78%	22%
Working in groups to complete class assignments	29%	71%
Playing video games	31%	69%
Using Facebook safely and ethically	40%	42%

Table 4
Student Attitudes Toward Learning Materials

Learning Materials	Somewhat Useful, Useful and Very Useful	Don't Care
Demonstration Videos	82.4%	3.2%
Software simulations	87.4%	1.3%
How-to books	69.4%	4.1%
Hands-on activities	96%	.9%
Projects	97.2%	0%

Table 5
Student Scheduling Preferences

Schedule	Percentage
Don't Care	19%
One 3-hour session per week	25%
Two 90-min sessions per week	45%
Daytime	34%
Evening	50%

Focus Group Results

Focus group interviews were facilitated by the course instructors using the Blackboard discussion tool. Two sections were randomly selected from the pool of six online sections. Two additional sections were randomly selected from the pool of eleven face-to-face classes. Seventy-eight students from the four randomly selected sections participated in the discussion-board focus groups. Listed below are the focus group questions with accompanying tables showing the top five student responses for each question.

1. What is your favorite technology-related activity? (82 responses from 78 respondents)

The most popular activities are the online activities of Social Networking and Web Browsing (30%). Students specifically noted Facebook and online photo sharing applications for the Social Networking category. The Web Browsing category includes specific responses such as Google Maps, news sites and search engine usage. Video Game responses include World of Warcraft, XBOX 360 and Wii.

Table 6
Favorite Technology Activity

Activity	Percentage
Social Networking	15%
Web Browsing	15%
Video Games	12%
Graphic Design	11%
Mobile	9%
Other	39%

2. What is a new technology or software skill you would like to learn? (75 responses from 78 respondents)

Students would like to learn Graphic Design skills (33%) more than any other software skill. The graphic design program most often noted by students was Adobe Photoshop. Productivity software at 19% includes office productivity software like Microsoft Office 2007 and Google Docs. Students want the skills to design websites (17%) but did not name a specific software package they would like to use.

Table 7
Software Skill Desired

Software Skill	Percentage
Graphic Design	33%
Productivity	19%
Web Design	17%
Video Editing	11%
Programming	7%
Other	13%

3. How would you suggest to a friend they learn a new technology or skill? (177 responses from 78 respondents)

Traditional classroom instruction (30%) was the most suggested method of instructions followed by online tutorials (20%). Students suggested community college courses, private training courses as well as university courses for the Class category. Students mentioned a variety of free online tutorials on sites like YouTube. Fifteen percent suggested using a book to learn a new technology or skill. In the Self-Taught category (12%) students recommended practicing with the technology without the aid of formal instruction or instructional materials.

Table 8
Suggested Learning Methods

Learning Method	Percentage
Class	30%
Online Tutorial	20%
Book	15%
Self-Taught	12%
Ask a Friend	11%
Other	12%

4. Describe any positive experiences with the content and materials (i.e., textbook and/or myitlab) you've had participating in EDT 321.
(65 responses from 78 respondents)

Myitlab accounted for (37%) of reported positive experiences. Unit Content (29%) refers to positive experiences with specific unit content in Word, PowerPoint or Excel. Fourteen percent of students reported a positive experience with the course textbook.

Table 8
Positive Experiences with Content and Materials

Content/Material	Percentage
Myitlab	37%
Unit Content	29%
Textbook	14%
Course	11%
Other	6%

5. Describe your experience with each of the following modules prior to taking this course. Use beginner, intermediate and advanced and describe why you have chosen to classify yourself that way. (112 responses from 78 respondents)

Only 8% of students reported their experience level with Word as beginner. Thirty-four percent of students described their experience with PowerPoint as beginner. More students reported themselves as beginners in Excel (70%) than the other two programs combined.

Table 9
Experience With Modules

Software	Experience Level	Percentage
Word	Beginner	8%
	Intermediate	59%
	Advanced	32%
PowerPoint	Beginner	34%
	Intermediate	53%
	Advanced	13%
Excel	Beginner	70%
	Intermediate	24%
	Advanced	5%

6. Describe the most useful knowledge you have gained by participating in this course. (46 responses from 78 respondents)

Despite a majority of students reporting intermediate to advanced experience levels with Word and PowerPoint, they reported that the most useful knowledge they gained in the course was from PowerPoint and Word (56% combined).

Table 10
Most Useful Knowledge Gained

PowerPoint	28%
Word	28%
Office 2007	9%
Course	4%
Other	26%

Performance Results

A total of 94 students were administered three tests to provide further evidence of the effectiveness of the myitlab simulation tool to teach Microsoft Office skills. The three sets of tests were one knowledge test (mean percentage 68.76%) with 20 multiple-choice questions, and two skill-based tests—skill based test I (mean percentage 66.48%) and skill based test II (mean percentage 51.59%)—with 20 tasks for each test. One student's scores on all three tests were missing and an additional 12 students had missing scores on one or the other skill-based tests. Considering these 12 students had some knowledge on computer literacy that was reflected from their scores on knowledge check test, mean imputation was used to estimate the value of these missing scores.

In order to reveal relationships between the students' scores on the three tests, a scatterplot matrix was examined and linear patterns were identified. Person product-moment correlation coefficients were computed among the students' scores on the three tests. To control for type I error, alpha was set at .017 (.05/3). Students' scores on knowledge check test were significantly correlated to their scores on the skill based test I, $R = .42$, $p < .001$ and significantly correlated to their scores on skill based test II, $R = .34$, $p < .001$. This indicated that students who scored high on the knowledge test tended to scored high on the two skill based tests. In addition, we find the two skill based tests were also significantly correlated, $R = .61$, $p < .001$, indicating that students scored high on one skill based test tended to scored high on the other skill based test.

Instructor Questionnaire

Nine instructors were invited to participate an online instructor survey and among them, five (25 to 42 years old) completed the survey. They had two to ten years of teaching experience at university level and all had previous training in MS Office. They all had a positive attitude of usefulness towards using the textbook, completing the myitlab activities, participating in class discussions and research, customizing project topics and retrieving online information. In addition, they all believed that demonstration videos, software simulations, hands-on books/activities and projects were helpful to student learning.

Discussion

In response to the terminal goals of the evaluation, the evaluators offer the following recommendations for improving EDT 321 as well as other Educational Technology courses directed at a similar audience.

Course Enrollment Demographic Recommendations

Students were surveyed why they decided to enroll in this course. From the survey data, this is very clear that the reason is that is course is a general studies requirement. This reflects that not only undergraduate advisors in College of Education advise their students to take this course, but also advisors in other colleges suggest students take EDT 321. This course enrollment demographic information informs instructional designers to include additional topics or skills to EDT 321, which will be useful for junior and senior students who will soon be seeking jobs.

Course Content

Undergraduate students live in a hyper-connected world as evidenced by their two favorite technology-related activities, social networking and web browsing. In a traditional university course setting, it is especially pressing to keep a course relevant to student's experience and expectations. Arizona State University maintains a Facebook application available only to ASU students. Along with the standard social connectivity functionality, the ASU Facebook application hosts course pages for every ASU course. These course pages include rosters, a course wall, polls and the ability to add teaching assistants. Integrating the ASU Facebook application into the content of EDT 321 will show students that the course is current and relevant. ASU has provided a FAQ for students a information page and guide for instructors and an introduction video. These resources will help instructors and teaching assistants to leverage the ASU Facebook application effectively.

Students most want to learn graphic design skills and software (Adobe Photoshop). Though graphic design is not within the scope of EDT 321, this data and EDT 321's large enrollment are significant assets to the Education Technology program. The program can leverage the positive experiences students had in EDT 321 by marketing EDT offerings throughout the duration of the semester in an effort to increase enrollment in courses like EDT 323. These marketing messages should be built into the EDT 321 content and delivered regularly by the teaching assistants. Based on this data, we fully support the graphic design-focused redesign of EDT 323. We see further opportunity to use the data and EDT 321's enrollment to create new courses that meet student's needs and increase enrollment for undergraduate and graduate-level Educational Technology courses, certificates and programs.

The survey and focus group responses indicate that EDT 321 students want to learn more of the advanced skills of MS Office, how to access and use Google docs, more about building websites and using graphic design software. Not many students like working in groups and playing video games. This shows the need for undergraduate university courses to teach students how to communicate and collaborate with people and perhaps introduce some introductory project management skills. Considering most of the students are females and not many people consider playing video games as learning activity, the response pattern is not surprising since usually more males than females are interested in playing video games. We recommend that both EDT 321 and EDT 180 incorporate some hands-on activities that emphasize the value of using simulations and video games for learning and educational research.

Based on the data, the decision to adopt Pearson Education's myitlab curriculum was a good one. Students provided overwhelmingly positive responses to the myitlab website and content. One student said, "myitlab exercises really help to understand the program functions and apply them to real world work." Another said, "I think that MyITLab has worked extremely well for me. I learn best by example and hands-on experience, and the MyITLab set up perfectly suits my style of learning. The textbook works perfectly well with the MyITLab material and has become a very handy reference that I know I will continue to use long after the course is over." We recommend the continued use of the myitlab website and textbook.

We were surprised by student's reported experience level with PowerPoint. As computer literacy course evaluators and instructors, a popular assumption about students is that they are proficient in Word and PowerPoint skills and deficient in Excel skills. While a portion of that assumption was proven to be correct; students reported beginner level experience for Word and Excel of 8% and 70%. 34% of students responded that they were PowerPoint beginners. Further, 28% of students responded that PowerPoint knowledge was the most useful they gained by participation in EDT 321. One student said, "I now feel very comfortable with PowerPoint. I am sure I will be able to use the knowledge I have gained to do things at work that others cannot." Another said, "I have had a lot of exposure and experience with those Office modules. I signed up for this course because it satisfies a degree requirement. I also went into it thinking I would learn nothing new. I am extremely surprised how many new things I have learned to do with Word and Powerpoint."

Word tied for the most popular useful knowledge response, also at 28%. Based on student's responses, they feel that Word and PowerPoint skills are the most useful because those skills are used regularly and valued in the workplace and the classroom. An educator's tendency is to place emphasis on skills that students do not know, in this case, Excel. The data shows that students both need and value Word and PowerPoint skills. Currently each unit of Word, PowerPoint and Excel are given equal time in the course. We suggest that the Word and PowerPoint units be given more time in future iterations of EDT 321.

Course Materials

The result of student attitudes towards the usefulness of some course components showed a general pattern that indicates that the current course materials are useful. Many students demonstrated favorable attitudes toward the textbook as a reference. But we cannot ignore that about 1/5 of students said that the textbook was not useful. The majority of students find the simulation myitlab useful. Therefore, we suggest keeping this component in the future and perhaps integrate it into the EDT 180 course but use different learning activities and assessments to differentiate the two courses.

Considerations for Future Evaluation Activities

There are several other course considerations that emerged in the open-ended survey questions and focus group interviews that were outside the scope of this evaluation project but that are noteworthy for instructional designers and course supervisors to consider in future design and evaluation projects designed to analyze this and other similar course audiences. We have summarized these considerations in Top Ten lists intended to summarize this information for further study.

Top Ten Things Students Liked Best about EDT 321

1. Hands-on learning
2. Choosing their own project topics
3. Online course option
4. Guided practice in myitlab
5. Enthusiastic, engaging instructor
6. Instructor that responds in a timely way to my emails
7. myitlab practice and grader projects
8. Appropriate pace that allows me to manage my time to complete projects
9. Learning new tips and tricks about Microsoft Office
10. Helps me now in school and is preparing me for future work opportunities

Top Ten Things Students Feel Could Be Improved about EDT 321

1. Wider variety of activities
2. More engaging instructor presentations; keep class focused rather than everyone using Facebook, etc.
3. Make the research requirement more clear and be sure there are enough studies
4. The textbook should be optional since it is expensive
5. Be sure information is posted in a consistent place; some is on Blackboard and other stuff is on myitlab
6. It would be cool if the class was more Mac friendly
7. Course should be online or in hybrid format
8. Change discussion board frequency; weekly is too often
9. Be sure computers work properly
10. Clearer and more explanation of projects; show examples

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A Twist on Social Media and History Education

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Abstract:

In light of the fact that several studies indicate that students can benefit from deeper understandings of the processes by which historical accounts are constructed, history educators have increasingly been focused on finding ways to teach students how to read and reason about events in the same manner as professional historians (Wineburg, 2001; Spoehr & Spoehr, 1994; Hynd, Holschuh, & Hubbard, 2004; Wiley & Voss, 1996). One possible resource for supporting this development may come out of emerging web-based technologies. New technologies and increased access to historical records and artifacts posted the Internet may be precisely the tools that can help students (Bass, Rosenzweig, & Mason, 1999). Given the right context, we believe it is possible to combine such resources and tools to create an environment for students that could strengthen their abilities to read and reason about historical events. Moreover, we believe that social media, specifically, microblogging (Nardi, Schiano, Gumbrecht, & Swartz, 2004) could play a key role.

Twitter is a micro-blogging service that enables a person to broadcast ideas or events to anyone following. *TwHistory* (http://twhistory.com) adapts this communication stream by using it to represent historical figures based on excerpts from journals, letters, or other primary source documents. By consulting multiple primary sources, the range of viewpoints, biases, experiences, and knowledge of people at the time will be represented, creating a more reliable secondary source (Barton, 2005). *Twitter* provides the basic elements for a recreating a historical event: individual profiles, communication, relationships, and time. Followers of *Twitter* reenactments get updates in real-time as the historical figures represented in a particular reenactment "communicate" by sending tweets, or *Twitter* messages, about what is happening. The 140-character messages are sent as close as possible to the time and day of the actual event and are shifted to the present tense to give the sense that they are happening in real-time. Here we outline the basic elements for how to set up a *TwHistory* historical reenactment.

Participants are tasked with representing a historical figure during a reenactment. While this may not align perfectly with the practice of historians, it does align well with the practice of history (e.g. living history museums). Participants are asked to research and then deliver a role as a historical figure. This is a complex problem because it usually involves identifying relevant historical documents and evaluating evidence that may not always be consistent. Participants may need to research the person's career, develop and utilize information literacy and writing skills, and collaborate with other groups.

Reenactment Recommendations

Turner (1985) suggests guidelines for selecting an event to reenact: events related to cultural or national heritage and traditions, how easily and faithfully it may be reproduced, a clear and logical sequence, distinguishable characters, and dramatic impact. Turner also points out that a segment of a long-term event is much more manageable, but the larger it is, the more students will understand its significance. Once the event has been chosen, the *TwHistory* development framework can be divided into four steps: 1) role assignment, 2) content creation, 3) content sequencing, and 4) deployment.

First, participants organize themselves and identify key historical figures. The facilitator has some flexibility at this point as to the extent of scaffolding provided to participants carrying out the reenactment. They may provide a set of documents and ask them to work within those sources. This lessens the burden on participants so they do not have to actually locate primary courses. Barton (2005) points out, however, that an actual historian would search out his or her own set of documents or evidence from which to work. Depending on the amount of time available, it may be worth the extra time to allow for locating the sources, rather than just analyzing previously selected ones.

Once the cast of historical characters is set, participants decide who will research whom. It may be beneficial to employ smaller groups of 3-4 in order to provide more characters for the reenactment while still promoting discussion about where to search for appropriate information on the figure, reflection on the quality and relevance of the information found, and group decision making about how to incorporate the information into the reenactment.

In the second step, the content is researched, evaluated, and discussed. This step is where the bulk of the work as historian happens. Once the group is in agreement about what to portray and how, the tweets are written and scheduled to be sent at a specific time during the reenactment. Each historical figure should have a *Twitter* account with a username that conveys who the character is. Each character's tweets should represent that historical figure as accurately as possible, based on the available historical evidence.

Within a classroom setting or other face to face environments, most of the coordination of research will happen in person. Thus, it would be useful to organize roles within the team, with a moderator to direct discussion and a scribe to record decisions as they are made. When recording the tweets, a spreadsheet should be used with columns to record information such as the date and time a message is to be posted, the message itself, a formula that calculates the length of a message to ensure it is not too long, and an indication that a message has been approved by the group. The spreadsheet will also facilitate importing and exporting data later when messages from multiple accounts are combined together.

For reenactments where the participants are communicating online rather than in person, the same spreadsheet structure should be used. The moderator role is not likely to be necessary because of the asynchronous nature of online communication; however, one may be needed to keep participants motivated or to keep discussions on topic. The need for a scribe would likewise be lessened, as all participants would be writing out their thoughts and contributions already. Online, freely available collaboration tools such as Google Docs and Google Groups can facilitate discussion and the recording of decisions made.

The third step involves combining all the character tweets together in chronological order. This provides an opportunity for participants to verify that all have written appropriate tweets that fit properly with the other *Twitter* characters. It is not necessary that all characters tweet the same event at the same time; depending on the situation, certain characters might not find out about an event until later. During the Gettysburg reenactment, one of the characters was a newspaper. Comparing the timeline of reports in the newspaper and in participant journals, it was obvious that the newspaper was often 2 or 3 weeks behind in publishing the news, which makes sense given the slower communication of the time. A decision was made to move up the newspaper reports to occur at the same time as they actually happened; this decreased the level of historical accuracy and lost some context about how news was disseminated at the time but made it easier for followers of the reenactment. It came down to a discussion and decision as a group; a different group might choose to make a different decision based on the goals of the participants in the reenactment.

In the fourth step, the *Twitter* messages are scheduled with a timer program so that each tweet is sent at the appropriate times (Figure 1). The idea is to match the date and time of the events as closely as possible to when they actually occurred and to when other characters will be tweeting the same events. Using a timer program makes it possible to schedule tweets to happen closer to the real event time, without requiring students to manually post messages, especially if they are not always somewhere with internet access. For a smaller reenactment with a limited number of participants, it may not be necessary. A timer program is essential for a larger scale reenactment, especially one with important detailed timing from multiple participants that needs to be maintained. It may also be necessary in a classroom situation where certain websites at the school may be blocked.

Figure 1 - Example *Twitter* stream from the Battle of Gettysburg

To prove the concept, a small group of volunteers developed *TwHistory* and "tweeted" the Battle of Gettysburg using journals and letters from fifteen soldiers present at the battle, starting about three months before and chronicling how they arrived in southern Pennsylvania and participated in the battle. The experiment generated many followers, and interest in the project grew. When one of the characters died on the first day of the virtual battle of Gettysburg, many followers retweeted this event, and that message brought additional followers as they became aware of the reenactment.

Once the virtual battle had gone viral, a diverse set of followers subscribed to the *Twitter* feeds. One of the Gettysburg followers was Carla Federman, a high school teacher in the American Midwest. She adapted the Gettysburg model as part of her Cold War History course. In that class, students re-enacted the Cuban Missile Crisis.

Classroom use of TwHistory

The Cuban Missile Crisis *Twitter* reenactment was the first case of *TwHistory* use in the classroom. Mrs. Federman organized her class into small groups, with each group responsible for representing a particular historical figure in the Crisis. During the two-week activity, students were given class time to research relevant sources, including primary sources from the Library of Congress website. Feedback from this preliminary classroom implementation was positive, with the teacher reporting student engagement and an interest to do another *TwHistory* reenactment in the future.

Part of learning to think historically involves seeking to understand the context in which historical events take place. Although Mrs. Federman encouraged her Cold War History students to stay in character with their *Twitter* messages, they did not always do so. At one point in the reenactment Khrushchev sends a message after conducting a nuclear test and exclaims, "Boo-yah!" This highlights the potential need for peer review and assessment in future implementations of *TwHistory*.

Given the flexible nature of the *TwHistory* framework and the diverse classroom settings in which it may be utilized, it is not imperative that all reenactments be structured as a precise reenactment. While it is generally recommended that text be quoted as accurately as possible, there are cases where that is not possible or recommended. Twitter itself limits what can be said to 140 characters. To work around this issue, researchers will sometimes break a longer message up into several consecutive tweets, but the most common practice in this case is that researchers will simply consolidate, paraphrase, and bring out the essence of what was said. During a reenactment of a trek across the Old West, it was found that some of the journals contained very poor spelling. An effort was made to keep the spelling and wording the same, but many words were fixed so followers would understand better what was being said.

Another technique that a facilitator or teacher may choose to employ is to have students translate antiquated or formal language into current language or slang. The downside to this is decreased historical accuracy and context for followers of the reenactment. A benefit may be for the students creating the reenactment; being able to translate into modern text requires that the student take the time to really understand what is being said. Thus, while Khrushchev's out of character exclamation may be problematic for reenactment followers, it shows a level of understanding and motivation to participate on the part of the students who created it.

Instructional Effectiveness

In Merrill's (2009) First Principles of Instruction, several principles align with and support the *TwHistory* model for effective instructional design. One important component Merrill recommends is the use of peer critique and discussion. This is an essential component of *TwHistory*, as a project of significant size is not feasible without coordination. Another recommendation of Merrill is to include a component of public demonstration. The nature of *Twitter* is that it is public to the world. While the *Twitter* is just a tool, and a reenactment could be done privately on another type of network, keeping it public motivates students to put on a good show for those following them, yet with minimal privacy concerns, since student personal information is not being publically released. While the Khrushchev outburst example has served as a good example of a bad example, if the students involved in sneaking that message through had thought more about the fact that the world was watching, they may have showed more restraint.

The central principle of Merrill's is that instruction should be task centered. By focusing on a large scale project of building a historical reenactment, everything students do is evaluated as to how it contributes to that task. In the end, the success or failure of the reenactment can be directly tied to how well students worked together on the task.

Conclusion

Preliminary feedback from Mrs. Federman suggests potential gains in engagement and understanding, but a more carefully monitored implementation is yet to be explored. Future classroom implementations are planned to explore and refine historical thinking outcomes through student-created virtual reenactments. Of particular interest is the decision-making process used in prioritizing, contextualizing, and portraying specific people, moments, and ideas within a larger reenactment. Activities like *TwHistory* are promising and worthy of study because they not only offer an engaging opportunity for students to begin to learn the skills of a historian, but they also help students understand the often subjective nature of the historical accounts presented to them in textbooks and other instructional media.

Biographies

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Smart apps: An analysis of educational applications available on smartphones and the implications for mobile learning

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Abstract

One of the more recent trends in education is the use of smartphones for mobile learning. This paper provides an overview of mobile learning, smartphones, and the benefits and challenges that accompany the use of smartphones for mobile learning. The study involves an analysis of educational applications on the Blackberry, iPhone, and Android systems. Findings suggest that although the highest rated applications on smartphones are games and entertainment applications, educational applications can be location aware, collaborative and 'interesting' applications.

Introduction

What can be considered a mobile device? What is mobile learning? These are important questions to ask and pursue to solidify mobile learning as a discipline. Mobile phones, specifically smartphones, are devices that are used in defending the argument for the potential of mobile learning. Mobile learning or mLearning can be defined as "the intersection of mobile computing and eLearning (i.e., electronic learning): accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment" (Quinn, 2000, p. 1). mLearning can occur through mobile computational devices, such as: Palms, Windows CE machines, and mobile phones (Quinn, 2000). In particular, applications (i.e., apps) developed for smartphones are used as a method to deliver mLearning content.

What is a smartphone?

Types of smartphones include the iPhone, Blackberry, HTC Evo 4G, Samsung Epic 4G, Driod, and T-Mobile G2. Market research shows that BlackBerry smartphones lead the market share with 41.6%; Apple's iPhone follows at 25.3%, but the iPhone market is growing (Lipsman, 2010). The Android has recently doubled its market share, and according to ChangeWave's survey, out of 4,068 consumers, 21% of those planning to buy a smart phone in the next 90 days say they would prefer to have the Android operating system on their new phone (Carton, 2010).

Smartphones have all of the capabilities of a normal cell phone, but also advanced features that can be found on a personal digital assistant or a computer, such as: e-mail, Internet, and web browsing (Cassavoy, 2010). Other significant features that further distinguish smartphones from regular cellphones are the ability to interact with laptops and computers, as well the installation of additional applications that are developed by the manufacturer, mobile phone company operator, or third party software developers (Singh, Bhargava, and Kain, 2008). Smartphone applications allow designers and developers to create tools for on demand learning.

Benefits of mLearning and smartphones

There are many observed benefits and affordances of mLearning, including providing on demand learning and improving communication and collaboration on projects (Schuler, 2009a). Smartphone applications allow designers and developers to create tools that can be used anywhere. Additional benefits include:

1. Compactable — Most smartphones fit in an adult sized hand. The use of applications has the potential to transform traditional classrooms by enhancing current techniques and allowing access to learning from your pocket.
2. Portable — Due to the size and low weight, smartphones are highly transportable.

3. Access to Rich Internet Applications (RIAs) — Smartphones enable the user to experience desktop computer-like applications without the constraints of static locality.
4. Various capabilities — Most smartphones include a built in camera, video, and audio capturing tool, as well as GPS (i.e., global positioning system).

Studies on the affective factors surrounding the use of smartphones in education have yielded findings indicating that there are many factors (e.g., making learning personal) that add to a learner's motivation (Jones et al., 2006; Issroff, Scanlon & Jones, 2007). Research shows that understanding the motivational aspects of using smartphones can assist in increasing motivation and retention within classrooms (Issroff, Scanlon & Jones, 2007). Smartphone applications offer benefits that can impact current educational practices, but there are also challenges that accompany them.

Challenges

Current theoretical frameworks are not always sufficient for studying the issues or helping explain the impact of mobile technologies in different settings and for different populations (Schuler 2009a). Although researchers, such as Sharples, Taylor, and Vavoula, have proposed standards that can be used for formulating a mobile learning theory, there is no widely accepted theory for assessing learning through mobile devices (2005). As the use of mobile phones in education continues to grow, there are challenges that must be identified and addressed, to enable full integration of these devices into curriculum design. Some of these challenges include:

- The difficulty in determining which applications are valid for educational purposes, because there is no industry standard and several applications are marketed as such to increase sales (Schuler, 2009a).
- The variability of smartphone brands and models in the market which results in complications for teachers who need to make their learning materials work for the various phones students own (Schuler, 2009a). Teachers may run into compatibility and design issues across platforms.
- The potential revolution in the educational field, similar to online music downloading and music industry; this will raise issues of quality, privacy, copyright and assessment of formal and informal learning (Sharples 2007).

Additional challenges that developers face are incompatibility issues with Learning Management Systems (LMS) and Content Management Systems (CMS). Many institutions rely on a LMS or a CMS for learning, but not all systems are optimized for smartphone access. Secondly, there is varying availability of bandwidth and signal; depending on the region, city, or the corner of the room (in some extreme situation) that a person is on, it is possible to not receive a signal. Lastly, there are many financial challenges. For example, smartphones are expensive! The average cost for the lowest end smartphone is $100 to $200. Additionally, smartphones require the user to purchase a data plan as well as the standard mobile phone plan. This could be cost prohibitive for many individuals.

Study

Research on educational applications has focused predominantly on the iPhone and the Apple iTunes store. In a content analysis of the educational applications available in Apple's iTunes store, Schuler (2009b) found that "there is a significant market for children's educational apps, toddler/preschool apps are more prominent than those for older children, the top educational apps cover a variety of different subjects, with foreign language and literacy being the most popular categories, and children's apps are significantly cheaper than adult-targeted Apps" (p. 6-8). While Schuler's research provides evidence of the use of educational apps on the iPhone, what about the other leading markets: specifically Blackberry and Android? Also, what percentages of smartphone apps (i.e., smart apps) in these markets are education-focused? The following study was conducted in October 2010 to answer these questions.

Method

The study involved three sets of analyses. First, in Study 1, the Blackberry, iPhone, and Android app stores were studied to determine the number of educational applications in the top 100-200 based on two categories: top paid and top free. In Study 2, a deeper analysis of the Blackberry, iPhone, and Android app stores was conducted to find the percentages and breakdown of non-educational applications in the top 100-200 range. The range from 100-200 was useful because the Blackberry, iPhone, and Android app stores do not provide the same search results. To fix this and standardize the findings, percentages are used. And finally, in Study 3, the educational apps discovered in the first two studies are analyzed using Patten et al.'s Functionality Framework (2006).

Results

Study 1

Starting with Blackberry, the leader in market share, the results show that out of the top 100 paid and top 100 free apps, there are no education apps, although an education category does exist (Blackberry, 2010). For the iPhone, the situation is different. Among the Top 200 paid apps in the iPhone app store, there are five education apps:

43. My very first app ($0.99),
51. Star Walk - 5 stars astronomy guide ($2.99),
81. Ace Flashcard ($0.99),
152. Cookie Doodle (0.99), and
177. Wheels on the Bus ($0.99).
(Apple, 2010)

For the top 200 free apps in the iPhone app store, there is only one education app: 64. American Museum of Natural History: Cosmic Discoveries (Apple, 2010). Unfortunately, there is no education category in the Android platform, so no results were found (Android, 2010).

Study 2

In Study 2, breakdown and percentage data were collected for categories of top applications in each app store. The results for each app store are listed in Figures 1-3. Results show that games and entertainment apps are the highest rated applications across all three platforms.

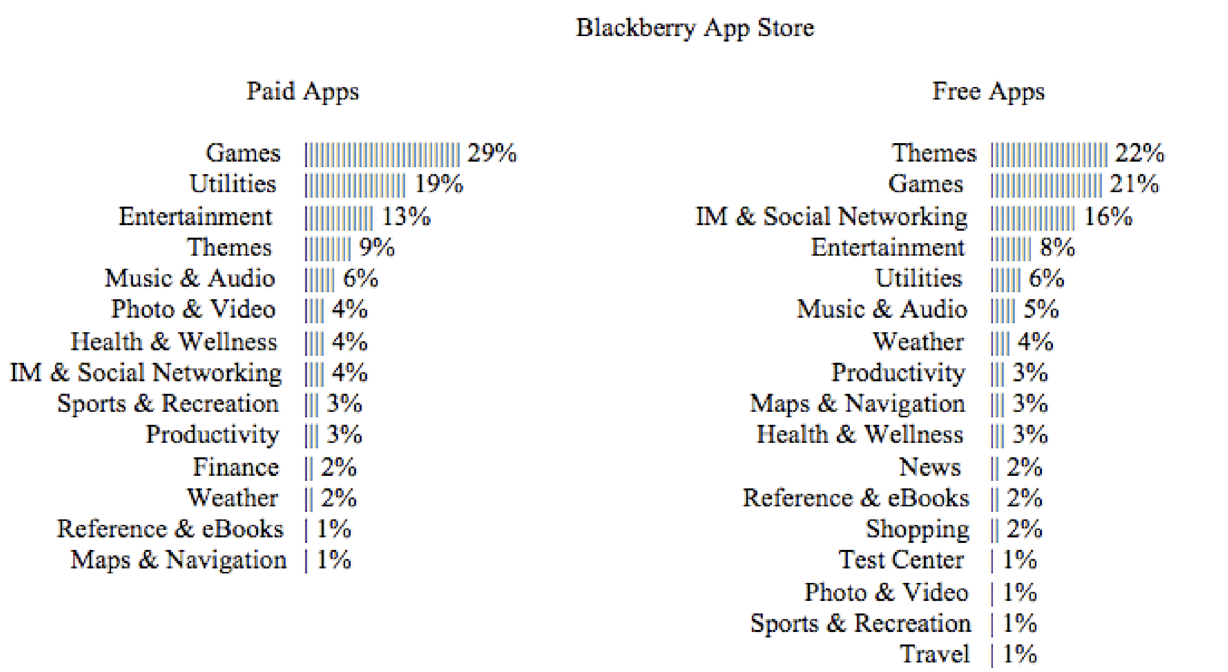

Figure 1. Top 100 Blackberry Paid and Free Applications. Each | mark represents one application (Blackberry, 2010).

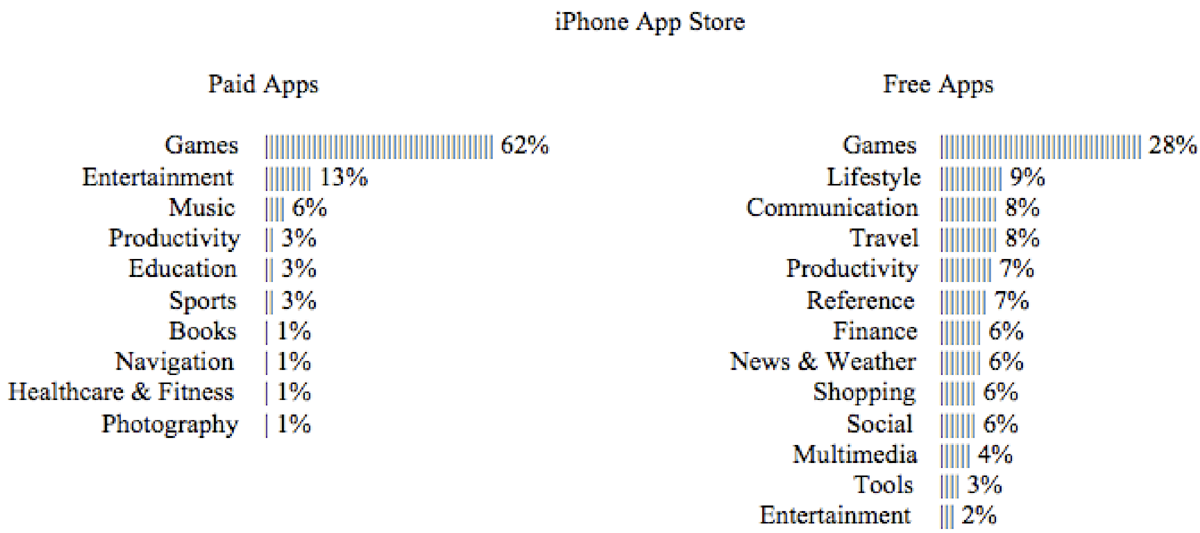

Figure 2. Top 70 Apple iPhone Paid and Free Applications. Each | mark represents one application (Android, 2010).

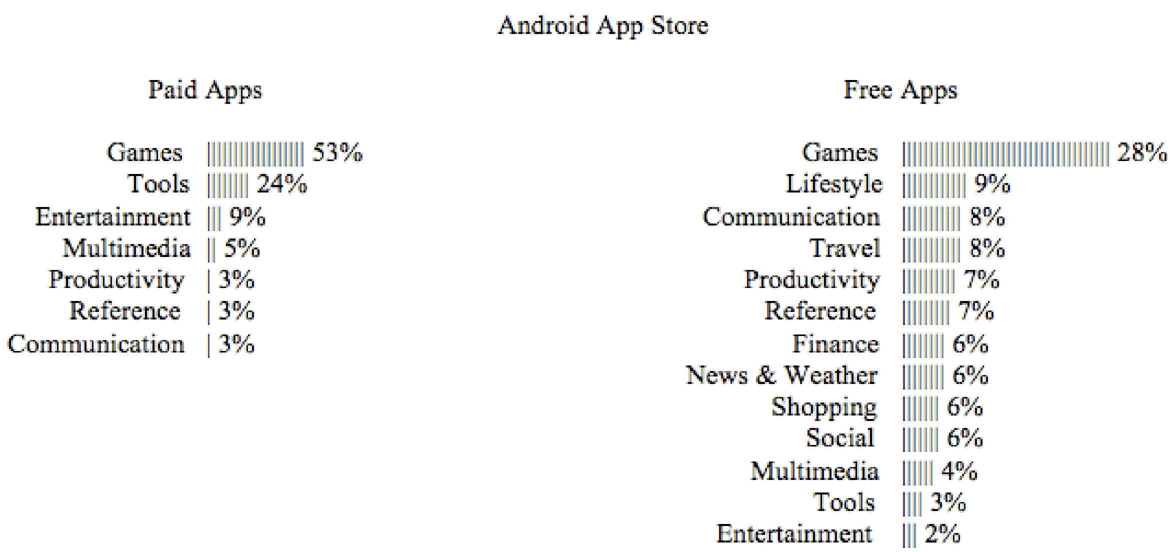

Figure 3. Top 34 Android Paid Applications and Top 134 Android Free Applications. Each | mark represents one application (Apple, 2010).

Study 3

There are no educational applications in Blackberry and Android stores; however, there are applications that have categories similar to education. One of the most noticeable is productivity. Productivity applications help to increase the ability to perform one's job. Many of these applications are used in learning situations and environments. For this reason, they are included in the third study. In this study, the productivity and educational apps from Study 2 are evaluated using Patten et al.'s Functionality Framework (2006). The Functionality Framework evaluates educational applications according to seven categories: administration, referential, interactive, microworld, data collection, location aware, and collaboration. Each category builds on the previous category. Descriptions of each category are described as follows:

1. Administration – "applications in this category do not scaffold or support knowledge construction and merely replicate tools already available on traditional platforms" (Patten et al., 2006, p. 297).
2. Reference – this includes applications that do not go beyond "information delivery" such as note taking or electronic book readers (p. 297).

3. Interactive – applications that are creative and enable user interaction but often are of "drill and test type aimed at encouraging memorization" (p. 297).
4. Microworld – applications that enable users to "construct knowledge through experimentation in constrained models of real world domains" (p. 298).
5. Data collection – applications enable users to collect and interact with scientific, reflective, or multimedia content
6. Location aware – applications in this category use the data collection category features with the addition of a global positioning system (GPS)
7. Collaboration – applications that enable "knowledge sharing" (p. 299).

Although the categories are useful, Patten et al. (2006) suggest that the most interesting applications are those that "facilitate learners to look away from their screen in order to engage with their surroundings and peers" (p. 299). For this reason, the evaluation process will involve categorizing the application according to the Functionality Framework and asking the 'interesting' question: *Does the application facilitate learners to look away from the screen in order to engage with surroundings and peers?*

The analysis below involves the two educational applications and the productivity applications across all three platforms. For each application, a brief description is provided with platform and free/paid information, followed by a categorization according to the Functionality Framework and 'interesting' question.

Education Applications:

- Star Walk – astronomy and constellation guide (iPhone Paid) – Location aware; interesting? Yes! This application enables you to move your iPhone in relation to the sky and find constellations, which in turns facilitates your engagement with the sky!
- My Very First App – matching game designed based on Eric Carle's books (iPhone Paid); Reference or Interactive; not interesting

Productivity Applications:

- Lookout Mobile Security – Protect your phone with Free lookout (Blackberry Free) – Administration; not interesting
- PrivacyStar – caller id, callblocking (Blackberry Free) – Administration; not interesting
- Who Is It – LED light alerts for contacts (Blackberry Free) – Interactive; not interesting
- BeJoose – phone memory optimizer (Blackberry Paid) – Administration; not interesting
- Secret Diary – store diary entries on your phone (Blackberry Paid) – Reference; not interesting
- StickyNote – put customized sticky notes on your home screen (Blackberry Paid) – Reference; not interesting
- RepliGo Reader – read .pdf documents on the go, add bookmarks, hyperlinks, and text search (Blackberry Paid) – Reference; not interesting
- Best Alarm Clock & Weather and Temperature (iPhone Paid) – Administration; not interesting
- Emoji Plus – Best Emoticon Keyboard (iPhone Paid) – Reference or Interactive; not interesting
- AK Notepad – write notes and share via SMS or email (Android Free) – Collaboration; not interesting
- Voice Recorder – save data and send through gmail (Android Free) – Data collection; not interesting
- Battery Widget – shows the exact battery level and charging status (Android Free) – Administration; not interesting
- OI Notepad – shows a list of notes that you can create, edit, and send (Android Free) – Reference; not interesting
- Astrid Task/Todo List – features tagging, reminders, adding to calendar (Android Free) – Interactive; not interesting
- Note Everything – features text-, paint-, voice-, checklist- and photo-notes (Android Free) – Data collection; interesting? Yes! This application can enable you to use your Droid as tool that facilitates your reflection and engagement with your surroundings to a deeper level!
- handyCalc – calculator with automatic suggestion and solving (Android Free) – Administration; not interesting
- OI File manager – browse files on your SD card (Android Free) – Administration; not interesting

- Tag-ToDo-List – features easy task handling, drawing graphical notes, and recording audio (Android Free) – Data collection; not interesting
- JETCET PDF – read .pdf documents on the go (Android Free) – Reference; not interesting
- RepliGo Reader – read .pdf documents on the go, add bookmarks, hyperlinks, and text search (Android Paid) – Reference; not interesting

Future Research

Future research must apply the findings in this paper to other mobile devices and platforms, in particular, Apple's iPad. Figure 4 provides breakdown and percentage data for the categories of top applications on the iPad. It is clear that the percentage of productivity applications on the iPad is much higher than were found in Study 2 (18% paid apps on iPad compared to 3% paid apps on the Android, Blackberry, and iPhone). Does this imply that the iPad is a better platform for educational applications? Future research must be completed to test this conjecture.

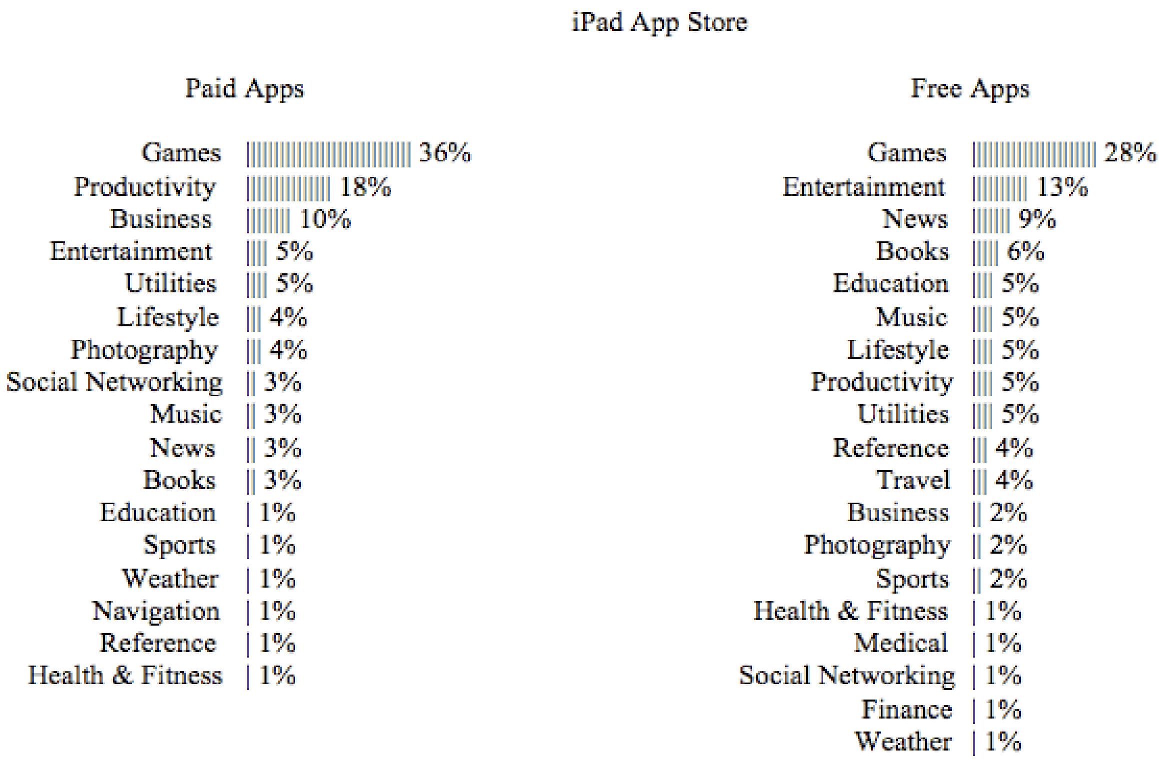

Figure 4. Top 80 Apple iPad Paid and Free Applications. Each | mark represents one application (Apple, 2010).

Conclusion

Cathy Burnett (2009) suggests, "it is those who have grown up with digital technology who may be most likely to understand the potential of digital affordances" (p. 115). We need to embrace technology and use it for education, especially as these children who use technology grow older. It is evident that mLearning is becoming a prominent topic for educators, but there is a lack of research conducted on the use of education applications on smartphones. This paper established a starting point to think about educational applications and help designers create 'interesting' applications – applications that "facilitate learners to look away from their screen in order to engage with their surroundings and peers" (Patten et al., 2006, p. 299).

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Open Source Visualization Tools to Enhance Reading Comprehension and Concept Attainment

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Visualization can be defined as the conversion of information to a symbolic representation of a particular idea, concept, or data object. In simplified terms, McCormick (1987) explained visualization as the process of transforming data, information, and knowledge into graphic symbolic presentations. There are advantages in use of tools designed to make the transformation of text possible. First, visualization tools can be used to make information more accessible. Early proponents reported successful use of visualization retrieval tools to present bibliographic displays generated from hugh amounts of digital information. According to Wise, (Wise, et al, 1995) data sources become manageable and information retrieval efficient through organized graphic displays.

Secondly, visualization permits perception at a higher level. Tools designed to create visualizations allow users to explore the symbolic structure of a text. Thinking processes are enhanced as users are interactively engaged in the reading process. Users may create images in order to identify relationships, main ideas, and patterns thus facilitating concept attainment and critical analyses of reading materials (Sadoski, & Paivio, 2001). Johnson-Glenberg examined the effects of question-writing and word association with visual imagery. The results of her study showed significant increase in reading comprehension scores for struggling readers (2005). These and other generative strategies suggest visualization tools can be used for ensuring recall and comprehension for readers of all ages (Hook & Borner, 2005; Mills, 2009; Wittrock, 1992). In more simple settings such as elementary school classrooms, concepts maps, pictographs, and word clouds can be used for making connections and predicting themes within expository text (Foote, 2009; Oliver, 2009). Most teachers have used pictographs and other representations for reading lessons however word clouds have only recently been used in K-12 classrooms.

The website Wordle.net provides an easy to use tool for creating word clouds by both teachers and K-12 students. In higher education, visualization tools accessible through Many Eyes provide interactive activities that include word clouds, tag clouds, and word trees, but with more complex textual information (Eisenberg, 2008; Hook & Borner, 2005; Viegas, Wattenberg, & Feinberg, 2009). Developed by designers in IBM labs, Wordle is the product of the creators for Many Eyes. Wordles produced by cut and paste of a selected reading passages result in a simplistic image from a complex narrative. Zhang refers to these visualizations as metaphors. Mental images can be formed and conceptual ideas more easily recognized, communicated, understood, and remembered (Zhang, 2008).

Both Wordle.net and Many-Eyes.alphaworks.ibm.com are interactive open source tools, but only Many Eyes permits registered users to post commentary on any of the thousands of visualizations published for public viewing. Although text can be entered directly through the user's keyboard, value is added to the use of these tools through the cut & paste process possible with digital information. The wealth of accessible online resources makes use of these tools easy and efficient for educators.

Purpose of this Study

Strategies using tools such as Wordle, Many Eyes, and Tag Cloud provided promise for visualization tools to enhance reading within a variety of contexts and learning environments. Could use of visualization tools such as word cloud imagery enhance reading comprehension and help both graduate and undergraduate students understand complex ideas and abstract concepts? This paper is a report on findings in use of a variety of visualization tools to enhance reading for adult learners.

Methods

Two populations were examined for use of visualization tools to enhance reading comprehension and concept attainment for assigned reading in both graduate and undergraduate classes. The first data collection involved graduate students in a master's level program for instructional technology. Visualization tools were used to analyze the contents of a job description for school technology specialists. A 500 word online reading from the state department of education was used as the source document for analysis. Using their assigned reading to copy and paste into Wordle.net, students generated visualizations representing the main functions of a technology facilitator. In small group discussion forums, students analyzed the keywords displayed in the visualization, predicting possible scenarios for the position of technology facilitator in a K-12 school. After the online discussions were concluded, students submitted proposals for internship experiences at their local schools. After writing the first draft of the internship proposal and posting these to the online discussion forum, students participated in a second discussion forum to compare interpretations of job functions for technology facilitators. Following the second discussion, a final proposal was written and submitted to the course instructor for evaluation. The design of internship proposals provided the first data set for this study. These are discussed in the results section below.

A second data collection involved pre-service teachers who received instruction in use of Phrase Net tools to visualize conceptual relationships in an assigned reading. Students in a traditional face-to-face Health Education methods class were given an online book chapter as assigned reading on the topic of learning and cognition. Following the reading of the book chapter, multiple choice tests were used to assess understanding of concepts discussed in the online book chapter as well as measures of confidence levels related to personal understanding. Test items included these areas: 1) concept attainment; 2) relationship between concepts with supporting ideas and examples; 3) relevancy to personal experiences. Mean scores for each of the measures were used to identify differences in pre and post use of the visualization tools. Mean scores for students' self reported confidence levels for pre and post tests were used to identify differences in confidence levels when using the visualization tools.

A third group included both graduate and undergraduate students who examined visualization tools for potential use in their K12 classrooms. Review of students' discussion threads revealed creative ideas for instructional use of tools. Lesson ideas were submitted to the course instructors who categorized each activity by skill, instructional method, outcomes, and assessment of learning. A summary of selected activities are presented in the results and discussion of this paper.

Results and Discussion

Word Clouds to Analyze Job Descriptions.

Interns in the MAEd in Instructional Technology used visualization tools to analyze content of internship proposals compared with similar visualizations produced using content from an online job description provided by the state of education. The tag cloud tool was used to calculate the presence and count of unique words in a document as well as statistical analysis of frequency and context of words and letter strings within the document. Interns compared output from their internship proposals with output generated from job descriptions accessed through the state department of education. The content of the job descriptions were dropped into Tag Cloud tools to produce visualizations that include word counts for all terms within the document. The interns used the output from their visualizations as a guide for discussions in an online forum. The visualizations resulted in a focused dialog with emphases in main functions for the job of technology integration specialist and technology facilitator. Qualitative evaluation of the students' proposals showed a clear and consistent alignment with national standards for these positions in K-12 schools. Interns' proposals from previous semesters did not reveal depth of understanding evident in this pilot group using visualization tools to analyze future job descriptions. Keywords predominate in the visualizations prompted interns to plan around terms such as “teacher support”, “instruction”; and “collaboration”. These were then used as prompts for negotiating projects for the semester internship experiences.

Phrase Nets to Enhance Reading Comprehension.

Undergraduate students were given an assigned reading in an online book chapter followed by an assessment of their understanding for 1) main ideas, 2) relationship between terms in the readings, and 3) relevancy to readers’ personal learning experiences. The participants were also asked to provide a self-assessed level of confidence in their interpretations of content from the book chapter.

Following the reading assignment and assessment of understanding, students were instructed to access the website Many-Eyes.alphaworks.ibm.com and generate a visualization using the Phrase Net tool. Phrase Net analyzes a text by looking for pairs of words that fit particular patterns. In Figure 1 is an example from a science article on the solar system. The user will specify a particular pattern such as the terms *earth* or *planets.* Phrase Net will create a network diagram of the words it found as matches. The terms *earth/planets* will be connected if they occurred in the same phrase. When viewing the output from the visualization, the user can compare differences in font size, color, and size of connectors to determine frequency and relationship of the terms. The size of a word is proportional to the number of times it occurred in a match.

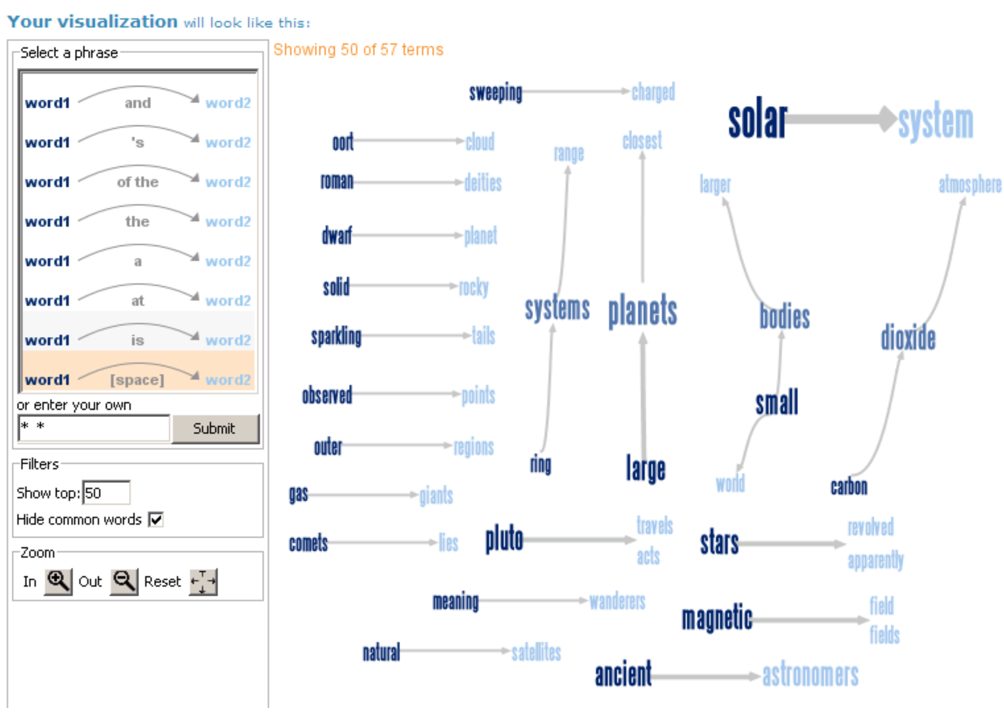

Figure 1. Visualization using PhraseNet

Note in the figure above the term “dioxide” is connected to terms “atmosphere” and “carbon”. Bold lines indicate a strong connection between terms “solar” → “system”; and “magnetic” → ”field(s)”. Drawing attention to strong and weak connections between ideas enhances the reader’s conceptual understanding of complex reading material.

Undergraduate students who participated in this study completed visualization activities followed by a post assessment to measure reading comprehension and confidence levels when using the Phrase Net tool. Students’ responses were rated 0 to 4 with 4 being the highest score possible. T Test analyses were used to compare pre and post assessment for the following: 1) understanding main ideas; 2) comprehension of relationships between main ideas in the readings; 3) ability to make connections between main ideas and personal learning experiences, and 4) self-reported confidence levels in understanding and comprehension for the readings. Differences in Pre assessment and Post assessment of main ideas when using the Phrase Net visualization is marginally significant ($p < .04$, 2-tailed). No significant differences were identified between pre and post assessments relating readings to personal experiences. However T Test comparison shows a significant difference in assessment of students' ability to see Relationship Between Ideas when using the Phrase Net tool ($p < .000$, 2 - tailed). Note in Table 1 differences in T scores ($T = 11.3$; $p < .000$, 2 - tailed) for the pretest [before use of Phrase Net] compared to T scores ($T = 14.3$, $p < .000$, 2 tailed) for the post test score [after use of Phrase Net].

Table 1. T Test comparison of students' ability to see relationships between ideas when using visualization tools.

	N	Mean	SD	Std Error
RelationPre	14	2.5714	.85163	.22761
RelationPost	14	3.0000	.78446	.20966

	t	df	Sig. (2-tailed)	Mean difference	Confidence Interval lower	upper
RelationPre	11.298	13	.000*	2.57143	2.0797	3.0631
RelationPost	14.309	13	.000*	3.00000	2.5471	3.4529

Students' confidence levels in identifying relationships among ideas also appear to be impacted through the use of Phrase Net visualization tool. In Table 2, differences in pre and post self-reported confidence levels is significant ($p < .000$, 2-tailed).

Table 2. T Test comparison of Pre use of Phrase Net with Post use of Phrase Net when measuring students' confidence in ability to identify relationships of main ideas in assigned reading.

Confidence in Identifying Relationships Between ideas

	t	df	Sig. (2-tailed)	Mean difference	Confidence Interval Lower	upper
ConfRelaPre	6.852	13	.000*	1.55643	1.0657	2.0471
ConfRelaPost	8.962	13	.000*	1.95786	1.4859	2.4298

Students' comments following the use of Phrase Net seem to support the positive effect of the visualization tools used to help students understand relationships between major terms appearing in assigned reading. One student commented:

> To visually see the connections of how strongly 2 concepts are linked to one another made me view this article in a different light. Previously, I selected main subjects points that were not as important or had fewer connections compared to the ones that I have selected after using PN. It reinforced the main issues that were being discussed in the article, rather than focusing on mini subjects that ewer not he key points. For example, PN greatly reinforced the strong connection between synapse over production and loss, which is an imperative method in how information is translated into learned concepts.

Ideas for Using Word Clouds in K-12 Classrooms.

Both graduate and undergraduate students provided innovative ideas for use of visualization tools for K-12 classroom instruction. In response to a discussion forum asking for possible uses of Wordle (Wordle.net), students submitted ideas for a classroom activity and method for evaluating outcomes from the lesson. See Table 3 for a selected sample of classroom activities designed by students participating in the study.

Table 3. Instructional activities using word cloud and tag cloud visualization tools.

Skills	Instructional Method	Outcomes	Assessment
Identify main idea	View word cloud for each paragraph one page narrative; compare key words; write one sentence with main idea for each paragraph.	Students made connection between font size and number of occurrences in the narrative; discussion on meaning of prominent words.	Teacher observation; enhance concept of "Big Idea"
Critical thinking	Individually generate a list of terms associated with educational theme; groups generate a 2nd list of terms; independently generate word cloud from assigned reading on the theme; reflect and discuss comparison of independent and group lists	Critical thinking required to compare and contrast word lists; accurate analysis of assigned reading; self-assessment associated with reflections on personal word clouds representative of themes in the reading	Comparison of word clouds representative of themes and main ideas within the reading; knowledge and understanding of vocabulary in the reading.
Expressive Writing	Assigned writing describing yourself; paste into word cloud software; compare characteristics with others in class; identify repeated words; reflect on self-image and your best attributes	Creative writing; good use of adjectives and adverbs; positive reinforcement for all students; identify the purpose of "sparkle words" for narrative writing.	Teacher assessment of writing style, use of vocabulary and positive dialog during whole class discussions.

The researchers summarized all students' word cloud activities and placed these into categories. Although more than 30 student assignments were submitted, we synthesized these into three main themes: Reading to Identify Main idea; Critical Thinking Skills, and Expressive Writing. Table 3 provides sample activity for each of the three themes.

Summary/Conclusion

Use of visualization tools as a pre or post reading activity has potential to enhance reading comprehension in adult learners. Although the researchers consider this a preliminary study, pre and post tests reveal a positive effect through use of Phrase Net tool for identifying relationships in ideas in expository reading. Feedback from participants suggests a positive effect on reading for understanding using complex college level materials. The readers were able to make connections between key ideas within the narrative. Use of visualization tools reinforced what some readers identified as related terms within the assigned book chapter; for others use of the visualization tools resulted in "aah ha" moments with new understanding in the readings. The researchers also suggest that visualization tools might aid the generative thinking processes as students recognize conceptual relationships within the text. Students are motivated to use visualization tools resulting in cognitive maps. By viewing the visualizations, the participants in the study were able to participate in discussions based on a mental map of abstract concepts and ideas. We consider differences in students' pre and post tests strong enough to warrant continued work in this area of research.

Use of word clouds and tag clouds provided imagery representing the many tasks and responsibilities of a technology specialist in a K-12 school. As students generated original word clouds and view output from others in their class, ideas for internship proposals showed a strong correspondence with national standards for a professional position in K12 schools. Content within the proposals from this group, compared with earlier internship proposals from previous semesters, showed an increase in clarity of ideas, consistency with standards, and innovation in proposed projects.

Participants in this study were motivated to use visualization tools in the design of K12 classroom activities. Graduate students in instructional technology courses and undergraduates in pre-service teacher classes designed classroom activities using Wordle.net. The activities were designed for critical thinking, problem solving, and other higher order processes for K-12 students. Based on results of this study we propose visualization tools can be useful to enhance digital literacy and improve reading comprehension with young and adult learners.

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Teaching with Facebook as a Learning Management System

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Introduction

This study focuses on students' digital voices as seen in their willingness to use facebook and their perceptions of Facebook use as the LMS in their Composition II research writing course. Evaluation of students' use as a social tool as well as an academic learning tool was the primary focus of the study; additional information emerged from the data regarding the instructor's role within the Facebook group and Facebook's impact on face-to-face class meetings.

Students – Learners – in the 21st Century have a swirl of mobile technologies, software applications and virtual realities circling their daily experience as they maneuver through their lives and their coursework. They have constant access to cell phones and use them to not only receive and make phone calls, but to send and receive text messages and send and receive emails as well. Students also receive constant updates from their social networks on their cell phones, if they have programmed their accounts to accommodate such postings. Students also have many software applications available to them on their cell phones or their laptop computers. They can create, open or save any type of document they have the application for; they can follow news and information feeds for any RSS they are subscribed to; they can tweet the latest news, the answers on the test or their emotional status via Twitter to everyone who is fortunate enough to be part of their Twitter circle. These students find everything they need online, and they truly believe that everything they do need is online. These same students, who are constantly connected with their 1500 Facebook friends through two or three technologies, will check in to their academic course websites only every couple of days – or right before they go to class. They may login to their email accounts only once a day or every couple of days because they "don't have time" to check email or the course LMS.

Course websites that are associated with students' courses may take a variety of forms. Instructors may develop their own websites for their courses and manage the curriculum in that fashion. Institutions may provide a Learning Management System (LMS) for their faculty to use; those same institutions may also expect online courses to operate on the LMS chosen by the school officials. Systems popular among colleges and universities include WebCT, Blackboard, D2L, and Moodle, and they are structured to provide a virtual classroom that has programming for submitting assignments, having discussions, monitoring grades, reading or watching lectures, listening to podcasts or linking to recommended websites – just to name the most common characteristics of an LMS.

Developed and promoted in the 90s, the LMS still operates largely on an instructor-centered paradigm, and the structure of the website has been found to be limiting because it is not open to activities happening outside of its realm (Martindale & Dowdy, 2009, p. 6). "The current one size fits all" (Saba, 2008, p. 2) LMS can be limiting in its effectiveness as trends in higher education indicate that an industrial type management of education does not benefit learners in this post industrial, mass production era (Saba, 2008). Using variables of structure and dialogue, Saba (2008) found that "programs with little structure, dialogue and easy interaction between the learner and the teacher permits very personal and individual learning and teaching" (p. 3). Using an LMS can easily become a virtual correspondence course where communications occur frequently, but only between the instructor and individual students. Paavola and Hakkarainen (2005) posit that students should be "prosumers" (both producers and consumers) of knowledge, ideas and artifacts. This concept builds on common elements of Bereiter's (2002) theoy of knowledge building and Engeström's (1987, 1999) theory of expansive learning. In an academic era where many educators seek to develop a course culture of community and exchange, a learning management system may or may not promote that type of paradigm shift.

The concept of Personal Learning Environments has developed among education theorists, practitioners and professionals that want to take advantage of online learning environments, but want to do so without the boundaries – digital and institutional – of the typical LMS. Personal Learning Environments (PLE) is defined as a supportive online learning environment that is developed by and for the learner/user, but at this point the definition is taking two forms. Some theorists would define a PLE as a specific online organizational tool, and others would consider a PLE to be a metaphor to explain the multiple and varied activities of 21st century learners (Martindale & Dowdy, 2009). However, until the PLE is more defined and can reach across academic and institutional barriers, a Learning Management System is helpful to manage courses, even considering the institutional and LMS limitations.

Certain tools are available on the web that resemble what these theorists characterize as a PLE, and many of them are open source. There is no need for a software application that reaches across the entire institution, and learners can use these tools to create individual environments that accommodate their resources, activities, products and interests. PLEX, Colloquia, Elgg and Netvibes are a few website organizers that could function as a PLE; Facebook is also included in the list of potential PLE tools (Martindale & Dowdy, 2009). The goal of integrating any of these tools into the learning experience would be for students to contribute to the community's existing body of knowledge as they participate in the sociocultural practices of the learning community (Lee et al. 2005).

Description of the Study

Since students already used Facebook on a consistent basis, this study explored the idea of using the popular social network as an LMS because it has the flexibility of a Personal Learning Environment, but it might also provide the benefit of a frequently visited virtual classroom. Students turn to Facebook to communicate with friends, to post positive or negative emotions, to notify their Facebook world about an event, to obtain quick information or to make arrangements about a class or a meeting or a party. The use of e-mail is minimum compared to Facebook. Almost one third (28%) of the students who participated in this study reported spending three or more hours on Facebook each day, while 11% of students reported spending five plus hours per day. The largest percentage (39%) of students said they spent approximately one hour per day on Facebook.

This study was guided by the following research questions:

- How did students engage with course content using Facebook?
- How did students engage with the instructor using Facebook, texting, and e-mail?
- How did students feel about adding classmates and instructor to their Facebook list of friends for the purposes of this course?
- What do students like and dislike in general about Facebook?
- Were students positive or negative about the use of Facebook in this class?

Background

While preparing for a new semester of courses, the primary researcher learned that the institution she was teaching for would not provide access to an LMS that year. The institution was in a transition between adopted LMS tools, and they would not have one available for faculty that semester, nor was the issue addressed, encouraged, or discouraged. She considered that the students might all have Facebook in common and decided to approach engaging them in class and in their writing development by using a social network with which they were probably familiar. Most students constantly receive Facebook status updates on their iPhones and cell phones, but would they be as receptive to receiving updates and messages from their Comp II class? On the first day of class the primary researcher announced her intentions of using Facebook as the LMS for the course and instructed each of them to 'friend' her before the next class. Initial responses from students included surprise that their instructor was on Facebook as well as general apprehension that is typical with freshmen and sophomores trying something new in a course.

Professionals, parents, students, adolescents, college kids, friends, co-workers – all types of people – are using Facebook. With a total of 500 million users (Facebook Press Room), it is the most popular of social networks among others such as MySpace, LinkedIn, and Proxy. When narrowing the focus of Facebook users to college students, the numbers are amazing; 96.7% of 600 students studied had established a Facebook page (Benson, 2008). Seventy percent of Facebook users live outside of the United States (Facebook Press Room), and students spend time on their social network spaces each day, and often the time and attention devoted to Facebook exceeds the time and attention spent on studies and coursework.

Setting

This study was conducted at a private liberal arts university of approximately 4000 undergraduate students. The course using Facebook as an LMS was a single section of International Composition II. The primary researcher and instructor for the course had never taught a composition course targeting international students. The course convened face-to-face three times per week from 12:30 – 1:20 p.m. (CST). The physical classroom featured a traditional arrangement of tables and chairs in rows and one classroom computer and projector.

Participants

Twelve undergraduate students were enrolled in the course. Fifty percent of the students were registered as sophomores, 38% freshmen, and 13% juniors. The first student in the classroom on the first day of class was a Mexican American student whose only connection with her ethnic heritage was her surname. She was born and raised in the United States, and English was her first language. The primary researcher noted students' ethnicity and informally evaluated their oral English skills as they entered the classroom.

"Xie" from China arrived, and he watched every move the instructor made and tried to understand every word spoken. He had been in the United States for nine months but had been enrolled in English classes since he was six years old – a total of 18 years. He kept his laptop open in order to constantly look up definitions to words he heard and words he wanted to say as discussions developed around him. "Betty," a United Kingdom student, came into the classroom, and she sat off to the side seeming to send out a message of isolation and distance. And then "Teona" from Jamaica entered the room. She seemed almost agitated and her English was certain, but it was definitely Jamaican English. We all had to listen very closely to understand familiar words with an unfamiliar, quickly spoken accent.

The remaining six students in the classroom that first day were a surprise: they were 100% English first language, American students. This was contrary to the instructor's expectations of an "International Comp II" class. One was from Rhode Island, one was from California, and the remaining four were from the heartland of America within 100 miles of the university that had brought us all together.

The final two members joined the class about two weeks into the semester. They were both from Saudi Arabia, but they did not know each other personally before they had been enrolled in this section of Composition II. Arabic was their first language, and both had been studying English in America for over a year and were just in their second semester of course work at this institution. "Ma'mar" was more proficient in speaking and writing English, and while "Ibkar" was all smiles and braces, he had to listen carefully and respond slowly to communicate in English.

All of the students were computer literate; Xie, Ma'mar, Teona, Jacey, Alan and Cliff all brought their laptops to class each day. Betty, a self-admitted Facebook addict, did not actually own a laptop computer but had been a member of Facebook for four years. Half of the participants had owned their Facebook for three years, and the remaining three participants who responded to the question related that they had been part of Facebook for two years or less.

Methods

Using social networking tools to help international students engage in face-to-face class activities and to improve their writing and learning was an interesting experience. On the first day of class, during the syllabus review, the students were instructed to 'find' the instructor on Facebook and to 'friend' her. The privacy settings were adjusted in such a way that the instructor's profile could not be located with a general search, and when she entered the classroom on the second day of class, the students were distraught and asked right away about the profile and if they had missed anything since they had been unable to friend the instructor.

Throughout the 16-week semester, students were directed to use Facebook for various assignments, links were posted on Facebook, discussions were posted and group communications were established. The instructor created a class group and engaged in Facebook chats and exchanged messages with students. Additionally, the instructor built a wiki site that was linked from the class Facebook group page to be used for posting assignments and also connected to an open source gradebook through a link on the course Facebook page. In the final weeks of the semester the instructor conducted a panel interview and asked students to share their perceptions about their current coursework in conjunction with Facebook, as well as their ideas for future uses of Facebook in other course work. This panel interview began with structured questions and developed into a wide ranging discussion on Facebook issues as well as the influence of Facebook on students' writing and other scholarly activity.

Researchers administered a brief survey using Google Documents in order to gather demographic data as well as online course experience background and perceptions.

Results

The results indicated that most students used Facebook an hour or more per day. Most students – 75% of those involved in this study – checked their messages and notices as soon as they logged on to Facebook, or they had their messages automatically forwarded to their cell phones. When the instructor had information to get to students, the quickest way to contact them was by a text message to their cell phones. It was almost as quick was to send a message to the entire group through the messaging feature in Facebook. Students would instantly reply to instructor messages. This strategy was discovered inadvertently by announcing a change in class meeting time. It worked so well that the instructor continued to use the messaging feature of Facebook to send out assignment reminders. Students engaged more in questioning through Facebook messages directed to the instructor than asking them verbally in the face-to-face classroom.

The instructor used Facebook scores of times throughout the semester to send messages to individual students and messages to the entire group. 100% of the time, the group messages regarding assignments or class notices received no reply. When students received individual messages – asking about an absence or commenting about an accomplishment outside of class or a situation in class – they would reply to those messages. Twice in the semester students initiated a message; the rest of the messages were initiated by the instructor to students, either as a group or individually.

Group messages about class or an assignment or due date on the Facebook group page led to a flurry of emails and text messages to the instructor regarding specifics. Students would not message the group page with specific questions but would email or text me instead. Words like 'citation' or 'evaluation' would be difficult for ESL students to understand, and they seemed to be more confident about understanding the instructor's answers when they had spoken face to face.

When engaging with the course in Facebook, students reported first checking messages or notifications when they logged on. Students were eager to confirm the specific use of Facebook the instructor was expecting. Four students were very comfortable adding the instructor and classmates as friends on Facebook. Others were less excited, noting that "there are some types of things that you want to share with peers only" and that "Chinese parents are manipulative." One student explained, "I am Facebook friends with a lot of my family members and im starting to realize that it's a little bit of an issue, especially with college life. They comment on everything, end up talking to my friends on my page and seeing pictures of my personal life all over the place."

Students were mixed in their general preferences in using Facebook. Some liked "keeping in touch with friends and family" and one student appreciated the opportunity to stay in touch with a few people they had met while in Europe for two weeks. Others wished for more privacy, particularly when being "tagged" in pictures. All agreed, however, that "Facebook is changing the way people communicate." Two-thirds of the participants believed that Facebook had an effect on their social lives and on their academic achievement. One-third of the participants believed that Facebook had no influence on any aspect of their life – they viewed the social network as random entertainment.

The students in this study had relatively little experience with any type of LMS. The truly international students had no concept of how classes were managed in an online fashion. The few students who had taken online courses had experience with WebCT and D2L. Their experience with Facebook as an LMS was a standalone experience rather than a comparison experience. All participants, except one, were interested in using Facebook as an LMS because they wanted to be incorporated into American student culture in as many ways as possible. Regarding the use of Facebook as an LMS in this class, students were unanimously positive, noting that Facebook made "it easier to connect with my teacher and classmates if we have a group project or if we are having trouble with homework" and "it makes it easier to communicate with the class." One student just responded that "it's fun," while another noted, "I definitely like it because I get my Comp 2 messages sent to my cell phone." "When I miss I am able to find out what I missed" and "in case I forget to write something down we have it on our page so that I can check on it anytime to see when something is due" were also offered as positives. Teona, the student who did not want to use Facebook in the Comp 2 course also did not want to use Facebook for any other reason. Her Facebook friends were only the people from her Comp 2 class – a total of 13 including her and the instructor. When asked if Facebook helped or hurt their success in school, participants indicated that Facebook was both good and bad. They could quickly communicate with classmates about school issues and school work, but they also could be distracted easily once they logged on. One student said, "[It] helps because I keep up with classmates and homework on [Facebook], but it hurts because if I have to type a paper, Facebook is always open and much more enticing than homework."

The distraction factor is significant from students' perspectives. They receive updates and can message others from their cell phones when they are not at a computer. When they begin doing their homework on the computer, they are tempted to check on their friends and chat, and they end up procrastinating on homework. Without realizing it students spend much more time on Facebook than on their studies. Students may creep on pictures for an hour or more before they realize they have not even looked at their homework. Facebook can also be a problem when students are in class because they may check their profile page instead of listening and participating in class.

Students' feelings toward Facebook being helpful or harmful were mixed. In general, they appreciated using the social media tool to connect with friends and family and improve communication, but most students mentioned the harm of spending too much social time on Facebook rather than doing homework. Overall, students see more help than harm in using Facebook. They appreciate the benefit of staying in touch with friends anywhere in the world. Xie used the Chinese version of Facebook for his Chinese friends in America as well as a communication tool with friends in China when they were able to get online. As international students, this included their friends from their home country and new friends in America. Ma'mar and Ibkar used Facebook as a social tool extensively, often posting their party plans and escapades as status updates. They had no worries about their female instructor holding them accountable for anything. One particularly candid student explained, "instead of researching I just end up playing games or talking to people, but even if there wasn't facebook I would find something else to distract me."

International students viewed Facebook as a place to express themselves or even to reach out to others. One lonely Friday night, Xie spent the entire evening ranting by periodically posting 75 or more status updates that reflected his anger. He ranted in English, and some of his Chinese friends replied in Chinese. Xie's status update rant was truly a cry for friendship and understanding. If he were just trying to express himself, he could have done so in Chinese.

Facebook is like a vehicle, money, or even food. It can be used unwisely or it can be a powerful part of a person's life – in the classroom, in online cultures or personally. Instructors can use Facebook as a way to engage students in course work. If reluctant students, or International students, or even underprepared students can establish a point of connection with a group of classmates or an instructor, then their willingness and ability to commit to the coursework increases tremendously. In the group of students that participated in this study, not one student dropped the course. Finishing with 100% of the students that begin a course is a rare experience in undergraduate classrooms.

Overall, the study successfully used Facebook as an LMS in and International Composition II course as determined by answers to the research questions. A final point for consideration is the fact that annually hundreds of thousands of dollars are spent on university hosted course management systems while open source social networking systems are available and provide similar or even superior features. University implementation and support of a proprietary LMS costs a large subscription fee and sometimes an accompanying support service fee. Some open source LMS models exist, but the support for those systems may also have to be purchased or training may need to occur for (paid) on-campus personnel to support questions and problems that arise throughout a course that is using the LMS. The individuality and personal attention that many students and instructors involved in education often prefer may actually be more attainable in an online environment if social networks like Facebook are used to promote communications. The often sterile, person-less atmosphere of an online course using a traditional LMS will be far less likely to engage students with their instructors or with their classmates than the social networks like Facebook where students spend large amounts of time and energy.

Future studies on this topic should include a comparison of two similar courses – one that uses a traditional LMS and another that uses Facebook as an LMS. Also, instructors should consider using a few of the 550,000 applications available on Facebook to increase the opportunities of students in a Facebook group to operate within that group and within that Facebook page.

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An Investigation of Web 2.0 and Interaction

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Background

Web 2.0 technologies are making an impact in the communicative behaviors of individuals. Abbitt (2007, p. 1) stated that there has been "tremendous growth in the popularity of websites focusing on social activities and collaboration"; this would include online applications such as Facebook. Facebook describes itself as a "social utility that connects people with friends and others who work, study and live around them" (Facebook, 2008, p. 1). However, the research related to what kind of interaction could occur in Facebook and be beneficial to students' learning is still limited in Taiwan. The study focuses on bridging the gap based on research that examined students' perceptions about what kind of interaction could benefit their learning in a class integrating Facebook.

Interaction is considered to be a necessary and important ingredient for a successful learning experience so distance learning practitioners and researchers have concerned with how much interaction a distance learning environment could provide for students (McIsaac & Gunawardena, 1996).

Activity theory was applied in analyzing students' interactions in a Web 2.0 tool--Facebook environment. Activity theory (Leont'ev, 1978; Vygotsky, 1978) is increasingly being used to explain social aspects of technology-supported learning (Jonassen, 2002). Activity theory can contribute to computer-supported collaborative learning by "[understanding] learning not as the internalization of discrete information or skills by individuals, but rather as expanding involvement over time—social as well as intellectual—with other people and the tools available in their culture" (Russell, 2002, p. 65).

There are seven elements in the model and the definition of each element as follows (Jonassen, 2002; Jonassen & Rohrer-Murphy, 1999; Collis & Margaryan, 2004):

1. Subject: The individuals such as leaner, peers, facilitator, supervisor, instructor, and mentor who participated in the activity.
2. Instruments: Methods, resources, supports, online tools and environments that facilitate the activity such as technological tools, networks, and learning resources.
3. Object: Products created by the subjects during the activity such as learning tasks, assignments, and projects.
4. Community: Socio-cultural environment in which interactivity takes place such as virtual classroom and organization.
5. Rules: Standards and norms of the community that rule the activity such as frameworks, culture and other standards that influence the learning environment.
6. Division of Labor: Roles and relationships within the community that affect task division and responsibilities. For example, roles and relationships within cooperative teams and courses.
7. Outcome: The overall results achieved by the activity system such as final products and learning outcome.

The purpose of this study was to find out students' attitude toward their interactions with peers, instructors, course material, and interface in a class integrating Facebook. The study tried to find out the kinds of interaction facilitating students' learning, the barriers encountered, and suggestions to overcome these barriers were investigated in the study.

Methodology

A purposeful sampling was used to select participants in a university in northern Taiwan in 2010. An intact class of 32 participants was used in this study. The participants were asked to use Facebook to take part in the discussions for each topic. The treatment lasted for 8 weeks. After the treatment, thirteen participants voluntarily took part in the in-depth interviews to provide an in-depth portrait of their experience of using Facebook in terms of interacting with others. The interview was semi-structured and questions were related to students' interaction experiences in Facebook. In order to completely understanding the feelings of the participants, the qualitative research was conducted for researcher to go deep into the interviews. The whole interview was video-taped. The video-tape was then transcribed by the researcher and a Grounded Theory Analysis based on Activity theory was used to analyze the transcripts.

Results and discussion

The transcripts were organized according to Activity Theory and the results provided the following findings:

Subject—Instrument Interactions: Facebook was easy to use

Most learners agreed that Facebook was simple and convenient to use. Most learners were familiar with the Facebook environment because they already used Facebook in their daily life. Most students didn't need to learn how to log in, get a new account, or post a message since they already did so before the class.

> "I use Facebook almost every day so I'm familiar with most functions provided in the Facebook."

> "It's convenient to me because using Facebook is part of my life so I don't need to use another website to discuss with my classmates."

Most students mentioned that wall post enabled teachers to announce news and remind learners when the weekly discussion was due. Besides, Online Chat enabled synchronous discussions among teacher and classmates. Some students used Online Chat to ask teacher and classmates questions.

> "I usually use Online Chat to ask questions about assignments. The response is immediate and I won't feel embarrassed. I can also check wall post to get the latest news about the class."

Subject—Object Interactions: Learn others' ideas by observing them

Most students agreed that they learned others' ideas and experiences from reading classmates' messages. Learning from others was regarded to be helpful to them.

> "After reading others' postings, I am usually stimulated from other viewpoints and I think this is helpful to my learning. I can also know my classmates more."

Photos and videos of students' presentations were taken in the class. Most students mentioned that sharing class photos and videos in Facebook motivated learners to participate in Facebook and learned from others' presentation.

> "I will watch the pictures and videos taken from the class. I think those are interesting. I also observe how my classmates present in the class."

Subject—Community Interactions: Students felt comfortable to express themselves in discussions

Most students felt comfortable in the Facebook environment and felt comfortable to express their ideas. Some students may not be willing to share their experiences or ideas in the class but Facebook provided the environment for students to discuss and ask questions.

> "I feel comfortable to express myself and I don't like to speak up in the class. It is too much pressure to express my ideas in the class."

Outcome—Understanding the course materials and interaction Increased

Most students expressed that when using Facebook to take part in the discussions, they studied their textbooks and searched the Internet to find out answers. They also asked teacher and classmates questions to solve their questions. Their interactions increased in the discussions and through Online Chat.

> "In order to participate in the discussions in Facebook, I studied and understood the course materials more. I also asked teacher and classmates questions to complete my assignments."

From the interview, the participants shared the problems when using Facebook and some recommendations provided by the students:

Subject—Instrument Interactions: Editing functions

Most students expressed that the editing functions in Facebook was still too basic and more font styles as well as colors should be provided.

> "I always use Microsoft Word to edit my answers first and paste the content to Facebook. The Facebook should provide more functions to make editing more easily."

Subject—Instrument Interactions: Uploading different types of files

Most students recommended that providing course materials would encourage students participate more often in the Facebook as well as become more familiar to the course contents. However, only pictures and video files can be uploaded in the Facebook so far. Enabling more different types of files such as doc, ppt, and pdf files to be uploaded in the Facebook was recommended.

> "I think if there are more course materials in the Facebook, I will be more willing to use the Facebook and it will be more convenient for me to read the materials and take part in the discussions."

Subject—Instrument Interactions: Learning management

Some students felt that record learners' number of postings and scores would be helpful to them. A reminder when they haven't completed certain discussions was also recommended.

> "Sometimes I don't remember which discussions I haven't completed. I need a summary to let me know my learning portfolio and remind me if I haven't completed."

Subject—Instrument Interactions: Group sorting function

Some students mentioned that providing the group sorting function would help them find the learning group used in the class more easily. Some of the students have participated in many groups already in the Facebook.

> "I have many groups in the Facebook already. It will be convenient for me if I could sort the groups that I participate in so I don't need to spend time searching for the group used in the class."

Conclusion

From the results presented above, it is concluded that most students felt the Facebook was easy and convenient for them to use as a discussion tool in the class. The wall post function enabled them to know the latest events happened in the class and reminded them what assignment was going to be due. However, most students mentioned that the editing function in the Facebook was still insufficient so they need to edit in other software such as Microsoft Word and then paste the content to the Facebook. Moreover, only pictures and video files were able to be uploaded to the Facebook so enables more types of files such as doc, ppt and pdf files will encourage students to read course contents and use Facebook more often.

Most students mentioned that using Facebook was part of their life so majority of them were familiar with the functions and they felt comfortable to express themselves in the Facebook. It was convenient for them because they didn't need to apply for another set of user name and password. Most learners agreed that they learned from reading others' postings and share their ideas help them to understand the course topic more.

The Online Chat function also helped students to ask questions and communicate with others for immediate feedback. Watching class pictures and videos also motivated them to use Facebook and took part in the discussions. However, there are some recommendations such as group sorting functions for those had many groups already and learning management function for students to create learning portfolio.

Although Facebook is known to provide a social networking environment, instructional designers and instructors should be aware of students' interaction experience in order to provide a better learning environment in the Facebook and help improve students' learning outcomes and satisfactions.

Recommendations

For further research, eight weeks of treatment may be too short for students to interact with each other. A longer period of time is recommended. The treatment could be conducted in a fully web-based class to find out the interaction types that may differ from this study. A bigger sample size is also recommended to see if other kinds of interaction become essential in the Facebook environment.

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Blogging in Higher Education: Issues, Challenges, and Design Considerations

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Introduction

Educators in higher education have started to integrate Web2.0 technologies for enhancing learning and instruction activities, taking advantages of their accessibility, ease of use, and potential in achieving various types of learning goals. Furthermore, many of the Web2.0 technologies have been designed and promoted as social tools which are conducive to interaction, communication, and collaboration (Gunawardena, Hermans, Sanchez, Richmond, Bohley & Tuttle, 2009)--the important skills to develop for the 21st century learners (Lesgold, 2009). Blog, the shorthand of weblog, is one of the Web2.0 technologies that have captured educators' attention in higher education for its potential for cyberlearning.

Technologically, blog systems offer an intuitive platform for publishing and commenting on the web with a content delivering mechanism that automatically updates the bloggers (i.e., blog authors) and readers about the latest content (Kim, 2008). This intuitive platform opens up the opportunities for contribution and participation on the Web in this information age (Hsu, Ching, & Grabowski, 2009). Pedagogically, blogging activities can help students develop a range of essential skills, such as writing, reflection, and critical thinking skills, depending on the desired learning goals. From the perspective of learning, "knowledge is created, shared, remixed, repurposed, and passed along" (Mason & Rennie, 2008, p.10) in a Web 2.0 environment such blogs. Socially, blogs create virtual spaces for interaction between the instructor and students, among the students, and between students and the public with access to the web (Fessakis, Tatsis, & Dimitracopoulou, 2008). With this increased interactivity, blogs enable development of communication and collaboration skills and serve as a powerful channel for social networking that encourages students to establish their support groups for learning (e.g., learning communities) and/or for professional development (e.g., communities of practice) (Gloff, 2005).

Although blogs theoretically may seem to be a promising technology for learning and instruction in higher education, research findings on the educational blogging are not always positive in terms of whether blogging activities had helped students achieved the intended learning goals (Divitini, Haugalokken, & Morken, 2005). Moreover, the emerging research on blogging at various higher educational contexts reveals challenges and issues associated with designing and implementing such activities. The accumulative research findings of successful and unsuccessful blogging activities suggested valuable implications for future design and implementation of such activities. This paper systematically examined empirical research studies on educational blogging in the context of higher education. The purpose of this presentation is to provide considerations for designing and implementing effective educational blogging activities to help achieve intended learning goals. Specifically, the following research questions were asked:

1. What are the learning goals that can be achieved via educational blogging?
2. What are the issues and challenges of educational blogging activities?
3. What skills do students need to develop in order to blog effectively for learning?

Research Method

This study systematically examined more than 10 existing empirical blogging research studies published in peer-reviewed journals to answer the aforementioned research questions. In general, the included studies were published between 2003 and 2009. The research articles were selected from these years due to the increasing popularity of blogging starting at 2003. Most of the studies were evaluation research or conducted using case study method. Table 1 presents the list of the included research articles along with the participant levels, number of participants, subject matter, and research method.

Table 1. *The articles of blogging research reviewed and included in this paper*

	Participants' Education Level	Number of Participants	Subject Matter	Learning Goals
Ellison & Wu (2008)	College students	52	Not specified	Writing and peer commenting to help understand course content
Farmer, Yue, & Brooks (2008)	Undergraduate freshmen	225	Art	Student interaction through reflecting and discussing on course content
Fessakis, Tatsis, & Dimitracopoulou (2008)	University students	7	ICT applications and product development for math instruction	Design and development of simple educational applications and learning activities for technology enhanced learning environment
Glass & Spiegelman (2007)	Community college students	Students from 4 courses	Math and Computer Sciences	Information literacy skills
Ladyshewsky & Gardner (2008)	Undergraduate students	38 students in groups of 4 or 5	Physiotherapy clinical field work	Reflective practice
Philip & Nichollas (2009)	Undergraduate students	21	Playbuilding in drama	Analytically and evaluatively reflective thinking skills
Sharma & Xie (2008)	Graduate students	8	Instructional Design	Reflection
Shoffner (2009)	Graduate students (pre-service teachers)	9	Not tied in with any courses.	Reflective practice
Tekinarslan (2008)	University students	42	Computer Usage	Research and writing skills; blog usage skills
Wassell & Crouch (2008)	Undergraduate students	24	Multicultural Education	Understanding of Diversity
Williams & Jacob (2004)	Graduate students in MBA program	51 students from two courses	Macro Economics and International Political Economy	Cross-course discussion
Xie, Ke, & Sharma (2008)	Undergraduate freshmen	44 participated but data were collected only from 27 students	Political science course	Reflective thinking skills

Findings

Learning Goals

The analysis indicates that blogging activities were designed to achieve a wide range of learning goals.

Reflective thinking/practices. Most frequently, blogging activities were adopted to replace the traditional journaling activities to promote reflective thinking. Serving as learning journals, blogs provide space for individuals to express their observations and perspectives, and to make connections between what they learn and their experiences (Gunawardena, et al., 2009). Studies showed that college and master's students improved their reflective thinking through regularly keeping a journal using blogs to reflect on their learning, projects, or clinical field experiences (Sharma & Xie, 2008; Xie, et al., 2008; Philip & Nichollas, 2009; Ladyshewsky & Gardner, 2008; Shoffner, 2009). In addition to the reflective skills, students in several studies indicated that they valued observational learning because they are able to learn from peers' experiences by reading their reflection on the blogs. The vicarious learning may augment students' applicable knowledge by assimilating relevant experiences from peers. It can also aid on the affective aspect of learning. When students understand that they are not alone when facing certain learning challenges, they may reduce their self-doubt and become more confident in their learning.

Critical thinking and writing skills. In another study, college students in the area of mathematics and computer sciences developed their information literacy skills such as searching and evaluating needed resources for composing while writing blog entries (Glass & Spiegelman, 2007). Preservice teachers in a course of multicultural education had applied learned theories to analyze related events and/or news through blogging (Wassell & Crouch, 2008). By reading peers' blogs, these preservice teachers also gained critical perspectives to understand the cultural issues that they did not have a chance to experience by themselves. Elisson and Wu (2008) explored student perceptions of blogging and whether writing and commenting on peer blogs helps students understand the course content. They found that students deemed reading others' blogs helped their understanding of the course content the most. On the other hand, making commenting on other blogs or receiving comments was found to be less helpful. In addition, commenting activity caused uncomfortable feelings among students.

Collaboration and communication. Other studies also explored how students took advantage of the commenting function and the role of group blogs in supporting group interaction and activities. For example, Fessakis and his colleagues (2008) created a group blog for a group of undergraduate students in math education to enhance a collaborative "learning by design" activity, with the goal to publish a common set of activities as participants' collaborative product. In Philip and Nichollas (2009), group blogs were also used to foster group communication and to serve as a project management platform for a collaborative playbuilding activity in a drama course. When working collaboratively on a project where communication is key to ensure a successful experience, research findings suggested that group blogs provide an alternative and valuable space for students to communication and collaboration.

Issues, Challenges and Implications

While the empirical evidence supports the educational value of blogging activities, issues and challenges associated with designing and implementing successful blogging activities also emerged. First, the findings of the examined studies suggest that well-structured learning activities are essential for students to perform their learning tasks. Among the studies we reviewed, several of them did not inform students about the requirement for frequency, length, content, and assessment criteria for their blogging, which led to student confusion or even frustration about the learning task (e.g., Sharma & Xie, 2008). This finding suggests that course instructors and designers need to provide explicit guidelines on the activity requirement. It is essential to specify the frequency, length, and assessment criteria prior to the blogging activity. It would also be beneficial to students by making the guiding questions available to prompt their reflect on their practices. For students who are new to a subject matter, these questions can be designed to elicit deeper understanding or analysis that exemplifies expert thinking and reflection. In addition, to increase students' motivation in participating blogging activities, reasonable weight in the course grade and sufficient time for completion has to be in place. Instructors also need to make it clear regarding the purpose (Kerawalla, Minocha, Kirkup, Conole, 2009) and rationale of including the activities so that students do not perceive the activity as just another piece of busy work.

Second, students often brought into the class their pre-existing perception of blogs and “proper” ways of writing blogs (Ellision & Wu, 2008; Kerawalla, et al, 2008). This perception might not be aligned with instructors’ vision of educational blogging, which could lead to confusion and low motivation on participating in blogging activities.

Depending on the learning goals, instructors may need to provide guidance for students on reconciling their perception of blogging with academic writing. If blogging is used as a way to keep reflective or learning journals, instructors may emphasize the non-formal voice that conveys a conversation regarding one’s learning progress between students and the instructor. On the other hand, if blogging is used to incubate writing ideas and compose drafts toward academic papers, instructors need to make the expectations explicit to students that the appropriate tone and writing style needs to be adopted.

Last but not least, privacy and security issues surfaced in almost all the examined studies. As a publishing platform, blogs make it easy for individuals to develop their voices on the Web. However, for individuals who are cautious and concerning about the privacy, protecting privacy while publishing on the Web is an issue. This may limit their perceived freedom of expression (Divitini, et al., 2005). On the other hand, students who are not aware of the privacy issues may make public too much personal information or may violate the confidentiality of others by accidentally publishing peers’ information when blogging due to their unawareness. Revealing personal information on the Web may lead to security issues. To address the privacy and security issues, many blog systems can be set up in a way to protect privacy by making blogs available only to designated group members (students in a course), or by making blogs/blog entries unsearchable through search engines. Students can also choose to use pseudonym and create a pseudo identity on the Web (Ellison & Wu, 2008). Nonetheless, students would benefit if instructors make the issue of privacy and security explicit and discuss good practice of protecting confidentiality with their students.

Skills for Participating in Blogging Activities

To participate effectively in blogging activities, students need much more instructional support in addition to a technological tutorial on how to navigate through the blogging systems. Our review found that blogging activities were designed to help learners in the higher education to develop important skills, such as reflective thinking, writing, information literacy skills, and communication and collaboration skills. Many of the reviewed studies incorporated a tutorial on the basic functions of blogging systems to train students on using the technology. These studies indicated that students usually are able to learn the basic mechanisms of authoring and commenting on blogs from a less than one hour of training (e.g., Tekinarslan, 2008). Yet, students were usually inadequately prepared for the learning tasks and wished for more instructional guidance on, for example, writing properly for specific purpose (Tekinarslan, 2008) or reflecting on learning and/or field experiences (Xie, et al, 2008; Farmer, Yue, & Brooks, 2008). When the blogging activities asked students to comment or provide feedback on others’ writing, it was found that undergraduate students were ill-prepared for confronting such task due to lacking experiences or skills. Students typically did not feel comfortable critiquing, or failed to discuss or comment on peers’ work in depth (e.g., Xie, et al, 2008; Wassell & Crouch, 2008; Farmer, et al., 2008; Fessakis et al., 2008). Thus, their feedback to peers’ work may only scratch the surface or focus on the technical aspects of the writing. Commenting skills involve critical thinking and questioning skills. Students will need to develop these skills before they are capable to provide constructive comments comfortably. They would benefit from instructional support on how to provide constructive feedback for their peers.

Recommendations for Instructional Design

The findings of this review indicated that many studies used blogging activity as an individual activity, meaning that no interaction or collaboration was required as part of the activity. While some instructors may request or expect that students voluntarily engage in the reading and commenting on each other’s blog entries, the results of this review suggests that the interaction between students may not happen without guidance. In their article, Gunawardena and her colleagues (2009) compared the focus of Web 1.0 and Web 2.0 technologies and the learning paradigms accompanied by these technologies. They distinguished Learning 2.0 from Learning 1.0, suggesting that Learning 2.0 emphasizing more on collaborative learning and peer-to-peer interaction, which are fundamental value promoted by Web 2.0 technologies. To promote Learning 2.0, instructional design of the blogging activities will need to build in mechanisms for interaction or collaboration. Instructional designers may consider incorporating instructional strategies that promote pair or group work when designing blogging activities.

To promote interaction between students and to develop critical thinking skills, a peer review mechanism can be built into the blogging activity. Engaging in peer review activities, students are encouraged to develop skills in critical examination and exchange, as well as consider multiple perspectives (Boud & Falchikov, 2007), and identify the aspects that had been overlooked. Students are also exposed to opportunities of developing academic discourse and reflection of their own learning (Lavy & Yadin, 2010). Research studies also found that the feedback provided by peers was taken seriously by students and helped refine students' original thinking (Lavy & Yadin, 2010). To guide students in peer review activities through blogging, guidelines on how to interact and how to provide constructive feedback need to be in place. For example, the length, frequency, and time for providing feedback should be specified. As far as the content of the feedback, it would be helpful to provide questions that direct student attention to key areas for constructing feedback. Depending on how familiar students are with the peer feedback activity, instruction may be needed to deliberately develop students' peer review skills and assess formally on such skills to increase motivation in skill acquisition (Macdonald, 2003). To close the learning loop, a reflection activity will offer an opportunity for students to examine their learning as reviewers and as review receivers. This would allow students to be more metacognitively aware of their roles and how each role contributes to their understanding of the subject and/or development of other important skills such as critical thinking skills.

Designing authentic tasks for blogging activity is likely to promote Learning 2.0. This review found that far too many existing research studies used blogs as a publishing platform instead of a space conducive for interaction, communication, collaboration and critical thinking. To elicit desired interaction and collaboration among students, blogging activities need to be designed to incorporate authentic tasks that involve collaboration. Authentic tasks have the following characteristics: ill-defined, real-world relevance, opportunities to collaborate, a sustained period of time for investigation, and opportunities to detect relevant vs. irrelevant information (Herrington & Oliver, 2000). When engaging student learning in such an authentic task, blogs can be incorporated as collaboration and communication tools. For example, in Philip and Nichollas (2009) study, students collaboratively created a play over a period of time and performed the play to real audience. During the process, group blogs were used effectively for coordination, communication, and management purposes, as there was a real need to interact and communicate among the members toward a common goal. As a result, the group blog was used effectively and desired learning goals were achieved. On the other hand, when the blogging activity does not involve interaction or collaboration with peers, it is unlikely that students will work with each other and view each other's blogs.

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Developing an Educational Technology Knowledge Management System for PK-12 Teacher Professional Development

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Descriptors: Innovations in Open Educational Resources
Teacher Professional Development

Abstract

The edu-techKNOWiki project enlists the collaboration of the educational technology professional community nationwide to develop a knowledge management wiki that organizes information related to educational technology, includes a sociogram of professionals in the field, and provides access to an environment of interactive learning communities. The interface to the system is based on an analysis of tasks performed in schools using educational technology and the socio-cultural patterns surrounding problem solving on those tasks. This innovative system is an open educational resource for teacher professional development.

Introduction

Information in the area of educational technology is extensive and evolves at such a rapid pace that educators struggle to keep up-to-date. Research in teacher professional development related to technology infusion demonstrates that short-term strategies such as workshops are not effective. Availability of just-in-time information and person-to-person support may be helpful. The emergence of Web 2.0 collaborative technologies marks a paradigm shift in the ways in which the Internet is used in schools, away from a depository of content information and toward means of collaboration for knowledge sharing and building. This article shares a project in which faculty members in educational technology are enlisting the collaboration of the educational technology professional community nationwide to develop edu-techKNOWiki, a knowledge management wiki that organizes the knowledge base related to educational technology, a sociogram of professionals in the field, and an environment of interactive learning communities.

A wiki is an online collaborative tool. The development of the content of the wiki is by definition a collaborative enterprise of the community that uses it. Registered members share creation and editing capabilities. Wiki is a word in Hawaiian that means fast; its usage in the lexicon of electronics applies because an electronic wiki enables rapid development of content material, based on a "What I Know Is…" contribution. Wikis are based on an open software architecture system that encourages collective development. Such a system in professional development would benefit everyone who used it either to access or to contribute to the development of its knowledge system.

The name edu-techKNOWiki was selected to reflect the centrality of learning to the field of educational technology with the embedding of the word KNOW. KNOW also highlights that the wiki is a knowledge management system. The beginning syllables, "edu-tech" connect with both educational technology and with the Internet suffix .edu since the system is Internet-based.

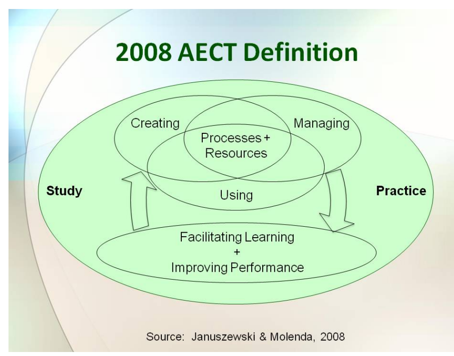
This innovative system is an open educational resource for educational technologists, one sector of which is teacher professional development. As a professional development strategy it provides teachers who want to infuse technology in their classrooms the opportunity to access constantly updated information as needed and to interact with other teachers and educational technology professionals for problem solving.

Knowledge Base

The knowledge base contains the substance of the knowledge in the field of educational technology including historical, theoretical, and technical information, organized into nodes. It reflects what we have done, what we study, and how we behave ethically and think innovatively – about hardware, software and process.

Conceptual Description

The field of educational technology is engaged in an iterative process of defining itself. Januszewski and Persichitte track the evolution of the definition as part of their commentary with the 2008 definition (2008). The first Association for Educational Communications and Technology (AECT) sponsored definition was developed in 1963 as a definition of audiovisual communications: "Audiovisual communications is that branch of educational theory and practice concerned with the design and use of messages which control the learning process… the planning, production, selection, management and utilization of both components and entire instructional systems" (Januszewski & Persichitte, p. 260). Subsequent definitions appeared in 1972, with the organization's change from the Department of Audiovisual Instruction to the Association for Educational Communications and Technology; 1977, which formally defined educational technology as a process; and 1994: "Instructional technology is the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning" (Seels & Richey, 1994, p. 1). The most recent definition was published in 2008. "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources." (Januszewski & Molenda, 2008, p. 1) These definitions document how we think about our field and how we have identified the field of educational technology across time. They constitute our reflective knowledge of ourselves and of our practice. As such they require a prominent place in edu-techKNOWiki.



In addition, because educational technology is practiced across a range of contexts including public P-12 education, higher education, corporate business and industry, health education and Military training, standards and elements have emerged from other professional organizations such as the International Society for Technology in Teacher Education (ISTE). Their National Educational Technology Standards for Teachers 2008 (NETS-T), for example, influence how educational technology practitioners in schools view the field. Teachers think about their role with educational technology as reflected in the ISTE's standards:

- Facilitate and Inspire Student Learning and Creativity
- Design and Develop Digital-Age Learning Experiences and Assessments
- Model Digital-Age Work and Learning
- Promote and Model Digital Citizenship and Responsibility
- Engage in Professional Growth and Leadership

The International Board of Standards for Training Performance and Instruction (IBSTPI) has published competencies for educational technologists (instructors, instructional designers, and training managers) across training environments. These standards and competencies reflect perspectives on educational technology from contexts of practice.

As reflected in the names of educational technology academic programs, there are varying perspectives on what the field should be called: educational technology, instructional technology, instructional systems technology, learning technologies, learning sciences. There are those of us who think the debate over a name has little meaning while others consider it of paramount importance to our identity.

These definitions and standards of educational technology serve as the interlinked structural foundation for the knowledge base, but edu-techKNOWiki is more than a collection of published information nodes. As is typical with a wiki, each node has an associated page for discussion. The openness and flexibility of the wiki format promote transparency and inclusion, permitting all entries, while the discussion screens provide a location for debate and discussion. The overall impact of information and discussion contributes to the conceptual evolution of the knowledge base of the field. Varying perspectives can be expressed; either consensus can be achieved or alternative perspectives can be developed.

Development process

The development of edu-techKNOWiki has involved enlisting the collaboration of the community of educational technologists. All the research literature on persuasion speaks of the importance of face-to-face contact, so over the past year we have visited campuses with large graduate programs in educational technology including Florida State University, University of Georgia and Indiana University. During these visits we met with recognized leaders in the field and engaged them in thinking about the wiki; two of them were on the definitions committee for the 2008 definition. We asked their for input concerning the top programs in the country and names of contacts for those programs. We also identified contacts and secured sponsorship of AECT, whose definitions of the field form the infrastructure for the knowledge base, and began conversations with various other professional organizations including ISTE for similar support.

To publicize the project and garner support, we presented at regional, national, and international conferences: the Eastern Educational Research Association conference in Savannah, Georgia; The Michigan Computer Users in Learning (MACUL) conference in Grand Rapids, Michigan; and the Society for Information Technologies and Teacher Education (SITE) in San Diego, California. We also wrote a chapter about the project for the Educational Media and Technology Yearbook, to be released in February, 2011.

Annually the Professors in Instructional Design and Technology (PIDT) retreat engages faculty members and graduate students from educational technology programs in dialog about issues and new ideas. We attended PIDT in Estes Park, Colorado, to get further feedback about developing ideas for the project and to seek contributions to the knowledge base.

To get things started, we have invited contributors to develop content in chunks related to their expertise and to link that information to descriptor terms from the 2008 AECT definition of educational technology: technology, study, ethics, practice, facilitating, learning, improving, performance, creating, using, managing, processes and resources. Category descriptions of these terms are being developed as well.

The unit of information in the wiki is a node. To establish some continuity and consistency across nodes, the example node on planning for technology (by Barry Fishman, University of Michigan) demonstrates suggested sections: Roots, Buds, Seeds, FAQs and references. Roots document the historical background related to the node while Buds discuss how the topic might influence or be influenced by emerging processes and technologies. The format for the node asks for reference to people (leaders, scholars and practitioners in the field) that have importance related to that topic (those who have planted Seeds for the developing thoughts). For ease of access to the information, each node contains frequently asked questions (FAQs), and references help to give authority to the information.

There are many models through which content for the wiki might be developed. Individual construction of a node or set of related nodes is of course open to anyone who creates an account. We urge faculty members in the field to create a course assignment in a graduate course to familiarize their students with edu-techKNOWiki as a future resource, and to generate content. Based on contacts made at PIDT, we have begun to establish relationships to provide a venue for promoting the work of various AECT groups such as the Definitions and Terminology Committee and the Publications Committee. The usefulness of this resource for the field and everyone involved in the field will depend upon the engagement and contributions of the professional educational technology community.

Sociogram

If organized information in a knowledge base is important to a field, its people share that level of importance. Our sociogram is a profile-based representation of the links of educational technologists to the field and each other.

Members of the field of educational technology range from novice to expert. One element of successful professional development across the field is mentoring; interaction fosters the evolution of ideas. Faculty members mentor doctoral and master's students. Technology facilitators mentor teachers. Researchers who develop new concepts challenge and extend each other's thinking. While we visited Indiana University, Charles Reigeluth told us that as he was focusing on developing instructional theory, interactions with M. David Merrill about similarities in elements across theories led him on a new path for one of the later volumes of the "green books." While some of these types of interactions are private and copyright protects intellectual property, a venue for open, transparent dialog may be of value both to participants and the field.

Because educational technology as a profession has developed largely from academic departments, the starting point for the sociogram that provides access through edu-techKNOWiki to people in the field is through the major academic programs around the country, starting with the following: Arizona State University, Boise State University, Brigham Young University, Florida State University, Indiana University, Penn State, Purdue University, San Diego State University, Syracuse University, University of Colorado – Denver, University of Georgia, University of Missouri, University of Memphis, University of Northern Colorado, University of South Alabama, Utah State University, Virginia Tech, Wayne State University.

Access to different functions in the wiki is restricted by account, although the restrictions are few. Anonymous visitors can view anything in the wiki. Individuals who register and have an affiliation with any academic or professional role in the field can view everything, create and edit knowledge base pages, participate in discussions, make their own professional profile page and use their profile discussion page as a professional blog.

Some content is protected from almost everyone. For example, a cohort of leaders in the field were invited to be project Keynoters. While their contributions are linked into the knowledge base, their Keynoter pages are not editable.

The first entries into the sociogram are these "Keynoters" - leaders in the field who have provided some support to the project through their agreement to be featured and honored for their contributions. As an example of a graduate student project which both fulfilled course requirements and resulted in the development of wiki content, graduate students from Eastern Michigan University this summer studied the publications and resumes of the Keynoters, and then interviewed them to ask what they considered their most important contributions to the field. In addition, Keynoters were asked to consider the directions the field might be heading and where their future work would fit into the developing field. Their contributions to the field have been captured through video interviews, writings and multimedia presentations.

Attendees at the 2010 AECT conference in Anaheim will have the opportunity to create an edu-techKNOWiki account and establish their profile and invite their colleagues to participate. Once they have created an account, these conference participants can begin creating content for the knowledge base.

Interactive Learning Communities

Perhaps the most common way of accessing information in the knowledge base will be through the wiki search engine. People may connect with other people in the sociogram by finding their classmates and instructors from their graduate programs. The role of the third part of the edu-techKNOWiki is to bring the people and the information together to solve problems and provide professional development.

Conceptual Description

Conceptually, the third element of the project is to provide a collaborative environment for the development of communities of practice surrounding use of educational technology across contexts of practice (PK-12 schools, higher education, corporate training, health, military and international settings), and where the context of practice is research, a community of research. Wenger (2006) defines communities of practice as: "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly." Wenger contrasts community of practice to clubs or networks between people, indicating that a community of practice centers around a commitment to a "domain of interest" through which members "build relationships that enable them to learn from each other." Physical proximity is not necessary, but opportunities to problem solve together, share information, experiences and assets are. The first context in which an interface to communities of practice in edu-techKNOWiki is developing is P-12 education.

P-12 schools encourage the infusion of technology into all classrooms, but the level of experience with technology and support provided varies widely. Educational technologists fill a variety of roles at the school and district levels, but often have limited time with individual teachers. Through the wiki communities of practice, teachers and technology facilitators will have access to experts in the field as well as others with common interests to engage in problem solving about technology infusion. The learning community page, like other wiki pages, can be established by any member by describing the domain of the problems to be discussed. Participants can then use the discussion pages for conversation, as well as share links to the knowledge base and other helpful resources.

Development Process

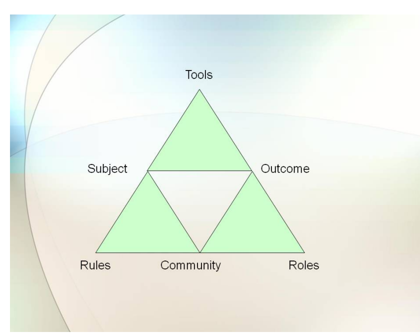
As with major development projects, a solution cannot be designed without analysis of the context and content. Development of the problem solving interface for the P-12 learning communities began with an analysis process based on a modified Delphi technique to identify and categorize the tasks which are performed in schools using educational technology. Further analysis applied Activity Theory (Engeström, 1987, as cited in Marken, 2006) a process in which human behavior is used as a basis of task analysis that examines both the tasks and the opposing forces present in the human context in which the tasks are performed. Researchers in the development of knowledge management systems have found Activity Theory useful as a means for considering culture when developing training modules (Schwen, Kalman & Evans, 2006).

Graduates from the last ten years from the educational technology master's program in a midwestern university who currently work in a P-12 educational environment were invited to participate in a modified Delphi process to identify the tasks for which P-12 teachers use educational technology. Participants individually listed all of the tasks for which they use technology in the schools. Facilitators compiled the list of more than 50 items into loose categories and invited participants to edit and prioritize the categories and re-assign and align the tasks. The result was a list of 15 categories of tasks, with those related to use of technology in teaching and learning as the highest ranking:

- Support student learning
- Teach students about/how to use technology and facilitate their use of technology as a tool
- Provide professional development
- Communicate information
- Promote access for special needs and/or overcome limitation(s)
- Assess learning
- Plan instruction
- Create and deliver visual presentations
- Develop and deliver distance learning
- Collect data and perform measurements
- Manipulate, analyze and interpret data
- Manage technology resources
- Organize and store information
- Plan, draft/design/create, proofread, revise and publish text and graphic representations of information
- Use hardware in instruction (integrate technology into instruction)

Once categories were identified, individual interviews were scheduled with participants to discuss their use of educational technology in the schools. The interview protocol, developed based on the Eight-Step Model for examining a situation (Mwanza, 2001, as cited in Marken, 2006), included the following questions about the eight elements of every activity:

1. Identification of the activity -What sort of activity am I interested in?
2. Identification of the goal (objective) of the activity—Why is this activity taking place? What will change as a result of this activity?
3. Identification of the people (subjects) involved in this activity—Who is involved in carrying out this activity?
4. Identification of the tools/processes mediating the activity—



By what means are the subjects carrying out this activity?

5. Identification of the rules and regulations mediating the activity—Are there any cultural norms, rules or regulations governing the performance of this activity?
6. Description of the division of labor mediating the activity—Who is responsible for what, when carrying out this activity and how are the roles organized?
7. Description of the community in which activity is conducted—What is the environment in which this activity is carried out?
8. Identification of the desired outcome - What is the desired Outcome form carrying out this activity?

In addition to information about the tasks themselves, analysis of responses to these questions can reveal contradictions between opposing forces within each element, known as primary contradictions. An example of a situation identified in the study, in which an element could contradict itself, was a situation in which a member of a technology support team for a vendor, who usually interfaced with the technology facilitators in the school rather than directly with teachers, found that budget cuts had forced termination of most technology facilitator roles. Loss of these critical roles put the vendor into the role of direct teacher support. The vendor both wanted to lobby for re-hire of the technology facilitator positions and wanted to maintain direct support of the teachers. The conflict inherent in the situation exists because the vendor's goals conflict with each other and cannot both be achieved within this cultural system.

To unveil secondary contradictions (between elements rather than within any one element) questions were asked that combined the elements. For example:

- What Tools does the Subjects use to achieve their Objective and how?
- What Rules affect the way the Subjects achieve their Objective and how?
- How does the Division of Labor influence the way the Subjects satisfy their Objective?
- How do the Tools in use affect the way the Community achieves the Objective?
- What Rules affect the way the Community satisfies their Objective and how?
- How does the Division of Labor affect the way the Community achieves the Objective?

Communities of practice develop around problems. The problems occur where contradictions exist within or between activities.

Technical Issues

Technically the wiki is served from a virtual server and uses MediaWiki, the same software engine that drives Wikipedia, arguably the most successful online collaboration project (http://en.wikipedia.org) in the world.

Points of interest will include the variety of ways in which users can enter the system. The most common means will be through alphabetical or topical search. The more innovative interface is the problem-based entry, based on an Activity Theory analysis of tasks performed by PK-12 educational technologists. Sections accessed through this interface serve as the foundation of the PK-12 communities of practice for ongoing teacher professional development in technology integration. Future development of similar interfaces is anticipated for educational technologists across other practice contexts such as business and industry, higher education, military, health and international.

Future

The strength of edu-techKNOWiki is that it belongs to the community that comprises the field of educational technology; it represents the dynamic, collective thinking of that body of professionals and permits the evolution of the record of those thoughts. The ongoing development process must involve faculty and graduate students in educational technology programs nationwide as well as practitioners. In addition, in the future we foresee a board of directors representing sponsoring organizations and practitioners in all areas of the field. It has been suggested that organizations willing to provide server space for the wiki might participate in a rotation to support shared ownership of the edu-techKNOWiki.

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Evaluation of an Online Master Program: From the Distance Learning Users' Perspective

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Abstract

The growth of distance learning in higher education has heightened the need to evaluate the effectiveness online degree programs. Twenty-eight educational practitioners pursuing an online Masters of Education degree participated on this evaluation study. The analysis of their responses to a 46-item online survey showed the program effectiveness; recommendations for improvements on course design and development, assessment strategies and learner support were made.

The Need for this Study

The increasing growth of online programs in higher education calls for a need to evaluate these programs in a systematic way. In this study Fitzpatrick, Sanders & Worthen's (2011, p. 7) definition of evaluation is used. They define evaluation as determining "the value, worth or merit of an evaluation object in relation to a set of criteria."

As cyberlearning becomes a trend, being able to conduct methodologically sound evaluative studies on the impact of online programs becomes an important part of the program itself.

Program evaluation is a vital element of successful distance education programs (Rovai, 2003). It should highlight students' learning contexts and serve as a vehicle for students to voice their recommendations for program improvement. Therefore, this study is focused on evaluating the effectiveness of an online Master's program from the students' or users' perspective. Online graduate programs should be designed with adult learners in mind to meet students' goals, expectations and their learning styles. Do online programs effectively offer courses that accommodate student's needs? To answer this question and others, an evaluation of an online Master's of Education degree program in curriculum and instructional technology was conducted. The results of this evaluation are described in this paper.

Goals of this Study

The online program evaluated was offered at a major research and land-grant university in the U.S. This degree was created to meet the needs of adult learners, especially K-12 teachers, and other educational practitioners, who were seeking and an advanced degree in Education, but could not enroll in a residential program. Using a cohort model, students enter the program every other year and enroll in one course per semester completing the program in three years. In the fifth year (after one cohort had completed the program, one cohort was in its second year, and a third cohort was starting the program), a study on the effectiveness of the online M.Ed program from the perspective of the distance learning users became a priority. The purpose was to conduct a systematic evaluation to inform decisions and actions for improving the quality of the online program. The evaluation addressed the following questions:

Q1: Has the program achieved its purpose?
Q2: Has the program helped students to define their educational goals?
Q3: Has the program content met the students' expectations?
Q4: Are students applying the knowledge and skills that they have learned in this program into their own professional practice?
Q5: What kind of issues have students encountered while pursuing this program?

Evaluation Methodology

The Online Program

The online Master's of Education in Curriculum and Instructional Technology (M.Ed in CIT) graduate program consists of 9 courses and 32 credits offered in a learning community environment to a cohort of students with a new cohort starting every two years. Cohort groups ranged in size from 8 -20 students. Most of the courses were delivered using WebCT as the learning management system. A creative component, such as an action research study or a portfolio, served as the culminating experience for students to synthesize their learning throughout the program.

The program uses a blended instructional approach where 85% of the instruction is on-line and 15% is face to face. Generally, students enrolled in one course per semester and each course begins with a face-to-face meeting (some courses had additional face-to-face meetings during the semester). When feasible, students travel to the university. Those who cannot travel, participate via internet conferencing (e.g. Skype, etc.). The face-to-face meeting allows for students and instructors to see each other and get to know one another in a non-mediated forum. In these initial meetings participants review course expectations, receive essential instruction (best provided face-to-face) and use the on-site technology laboratory facilities. Technical support is provided by the program coordinator, who assists students in resolving technical problems, assists faculty in the design of online course materials, and serves as a communication liaison between faculty and students. At the time of the study, there were six full-time faculty members and one administration staff involved in the M.Ed in CIT.

Students entering the program the same semester are grouped into cohorts. Cohorts have been used effectively in a wide variety of educational settings to foster learning (Barnett & Muse, 1993); cohorts are especially important for on-line students to quickly acclimate to being physically distant from their peers and instructors. Cohort grouping helps to develop and maintain group dynamics across individual classes throughout the program. But to prevent the phenomenon of "group think" (where everyone is so familiar with each other that new ideas and approaches are rarely introduced, explored, and accepted) 3-5 additional students, not in the cohort, enroll in courses with the cohort students. That is to say, students who may be in the traditional face-to-face program or in other degree areas often enroll in courses with the online cohort students.

The Participants

Twenty-eight students participated in this study from January to December 2009. All students had a background in teaching, and most were or had been full time K-12 teachers. Out of the 28 students, four were from the first cohort (cohort 1, beginning in 2004), 11 from the second cohort (cohort 2, beginning in 2006), and 13 from the third cohort (cohort 3, beginning in 2008).

The four cohort 1 students were females between the ages of 20 and 40. In cohort 2, four students were male and seven were female ranging in age from 20 to 50 years old. Cohort 3 had seven males and six females ranging from 20 to over 50 years old. Additional demographic information about the students who participated in this study is summarized in Tables 1, 2 and 3.

Table 1: Student Online Survey in Cohort 1 (Demographic Data)

Category		Number of Students n = 4
Gender		
	Female	4
Age		
	20 – 30	3
	31 – 40	1
Position		
	K12 Teacher	4

Table 2: Student Online Survey in Cohort 2 (Demographic Data)

Category		Number of Students n = 11
Gender		
	Male	4
	Female	7
Age		
	20 – 30	7
	31 – 40	3
	41 – 50	1
Position		
	K12 Teacher	5
	Technology Coordinator	2
	Elementary Technology Teacher	3
	Instructional Designer/Software Engineer/Trainer	1

Table 3: Student Online Survey in Cohort 3 (Demographic Data)

Category		Number of Students n = 13
Gender		
	Male	7
	Female	6
Age		

	20 – 30	7
	31 – 40	3
	41 – 50	2
	more than 50	1
Position		
	K12 Teacher	6
	Technology Coordinator	5
	Instructional Designer/Software Engineer/Trainer	2

Data Collection Method

An online survey was used to collect the data. It consisted of 46 questions: 4 questions on demographics; 7 open-ended questions; and 35 close-ended questions with a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The areas addressed on the survey were: (a) program objectives, (b) learning activity experiences, (c) delivery of materials, (d) instructor, (e) assessment, and (f) program administration. A pilot study of the survey was conducted to support reliability of the scores generated by the online survey items. This survey used some of the evaluative areas identified by Rae (2004) and the Michigan State University Virtual University Design and Technology (2007).

Data Analysis

Quantitative data was analyzed using SPSS. Qualitative data from the open-ended items were analyzed through the use of thematic coding and content analysis.

Results from the Evaluation

The online masters program evaluated had an 88% persistence and graduation rate for its cohort 1 students beginning in 2004, with 7 of the 8 students remaining in the program until the completion of all coursework and successfully graduating with a Masters of Education degree. Cohort 2 students, who began in 2006, had a 92% persistence and graduation rate with 12 of the 13 students completing all coursework and graduating in Spring 2009 (Correia et al., 2009). Out of the 17 students initially enrolled in cohort 3 that started in 2008, 14 are expecting to graduate in Spring 2011.The results from the evaluation are organized by cohort and evaluation question.

Cohort 1 Student Perspectives

The return rate for students in Cohort 1 was 57% for the online survey. Four (57%) out of seven students who graduated responded to the online survey.

Q1: Has the program achieved its purpose?

Cohort 1 students responded positively to the survey items related to the program's purpose with an overall average of *4.65* (Table 4). However, the mean score for item 2, 3, and 4 was below average *(item 2: m = 4.25, item 3: m = 4.5, item 4: m =4.5)*. Students expressed mixed opinions regarding the fact that the program was improving their leadership and management skills. Open-ended comments reflected concerns related to balancing full-time work and pursuing the online degree program.

Table 4: Online survey items categorized under Q1 (cohort 1).

		Response (%)					
#	Items	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	n = 4 (Mean)
1	This program provided me with real-life experiences useful to my profession.	-	-	-	-	100%	5

#	Items	Response (%)					n = 4 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
2	I have improved my leadership skills by attending this program.	-	-	25%	25%	50%	4.25
3	This program helped me to better understand learning and teaching issues.	-	-	25%	-	75%	4.5
4	I improved my management skills by attending this program.	-	-	25%	-	75%	4.5
5	The program was flexible enough to accommodate my needs.	-	-	-	-	100%	5
	Average of Q1						4.65

Q2: Has the program helped students to define their educational goals?
Cohort 1 students were satisfied with their course experiences with an average score of *4.8* (Table 5). They stated the following opportunities were available to them: (1) to engage in collaborative activities, (2) to use their own professional experiences in course activities, (3) to discover new things, and (4) to synthesize new information; however, students were not that positive in relation to the time they had to learn at their own pace, and the availability of well-designed social and practical activities (item 3, 8 and 9 were below average).

Table 5: Online survey items categorized under Q2 (cohort 1).

#	Items	Response (%)					n = 4 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
1	There were collaborative activities in the courses I took.	-	-	-	-	100%	5
2	I have learned from collaborating with my classmates.	-	-	-	25%	75%	4.75
3	This program offered well-designed social activities.	-	-	-	50%	50%	4.5
4	Activities required me to use my own professional experiences.	-	-	-	-	100%	5

#	Items	Response (%)					n = 4 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
5	There were practical activities in this program.	-	-	-	-	100%	5
6	I had many opportunities to discover new things in this program.	-	-	-	-	100%	5
7	Course activities encouraged me to synthesize new information.	-	-	-	-	100%	5
8	In this program, practical activities were well-prepared.	-	-	-	50%	50%	4.5
9	I was given enough time to learn at my own pace during the program.	-			50%	50%	4.5
	Average of Q2						4.8

Q3: Has the program content met the students' expectations?
Most of cohort 1 students agreed that the program content met their expectation with an average score of *4.5*(Table 6). However, open and close-ended questions showed some concerns about adequate evaluation activities to assess their own learning and opportunities to assess themselves in every learning activity. Mean scores for items 10 and 11 in Table 6 were significantly below the average *(item 10: m = 3.5, item 11: m = 3)*. Students recommended additional and timely feedback from the course instructors about students' progress.

Table 6: Online survey items categorized under Q3 (cohort 1).

#	Items	Response (%)					n = 11 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
1	I was able to obtain course materials easily via a variety of technological tools.	-	-	-	-	100%	5
2	I was able to work in WebCT.	-	-	-	-	100%	5
3	Course materials were well-designed.	-	-	-	-	100%	5
4	Course materials were motivating.	-	-	25%	50%	25%	4
5	Delivery of course materials were suitable for me.	-	-	-	-	100%	5

#	Items	Response (%) Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	n = 11 (Mean)
6	Instructors had good knowledge of subject.	-	-	-	-	100%	5
7	Instructors organized course well.	-	-	-	-	100%	5
8	Instructors were well prepared.	-	-	-	-	100%	5
9	I was able to easily communicate with instructors.	-	-	-	-	100%	5
10	There were adequate evaluation activities to asses my own learning.	-	25%	25%	25%	25%	3.5
11	I was able to assess myself in each activity I participated.	-	50%	-	50%	-	3
12	Student assessment strategies enhanced my learning.	-	25%	-	25%	50%	4
13	Grading was accurate.	-	25%	-	25%	50%	4
	Average of Q3						4.5

Q4: Are students applying the knowledge and skills that they have learned in this program into their own professional practice?

Cohort 1 students were clearly able to utilize knowledge/skills gained from the program in their own professional practice (Table 7). Open-ended questions revealed students were satisfied with this aspect of the online graduate program.

Table 7: Online survey items categorized under Q4 (cohort 1).

#	Items	Response (%) Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	n = 11 (Mean)
1	I could apply what have learned in this program to my profession.	-	-	-	-	100%	5
	Average of Q4						5

Q5: What kind of issues have students encountered while pursuing this program?

Students were asked to rate the administration of the program, which related to the program length and course sequence, support received, and educational cost and value. This aspect received an average rating of *4.75* (Table 8). It seems that the program administration was not an issue for any of the students and that they received adequate administrative and technology support throughout the program. However, items 6 and 7 were rated below the average, which shows that the students were likely not fully pleased cost and value of the overall program.

Table 8: Online survey items categorized under Q5 (cohort 1).

#	Items	Response (%)					n = 11 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
1	The length of this program is adequate to complete a Master's Degree.	-	-	-	-	100%	5
2	The courses I took were logically sequenced.	-	-	-	-	100%	5
3	I was given appropriate administrative support when I had questions (admission, add/drop courses, tuitions/fees)	-	-	-	-	100%	5
4	My major professor encouraged me to pursue my area of interest.	-	-	-	-	100%	5
5	I was given appropriate support when I had any course -related technology problems.	-	-	-	-	100%	5
6	The program cost as a whole was reasonable.	-	-	25%	50%	25%	4
7	The value of education outweighed the program cost.	-	-	-	75%	25%	4.25
	Average of Q5						4.75

Cohort 2 Student Perspectives

The return rate for students in Cohort 2 was 92% for the online survey. Eleven (92%) out of twelve students who graduated responded to the online survey used for this study.

Q1: Has the program achieved its purpose?

Overall, cohort 2 students agreed that the objectives of the program were met. It is shown in Table 9 that evaluative question 1 received overall average of *4.18*. According to students, the program helped them to improve leadership skills. It provided real-life experiences for their profession. However, the mean score for item 3, 4, and 5 in Table 9 was below average *(item 3: m = 4.09, item 4: m = 3.82, item 5: m =4.09)*. The findings indicate that students found the management skills and enhancing understanding of their job after engaged in this program were appropriate, but the course content is still need to be improved. Therefore, it is likely that some of the coursework might not really applicable to their teaching and enhancing their management skills. They commented that they wanted to learn more about the use of technology in the courses, which may contribute positive effect on their own teaching and classroom.

Table 9: Online survey items categorized under Q2 (cohort 2).

#	Items	Response (%)					n = 11 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
1	This program provided me with real-life	-	-	-	63.63%	36.37%	4.36

#	Items	Response (%)					n = 11 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
	experiences useful to my profession.						
2	I have improved my leadership skills by attending this program.	-	-	-	45.45%	54.55%	4.55
3	This program helped me to better understand learning and teaching issues.	-	9.0%		63.63%	27.28%	4.09
4	I improved my management skills by attending this program.	-	9.09%	9.09%	72.73%	9.09%	3.82
5	The program was flexible enough to accommodate my needs.	-	18.18%	18.18%		63.64%	4.09
	Average of Q1						4.18

Q2: Has the program helped students to define their educational goals?
The students were asked to assess the learning activities that they had experienced in order to set their educational goals. Cohort 2 students were satisfied with their course experiences and the average score of satisfaction was *4.42* (Table 10). They indicated that the program structure was flexible and allowed them to work from home, adjust teaching schedules as well as family commitments; however, one student responded that they were not given enough time to learn at their own pace during the program (reflects from item 9 was below average, *item 9: m = 4.36*). Students really appreciated being a cohort group as they learned as much from other students in the group; they were together throughout the program, developed a strong relationship, and could rely on each other for assistance and guidance. The program also provided them with opportunities to get involved in collaborative activities, discover new things, and synthesize new information, which they could connect those experiences into their own classroom teaching. It can be said that the program helps students to set their educational goals through providing the flexibility of the program structure, schedule, and cohort system.

Table 10: Online survey items categorized under Q2 (cohort 2).

#	Items	Response (%)					n = 11 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
1	There were collaborative activities in the courses I took.	-	-	-	36.36%	63.64%	4.64
2	I have learned from collaborating with my classmates.	-	-	18.18%	9.09%	72.73%	4.55

#	Items	Response (%)					n = 11 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
3	This program offered well-designed social activities.	-	-	18.18%	45.45%	36.37%	4.18
4	Activities required me to use my own professional experiences.	-	-	-	63.63%	36.37%	4.36
5	There were practical activities in this program.	-	-	-	63.63%	36.37%	4.36
6	I had many opportunities to discover new things in this program.	-	-	9.09%	54.54%	36.37%	4.27
7	Course activities encouraged me to synthesize new information.	-	-	-	27.27%	72.73%	4.73
8	In this program, practical activities were well-prepared.	-	-	-	63.63%	36.37%	4.36
9	I was given enough time to learn at my own pace during the program.	9.09%			27.27%	63.64%	4.36
	Average of Q2						4.42

Q3: Has the program content met the students' expectations?
Students were asked to evaluate several aspects of the program related to program content, which including course materials, learning support, and assessment. Students were satisfied with these aspects and the average score of satisfaction was *4.32* (Table 11). This indicates that the element of TPACK (Technology, Pedagogical and Content Knowledge) was embedded in the course contents. Although the score was high, students commented that they should have been exposed to more technology tools that could be used in their classroom. It is shown that it is good to have an alternative to WebCT and that it may be better to use contemporary technology tools, so that students are able to work with sophisticated tools in order to enhance their technological skills.
On the other hand, the mean scores for items 10, 11, and 12 in Table 11 were below than category *'Agree' (item 10: m = 3.91, item 11: m = 3.73 item 12: m = 3.91)*. Most students indicated that the course materials were easy to access and well prepared, but be motivating and consistent in courses organization.

Adequate and timely feedback from instructors is essential in any teaching and learning setting. Students reported that most of the instructors were very experienced and knowledgeable, and cooperative. However, some students felt that they did not receive adequate and timely feedback from instructors. They commented that high quality rubrics should be designed for each assessment in order for students to examine their learning outcome. Thus, it is noted that instructors need to be more clear and precise about their expectation and to also provide a platform for students to ask questions and interact with others.

Table 11: Online survey items categorized under Q3 (cohort 2).

		Response (%)					
#	Items	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	n = 11 (Mean)
1	I was able to obtain course materials easily via a variety of technological tools.	-	-	-	27.27%	72.73%	4.73
2	I was able to work in WebCT.	-	-	-	-	100%	5.00
3	Course materials were well-designed.	-	-	-	72.72%	27.28%	4.27
4	Course materials were motivating.	-	-	-	90.91%	9.09%	4.09
5	Delivery of course materials were suitable for me.	-	-	9.09%	63.63%	27.28%	4.18
6	Instructors had good knowledge of subject.	-	-	-	9.09%	90.91%	4.91
7	Instructors organized course well.	-	-	-	81.81%	18.19%	4.18
8	Instructors were well prepared.	-	-	-	72.72%	27.28%	4.27
9	I was able to easily communicate with instructors.	-	-	-	45.45%	54.55%	4.55
10	There were adequate evaluation activities to asses my own learning.	-	18.19%	9.09%	36.36%	36.36%	3.91
11	I was able to asses myself in each activity I participated.	-	18.19%	9.09%	54.54%	18.18%	3.73
12	Student assessment strategies enhanced my learning.	-	18.19%	9.09%	36.36%	36.36%	3.91
13	Grading was accurate.	-	-	-	54.54%	45.46%	4.45
	Average of Q3						4.32

Q4: Are students applying the knowledge and skills that they have learned in this program into their own professional practice?

Cohort 2 students felt they applied their learning to their own profession and were able to add technology into their own curriculum effectively. They evaluated these aspects relatively high with a mean of *4.64* (Table 12). Most of the comments focused on gaining research skills and the ability to integrate new technology into their profession. The students were mostly pleased with the skills that they have learned from this program such as project based learning with technology integration and strategy of metacognition.

Table 12: Online survey items categorized under Q4 (cohort 2)

		Response (%)					
#	Items	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	n = 11 (Mean)
1	I could apply what I have learned in this program to my profession.	3.5%	-	-	36.36%	63.64%	4.64
	Average of Q4						4.64

Q5: What kind of issues have students encountered while pursuing this program?
Students were asked to rate the administration of the program, which related to the program length and course sequence, support received, and educational value. This aspect received average ratings of *4.34* (Table 13). It seems that the program administration was not an issue for most students and that they received adequate administrative and technology support throughout the program. However, items 6 and 7 were rated below the average (*item 2: m = 4.27, item 6: m = 3.57, item 7: m = 4.18*). It shows that the students were likely not satisfied with the sequence course taken in the program and also the program cost.

Table 13: Online survey items categorized under Q5 (cohort 2).

		Response (%)					
#	Items	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	n = 11 (Mean)
1	The length of this program is adequate to complete a Master's Degree.	-	-	-	18.18%	81.82%	4.82
2	The courses I took were logically sequenced.	-	-	-	72.72%	27.28%	4.27
3	I was given appropriate administrative support when I had questions (admission, add/drop courses, tuitions/fees)	-	-	9.09%	18.18%	72.73%	4.64
4	My major professor encouraged me to pursue my area of interest.	-	-	27.27%	9.09%	63.64%	4.36
5	I was given appropriate support when I had any course-related technology problems.	-	-	9.09%	27.27%	63.63%	4.55
6	The program cost as a whole was reasonable.	-	27.27%	9.09%	45.45%	18.19%	3.55
7	The value of education outweighed the program cost.	-	9.09%	9.09%	36.36%	45.46%	4.18
	Average of Q5						4.34

Cohort 3 Student Perspectives

The return rate for students in Cohort 3 was 93% for the online survey. Thirteen (93%) out of fourteen students who are planning to graduate in spring 2011 responded to the online survey used for this evaluative study.

Q1: Has the program achieved its purpose?

Overall, cohort 3 students agreed that the objectives of the program were met with an overall average of *4.62* (Table 14). According to students, the program provided real-life experiences, helped them to better understand learning and teaching issues and was flexible enough to accommodate their needs. However, the mean score for item 2 and 4 in Table 14 was below average, which displays some areas of program improvement on developing leadership and management skills. Open-ended questions also included positive comments (flexibility, application and pace) to the program and its objectives, but some concerns/ issues were raised: (1) inconsistency on participation and strategies for engagement on online discussions, (2) need for more lecture-style presentations (pre-recorded live), and (3) inconsistency on work load among the different courses and design of the online environment.

Table 14: Online survey items categorized under Q1 (cohort 3).

#	Items	Response (%)					n = 13 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
1	This program provided me with real-life experiences useful to my profession.	-	-	7.7%	38.5%	53.8%	4.69
2	I have improved my leadership skills by attending this program.	-	7.7%	-	61.5%	30.8%	4.38
3	This program helped me to better understand learning and teaching issues.	-	-	-	46.2%	53.8%	4.77
4	I improved my management skills by attending this program.	-	-	15.4%	46.2%	38.5%	4.46
5	This program was flexible enough to accommodate my needs.	-	-	7.7%	46.2%	46.2%	4.77
	Average of Q1						4.62

Q2: Has the program helped students to define their educational goals?

Overall cohort 3 students were satisfied with their course experiences with an average score of *4.35* (Table 15). They reported opportunities to work collaboratively in class and activities where they were able to apply their professional experiences, encouraged to discover new things and synthesized new information. Lower scores (below average) were shown regarding the offering of social activities, design of practical activities and enough time to learn at their own pace (items 3, 8 and 9 with $m = 4.08$, $m=4.23$ and $m=3.69$, respectively).

Table 15: Online survey items categorized under Q2 (cohort 3).

#	Items	Response (%)					n = 13 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
1	There were collaborative activities in the courses I took.	-	-	-	46.2%	53.8%	4.54
2	I have learned from collaborating with my classmates.	-	-	-	23%	76.9%	4.77
3	This program offered well-designed social activities.	-	-	23%	46.2%	30.8%	4.08
4	Activities required me to use my own professional experiences.	-	-	-	46.2%	53.8%	4.54
5	There were practical activities in this program.	-	-	-	53.8%	46.2%	4.46
6	I had many opportunities to discover new things in this program.	-	-	15.4%	30.4%	53.8%	4.46
7	Course activities encouraged me to synthesize new information.	-	-	-	53.8%	46.2%	4.46
8	In this program, practical activities were well-prepared.	-	-	7.7%	53.8%	30.8%	4.23
9	I was given enough time to learn at my own pace during the program.	-	15.4%	23%	38.5%	23%	3.69
	Average of Q2						4.35

Q3: Has the program content met the students' expectations?
Students were asked about their satisfaction in relation to course materials, learning support, and assessment with an average score of *4.20* (Table 16). Even though access to course materials in WebCT, appropriateness of the mode of delivery and instructors' technology, pedagogical and content knowledge were scored above the average, there were several aspects of the program content that had lower scores (*m< 4.90*). They were:

- the overall design of the course materials (*item 3: m=3.86*),

- the motivational design of the course materials (*item 4: m=3.85*)
- communication with the instructors (*item 9: m=4.15*), and
- evaluation activities, assessment and grading *(item 10: m = 3.92, item 11: m = 4.00, item 12: m = 4.00, item 13: m=4.08)*.

Table 16: Online survey items categorized under Q3 (cohort 3).

#	Items	Response (%)					n = 13 (Mean)
		Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	
1	I was able to obtain course materials easily via a variety of technological tools.	-	-	-	76.9%	23.1%	4.23
2	I was able to work in WebCT.	-	-	-	46.2%	53.8%	4.54
3	Course materials were well-designed.	-	-	7.7%	69.2%	23.1%	4.15
4	Course materials were motivating.	-	-	23.1%	69.2%	7.7%	3.85
5	Delivery of course materials were suitable for me.	-	-	7.7%	61.5%	30.8%	4.23
6	Instructors had good knowledge of subject.	-	-	15.4%	46.2%	38.5%	4.85
7	Instructors organized course well.	-	-	7.7%	53.8%	38.5%	4.31
8	Instructors were well prepared.	-	-	-	76.9%	23.1%	4.23
9	I was able to easily communicate with my instructors.	-	-	7.7%	69.2%	23.1%	4.15
10	There were adequate evaluation activities to asses my own learning.	-	7.7%	23.1%	38.5%	30.8%	3.92
11	I was able to asses myself in each activity I participated.	-	-	23.1%	53.8%	23.1%	4.00
12	Student assessment strategies enhanced my learning.	-	-	23.1%	53.8%	23.1%	4.00
13	Grading was accurate.	-	-	7.7%	76.9%	15.4%	4.08
	Average of Q3						4.20

Q4: Are students applying the knowledge and skills that they have learned in this program into their own professional practice?

Students reported that they applied the knowledge and skills they were learning in the program into their professional practices with an average score of *4.46* (Table 17). Most of the comments focused on the opportunities to use different applications in the classroom and to effectively use technology for instruction. Other students mentioned the application of instructional design principles into their practices; with other students explaining that they were using what they were learning in the program into professional development activities.

Table 17: Online survey items categorized under Q4 (cohort 3)

		Response (%)					
#	Items	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	n = 13 (Mean)
1	I could apply what I have learned in this program to my profession.		-	-	38.4%	53.8%	4.46
	Average of Q4						4.46

Q5: What kind of issues have students encountered while pursuing this program?

Cohort 3 students rated a variety of features of the program regarding the administration, program length and course sequence, support received, and educational value of the program. This aspect received average ratings of *4.00* (Table 18), with items 4 and 6 rated below that. This shows that the students were not fully satisfied with the encouragement they got from their major professor on pursuing an area of interest (*m=3.31*) and with the cost of the program as a whole (*m=3.69*). Two of the major issues pointed out by the students were on the open-ended questions: (1) keeping self-motivation, (2) willingness to self-discipline and self-monitor; and (3) inconsistency among instructors in course planning, instructional materials development, course communications, and assessment.

Table 18: Online survey items categorized under Q5 (cohort 3).

		Response (%)					
#	Items	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	n = 13 (Mean)
1	The length of this program is adequate to complete a Master's Degree.	-	-	7.7%	53.8%	30.8%	4.23
2	The courses I took were logically sequenced.	-	-	7.7%	69.2%	23.1%	4.15
3	I was given appropriate administrative support when I had questions (admission, add/drop courses, tuitions/fees)	-	-	23.1%	38.5%	38.5%	4.15
4	My major professor encouraged me to pursue my area of interest.	7.7%	-	53.8%	30.8%	7.7%	3.31
5	I was given appropriate support when I had any course-related technology problems.	-	-	7.7%	61.5%	30.8%	4.23
6	The program cost as a whole was reasonable.	-	15.4%	23.1%	38.5%	23.1%	3.69
7	The value of education outweighed the program	-	-	23.1%	53.8%	23.1%	4.00

#	Items	Response (%) Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	n = 13 (Mean)
	cost.						
	Average of Q5						4.00

Conclusions and recommendations

Overall, the participants of the online Masters of Education in Curriculum and Instruction were positive about the program. From the users' perspective the program had achieved its purpose of providing a high quality online graduate program in education. A large majority of students completed the program or were on schedule to complete the program in the 3-year timeframe. Although the students were positive about the program in general, they offered relevant suggestions for program improvement as well as pointing out components of the program that supported its effectiveness. Student comments included the following:

- "I don't know if the workload for this program is any different than the workload for other Masters programs, but the discussions we have online definitely get me participating more than I would in a normal classroom setting. I am also able to bring my classroom experiences into the learning environment and get useful feedback from colleagues."
- Keep the cohort system as it provides a sense of belonging among the students and develops strong relationships
- Expand into an online MS and/or Ed.D/Ph.D.
- Courses should offer more opportunities to engage with the latest technologies for learning and teaching
- Assessment methods and criteria should be made more explicit through examples of deliverables, homework, and discussion replies
- Coursework should be more aligned with the portfolio standards plus provide additional support in creating portfolio.
- "Push the idea of 'anytime, anywhere' through the fusion of on-line & on-campus instruction. Also, the collaborative & collegial atmosphere found in the Cohort would be attractive to most applicants. If someone is interested in this field, they would like to see the variety of instructor interests…"

The demands of a technology-saturated society require that degree programs at all levels be offered via distance education. The results of this study indicate that offering an online graduate degree in education with an emphasis in instructional technology can be an effective means for K-12 teachers to expand their educational background and technology integration skills and knowledge. In this study, students who were in or had recently completed an online graduate degree were positive overall about their online learning experiences in the program. Greater insight into their views at various stages throughout the three-year graduate program will allow instructors and instructional designers to better develop environments that meet their situational needs and learning demands. Further research in this area is appropriate and needed.

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Increasing Connections in Online Learning: Student Response to Interaction Tools in the Online Environment

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Abstract
Current research (Chang & Smith, 2008; Herbert, 2006; Kemp, 2002) indicates there is a close connection between online student satisfaction and retention in this delivery modality. Student dissatisfaction with online courses is often the result of a lack of interaction (Bollinger & Martindale, 2004). In this study, 255 student end-of-course evaluations for 23 online courses and 17 instructors were evaluated to determine teacher effectiveness in utilizing course tools that support interactivity. Results indicated that students want instructors who are active participants, provide clear directions and expectations, and are available. This information was then used to create a plan for increasing instructor-student and student-student interaction in online courses. The intervention strategies were implemented and tested and the student end-of-course evaluations indicated that students found the increased communication engaging and motivating resulting in a more learner-centered environment.

While distance education continues to be a valuable asset in the delivery of course content, research shows that interaction (Wanstreet, 2006) impacts student learning and satisfaction. Perez (2001) states that students often report dissatisfaction due to the lack of personal interaction between the instructor and students and among students. As the competition for online students grows, so do efforts to attract and retain students, particularly since the retention rates in online classes have historically been low, (Herbert, 2006).

Current research in online education suggests a close tie between online student satisfaction and retention (Chang & Smith, 2008; Herbert, 2006; Kemp, 2002). Bollinger and Martindale (2004) suggest that student satisfaction with online courses is influenced by three major constructs; instructor variables, technical issues, and interactivity. They also note that the instructor is the main predictor of student satisfaction with online courses.

Background and Problem

One obvious way to remedy the problem of low or infrequent interaction is by increasing personal interaction during the course. While this is an obvious solution, the implementation is the challenge. Course Management Systems (CMS) provide a variety of tools, that when utilized, have the potential to increase communication and learning. The research of Zemsky and Massey (2004) supports the impact of how the instructor delivers the course content. They found that although instructors were using online learning delivery methods, they were still using teacher-centered pedagogy. Mahle clearly states that, "Instructors need to be cognizant of incorporating a significant amount of interactivity into their courses (Mahle, 2007, p. 47). The question then becomes how to get course instructors to change their pedagogy and integrate more interaction in their online courses.

Given the need to help fulltime and adjunct faculty transition successfully into the expanding online environment, this study provides an analysis of 255 end-of-course student evaluations collected from 23 online course sections and 17 instructors over a period of six months in 2010. Current research on best practices in online education formed the theoretical base for the study which involved graduate students enrolled in one of the required core classes offered through the Teacher Education Department in the School of Education. Using the current institutionally-approved online end-of-course evaluation of teaching instrument that is contained within the University's existing e-College platform, the purpose of this study was to explore the factors contributing to low student evaluations of online faculty and utilize the results to develop effective intervention strategies designed to improve the pedagogy and thus, the student ratings of low-scoring faculty.

The Study and the Purpose

One way to impact pedagogy is to first make the instructor aware of the issue. In order to determine the level of student satisfaction, 255 online end-of- course student evaluations were analyzed for 23 sections and 17 instructors over a six-month period from January 2010 through June 2010 at a private, non-traditional, not-for-profit university. This study looked at the satisfaction ratings from students completing the course and identified areas of need. The assessment of teaching section of the course evaluation revealed three major areas for improvement: meaningful chat sessions, active instructor participation in the course, and timely and helpful feedback. The author then reviewed student comments to gain a greater insight into student needs. The detailed comments supported students' desire for greater instructor interaction and involvement in the courses including the use of the Announcements, Discussion Boards, Virtual Office, and Live Chat. Based on this data, the author searched for effective strategies to increase student activity. The author met with colleagues who successfully used instructor-student interaction techniques resulting in higher student satisfaction as indicated by their end-of-course evaluations. Then, a plan was developed for implementing new strategies to increase interactivity in online courses.

Theoretical Framework

The importance of interactive, student-centered instruction has been a central theme in higher education since the original Chickering and Gamson (1987) study on *The 7 Principles for Good Practice in Undergraduate Education*. Subsequently updated for distance education in 1996 by Chickering and Ehrmann, *Implementing the 7 Principles: Technology as Lever* has strongly influenced the development of contemporary research related to best practices and effective virtual classroom instructional strategies for use in the online environment.

Research in best practices for online education emphasizes the importance of promoting interactivity, encouraging student-instructor and student-student interchanges as well as building online learning communities (Bangert, 2005; Bannan-Ritland, 2002; Dennen, Darabi, & Smith, 2007; Kennedy, 2004). Recent contributions to the field of web-based distance education state that interactivity and communication are key components required for successful online teaching and learning (Fabry & Schubert, 2009; Mahle, 2007; Moore, 2001; Tobin, 2004). Citing results from a recent study on the importance of interaction to student learning within web-based online learning programs, Sher (2009) notes that, "Student-instructor interaction and student-student interaction were found to be significant contributors of student learning and satisfaction" (p. 102).

The literature related to interactivity in online learning generally focuses on the traditional trilogy of interaction which includes (a) Learner-Content, (b) Learner-Learner, and (c) Learner-Instructor (Chang & Smith 2009; Moore, 2001). Mahesh and McIsaac (1999) took a slightly different focus on the same theme of interaction, but focused more on communication. Their research study looked at the dynamic of instructor-student communication and the strategies the instructor implemented that encouraged communication within the virtual classroom, including regular feedback. Communication in online classes most frequently takes the form of asynchronous threaded discussions, announcements, virtual office, synchronous chats and e-mail. Instructor feedback on course assignments also plays a crucial role in student success and can be regarded as a specific form of communication. Effective interaction and successful communication include the use of multiple strategies and activities where instructors provide feedback that is both immediate and frequent (Bollinger & Martindale, 2004; Dennen, Darabi, & Smith, 2007).

Research related to interactivity in online instruction formed the basis for this study that focused on determining how the interactivity variables presented faculty with the most challenges in relation to student satisfaction with instruction. By identifying the key variables, the author sought to develop effective strategies designed to improve faculty interaction in specific areas of need.

Creating and Implementing a Plan to Increase Interaction

Data from the end-of-course evaluations clearly revealed that students want an instructor who is an active participant in the class, provides meaningful synchronous and asynchronous chat sessions, and responds in a timely manner. After analyzing the data, the author created a list of interaction strategies based on the research in effective online teaching. One section of the online course was taught in July 2010 integrating the interaction strategies. [Note: The non-traditional format of the university is a one-month long course that is fast-paced and rigorous.]

Given the data showing student areas of concern, the plan for increasing interaction focused on five tools: E-mail, Announcements, the Virtual Office, Threaded Discussions, and Synchronous Chat.

E-mail can often become an afterthought in online classes; however, it has the capability to enhance interaction. Sending a welcome e-mail to the class before the class begins sets the tone for communication. In the first e-mail contact students were provided with a welcoming statement, a brief introduction to the professor, the preferred method of contacting the instructor, the course syllabus/outline, and a request for a response to the e-mail. Several strong messages are conveyed through this first communication: you care, you are present, and you are available. Additional e-mails were utilized throughout the course to remind students of course events, clarify questions, and share resources.

The Announcements tool has the potential to provide multiple interactions with students. If used only infrequently and in a pedantic manner; this tool is not being used effectively. To increase instructor-student interaction, Announcements should be of high interest and posted at regular and frequent intervals. Announcements were used to provide general information to the class, as well as tips and suggestions for successfully completing assignments. The content of six to eight announcements each week ranged from reminding students of when assignments were due, where to locate specific information in the course, how to locate a peer-reviewed article in the online library, and where to find student examples of assignments. Announcements were often the result of questions e-mailed to the instructor.

The Virtual Office offers opportunities for student-to-instructor and student-to-student communication. The Announcements tool was used to direct students to the Virtual Office. As a cross-reference the Virtual Office hours were posted in Announcements and participation was encouraged. Three times each week the instructor logged on and held Virtual Office hours, during which time students could log on, ask questions, and provide feedback. Students were able to respond to each other, as well as the instructor. Throughout the week, the Virtual Office was checked both in the morning and evening for other questions, comments, and feedback.

Discussion Boards, asynchronous chat areas, can become difficult to manage when 35 students are required to post an initial response and then respond to at least two of their classmates. The instructor used the tool to create smaller subgroups that were more user-friendly. Students were invited to share their responses by grade levels in the course. Elementary, middle, and high school teachers had their own discussion areas. The instructor responded to each initial posting for every student and encouraged participation using carefully crafted question to elicit higher order thinking and to help learners make deeper connections.

The final tool used to increase interactivity was the synchronous chat, Class Live Pro. This tool has both audio and video capabilities as well as a plethora of functions. Live chats were conducted once each week. The topics were application based. Students were asked to take the discussion thread topic and share how they could implement it in their classroom. During the chat, breakout rooms allowed students to work in small groups and then reconvene to report out in the large group.

Results and Recommendations

The End-of-Course Evaluation for the July class indicated a positive response from students concerning interaction. The increased use of Announcements resulted in fewer one-on-one questions from individual students. While this may sound like it was counter-productive, it was not. It allowed for more time and interaction in the Virtual Office. Students said that they liked knowing there were specific times they could speak with the instructor and their classmates.

The interaction during the Discussion Boards was frequent and enthusiastic. Students reported that they liked knowing the instructor was an active participant. Students said that they liked being challenged to make new connections. This same response was given concerning the live chats. Students felt the chats provided them with authentic solutions to their classroom problems. They also felt more connected to classmates and the instructor.

This study and the results are limited to one class delivered online with 35 students. Additional studies will need to be conducted with faculty who are willing to learn and implement new interactive knowledge and skills.

One caveat need to be noted: Providing opportunities for increased student interaction also increases instructor time both in preparation and delivery. Instructors need planning and implementation time to increase student satisfaction concerning interaction in the online classroom. Additional studies could provide more data on just how much time is needed and how instructors can be supported to focus on increasing student interaction and satisfaction.

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How to Teach Students to Learn: Techniques Used to Increase Student Capacity to Self-Direct Learning

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An important aim for educational institutions is to increase learner self-direction among students (Bolhuis, 2003; Guglielmino, 2008; Meichenbaum & Biemiller, 1998). Learner self-direction is defined as the ability to self-direct and self-regulate one's own independent learning processes (see Brockett & Hiemstra, 1991; Candy, 1991). Graduates will need self-directed and self-regulated learning (SRL) skills to help them keep up in career, personal and academic settings (Guglielmino, 2008; Zimmerman, 1994). In the United States and other similar countries, graduates' will enter an economy characterized by high career mobility (U. S. Bureau of Labor Statistics, 2008), and abundant information (Lyman & Varian, 2003), making learner self-direction both more possible and more necessary than it has been in the past. Yet concerns have been raised nationally in the United States about the ability of higher education institutions to prepare students with the skills necessary to learn independently and keep up with career changes (The Secretary of Education's Commission on the Future of Higher Education, 2006; The Secretary's Commission on Achieving Necessary Skills, 1991). In addition, preliminary studies at two different universities in the United States have found no significant increase in SDL skills among students from freshman to senior years using scales based in the SDL literature (Litzinger, Wise, Lee, & Bjorklund, 2003; Preczewski, 1997).

U.S. higher education institutions have been challenged to develop new and innovative pedagogies to support previously neglected skills such as those needed for independent learning (The Secretary of Education's Commission on the Future of Higher Education, 2006; The Secretary's Commission on Achieving Necessary Skills, 1991). These types of outcomes have been advocated more particularly in science learning on the national stage by the National Science Education Standards of the National Research Council (1996). In this report, teachers are encouraged to foster learner self-direction by offering students the opportunity to take responsibility for personal learning, conduct self-assessments, and participate in the design of learning environments (see also Bransford & Donovan, 2005).

Similarly, institutions and governing bodies outside of the United States have long emphasized the importance of SDL and lifelong learning for education. Notable initiatives and educational implementations of SDL related activities have been implemented in European countries such as Belgium, The Netherlands, Switzerland, France, Italy, Greece and the United Kingdom with national reports focused on SDL from many of these countries (Straka, 1997). SDL-focused reports of research and advocacy have come from areas as diverse as Asia (Chu & Tsai, 2009; Mok et al., 2007), Australia (Candy, 2004), and South Africa (Lindh & Hugo, 2005). It is clear that many countries around the world believe that fostering SDL skills is vital in our global economy.

Partly in response to such mandates and challenges, higher education institutions in the United States and elsewhere have increasingly adopted language in mission statements indicating the importance of helping students self-direct, learn independently or become lifelong learners (Guglielmino, 2008). However, there is not wide agreement on how to best foster learner self-direction among students.

Much of the SDL literature from adult learning views learners as universally highly self-directed during learning activities; needing only the opportunity to take charge of their own learning. These highly self-directed individuals who initiate their own learning are hypothesized to learn more deeply and meaningfully (Knowles, 1975, 1980). Consequently, SDL models have advocated removing support and guidance for learning, placing the responsibility for learning squarely in the learner's hands (e.g. Hammond & Collins, 1991; Knowles, 1975). Such approaches may be appropriate if certain assumptions about learners are met (Knowles, Holton, & Swanson, 1998). However, experience indicates not all adults are highly self-directing nor is self-directed learning always the best learning solution (Brockett, 1994). In formal education, for instance, learners may not be considered highly self-directed adults, and contextual factors such as curriculum requirements and standards usually affect the provision of SDL activities (Garrison, 1997). Students in formal education have been found to preliminarily need support and guidance for learning in the form of teacher-directed activities (Howland & Moore, 2002; Raidal & Volet, 2009). Thus, fostering learner self-direction in formal education involves more than simply reducing the amount of support and guidance given to learners (Brockett & Hiemstra, 1991; Candy, 1991; Merriam, Caffarella, & Baumgartner, 2007). Approaches to learning and instruction that simply reduce or remove learning support may also be highly detrimental to the acquisition of knowledge in long term memory (Kirschner, Sweller, & Clark, 2006). Consequently, some guidance and support for learning may be needed with the aim of helping learners become more self-directed over time. In addition, the shift from teaching only for subject matter acquisition toward higher order skills such as learner self-direction is a formidable challenge for many teachers (Bolhuis, 2003). There is a need for realistic guidance on how to foster learner self-direction within the contextual constraints of formal educational settings and among students who may not be universally highly self-directed.

To meet this aim, this paper synthesizes literature from SDL and SRL for principles for fostering learner self-direction in formal education and describes a learning environment based on these principles. The learning environment is illustrated using examples from science learning. The definition of SDL in this paper encompasses SRL elements (see Loyens, Magda, & Rikers, 2008; Pilling-Cormick & Garrison, 2007).

Principles for Fostering Learner Self-Direction

Four main prescriptive principles for fostering learner self-direction in formal education can be extracted from SDL theory, models and research;

- Match the level of self-directed learning required to learner readiness
- Progress from teacher to learner direction of learning over time
- Support the acquisition of subject matter knowledge and learner self-direction together
- Have learners practice self-directed learning in the context of learning tasks

These principles will be discussed and supported with relevant theoretical and empirical literature.

The first principle for fostering learner self-direction involves matching the level of SDL required in learning activities to learner readiness (Bolhuis, 2003; Brockett & Hiemstra, 1991; Grow, 1991; Hammond & Collins, 1991; Knowles, 1975). Adult learning literature acknowledges that individuals may be highly self-directing in some situations and not in others, or that they may be somewhere in-between high and low on the self-directing continuum (Candy, 1991; Knowles, 1980; Knowles et al., 1998). A learner's level of relevant domain knowledge and self-directed learning experience will affect whether they are able to self-direct learning in a given situation (Candy, 1991; Grow, 1991). SDL activities that this principle applies to may include allowing learners to set learning goals, specify what will be learned, determine the pace of learning, and evaluate learning outcomes (Hiemstra, 1994). If a learner is required to do these activities without regard to readiness, he or she may fail to learn or increase in learner self-direction (Brockett & Hiemstra, 1991; Candy, 1991).

Findings from studies of SDL and SRL indicate that many learners are not ready to completely control a learning situation, and may need to first experience teacher-directed learning (Howland & Moore, 2002; Raidal & Volet, 2009). Dynan, Cate and Rhee (2008) found that students whose SDL readiness is matched to a requisite learning structure (structured learning or unstructured learning) increased in self-direction over the course of a semester to a greater degree than those who were not matched. Bhat, Rajashekar and Kamath (2007) found that a high level of SDL activities helped high performing students learn while these activities did not benefit lower performing students. These findings suggest that matching the level of SDL activities required to learner readiness may be important for helping students learn and increase self-direction.

The second principle advocates progressing from teacher to learner direction of learning over time (Bolhuis, 2003; Brockett & Hiemstra, 1991; Candy, 1991; Grow, 1991; Meichenbaum & Biemiller, 1998). This principle takes a learner from his or her current level (as suggested in principle one) toward higher self-direction over time. Prescriptive models of SDL offer practices for gradually increasing learner direction of the learning process. For example learners can be increasingly allowed to set learning goals, specify what will be learned, choose learning resources and evaluate learning outcomes as a learning experience progresses (Grow, 1991; Hiemstra, 1994). Such an approach should take into account the first principle and provide learners SDL activities that match their readiness. Learners' abilities to self-direct may increase as opportunities to self-direct learning are increasingly provided (Bolhuis, 2003; Grow, 1991).

Azevedo, Cromley and Seibert (2004) suggest that shifting learning responsibility toward learners over time by scaffolding and fading support for SRL and SDL skills is vital for the teaching of self-direction. Hadwin, Wozney and Pontin (2005) followed the SRL development of graduate students in a research methods class for several months. They found that the general process in this setting involved teacher-direction that progressed to co-direction and finally student-direction of the learning process. This shift toward student direction of the learning process was also found in elementary school classrooms considered high in SRL (Perry, VandeKamp, Mercer, & Nordby, 2002). Schunk and Rice (1993) found that fading self-regulatory instructions were superior to self-regulatory instructions that were not faded in helping students with reading problems to self-regulate their learning. These studies suggest that gradually increasing learner direction of the learning process may foster learner self-direction.

The third principle for fostering learner self-direction involves supporting the acquisition of subject matter knowledge along with learner self-direction. Cognitive strategies (such as those required for SRL and SDL) are thought to require the use of intellectual skills (concepts, rules, etc. of a discipline) which require basic knowledge of subject matter (Gagné, 1985). Theoretical models of SDL have recognized that some domain knowledge is necessary for learners to be able to take responsibility for learning (Bolhuis, 2003; Grow, 1991). Learners should be introduced to relevant domain knowledge including underlying principles, procedures for knowledge acquisition, and generalizability of knowledge and practices, as they practice self-direction (Bolhuis, 2003; Vermunt & Verschaffel, 2000).

Extensive domain knowledge may enable learners to free up working memory for processes related to self-regulation and self-direction of learning (Sweller, Van Merrienboer, & Paas, 1998). Experts have elaborate mental knowledge structures that enable them to monitor progress, choose appropriate strategies, and decide on appropriate solutions to problems (Chi, 2006). Within the self-regulated learning literature, Glaser and Brunstein (2007) found that providing instruction on both subject matter and SRL skills was more effective for helping students to control their learning than simply teaching subject matter. Cotterall and Murray (2009) provided SDL opportunities to students in a language learning course including allowing students to decide what to learn and choose resources to use for learning. The authors conclude that these elements of the course structure along with subject matter acquisition contributed to an increase in learner self-direction.

The fourth principle for fostering learner self-direction advocates practicing SDL in the context of learning tasks. Studies of self-directed learners describe these learners as task-oriented, with the practical aim of applying learning to a specific task (Houle, 1961; Tough, 1979). Consequently, models of SDL have advocated providing learning that is centered on tasks that learners are likely to encounter in the future (Bolhuis, 2003; Hammond & Collins, 1991). As learners engage in these tasks, they may be required to do such SDL activities as: (a) choosing a learning path; (b) finding, evaluating, and applying information to complete tasks and solve problems (Bolhuis, 2003; Candy, 1991); (c) monitoring and adjusting personal learning as needed (Butler & Winne, 1995; Garrison, 1997) and; (d) determining ways in which personal performance should be improved (Bolhuis, 2003; van Merriënboer & Sluijsmans, 2009). Practicing SDL in the context of tasks may foster learner self-direction while increasing the relevance and usefulness of learning activities.

Conceptual connections have been made between regulation of one's own learning processes and problem-solving and experimentation activities (Mayer, 1998; Winne, 1997). For instance, Winne (1997) hypothesizes that students will "bootstrap" self-regulated learning skills from experiences in which they are engaged in goal-directed learning tasks. Connections have also been made in the literature from the implementation of problem-based and task-centered learning to self-direction (Gurses, Acikyildiz, Dogar, & Sozbilir, 2007; Hung, Jonassen, & Liu, 2008; van Merriënboer & Kester, 2008; Stewart, 2007). Woods (1996) found that student self-perception of SDL ability increased over time in a problem-based learning environment. Blumberg and Michael (1992) implemented a partially teacher directed and problem-based curriculum and observed increases in students' SDL activities as measured by self-reports, program evaluations and library circulation data. Sungur and Tekkaya (2006) found that a problem-based learning environment enhances SRL skills more than a traditional lecture based environment. Findings from these studies support the hypothesis that centering learning on realistic tasks or problems provides an environment in which learner self-direction can increase.

A Learning Environment Designed to Foster Learner Self-Direction

Four principles for fostering learner self-direction have been presented;

- Match the level of self-directed learning required to learner readiness
- Progress from teacher to learner direction of learning over time
- Support the acquisition of subject matter knowledge and learner self-direction together
- Have learners practice self-directed learning in the context of learning tasks

These principles have implications for the design of learning environments and can be implemented in a variety of settings. In this section, a description of what a learning environment focused on fostering learner self-direction might look like is given using examples from science learning in higher education. The practices presented in this paper are based on SDL research and theory (e.g. Bolhuis, 2003; Brockett & Hiemstra, 1991; Garrison, 1997; Knowles, 1975; Tough, 1979), and task-centered models of instruction (Collins, Brown, & Newman, 1989; van Merriënboer & Kirschner, 2007; Merrill, 2002a).

A student in a learning environment designed to foster self-direction does tasks that represent activities done in the professional world outside of school (principle four) and follows a process similar to those described in studies of the SDL experience (e.g. Brockett & Hiemstra, 1991; Knowles, 1975; Spear & Mocker, 1984; Tough, 1979). The SDL process can be described as having four phases; initiation, acquisition, performance and assessment (see figure 1).

The overall approach to fostering learner self-direction involves repeatedly showing students a learning task, presenting core concepts that are relevant to the task, modeling how to apply the core concepts to the task, having students perform the task, and assessing student performance of the task. The process repeats within the class in task sequences, and over time, responsibility for initiation, acquisition, performance and assessment is shifted from teacher to student.

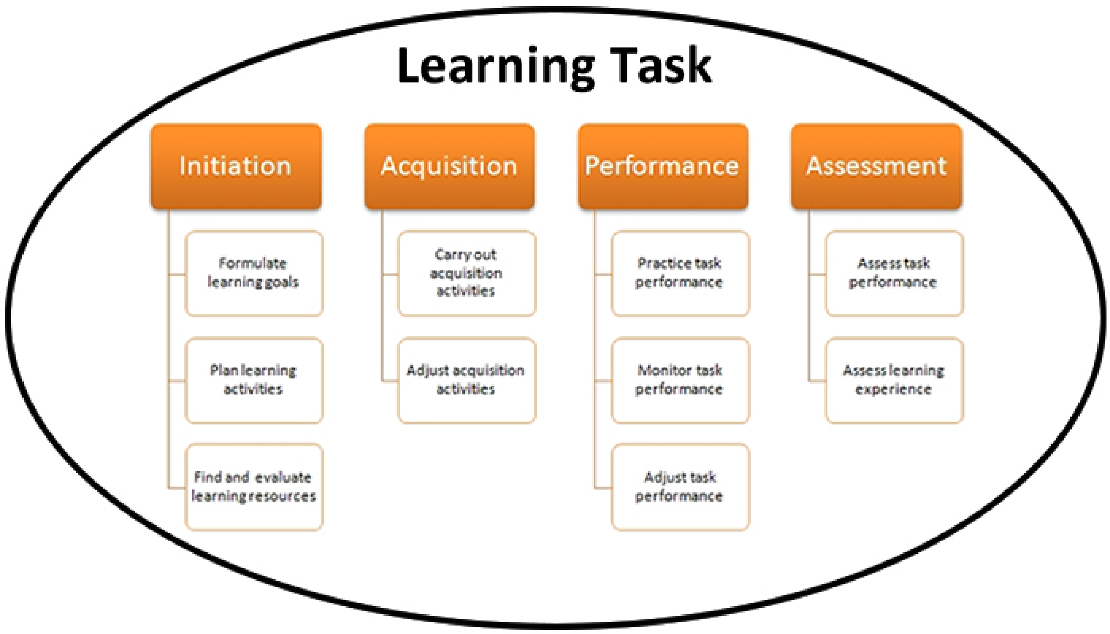

Figure 1. Phases of the self-directed learning process that occur within a learning task. Students initiate a learning task, acquire knowledge relevant to the task, perform the task and receive feedback on their task performance. The responsibility for these activities is shifted toward students over time.

The Initiation Phase – Introducing Students to the Learning Task

At the start of a unit, students are introduced to a challenging learning task (principle four; see table 1). Learning tasks are activities that students do that require them to apply knowledge from the course content to perform activities (cognitively and/or physically) that require the use of skills similar to those used in professional practice outside of school. Learning tasks should be based on the activities that students are expected to do with knowledge and skills after they finish the class (see the "determining learning tasks" section below; van Merriënboer & Kirschner, 2007; Merrill, 2002a). In the initiation phase of learning, students also make preliminary plans for how to accomplish the learning task and decide on a general plan to apply information to the task (Butler & Winne, 1995). At this stage in the process, however, students likely lack the required knowledge and experience to complete the learning task. This approach may help motivate students to mindfully process course materials in search of information relevant to the learning task (e.g. Piaget, 1977). In addition to introducing the task, a teacher should also activate students' prior knowledge by having them relate what they already know to the learning task (Merrill, 2002a).

As students become more knowledgeable and self-directed, they are given more opportunities to choose tasks to learn and perform. Students are also increasingly required to choose appropriate learning resources and plan how to approach learning tasks over time (principle two; see table 2).

An example of how the initiation and other phases of the learning processes are implemented can be provided from a learning task within a biology class genetics unit. The Learning task is centered on a case study called, "Those old Kentucky Blues (Leander & Huskey, 2008)," that requires students to determine the origin of a patient's blue skin using genetics knowledge. The teacher introduces the learning task to students in a presentation that sets up the case, explaining that a clinic patient with blue skin presents herself and that students must determine the source of her skin discoloration. The teacher also assigns students to read a short paper explaining the problem. As students first learn about the task, they lack the genetics knowledge necessary to complete it, but they begin to determine what knowledge and skills they lack and think about how to approach the task. In this example, the teacher has chosen "Those Old Kentucky Blues" as a learning task for students to do, however, if students are ready for more SDL opportunities, a teacher can allow students to choose the tasks they wish to be engaged in (see table 2).

The Acquisition Phase – Acquiring Domain Knowledge and Modeling Application

In the learning phase, students acquire the knowledge that they need to perform the learning task (principle three). Students learn two main types of knowledge in the learning phase, knowledge from the core concepts of the discipline, and knowledge about how to apply core concepts to the learning task. A teacher can use a variety of techniques to present core concept information including lectures, textbook readings, online presentations, etc. Learning how to apply knowledge of core concepts to a learning task is best done through teacher modeling and repeated student experience (Bandura, 1991; Collins et al., 1989). Student experience is provided in the performance phase, while modeling is provided in the current (learning) phase. A teacher models a learning task by showing students how to do it while calling attention to important performance aspects, discussing reasons why the task is done in a certain way and explaining the thought processes that are needed to complete it (Collins et al., 1989). Modeling particularly supports SDL skills when the model makes some mistakes and later corrects these mistakes (Kitsantas, Zimmerman, & Cleary, 2000).

Table 1.

Teacher and student activities in a learning experience designed according to the four principles for fostering learner self-direction.

Learning Phase	**What a teacher does**	**What students do**	**Cognitive activities important for SDL/SRL**
Initiation	• Present a new learning task • Activate student prior knowledge	• Make learning task plans • Choose learning resources	• Motivation • Activation of prior knowledge • Goal-setting • Strategic planning
Learning	• Present core concepts that are relevant to the learning task • Model application of core concepts to the learning tasks	• Actively determine relevant aspects of information for task completion • Learn strategies that could be used for task completion	• Subject matter acquisition • Strategy knowledge acquisition
Performance	• Provide coaching and feedback as needed	• Final selection of task strategy • Perform/complete the task • Use relevant domain knowledge	• Self-management • Self-monitoring • Motivation • Induction
Assessment	• Provide task-oriented feedback on task performance	• Assess a peers task performance • Self-assess personal task performance	• Self-reflection • Self-evaluation and assessment

Following principle two, student acquisition of core concepts is supported through more teacher-directed methods at the beginning of the learning process. Modeling showing how to apply core concepts is also provided in teacher-directed ways. However, teacher-directed instruction is faded over time, giving students an opportunity to carry out and adjust their information gathering processes with increasing independence. Highly self-directed students may be required to find, study and apply all knowledge on their own and complete learning tasks without a model (see table 2).

In the “Those Old Kentucky Blues” learning task, after being introduced to the problem, students begin to learn about relevant topics within the biology field such as dominant, recessive, co-dominant, and sex-linked genes, and other topics. Students learn about these topics through lectures, textbook readings, media presentations and SDL activities. As students learn the material, they actively search for ways that the information can be used to determine why a person might have blue skin. At the beginning of the genetics unit a teacher introduces the major concepts of genetics to students through more teacher-directed methods (including lecture, one on one instruction and readings). Later, students are required to find some or all of their own learning resources to complete genetics learning tasks (e.g. by searching through the textbook or looking online). When students have finished learning about core concepts from genetics, the teacher takes students through the process of applying these concepts to the learning task. To model the process, the teacher takes on the role of a coping model, making the mistake of applying an incorrect inheritance pattern and realizing that, based on family tree information, this pattern does not fully account for the blue skin. Next, the teacher explains his or her thinking process for applying the correct inheritance pattern while pointing out how and why this pattern applies to the problem. The teacher does not completely solve the problem, requiring students to finish solving it independently. Later in the genetics unit, students must complete learning tasks with minimal modeling and must determine how best to use relevant biology concepts to do this.

The Performance Phase – Applying Knowledge and Completing the Learning Task

In the performance phase, students apply their recently learned knowledge to complete the learning task. In a higher education science classroom, students can complete a learning task as part of a class assignment and then provide evidence that they completed it. This evidence might take the form of a written paragraph, an artifact resulting from task completion, or performance of the task with the teacher watching. Along with evidence of task completion, students should be required to explain what strategies were used to complete it and why. Learning task performance requires students to practice vital SDL skills including self-monitoring, self-management and motivation to stay engaged in a task (Garrison, 1997; Zimmerman, 2002). In self-monitoring, students observe, judge and react to the learning task, adjusting learning strategies that are not working (Butler & Winne, 1995; Zimmerman, 1998). Self-management refers to student management of the task performance process as they take the steps necessary to complete the task (Garrison, 1997). Early in the learning experience a teacher provides coaching and feedback to help students self-monitor, self-manage and stay motivated. Later in the learning experience, or if students are highly self-directed, support for task completion is reduced (principle two).

In the “Those Old Kentucky Blues” learning task, students are required to determine the genetic source of the blue skin after learning about how traits are inherited (core concepts) and being shown how inheritance patterns might be applied to the problem. In this case students must hand in a short paper indicating what the source of the blue skin might be, how they came to this solution, what strategies they used and what genetics knowledge was relevant to the problem. If students need help while working on the learning task, they contact the teacher, who provides guidance and feedback. During the task completion process, students learn how to apply genetics concepts effectively as they discover the ways genetics knowledge can be used. In addition, students gain SDL experience selecting learning strategies to complete tasks. Later in the genetics unit, students must independently complete other tasks without teacher help. They will continue to use knowledge of inherited traits and more advanced genetics concepts to do this.

The Assessment Phase – Assessing Learning Task Performance

After the learning task has been completed, the teacher gives a grade and feedback telling how well students did. The teacher also indicates which aspects of students’ task performance were high and low quality and why (Shute, 2008). Students are also required to assess a peer’s or group’s work, providing similar feedback. Finally students might be required to self-assess their own work indicating strengths and weaknesses of personal task completion. Students who concentrate on specific aspects of task performance and self-assess may continually improve personal performance efforts (Butler & Winne, 1995; Ericsson, Krampe, & Tesch-Römer, 1993). For highly self-directed students, a teacher can require students to self-assess learning task performance through a comparison to course criteria or a peer's performance (Garrison, 1997; Zimmerman, 2002).

In the "Those Old Kentucky Blues" learning task, students receive informative feedback from a teacher assessment, peer-assessment and self-assessment. Students assess a peer's (or peer group's) write-up after handing in their own using a rubric provided by the teacher. Later in the learning experience students may also be required to self-assess their task completion, using a similar rubric. In this problem, there is not necessarily one correct answer, so grading does not focus on whether the task solution was right or wrong. Through reflection on peer and personal performance, students gain a greater understanding of how genetics knowledge can be applied and transferred to different situations (van Merriënboer, 1997; Merrill, 2002a).

Table 2.

Teacher-directed, moderate and student-directed approaches to learning activities within each phase of the learning process.

Course element	Teacher-directed approach	Moderate approach	Student-directed approach
Learning task choice (initiation phase)	Teacher chooses and provides all learning tasks	Teacher provides a list of learning tasks for students to choose from	Students choose learning tasks to engage in
Learning resources for core concepts (Learning phase)	Teacher provides all learning resources (lecture, textbook, online etc.)	Teacher provides some learning resources and asks students to find and apply additional resources	Students find, evaluate and apply learning resources independently
Modeling application of core concepts to the learning task (Learning phase)	Teacher provides extensive and specific modeling showing how to apply core concepts to learning tasks	Teacher only models a part of the application process	Students apply core concepts independently without a model
Learning task performance (Performance phase)	Teacher provides extensive coaching and feedback for task performance	Teacher provides coaching and feedback when students request it	Students provide own coaching and feedback
Assessment of learning (Assessment phase)	Teacher assesses student performance	Students assess personal and peer performance and a teacher also provides assessment	Students assess personal and peer performance

Note. Ideally, a learning experience gradually shifts from teacher-directed to student-directed approaches over time.

This process of initiation, acquisition, performance and assessment repeats in the genetics unit and continues in other units of the class. Repeated tasks that require students to apply similar information help students develop a conceptual knowledge of the principles involved (e.g. genetics) and transfer this knowledge to other situations when needed (van Merriënboer, 1997). SDL skills are fostered in this process through learning tasks that require students to apply knowledge and through a gradual shift of responsibility for learning toward students. By the end of the class students are required to direct many aspects of their own learning processes (see table 2). They must choose learning resources, plan how to complete learning tasks, monitor and adjust their task performance, and self-assess their learning.

The Design of a Learning Environment to Support Learner Self-Direction

The process above involves students in learning tasks and shifts responsibility for learning toward students over time. The creation of this learning environment takes some careful planning, design and implementation activities. General guidelines for the design of the learning environment described above will now be given including guidelines for determining learning tasks, finding out about students, designing the learning experience, developing course materials, and adjusting the learning experience.

Determining Learning Tasks

The question, "what should student's learn?" usually guides a teacher/designer in making curriculum decisions. Within formal education, the subject domain is usually specified (e.g. biology) along with specific units of items that should be learned (e.g. genetics, evolution, ecology). In contrast, task-centered models and SDL theory suggest that what students learn should be based on a task analysis, or an analysis of what students will likely be required to do after they are finished with the learning experience (Hammond & Collins, 1991; Knowles, 1980; van Merriënboer & Kirschner, 2007; Merrill, 2002a). This changes the question from, "what should students learn," to, "what will students do after this class is over?" This thinking is consistent with the fourth principle, centering learning on tasks. These learning tasks are based on the activities that students are expected to do once they are finished with a class. For example, in a writing class, students should do writing tasks that are typically performed in business situations (i.e. writing a proposal for action, communicating clearly by email, creating meeting agendas) if students are likely to seek out a career in business.

Finding out about Students

The above example also implies that a teacher/designer needs to gather information about students before class. Typical student aspects that are important to the design of learning experiences include how much students already know about a subject, what motivation students have to learn, and what professional activities students are likely to do in the future (Dick, Carey, & Carey, 2005; Gagne, Wager, Golas, & Keller, 2005). Principle one indicates that teachers must also know how ready students are to self-direct their own learning. A teacher/designer can find this out through a class discussion, an instrument designed to measure SDL or SRL readiness (e.g. Guglielmino, 1977; Pintrich, Smith, Garcia, & McKeachie, 1993; Stockdale, 2003), a questionnaire, or other pretests. At the very least, a teacher/designer should estimate the SDL readiness of students using past teaching experience as a guide. Knowing about students' readiness to take charge of their own learning activities can guide a teacher/designer in determining the level of control to give to students during the learning experience. For instance, if in the past students have shown low levels of successful engagement in SDL activities, the teacher should start with a lot of teacher control and then gradually move toward student control of the learning process (principle two).

A teacher may also benefit from finding out what students want to learn and adjusting course items based on this input (Hammond & Collins, 1991). This approach to education has been advocated by authors in adult learning and SDL theory for learners who are highly self-directed (Knowles, 1975, 1980; Knowles et al., 1998), but may be very difficult to implement when course content is tightly controlled or when students do not know what they want to learn.

Designing the Learning Experience

The design of the learning experience should start with the identification and ordering of learning tasks (principle four; van Merriënboer & Kirschner, 2007; Merrill, 2002b, 2007). These tasks should be ordered from easy to difficult and provide a conquerable challenge for students. In classes where the subject matter is already specified and controlled, a teacher will have little room to change what is taught. In these cases, however, it is still possible to use tasks. For instance, a basic course in electrical engineering may have required units such as electrical circuits, motors, generators, and computer systems. A teacher/designer can create a sequence of tasks for students to do within each of these areas based on professional engineering practice. For example, a teacher/designer can design two or three learning tasks that will require students to apply their knowledge of electrical circuits for the electrical circuits unit. An approach to the sequencing of tasks that moves toward student direction of the learning process (principle two) might involve creating a list of learning tasks for students to choose from and providing advice on which tasks to choose (Kicken, Brand-Gruwel, & van Merriënboer, 2008; van Merriënboer & Sluijsmans, 2009). Ultimately students might be given the opportunity to independently choose all learning tasks (see table 2).

When specifying learning tasks, a teacher/designer must also determine the types of knowledge students will need to have in order to complete the tasks (principle three). Two types of knowledge should be provided to students. The first is knowledge about the domain(s) in which the task resides (core concepts) that is relevant to the completion of a learning task. In the engineering example, this is knowledge about engineering concepts relevant to electrical circuits including knowledge about the different types of circuits, Ohms law, Kirschoff's laws, how circuits are built, etc. According to principle two, this knowledge should be provided with more teacher-directed instruction at first and then gradually a teacher/designer should shift the responsibility of finding and evaluating this knowledge toward students (see table 2).

The second type of knowledge shows students how to apply core concept knowledge to a learning task. In the electrical engineering example, this information might include how to apply laws of current to the creation of an analog electrical circuit. This information is best provided through modeling that shows students how to complete a learning task and explains the thought processes leading to actions (Collins et al., 1989). To increase student direction of the learning process over time (principle two), the responsibility for modeling and application of concept knowledge should be gradually shifted toward students.

In addition to designing learning tasks and the knowledge needed to complete a learning task, a teacher/designer will also need to design assessment instruments. Most higher education courses require a final assessment and mid-term tests, but assessment for fostering learner self-direction is much more. For each task students perform, they should receive a grade and feedback indicating what was done well and what could have been done better (Shute, 2008). The design of assessments should also follow principle two and gradually shift from teacher to student assessment. Findings have indicated that, if implemented correctly, self-assessment and group assessment by students tend to have high validity when compared to teacher assessments (Cho, Schunn, & Wilson, 2006; Kilic & Cakan, 2007; Ryan, Marshall, Porter, & Jia, 2007).

In addition to the above task design activities, a teacher/designer needs to determine in what order and how tasks should be presented to students. Overall, learning tasks should be designed to go from easy to difficult or from high to low support (van Merriënboer & Kirschner, 2007; Merrill, 2002a). Students can also do learning tasks individually or in groups with differing levels of support (Merrill & Gilbert, 2008). The sequencing of tasks can support a gradual shift from teacher to student direction of the learning process (principle two). For instance a design can feature a high amount of guidance and modeling when students are asked to perform a task at the beginning of class and fade this guidance and modeling later.

Developing Class Materials

After analyzing aspects of the learning situation and designing a learning experience, a teacher/designer must develop materials, media and tasks for student use (Dick et al., 2005; Gagne et al., 2005). Development includes the creation of media for student involvement in the learning tasks and the final selection of learning materials from which students will learn. Development also involves making decisions about how to best provide guidance and feedback to students as they perform tasks. Different media that can be used to present knowledge include in-class presentations, textbook readings, videos, web pages etc. Students should be increasingly given the opportunity to choose learning resources to use over time. For example at the beginning of a class, a teacher might provide a list of resources to students and suggest that they also look up further resources as needed to complete a task. In later tasks, the teacher could suggest fewer resources for learning and ask students to find additional resources themselves. Care should be taken, however, to assure that students know how to identify reliable resources.

Making Needed Adjustments to the Learning Experience

Constant effort is needed to determine the effectiveness of the learning experience and to revise it to better support learning and self-direction. Information that can guide the revision efforts can include informal student feedback, assessment data, classroom observations etc. (Dick et al., 2005). A chance for revising and improving a class occurs after students have viewed each learning resource, completed each learning task, and interacted with other course elements. Information about student experiences in doing SDL activities and interacting with tasks can help guide efforts to improve a class.

When the newly-redesigned class is "tried out" with students, some of the most important discoveries are made. Experience in class might indicate a needed adjustment in learning task difficulty, amount of student direction required, amount of support and guidance given, amount of resources students must look up, and level of self-assessment required of students. For instance, students may find that a learning task is too easy or too difficult to perform with the provided support. They may be unable to self-regulate and self-direct learning to the degree that is required in the class. Such issues are an indication that adjustments need to be made to the learning experience to increase its effectiveness.

Conclusion

Higher education is a means by which students prepare for lifelong learning and career performance. Increasing students' ability to learn on their own should be an important goal for higher education learning experiences (Bolhuis, 1996; Grow, 1991; Guglielmino, 2008). Learner self-direction continues to be necessitated by increases in career mobility rates (U. S. Bureau of Labor Statistics, 2008), in which graduates will have to use SDL skills to keep up (Guglielmino, 2008). This paper presented and supported four principles for fostering learner self-direction in formal education from the SDL and SRL literature. The four principles can guide the design of learning environments intended to foster learner self-direction. The learning environment presented in this paper involves students in four phases of the SDL process while completing tasks. Throughout this process, responsibility for key processes such as choosing a task, acquiring knowledge, applying knowledge, monitoring performance and assessing performance is shifted toward students. It is hoped that the model presented above presents salient guidance to educators and instructional designers for providing learning experiences that foster learner self-direction.

Based on preliminary studies (e.g. Litzinger et al., 2003; Preczewski, 1997), it may be that, at present, higher education is overly focused on creating "good students" who are able to acquire knowledge only in the most teacher-directed situations. Instead, we can prepare students to be "intelligent engineers" who know how and when to independently acquire more knowledge, and apply this knowledge to accomplish useful tasks. As we move forward, we will need to move away from creating "good students," and toward creating "intelligent engineers."

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21st Century Community College Teaching Strategies and Medieval History: A Design and Development Project

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Introduction

Systematic instructional design provides a crucial vehicle for designers and teachers to develop efficient and effective learning environments (Dick, Carey, & Carey, 2005). Formative program evaluation provides an opportunity for designers and teachers to modify previous instructional experiences, to foster enhancement of student learning and performance (Russ-Eft & Preskill, 2001). This paper will outline the program evaluation conducted on a systematically designed instructional unit for a large community college in the Northeastern US, located in upstate New York.

Program Overview

Medieval Philanthropy: A Bible in Glass and Stone, is an 80-minute prototype program, which includes the introduction of Romanesque style architecture and the progression of the physical aspects of medieval architecture, from the birth of Romanesque style churches through the introduction of the 'new' Gothic style architecture. The lesson also includes a focus on the influence of the period's social concerns, the European climate type, new discoveries, and the introduction of new building technology. This rich background information adds breath and depth to the developmental analysis of medieval architecture.

The goals of this program are twofold. They include the following: a) Students' ability to identify the physical attributes of Romanesque and Gothic style churches. b) Participants should also be able to identify the social and climate-type factors, which led to the development of these two architectural styles. Early field test results attest to students' realization of these goals, when using this instructional program.

This program was specifically designed to educate and motivate an approximately 33-student class of one hundred or two hundred level undergraduate, general studies students. With modifications, it may be used for more advanced coursework or larger class sizes as well. The use of multimedia, student participation, and underscoring connections to modern life have been proven to help facilitate an engaging experience for adult learners of all ages in this program, during this field test.

Instructional Objectives

Medieval Philanthropy: A Bible in Glass and Stone is designed so that students can attain the following two objectives by the end of the program. 1) Given examples and non-examples of the periods' social factors and geographic climate type, students will identify the factors that influenced the progression of architecture, from Roman Basilicas to the introduction of Gothic architecture, with 80% accuracy. 2) Given examples and non-examples of physical architectural elements and whole building illustrations, students will classify features from the

Romanesque time period with 80% accuracy. 3) Given examples and non-examples of physical architectural elements and whole building illustrations, students will classify features from the Gothic time period with 80% accuracy.

Instructional Materials

Medieval Philanthropy: A Bible in Glass and Stone includes all of the materials needed for instruction and assessment on the lesson content and objectives. These materials include: a student participation (Apprentice) manual with complete lesson content, learning activities, practice objective assessment items, a pretest, a posttest, an instructor guide, and 2 supporting CDs including both manuals, video clips, and presentation slides.

Evaluation Method

Participants

A total of 42 general studies students from two different class sections participated in this prototype tryout. They each belonged to a one-hundred-level medieval history course, at Hudson Valley Community College, in New York State. The single course instructor reported the following demographics from his observations: The average age of student participants in the day class was approximately 19 years old. There were three Caucasian females and 16 Caucasian males. The average age of student participants in the evening class was approximately 27 years old. However, there were also two participants in his/her 50s and one in his 70s. The evening section included one African American and 21 Caucasian students. The male to female ratio for this section was about equally split.

Process

One instructor taught the lesson to his own students using the procedures described in the *Medieval Philanthropy: A Bible in Glass and Stone Instructor Guide*. The teacher administered and scored the pretest and posttest. An optional creative writing activity was included during the evening section, but not implemented for the daytime section. The creative writing activity, which asked students to create a cartoon strip incorporating key lesson concepts, was met with some opposition during the evening section; many of the more mature students (aged 35 and older) chose not to participate in the activity.

Data Sources and Collection

To conserve class time the pretest only consisted of 10 multiple-choice items: three items for objective one, four items for objective two, and two items for objective three. The posttest consisted of 14 multiple-choice items: 5 items for objective one, four items for objective two, and five items for objective three. The student attitude survey and teacher questionnaire were adapted from previously constructed instruments, by Educational Psychology Department faculty members, Dr. Wilhelmina Savenye, Dr. James Klein, and Dr. Howard Sullivan. The data collected by the pretest, posttest, student survey, and instructor questionnaire will be used to evaluate and revise the instructional program. Permission was granted by Arizona State University's Internal Review Board (IRB) for data collection, analysis, and publication.

Results

Student Achievement

The mean percentage scores of the entire field-test cohort on the pretest and posttest show that the overall mean scores were 41.5% on the pretest and 77.9% on the posttest. Students' pretest scores were near the 33% chance level on objectives 1 and 2. Students' pretest scores were 64.3% for objective 3. However, the limited sample number of two items for objective 3 may have distorted those results. The posttest scores were above 80% on objectives 2 and 3 but below this level (61.5%) on objective 1. There were no statistically significant differences between the students' achievement in the day section vs. the evening section. The overall pretest mean for the day section was 40.9%, as compared with 42% for the evening section. The overall posttest mean for the day section was 77.8%, as compared with 78% for the evening section.

Student Attitudes

The majority of the program participants enjoyed this program, as can be seen from the positive ratings on the student satisfaction survey. 90% thought it was interesting. 78% or more thought it was clear and an all-around good instructional program. When asked what they liked best about the program, students reported: the content, the instructional style, and the visual aids. Complete survey results are shown in the appendix.

Teacher Attitudes
The single tryout teacher generally liked the program design, as indicated by his responses on the instructor questionnaire; he gave positive responses about ease of program use, organization, and appeal. The major strengths were said to be the visual cues and well-formatted assessment questions. The instructor suggested adding more pictures and removing the creative writing comic and What do we know? What do we want to find out? How can we find what we want to learn? What did we learn? (KWHL) chart activities.

Discussion/ Suggested Revisions

Based upon the data collected during the prototype tryout, the following considerations should be made for revision:

About 22% of the student participants noted a preference for a slower instructional pace in the qualitative comment area. However, several students' comments (approximately 10%) suggested adding more material or depth to the content in the qualitative response area. The instructor also reported that he would like to see more example pictures included of churches and stained glass windows. These ideas really complement each other. Adding more pictures would make the pace feel slower since they would allow students to spend more time on each concept. Due to the volume of suggestions, this revision will be immediately implemented.

The instructor suggested removing the KWHL chart due to observing confusion emanating from students' behaviors, which may have led to the observed lack of student participation in this activity. Future versions will present it as an "optional activity" in the instructor guide.

The instructor only had enough instructional time to present the comic activity during the evening section. He reported a complete lack of participation from all students approximately 35 years old or older during the comic strip optional activity. He noted that they wouldn't even get up to go into groups on the instructor questionnaire. Due to this activity's radical instructional style which many instructors are not familiar with and the lack of student participation, it will be removed from future versions of this program.

Conclusion

This instructional program was designed to provide an opportunity for non-major undergraduate medieval history students to connect with information generally thought of as inconsequential for many in modern society. After three years of implementation, the instructor still uses the program to cover these specific curricular objectives. The program successfully engages these students through allowing them to explore relationships between historical events and common architectural features. Through focusing on making relevant connections and applying modern teaching strategies, designers and instructors may successfully capture students' attention, motivation, foster positive learning attitudes, and help learners succeed.

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Appendix

Responses for Student Satisfaction Survey*

Directions: Circle the answer that best describes how you feel about each question. Use the following scale to help you:

		Agree Strongly	Agree	No Opinion	Disagree	Disagree Strongly
1.	The program objectives were clearly stated	17%	64%	12%	7%	--
2.	The program was interesting	19%	71%	10%	--	--
3.	The information presented was clear to me	24%	55%	14%	7%	--
4.	The practice exercises aided my learning	12%	69%	17%	2%	--
5.	The video aided my learning	26%	57%	17%	--	--
6.	The presentation slides aided my learning	26%	64%	10%	5%	--
7.	The assessment was a reasonable way to tell what I had learned	14%	60%	21%	5%	--
8.	This was generally a good instructional program	14%	64%	17%	5%	--

		Too Hard	About Right	Too Easy
9.	The program was	5%	88%	7%

10. What did you like most about this program? (30 comments total)

- The material or the content. (17)
- The slides, or the video, or the visual aids. (6)
- The humor. (2)
- The instructional style. (2)
- The connection made between then and now. (1)
- The teacher. (1)
- The Wu Tang Clan music. (1)

11. What did you like least about this program? (25 comments total)

- It was hard to follow, or it went too fast, or it was too brief, or it was too short. (12)
- The video or the slides. (5)
- The content. (3)
- Nothing. (2)
- I'm tired, or I didn't get to build a church, or I don't like me. (3)

12. Please take a moment to write any suggestions you may have for improving this instructional program. (10 comments total)

- Slow down. (3)
- More about stained glass, or more information, or more depth. (3)
- No suggestions. (1)
- Do this for multiple topics and future discussion. (1)
- More pictures of local churches' interiors and exteriors. (1)
- Student, arrived 35 minutes late: "I had no idea of what we were doing. No real instructions or objectives." (1)

*Adapted from Dr. Wilhelmina Savenye, Dr. James Klein, and Dr. Howard Sullivan, copyright 2007

Making Instructional Design Accessible in Recessionary Times: A Partnership-based design and development evaluation

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Introduction

While high quality instructional design tends to be economically rewarding for organizational adopters, it also requires a substantial capitol investment that small businesses often forgo. Such deployments require relatively robust corporate budgets, which are unrealistic for most modern small businesses. Further, Paradise and Mosley (2009) report that in past economic downturns, organizational managers have tended to reduce investments in learning budgets and fail to reinstate those lost resources once the economy had recovered. The current amount of limited resources devoted towards systematic analysis, design, development, implementation and evaluation, of human performance technology has begun to require instructional designers to reinvent their roles. A team of educational technologists used client coaching, scaffolding, instructional design mentoring, and open-source learning management software to meet the training needs of a client in the fitness industry.

In the past, most training was provided to many of industries' early novice learners by expert mentors. A glance at historical training solutions might remind us of the importance of apprenticeships, which were heavily used by small businesses in areas such as architecture, metal working, masonry, farming, cottage industries, mechanics, folk arts, studios, etc. This early on form of performance training combined with the gift of modern pedagogical scaffolding tools, coaching, and open-source learning management software can result in professional quality, state of the art instructional design.

Coaching has been a popular performance improvement strategy which when implemented often has a positive impact on individual and organizational learning (Luecke, 2004). Through supporting the client's search to firmly identify goals and take action to reach those goals, the authors guided a small business in the transformation of face-to-face instruction into a high-quality blended learning program at a fraction of the cost of traditional in-house instructional design. The following evaluation report outlines the results of this project.

Program Overview

The Christian yoga online instructor-training program was designed as an introductory, asynchronous, three-month or two-hundred hour, interactive online learning opportunity, which is housed in the open-source course management system, Moodle. The online training is organized into eight instructor-facilitated modules; 1) Orientation, 2) Christian yoga philosophy, 3) Nutrition and healthy living, 4) Marketing Christian yoga, 5) Yoga industry, 6) Anatomy and physiology, 7) Alignment and postures, and 8) Teaching methodology.

The goals of the online instructional component of this program are to a) provide students with an opportunity to acquire the declarative knowledge needed to become a Christian yoga instructor, and b) begin building a professional support network. An instructional design team facilitated the transition from a face-to-face curriculum into an online hybrid-learning environment. The team possessed collective expertise in program management, network administration, instructional design, online learning, and the health fitness industry. The online learning environment supported students' acquisition of technical declarative knowledge, comprehension, and analysis, of philosophy, nutrition, entrepreneurship, and vocabulary. The physical postures and kinesthetic alignment were the focus of the subsequent two-week or eighty-hour face-to-face portion of the course.

The target population is comprised of men and women who worship Christ and would like to develop a Christian yoga ministry. Program participants should have taken at least 5 yoga classes, possess strong English language skills, successfully completed at least an eighth grade education, as well as feel comfortable using a computer and the Internet.

Each of the three online program instructors received online facilitator training and professional consultation. The human performance technology consulting group personnel provided all training and consultation during the pilot program. The online instructor responsibilities included planning for instruction, developing instructional materials, tracking individual participants' progress, answering questions, providing support and motivation for students, as well as facilitating group discussions.

A Moodle course-management administrator was also trained and supported by the human performance technology-consulting group during the pilot program. The administrator's responsibilities included uploading instructional materials, assessments, setting up the Moodle environment, and populating the Moodle environment. Formation of all milestone goals, expectations, an applied introduction to instructional design aligned with related content examples, work process, approval procedures, implementation, and evaluation plans, were planned collaboratively between the consulting group and clients. Training sessions and consultations for the instructor and administrator clients were provided face-to-face, via the phone, and through email correspondence for the duration of the pilot program.

Evaluation Method

Participants

A total of 16 students from across the U.S. participated in this online pilot program. Some students had experience with online learning environments and some did not. All students voluntarily registered for the online instructor-training course. The average age of this predominately Caucasian student participant group was approximately 33 years old. All students in this pilot group were female.

Process

Three instructors and one administrator facilitated the delivery of the Christian yoga instructor training online learning program during a three-month period. A 90-minute face-to-face evaluation session was also conducted with the same 16 online students at the Christian yoga studio, during the 10-day face-to-face portion of the training program.

Data Sources and Collection

Three of the eight online modules, Christian yoga philosophy, Anatomy and physiology, and Alignment and postures, included several objective-type multiple-choice assessment items. The assessment items were grouped into several topic areas within each of their respective modules. All 16 online students were allowed to take each of the assessments as many times as needed, until each student answered 80% or more of the questions correctly.

All eight online modules contained open-ended discussion prompts. The discussion prompts asked students to analyze the meaning they made of the materials provided. Students were also prompted to explore the applicability of the course content to various situations they may encounter as Christian yoga instructors, within a discussion board format.

The ninety-minute face-to-face evaluation session was used to elicit feedback on the students' experiences with the online learning program and explore desired features for a future online post-program graduate portal. The evaluation tools included a silent, anonymous, pencil-and-paper student satisfaction survey, three small group focus panels, and a large group discussion to verify data gathered in the small focus panels and explore an online post-program graduate portal.

After the face-to-face student evaluation session, each of the three instructors also received an opportunity to complete an online survey used to evaluate their experiences with the online learning program development and the human performance technology-consulting group. Two instructors collaborated to respond to one survey as well as a third instructor who also completed an instructor satisfaction survey.

Results

Student Achievement

All 16 students were eventually able to successfully answer 80% of more of the objective-type multiple-choice questions asked about each topic assessed in the Christian yoga philosophy, Anatomy and physiology, and Alignment and postures, modules. During a small group focus panel discussion in the face-to-face evaluation session, students reported to the facilitator that many of them took advantage of the option to retake the quizzes and tests, as many times as they needed. However, some students voiced concerns over the wording of some of the questions during the small group focus panels. All 16 students were also able to respond completely to the discussion questions posed in each of the eight online modules, with facilitation and instructor prompts. However, some students voiced concerns about redundant topical discussion questions during the small group focus panels.

Student Attitudes

Satisfaction Survey Results

All 16 students responded to the paper-and-pencil online student satisfaction survey. Both the quantitative and qualitative satisfaction survey data revealed that students generally enjoyed their learning experience. The overwhelming majority of students reported that the online course meet their expectations (4.6 rating out of 5.0) and rated the course content at 4.3 out of a 5.0-point scale. Students mostly reported enjoying the performance of each of the three course facilitators as evidenced by the 4.5 averaged rating out of a 5-point scale. Data collected also showed that students appreciated the instructors' responsiveness to student questions (4.4 out of 5.0) and that the required reading documents were generally easily accessible from the online environment (4.25 out of 5.0). Students also reported the course as being generally well paced (4.6 out of 5.0) and well organized (4.7 out of 5.0). Students' opinions tended to vary a little more in their opinions of the necessity of the RYT designation, as evidenced by the 4.1 rating out of the 5.0 scale of importance.

Student's qualitative survey feedback was generally positive. Many students remarked that they enjoyed their instructor's supportive and positive online personalities, subject matter expertise, and their quick responses to content-related questions as well as their technology challenges. Many students also reported learning a great deal of new information, enjoying the online environment, and feeling connected with the learning community. Some students remarked that a future RYT designation would be relatively important to obtain but that it wasn't something they felt they needed at this time, while others would have liked to complete the training with this designation.

Face-to-Face Focus Group Results

All 16 students also participated in one of three face-to-face, small focus groups (e.g. course content/pacing/workload, technology, student-teacher communication/fellowship). Each group was asked the same four questions; a) What should stay the same?, b) What should be added?, c) what should be taken away?, and d) What could be improved? After each small group had a chance to brainstorm and discuss their input, the information was reviewed for completeness and verified with the large 16-student group. Students were asked to comment on their experiences with the online portion of the course, however some students also contributed comments that were focused on the face-to-face classroom experience.

Course content, packing, and workload focus group

Students reported that they enjoyed the Christian part of the course as well as having a pacing calendar presenting an overview on the whole module. Many students recommended that a place for immediate, anonymous feedback be incorporated into each module. Students also requested a video chat feature to be added to the course and more instruction on the purpose and path within the spiritual basics section of the course. Students recommended that the redundancy within the spiritual basics and orientation modules be reduced. Many complained that they felt they were being asked the same discussion topics during these two modules. Students also suggested that all of the handouts in each module be compiled into one printer-friendly booklet, introducing more yoga sooner, providing more explicit instructions on how to use some of the Moodle features such as the instant chat and discussion boards. Several students requested additional organization, content alignment, and test preparation to be added into the course.

Technology focus group

Students reported that they enjoyed the participant information profiles, pictures, discussion forums, the ability to review wrong answers, as well as the ability to access and download handouts even after each module ended. Again students requested more instructions on how to use different features within Moodle, as well as more instructional DVDs on postures and anatomy. Students also reported a desire for the ability to provide status updates, such as those available in Face Book. Students also discussed their dismay with the enrollment problems from modules 4, 5, and 6. Again, students requested access to additional communication features.

Student interaction, teacher interaction, and fellowship focus group

Students generally reported that they liked the timing of interactions, getting to know each other, having access to everyone's different points of view, and receiving personal emails/responses from their teachers. Some students reported feeling isolated towards the end of class, requesting more discussion forum opportunities. Students in this focus group also requested a place for immediate, anonymous feedback and other communication features/instructions such as a synchronous chat. Students requested more detailed information on each teachers' role(s), more direction, clarity in the orientation, and video explanations.

Instructor Attitudes

All three pilot course instructors participated in an online instructor satisfaction survey, which was distributed following the face-to-face portion of the school's first hybrid program student cohort. Two of the three survey participants completed one online evaluation form collaboratively. Both instances of the survey results were kept anonymous by one of the evaluation tool's software features. Each of the three instructors was brand new to online educational environments. However, they had been conducting face-to-face Christian Yoga Instructor Training courses for approximately three years prior to when this instructional design project began.

In general, the survey results revealed that the three instructors were satisfied with their instructional design project work, course implementation, and facilitation. This is evidenced by the five point Lykert scale measurement tool, which was created for this unique project with input gathered from all stakeholders. For example, when the instructors were asked to rate their feelings about the within-module organization, overall course organization, course pace (or rhythm), overall course quality, the instructional design team's services, the instructional design process, and the Moodle learning environment, the instructor's measured their satisfaction at the satisfied or very satisfied level, 93% of the time.

Overall, the qualitative evaluation questions also revealed a satisfied general consensus about the project. One instructor remarked that, "The course content brought our education to the 'Gold Standard' outcome we so desired. It made us think long and hard about what we are teaching and the best way to do it." Another instructor remarked that she, "Learned a whole new set of skills for myself, and enjoyed the teamwork." Several other comments were also made about the talents held by the human performance technology consulting team.

The few concerns noted in the evaluation results centered mostly on the early portion of the instructional technology design learning curve and becoming acquainted with the learning environment. Survey respondents shared their apprehensive feelings about the amount of new information being presented, the level of content preparation expected from the teachers, not being able to get into the Moodle environment earlier in the project for help with conceptualization, some early confusion with the technology, the online portion of the program's pacing, and the quality of student posts. Several of these concerns have already been resolved with the hands-on experience gained by the Christian yoga instructor team through the pilot program.

Suggested Revisions

The majority of the feedback gathered from both students and the instructors has been positive. However, valuable life experience and the field of evaluation often tell us that there is usually room for improvement and growth. It should be noted that due to the one-time case-study nature of this project, as well as both small student and instructor sample sizes, change decisions should be carefully calculated and implemented. In addition, the development of a continued formative evaluation plan is advised as well as further data collection and analysis.

Based upon the data gathered from this pilot hybrid training program's online component evaluation, development opportunities have been classified into four different areas; course structure, content, assessment tools, and Internet learning environment.

Course Structure

Suggested adaptations within the course structure focus on communication and organization. Some of those who participated in this evaluation felt uncomfortable with the pacing, at different times during the online portion of the course. Extra effort should be made to communicate pacing and work expectations with students. The calendar feature within the Moodle course should be provided, updated, and monitored by the current instructor facilitator or administrator. Also, the supporting reading handouts or materials could be compiled into one document for each module. Access to additional communication options within Moodle, such as instant chat seems to be important for students and warrants investigation. More opportunities for community building were requested in the form of continued forum discussions throughout the later portion of the online program.

Content

Due to several student comments made about the redundancy of discussion forum topics and responses, a detailed transcript analysis is recommended. Should redundancy in student responses be found, one must consider whether the prompts are the major influence or facilitation style and revise accordingly. Additional resources depicting postures, movement, and anatomy should be considered as well because students requested additional test preparation and video resources. Market research should also be conducted to determine the impact of the RYT designation on program enrollment.

Assessment Tools

Questions about test question and instructional resource alignment arose several times during the program's pilot and evaluation periods. In order to validate the instructional alignment and assessment questions, a record of response attempts students made and results would need to be obtained. The assessments could either be tested with a student cohort or a limit on the possible attempts would need to be implemented along with observation of ensuing results. One instructor noted that she was disappointed with the quality of student posts. Further discussion transcript analysis should take place to determine if additional facilitator professional development is necessary or if the course structure needs revision. An anonymous feedback instrument embedded into each module might also help with identifying specific test question problems, organizational concerns, and better program tracking in general.

Internet Learning Environment

The request for additional instructions on the use of the tools embedded within the Moodle environment came up several times during the evaluation process. The evaluation process also revealed considerable student desire for the availability of additional communication features such as instant text and video chats. Since one of the main focuses of this program is to provide the foundations for building an active, informed, Christian yoga community across the country, the addition of these features is highly recommended. However, along with providing additional communication features, more robust training instructions should be provided for the use of these tools. The evaluation also revealed discrepancies with the Moodle learning environment organization; some students remarked at the excellent organization while others noted their desire for a revised organizational structure. Thus, more information should be gathered prior to any major organizational changes.

Discussion

Hakkin notes that instructional designers need to pay more serious attention in recognizing the importance of participatory and collaborative modes of designing needed to support explicit thinking about the border between the design artifact and its context of use (2002). This is not a new challenge to the field. Hannafin also wrote that instructional designers have not been very open to new alternatives; they have not reassessed the basic foundations or assumptions of the models (1993). The innovative instructional design project presented by these authors will address these common concerns and provide insight to new design and development strategies, which closely integrate the instructional program development with its intended context of use.

It has also been noted that the interplay of different learning theories often provides a necessary challenge in the design of complex, collaborative learning environments (Hanafin, 1993). We feel the success of this project must be attributed in some part to a close connection between constructivist learning theories, traditional systematic design models, and the weaving of human performance technology interventions, which have resulted in a comprehensive, innovative learning program. For example, the authors agree that team buy-in is essential to achieving timely progress. Extra precaution and support must be provided to prevent client from asking coach to do all the work. Use subject matter experts in your coaching team to handle instructional design, technology implementation, and project management. Client feels ownership of completed instruction so client rejection is minimized. Impacted the organization's outlook and approach to instruction throughout the organization.

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Smart Phones and Smart Users: Developing Online Courses for Use on the Smartphone.

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Abstract

With the popularity of smartphones on the rise, students are using their mobile devices to access everything from email to their social networks. The purpose of this research was to explore what student perceptions were on using their smartphones for their online courses and to explore what were distance course designer perceptions on developing courses for the smartphone device environment. Students were concerned about the costs involved, the limitation of the input device, the small screen size, lack of operational programs, the location of learning, and whether the device was the best tool to use. The students also felt that smartphones were constantly being approved upon and they had no doubt that future device improvements will overcome the current issues. The designers reported that there was compatibility issues between the various operating systems, that developing easy navigation was important, and that course content needed to be lightweight and portable. The evolution of the smartphone has undeniably affected the way we communicate, socialize, work, and access information. Through the perspectives of online learners and online course developers, this research explored the issues of it being a mobile learning device for online course access.

Introduction

The advancement of computer technologies and the World Wide Web have allowed many users to successfully fulfill degrees via the online learning environment. University systems have recognized that expanding their programs requires their ability to offer an online component (Allen & Seaman, 2006).

A successful online program starts with basic essentials such as a functional and reliable campus network, secure access, data storage, and availability of the technology tools to access the online environment. Other factors that affect success are faculty training (for administrative and technology support), technology mentoring, and effective course development. Besides being the facilitator of an online course, the instructor must also provide students with the administrative and technology support (Maiuka, Shi, & Bonk, 2005; Restauri, 2004). Removing institutional barriers, updating obsolete policies, accepting the technology paradigm shift, developing faculty and staff skills, considering faculty workload, designing effective instruction, and selecting appropriate technology equates to a good online program (McLean, 2005; Thompson, 2003). The use of mobile technologies are becoming acceptable means from which students connect to their online courses. Using mobile technologies to learn lends itself to the term mobile learning or m-learning (Wagner, 2005). These mobile technologies include laptops, handheld computers, netbooks, and more recently devices such as tablet computers and smartphones.

Wagner (2005) defines a smartphone as any handheld device that integrates personal information management with mobile phone capabilities, and the key feature of its addition of mobile applications. Mobile phones and emerging technologies are enabling phones to do more than transmit voice calls. Besides the basic ability to transmit voice communication, mobile phones are evolving in tandem with other technologies such as GPS, digital photography, digital video recordings, electronic book readers, and internet browsers. Whether for business or personal use, smartphones' communication prowess includes the ability to surf the internet, instant message, email, and access social media tools.

The International Telecommunication Union (2010) predicts that by the end of 2010, there will be five billion mobile phone subscribers worldwide. Pew Internet reports that 82% of all U.S. adults are cell phone users, with a little less than a quarter of them owning a landline (Purcell, Entner, & Henderson, 2010). Amongst all U.S. cell phone users, the Nielson Report (2010) has discovered that 25% of all U.S. mobile subscribers own a smartphone. More than half of U.S. teens are texting daily, and over 40 million U.S. adults are accessing the internet using their cell phones.

Advances in smartphone technologies have made it increasingly easy for users to stay connected. Within the last decade, these smartphones have become smaller, less expensive, and more powerful in computing. These smartphones have revolutionized the way individuals are connected to the world (Schlosser, 2002). Individuals are using the available features like the calendar, GPS, the web browser, the camera, the organizer, games, and thousands of other applications; it would seem logical that students with smartphones would use it to access their online courses.

With the rich success of higher education implementing online programs, emerging research are now focusing on the advancement of technologies for use in education. The advent of Wi-Fi, Bluetooth, and global wireless technologies such as GPS, GSM, 3G, and 4G have created new possibilities for students to stay connected online. When the new communication technologies merged with mobile computers, mobile learning emerged. In terms of technology and learning, mobile learning has also been defined as learning that takes place via wireless devices such as laptop computers, personal digital assistants, netbooks, e-readers and mobile phones (O'Malley, Vavoula, Glew, Taylor, Sharples, & Lefrere, 2003; Wagner, 2005). With the expansion of data networks and the advancement of smartphone devices, Asians and Europeans are finding that their computing and broadband computing needs can be met through a single device (Wagner, 2005). Given the vast research concerning m-learning devices, this research will specifically focus on the smartphone.

Methodology

Purpose of the research

The use of smartphones to support, enhance, and improve online course access is a relatively new idea; many students are using their smartphones for their everyday communication needs. The purpose of this exploratory study was aimed to explore if students are using their smartphones for their online learning and what their perceptions were about using them and what online course designers felt about developing for them.

Exploratory study

This exploratory study on using smartphones for accessing online courses, did not utilize quantitative research techniques because it was not the best method for reporting perceptions. Literature recommends the use of a qualitative approach when confronted with new and emerging research (Maykut & Moorhouse, 1994; Hoepfl, 1997). This study utilized focus group interviews and follow up one-on-one interviews.

A typical description of this qualitative study suggested that it is based on grounded theory. Qualitative researchers using grounded theory are expected to gather rich descriptive data and ground conclusions and understandings from the data collected, not prior theories (Charmaz, 2003; Creswell, 2005; Straus, 1987). It is the particulars that will alert the researcher the attitudes of the participants towards the research topics. This qualitative inquiry involves using a flexible structure (Creswell, 2005). Basch (1987) has suggested that focus groups with adults are a relatively easy and flexible way to gather a diverse range of information and learn about the ideas and opinions of homogeneous groups.

Instrumentation

Several instruments were used to investigate the research topics. In allowing for emergence, the most effective strategy employed in this qualitative study was the use of triangulation to ensure reliability: focus group interviews and follow up interviews.

The researcher first compiled and determined significant themes from each group about their perceptions of smartphones use or development for mobile learning. After the preliminary themes were developed, the researcher interviewed new participants for one-on-one interviews.

The focus group phase of data collection functioned as the primary source of findings. The second phase of one-on-one interviews refined the data points collected in the first phase. This two-step data collection process supports the principles of constructivist grounded theory (Charmaz, 2003). This constructivist approach acknowledges that the researcher interacted with the participants, the data, and the analysis. The data collected was used to formulate common themes and ideas which were then reported in the findings section.

Participants

The first topic of the study was to understand qualitatively student perceptions of using smartphones to access online courses. The second topic was to explore course developers' perceptions and ideas behind developing online courses for the smartphone environment. The first phase of the study collected data from two separate focus groups. Each small group had at least three participants each and all participants had a smartphone device as their main cellular device. The focus groups were separated into students and course developers.

The student group comprised of five volunteers who fit three criteria: having a smartphone, having participated in an online course, and be willing to participate in this exploratory study. Three males and two females were selected. All of the students were at least 20 years of age and attend a public university. Participants were classified undergraduate and graduate students in differing departments which included computer science, language studies, and education. The researcher purposely selected participants because of the polar criteria needed to explore the topic.

The second focus group was comprised of four course developers from a grant sponsored online course development team. Three were instructional designers and the other was a graphic designer. The participants also came from various educational backgrounds from graphic design, communication, business administration and educational technology.

The one-on-one participants consisted of two smartphone using students and two online course developers, and their ages ranged between 25 to 35. Their educational backgrounds also varied. The students reported that they each have had more than two years of online course experience. While the developers had more than five years of experience in developing online courses. The interviews were used to clarify some of the emerging themes and ideas collected from the first phase.

Research topics

The researcher began the focus groups with a grand tour question. Grand tour questions are broad and unfocused questions which allow the interviewees to lead the researcher into specific topics (Shank, 2006). The qualitative inquiry of the focus groups and one-on-one interviews aimed to gather information and explore two main topics: students' perceptions of using smartphones for their online courses and course designers' perceptions when developing online courses for the smartphone environment. Figure 1 lists sample questions used in the focus group and interviews.

Topic1	What are students' perceptions of using smartphones for their online courses.
Topic 1 Sample Questions	Are you accessing your online courses via your smartphone? Is using a smartphone to access your course a viable means to access your online course or course content? What do you perceive to be the important basic level needs (student needs, software needs, or hardware needs) required for accessing online courses on your smartphone?
Topic 2	What are course designers' perceptions about developing online courses or course content for the smartphone.
Topic 2 Sample Questions	What should course developers know about developing courses for the smartphone environment? What are some of the advantages/challenges of developing courses for the smartphone environment? Should course designers be developing courses for use on a smartphone?

Figure 1. Semi- structured topic and sample questions

Findings

Topic 1 Findings

Using a smartphone costs students money.

Although the participants had smartphones, there are a couple of costs involved in using it. The first cost would be the purchase of the smartphone, and the second cost would be the monthly plan to use it. Some students perceived that if they were using their phone for educational use, they wanted to know if they could get cheaper educational rates for smartphone purchase or cheaper data rates. The students felt the smartphone costs were not equivalent to textbook costs, since smartphone data plans required 2-year contracts which was much longer than the duration of any course.

Smartphones need better input devices.

There were differing skill levels when it came to typing text on their smartphones. Some smartphones utilize touch text, others include a physical keyboard, and others use Swype. Swype is a text tracing application that allows for faster and easier typing input. A participant reported that having bigger fingers meant typing was a pain and if he had the choice, he would just wait to use a real keyboard on his laptop. It was clear that the participants were learning to become more effective smartphone typists, but they agreed that typing speeds were significantly slower compared to real keyboard typing. On the other hand, most students felt that they preferred using a touch screen over a ball mouse or touchpad.

Smartphones need bigger screen sizes.

Participants agreed that screen size was one of their biggest concerns about accessing their courses online. The students reported that their smartphones could easily log into their courses, but the courses were difficult to see and required extra scrolling and zooming just to navigate through the course. Screen size differed amongst the smartphones but the general perception was that the screens were too small to productively view the course.

Not everything works on the different phones.

Along with difficulty in navigating through a course, participants could not access certain content in their course. Differing smartphones have different capabilities. For example, some phones are able to watch Flash animations, while others cannot. Another example is document handling; some phones could easily download and view documents while others could not. A participant stated that most files were made to be used on the computing environment and the smartphone is not quite there yet.

Using a smartphone for accessing and completing their online course was not the best mobile learning device tool.

The participants perceived that a laptop with internet access was the mobile learning device of choice when it came to online course access and participation. They suggested that using a smartphone as a supplemental tool may be a better approach when it comes to mobile learning. They perceived that accessing components such as email, electronic readings, at a glance course calendar or schedule, and list of homework assignments would work better with the smartphone environment. This method suited most students' needs because it would not be wasting battery life. They felt that mobile learning would be optimally reached if they used their Wi-Fi enabled laptops at their convenience.

Students felt that not everywhere was a good place for learning.

When suggested that commuting would be a good time to learn, many responded that they used that time to play games, update their social networks, listen to music, and read up on the news. Many felt that it was just easier to complete their online learning in places more suitable for learning (e.g. home, library, café, or quiet corner). They perceived that their smartphones keeps them connected, but there were limits to how much they need to be connected. Participants felt that they were willing to wait and access their courses when they were ready to focus on it.

There are problems but it's getting better.

Most agreed that smartphones could make their lives easier by supporting, enhancing, and improving their access to their social, work, and educational lives. They felt that the hardware and software were improving with every new version of their smartphone. The students agreed that once they have owned a smartphone they would never go back to using a regular cell phone. With the smartphone issues being resolved, the participants were enthusiastic about one day accessing their online courses via their smartphones.

Topic 2 Findings

Compatibility is a huge issue.

The designers all stated that developing for smartphones is difficult because there are seven operating systems (Android OS, Apple iPhone OS, Symbian OS, Linux, RIM BlackBerry OS, Palm OS, and Microsoft Windows Mobile). Thus, the developers felt that building applications for courses would cost too much since there are no standards across the operating platforms. The developers perceived that smartphone application development would emerge new functionality and usability problems.

The course developers stated that smartphones all had web access. Logically, they suggested that using web standards was the most realistic way of addressing compatibility issues. HTML5, CSS3, and Javascript were brought up by more than one occasion because they are web based computer languages and require only a web browser with internet access to operate them. Using HTML5, CSS3, and Javascript would also be smaller in file size because the interactive and dynamic components of a course could be embedded in the code. On the other hand, HTML5 is not standardized itself, but it will be in the near future. Currently, most browsers are being developed to handle HTML5. The general perception is to develop courses using web standards that are future proof, easy to develop with, dynamic, interactive, and deployable to all web browsers.

Ease of navigation.

With smartphones having limited screen size, the developers felt that easy navigation will be an important design principle to follow. The development of an easy to use navigation system will promote a better course viewing experience without the hassles of constantly searching for course materials. Course content organization will also help students efficiently and effectively navigate the course.

Course content needs to be lightweight.

Along with the smartphone portability, the course content also needs to be portable. The designers felt that containing instruction that is easy to get to, easy to use, effective in teaching, and accessible at any moment, will positively impact students' experience and add to the value of using a smartphone for m-learning. This idea also means that smartphones should not heavily use processing power or resources to view the course content.

There is a future in mobile technologies.

The designers all felt that there will be a need for developing for mobile devices. A designer happily joked that mobile technology development meant job security. That implication is very true, because designing for m-learning requires new expertise or personnel to effectively develop, administer, and support this new learning environment. In summary, they felt that smartphones will eventually become widely adopted m-learning devices, and that most good designers will have already prepared themselves for it.

Discussion

The researcher thought that the emerging themes were relevant and applicable to anyone thinking about developing courses for the smartphone environment. Hopefully, the findings may be valuable to students or instructors thinking about mobile learning in terms of the smartphone. Attempting to deliver courses on the smartphone is a fairly new concept and the feelings towards its use for online learning are mixed. On one hand, the flexibility for students to instantly have access to their online course deliverables may be a desirable draw to mobile online learning. On the other hand, the technology is so new that factors such as cost and non-standardization of devices poses real threats to its adoption. Course developers need to develop courses that are standards based and m-learning friendly.

This exploratory study began with the uncertainty that smartphones were the newest mobile device tool used to access online course content. It was quickly realized that the issues behind using smartphones for m-learning were big enough reasons to not to use them. It is also important to be aware that building courses for the smartphone will require extra time in terms of development, deployment, and support. The researcher recommends that online course development for smartphones be developed according to functional web standards and to be aware that hardware and software issues currently hinder full deployment.

In conclusion, smartphones are being used for more than just voice calls and chatting, they are essentially becoming pocket-sized computers. To further explore this phenomenon, future studies may include measuring the adoption rate of students using smartphones for their online courses. Other studies could also expand on this exploratory study and define more thoroughly the design principles associated with smartphone course development. The potential use of these devices in our personal, work and educational lives are being extended with users wanting and expecting more. Therefore, a mixture of hardware changes and computing standards will no doubt play a key role in one day offering fully online courses developed for the common smartphone.

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Microblogging with University Students 24/7: Twitter Comes of Age

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Introduction

This study presents the quantitative and qualitative results of a Universal Design (Behling & Hart, 2009) modification to a face-to-face blended learning environment which intended to quickly disseminate classroom information and provide for a diversity of learning styles. One of the most challenging components of teaching in higher education is on-going formative feedback between university professors and their students. According to a recent review of online learning studies by the U.S. Department of Education (2010),

> Online learning can be enhanced by giving learners control of their interactions with media and prompting learner reflection. Studies indicate that manipulations that trigger learner activity or learner reflection and self-monitoring of understanding are effective when students pursue online learning as individuals. Studies indicate that manipulations that trigger learner activity or learner reflection and self-monitoring of understanding are effective when students pursue online learning as individuals. (p. xvi)

Additionally, Cleveland, et.al. (2002) notes that the blended nature of courses cannot leave the integration of technology to the technology courses. Adding blended learning components to student's activities for both Online and Face-to-Face learning environments adding flexibility to fulfill course objectives (Graves & Ziaeehezarjeribi, 2009).

Literature Review and Background of Study

After teaching undergraduate courses for a number of years, several professors became dismayed with an increase in the number of cell phone interruptions to classroom activities. While the university professors were not necessarily distracted by the ring tones, some of the students were. Seldom does a day pass when a professor did not complain to another colleague of the "rude" behavior of cell phone users in the classroom. Regardless of how instructors enforced classroom etiquette on the use of mobile technology (cell phones) during school year, the usage of cell phones during instructional time has increased. Out of consideration for those students with attention differences, many professors from where this study originated, began to include a standard statement in their syllabus regarding the use of cell phones (Figure 1).

Figure 1. Standard Classroom Etiquette and Netiquette Statement included in Syllabus

Professional courtesy also includes the creation of an environment by all learners and the facilitator that is conducive to learning. Please turn off cell phones, beepers, and watch alarms before class.
If you are using humor or sarcasm, clearly label the message as such. i.e. "ha ha" or :) • Know your audience. Make sure that the person(s) to whom you are sending your message are the appropriate one(s) with whom to communicate. • Avoid cluttering your message with excessive emphases (such as stars, arrows and the like). They may make the message hard to follow. • If you are responding to a message, either include the relevant part of the original message in your response, or make sure you refer to the contents of the original message. • Be specific, especially when asking questions. • Include your name in the text of your message, as well as other contact information, such as email address or phone number for a reply. The end of the message is a good place for this information.

Digital Natives. The increasing frustration of university professors can be directly attributed to the shift in the way students currently experience and access learning. According to Skytland (2009), there are several important components (Table 1) indicative of contemporary learning styles.

Table 1. Unique Qualities of Today's University Students

On Demand	Accustomed to wireless mobile technology, which provides instant access to others, for learning, social networking, which may blur the lines between school and other social settings.
High Expectations for Learning Environments	Expect high quality interactive media, able to multitask, learn through sound bites or short pieces of information.
Global Connections	Have access to instant feedback for questions through the internet, social networks.
Collective Participation	Many students learn through collaboration. Alternative communication may support increased engagement. (e.g. shy students may choose to submit answers electronically instead of verbally)

Contemporary (Net-Generation) students are accustomed to instant access to high quality global perspectives and information, and collective participation in the information age via social networking. In short, students are accustomed to having a voice in their own learning. The increase and dependence on the use of Mobile Technology (cell phones) may have less to do with high quality access and more to cell applications that serve the same functions a laptop computer. For instance, many of the students, with whom this study was conducted, used their cell phones to "*Google*" answers to questions posed in the classroom instead of depending on their own memories after completing the assigned reading for the course. Many students routinely accessed the university management system (BlackBoard) through their cell phones to complete reading assignments, post to discussion boards, read communication with the course instructor, and check grades. These shared experiences at this university level reflected a larger trend, which has shown 69% of college students said they were more likely to use the phone than the Internet to communicate socially (Jones, 2009). In that same report, 61% of 18-24 year olds owned a cell phone, and 19% of American Internet users (median age 31 years) used Twitter in August 2009. In short, mobile technology is smart and has the same functionality as a laptop.

From static to ecstatic. This paradigm shift is more than simply easy access to information. According to Bonk (2009), Twitter can be used as a form of "quasi-virtual apprenticeship," which has shown to shift the dynamics of the classroom in very powerful ways. As Bonk (2009) noted, Twitter allows students to "shadow" professionals through "the movements of a well-known researcher in the field who uses *Twitter* for online interdisciplinary discussion. Such an activity gives them (the student) a close up view into the life of the expert" (p. 301).

More importantly, Bonk (2009) noted the potential to "give small teams a sense of identity" in much of the same way study groups functioned in the past. Noting that cell phones are now an integral component of students learning, noting the high expectations students have for interactive media, and the motivation to increase engagement using collaborative learning in classroom discussions, the researchers in this study decided to incorporate the use of microblogging (Twitter) as an optional component of classroom participation.

Methodology

Background

As part of a Universal Design (Behling & Hart, 2009) project through the university, a group of faculty began to meet to create and improve on their own practice through close examination of accessibility for special needs students in the classroom. After several months of examination of each other's courses regarding such issues as Web Content Accessibility Guidelines1.0 (World Wide Web Consortium, 2010), each person decided to make changes with the intent of creating course content that was "accessible to the widest possible variety of students" by learning to use software which automated course material (Behling & Hart, 2009). One of those professors decided to incorporate *Twitter* into the course design to help support student engagement in the undergraduate Reading Methods course. In addition to using *Twitter* to access course information, the faculty member with whom this study was conducted, employed the use of Just in Time Teaching (JiTT) strategies (Novak, Patterson, Gavrin, & Christian, 1999; Simkins & Maier, 2004) which posed *Twitter* questions prior to class to both assess student understanding of course material and prepare students for classroom discussions. *Twitter* posts were also used to remediate any misunderstanding of course content or instructions through collaborative responses.

Setting

Data was collected in a university undergraduate reading methods course in three different campuses in a small southwestern teacher education program. An online (Blackboard) management system was used to submit writing assignments, send and receive emails, access reading assignments and media, post to discussion boards, and receive grades. Twitter was initially offered as an expedient method through which students could have ready access to the course instructor, correspond and collaborate with other classmates, and receive course updates.

Participants

The participants included the course instructor and 130 (129 female: 1 male) senior level undergraduates in a teacher-licensing program over the course of two semesters. 27 students were over 30 years of age. 102 of the participants were between 20- 24 years of age. While the classes were predominantly of European-American origin, eight students were of Hispanic-American origin (not ESL).

Data Analysis

Instructor and student participation (*Twitter* posts) were quantified into two discrete categories, *Classroom Discussions* and *General Information* but were not limited to social discussions among peers. Pre and Post-testing data was collected to determine if *Tweets* helped student transfer important classroom content to various classroom assessments. For instance, the Writing Intensive component of the course held the potential to include information attained through following Twitter posts from professional educators. For instance, this study anticipated students would reference Twitter posts during writing assignments. An *End of Course Survey* was administered after final course grades were posted.

Initial Findings

Students were more likely to follow guidelines and instructions in short bites (140 characters or less) or cues (Morrison, Ross, & Kemp, 2004). For instance, the study protocol began the academic year with a short *Tweet* to all of the 130 students in the four course sections, "Do you believe there is no such thing as a lazy student?" This one-line opener laid the foundation for the manner in which students were expected to engage in classroom discussions. According to the professor, the *tweets* allowed students to consider the content related question while they completed the assigned reading for the week. Through *tweets,* students were more likely to focus on important information found on the end of course assessment. Instructors used feedback from before-class *Tweets* to individualize instruction for a particular section or make decisions on field placements (Table 1).

Table 1. Faculty Comments/Instructions

Classroom Discussion Questions	"What is the difference between CALP and BICS?" "Be prepared to answer the question, How has writing instruction changed in the past 30 years?"
Changes in Class Schedule	"If you think the drive to (university town) is too dangerous for you do not attempt the drive.
Course Reminders	"Reading and Writing interview and one page discussion due on BBoard"
Answers to Student Questions	"Remember to bring your QRI-4 reading miscue analysis book and extra paper and pencils for students. See you at noon at (school name)" "All of your assignment due dates are listed in your syllabus."

The data from this study mirrors the benefits of JiTT (Simkins & Maier, 2004), "students come to class better prepared, leading to more effective in-class discussions and activities" (p. 3). The ability to communicate with the professor and other classmates created opportunities for instant updates on classroom information and remedy misunderstandings in classroom assignments or due dates.

Twitter allowed for meaningful "teachable moments" throughout the semester.

Table 2. Student Participation

Answers to Classroom Discussion Questions	"Vowel followed by r makes special sound...star....bird" "Gee talks about how video games are created with methods to improve thinking and complex problem solving"
Questions about Classroom Assignments	"WOW!!! What a week. Let's hope my (assignment) will get a good grade this time. I feel better about it this time around thanks to (professor's name).
Questions about Field Placement	"Does (section name) meet at the elementary today?"
Student to Student Posts	"There's a really bad accident on (highway) before (town). Both lanes are blocked. I'm stuck..be careful everyone!!!!"
Other	"This text is from the (school district). Due to current weather conditions all school campuses will be closed today, Thursday Febru …"

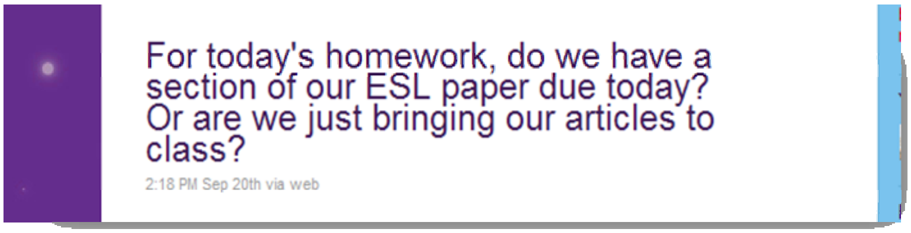
Pre and Post-Testing

Quantitative (Pre and Post testing) data revealed a significant increase in the use of discrete course content vocabulary, such as basic interpersonal communicative skills (BICS) and cognitive academic language proficiency (CALP) (Cummins, 1981). Pre and Post data showed that students had an 87% mastery of questions, which were *Tweeted* compared to a 43% mastery of those which were not. Because there was no experimental design to control for contributing factors, such as the difficulty of different course content objectives or different methods of instruction between sections, formative claims surrounding pre and post testing cannot be made. In future studies, the need to find direct correlations to improved retention and control for external variables are in order. Carefully placed *tweets* may have allowed students to understand content in preparation for the teacher-licensing exam. On the *End of Course Survey*, four students noted that without *Twitter* they would not have remembered important information for a quiz. A less successful endeavor was the suggestion for students to follow blogs by noted professors such as Stephen Krashen and Kenneth Goodman. Only two participants incorporated comments from blogs into writing assignments or classroom discussions.

End of Course Survey

Qualitative post semester interview data revealed that 82% if the participant self-reported they felt more accessible to the university professor through instant feedback for questions regarding classroom projects, difficulty with posting assignments, instant notification of changes to classroom schedule (weather), and fieldwork. Students *Twittered* with each other about everything from classroom projects to social networking, including family issues, professionalism, and yoga meeting times (Figure 2).

Figure 3. Student Tweet



Unfortunately, 3% of the participants reported *Twitter* was an invasion of their free time, felt they had "already done their time in (name of professor's) class," and "resented having to worry about participation points" outside of class time even though the use of *Twitter* was optional. These comments came from the same participants who self reported engaging in less than 1-3 hours of out of class work during the week. Because the course instructor did not require *Twitter,* post course interviews revealed students who opted not to participate on *Twitter*, felt left out of classroom communications (Figure 4) even though similar content was posted on the mandatory university management system

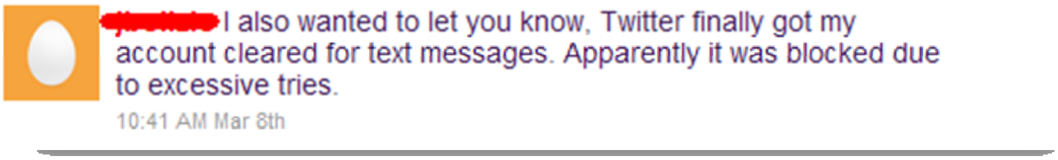
Figure 4. Instructor Feedback

Other Findings

Twitter had fewer interface problems than did the university management system. For instance, when a severe weather alert was posted, most students were not near computers but had access to cell phones. Additionally, when students did not have cell phone reception, they were still able to access the professor through text messaging capabilities of *Twitter.* The professor noted, "It is so much easier to send one bit of information to a hundred students through my cell phone, than the slow process of driving back to my office, turning on the computer, opening up my (university management system), accessing each section individually, and then composing four different emails. That alone makes *Twitter* important as classroom management tool."

While Twitter did have fewer interface problems, students encountered several small problems after signing up for an account. Future integration of Twitter into the normal class routines will include specific time devoted to testing student accounts and in-class opportunities to troubleshoot software settings. While the instructional video (Howcast, 2010) used with this course was required, at least 13% of students struggled with the *Twitter* settings because they had not watched the video. Moreover, several students encountered problems with their cell phone provider and did not receive text messages until hours or days later (Figure 5).

Figure 5. Student Difficulties with the Use of Twitter



The limited number of characters (140) compelled students to synthesize important information during classroom discussions, brevity did not always allow students to complete a thought before another person added a comment. Educators must remember Twitter was not used to take the place of regular in-class written assignments. On the contrary, the need for brevity included extensive Internet slang (e.g. lol, U 2, :), etc). Some instructors may find the slang difficult to decode or not appropriate for the university setting. When considering implementation into the classroom, clear Internet etiquette should be included in the course syllabus. Several students made inappropriate and unprofessional comments to the course instructor during their twitters, which affected their professionalism grades. The informality of *Twitter* may have blurred the lines between formal and informal vocabulary.

Conclusion

For the instructor of this study, *Twitter* served as a tool to integrate all the important qualities of Universal Design (Behling & Hart, 2009) and Just-In-Time Teaching (Novak, Patterson, Gavrin, & Christian, 1999; Simkins & Maier, 2004) taking into account the unique qualities of today's university students. Adding new tools to student's daily activities provide students with the flexibility of time and place which is not a substitute for replacing a teacher or a quality lecture, however, provide the students the potential for transferring information synchronously and asynchronously. This is mainly to apply tools that are widely used by students in their daily activities through social networking and mobile technology at their disposal. Future integration of *Twitter* into the classroom will still need to take into account students who do not have access to Web 2.0 applications and instructors who are not comfortable with 24/7 access to students. The definition of Blended learning tools should include the important application of mobile communication devices.

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Model of Pedagogical Framework and Software Architecture for Integrated E-Learning Environment in Chinese Universities

Xibin Han, Yingqun Liu, Qian Zhou

Development and Problems of Applied E-Learning Systems in Chinese Universities

E-learning systems were first introduced into Chinese universities and colleges in the late 1990s to supplement traditional teaching. The development and application of e-learning systems are partly derived from the internal needs of the universities and colleges. At the very beginning, only the single-purpose learning management system (LMS) was used to assist lecture-centered instruction. As teaching approaches became diversified and information and communication technology became popular, various e-learning systems were established and applied. These included collaborative activity-based learning, laboratory-based instruction, resource-based learning, and degree thesis-based research (Han et al., 2008). In addition, the Chinese government has played a very big role in the development and application of other related systems. As one measure to improve the teaching quality of higher education, the Ministry of Education of China initiated the Teaching Quality and Reform Plan in 2003 (Ministry of Education of China , 2003). This created such special projects as specialty structure adjustment and authentication, course evaluation, teaching resource development and sharing, practical-based teaching, and training mode innovation (Ministry of Education of China, 2003). Many achievement demonstration and sharing systems, such as course demonstration websites – whose content is actually part of the above e-learning systems – that have been developed and used by universities and colleges have been evaluated for selection into the National Quality Course Plan by the Ministry of Education (Han and Liu, 2010).

However, the above-mentioned e-learning systems, specialty/course demonstration and evaluation systems, as well as resource sharing systems were built in isolation at each university. As a result, instructors had to repeatedly create the same teaching resources in different systems for different purposes; students had to log into different systems in order to access relevant learning resources and tools; curriculum administrators had to collect statistical data from different systems and combine the information manually to get an overall assessment of students' academic performance and instructors' teaching performance. Moreover, updated teaching resources and results accumulated during daily teaching and learning activities and stored in the learning systems, could not be holistically included in the demonstration and resource sharing systems for the public in time. Therefore, those individually developed single-purpose systems would become obsolete after a short time because of the limited integration (Han et al., 2008).

A number of researches discussed the integration of multiple learning systems. Dimitrova et al. (2004) stated that flexible pedagogical frameworks were needed to underpin e-learning environments in order to ensure that they effectively addressed the individual learning approaches of two types of learners: those relying extensively on social interaction, and those most in need of lecture-based learning. Students should be given a choice of learning activities and tasks that support the development of different cognitive skills and promote meaningful online communication (Dimitrova et al., 2004). The model in the study can be used to construct a learning environment integrating both learning approaches.

Marengo et al. (2007) presented an idea to integrate LMS, videoconferencing, multimedia classrooms, and multimedia and management software, as well as MS Office, antivirus, editing, and streaming software, etc. into one project: Advanced Services for E-Learning in Puglia financed by the Italian Ministry of Universities (Marengo et al., 2007). However, the study did not describe the pedagogical and technical model indicating how these systems were integrated.

Abdallah et al. (2003) presented a model for a learning environment that built several pedagogical baselines of e-learning strategies and supported the exchange of learner profile and courseware with other systems and repositories (Abdallah et al., 2003). The study did not consider the data exchange of learning systems with other related systems, such as curriculum evaluation system, academic affair information management systems, etc.

These researches discuss the integration of multiple learning systems only from the view of a single course, or learning activity even. While the utilization of e-learning systems scale up from the curriculum to institutional level, the number of involved systems increases dramatically, thus further complicating the issues of integrating single-functioned and isolation-built e-learning systems.

This paper discusses a model of pedagogical framework and software architecture that integrate diverse isolated systems into a whole learning environment. The objectives of an integrated e-learning environment in a university include:

- the flexibility for instructors to roam among different systems and organize instructional resources and activities effectively depending upon their pedagogical strategies.
- the convenience for students to access learning resources and tools across multiple systems.
- the ability for curriculum administrators to evaluate the overall teaching and learning performances and choose valuable instructional resources and achievements for demonstration and sharing.
- the ability for institutions to make systematic planning of e-learning systems and run a long-term sustainable development of the e-learning environment.

Pedagogical Framework of the Integrated E-Learning Environment

According to the desired organizational mode of teaching/learning in a university as well as information and resource exchanging among various systems, the proposed model is divided into three layers from the inside to the outside, and thus, constitute an integrated e-learning environment (Figure 1).

In general, there are two ways for college students to obtain the credits required for graduation: first and foremost is curricular learning, the other is non-curricular learning, such as degree thesis research, resource-based learning etc., which need to be supported by the e-learning environment.

At the very core of the environment, systems are centered on the curriculum. Different systems are used at different stages for supporting different course approaches. When different systems are required in one single course, it is necessary for students and instructors to share teaching information and resources, such as student information, teaching team information, course syllabus, learning resources, performance assessment and course administration, etc.

The middle-layer systems support the non-curricular learning activities, which include the degree thesis-based research, student research training (SRT), and student self-learning, such as blog community-based learning and resource-based learning. Because these learning activities are carried out on an individual level, these kinds of systems do not need to exchange basic course information but learning resources.

The outermost systems do not correlate to daily teaching and learning activities, but are platforms for demonstrating, sharing and evaluating the achievements and resources from the inner-layer systems. The forms of demonstration for teaching activities and resources are different due to different requirements. For instance, a quality course project requires course-based demonstration of the curriculum construction achievements that is reviewed by the evaluators (Han and Liu, 2010). A featured specialty project requires a specialty-based demonstration of related courses (Ministry of Education of China, 2003). Teaching/learning resources from all these learning systems need to be collected into and managed in a unified repository. As a result, it is necessary to develop different support systems.

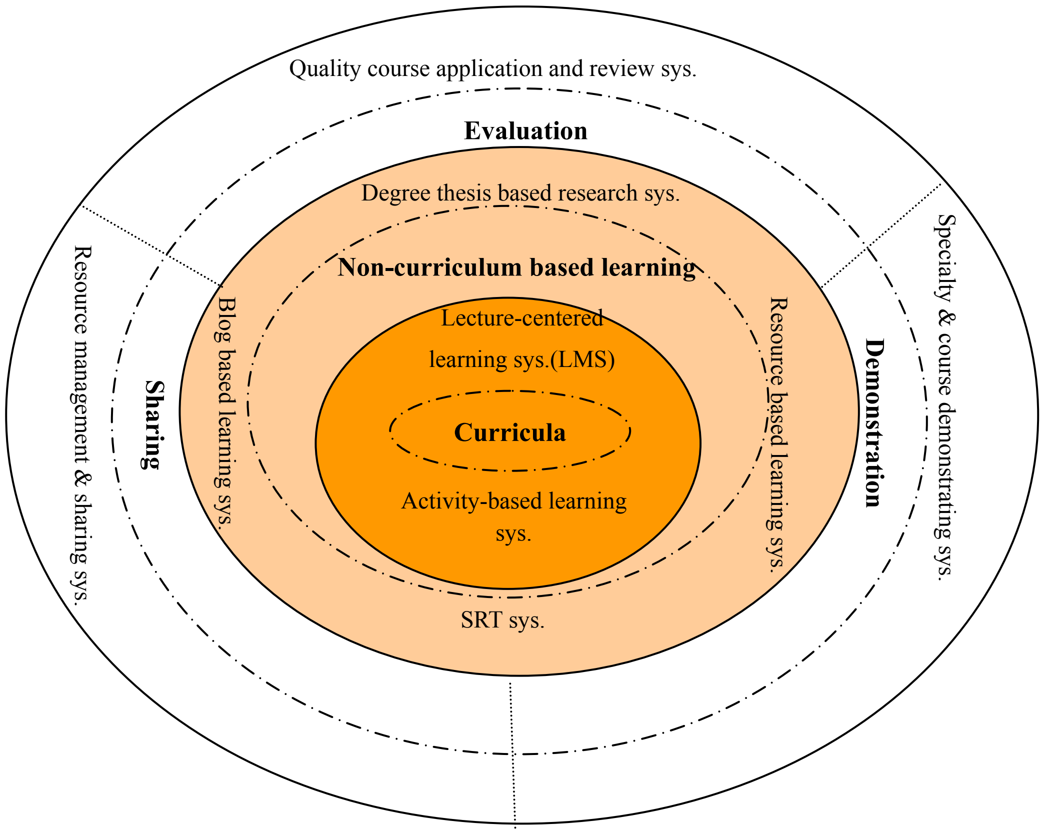

Figure 1 Pedagogical framework of the integrated e-learning environment

Software Architecture and Key Problems for Construction of Integrated E-Learning Environment

The software architecture necessary to construct an integrated e-learning environment involves four layers: basic data, shared instructional resource, application system and portal (Figure 2).

The basic data layer is built according to specific data standards. It provides basic data such as student, instructor and course information, and the data exchange interfaces with the application systems.

The shared resource layer manages resources via a management platform. It gives application systems a uniform interface, which offers users convenient access and exchange of teaching and learning resources.

The application system layer consists of the e-learning systems mentioned above: curriculum-based systems, non-curriculum-based systems, and demonstration, sharing and evaluation systems of the achievements and resources.

The portal layer integrates various application systems. According to the organizational mode of teaching/learning in a university, users in the e-learning environment are divided into students, teachers,

administrative personnel, evaluating experts and visitors. Through the portal, they log into the integrated e-learning environment with ID-based user authentication to access personalized information and services corresponding to their roles, which enables their single sign-on and multi-system
roaming.

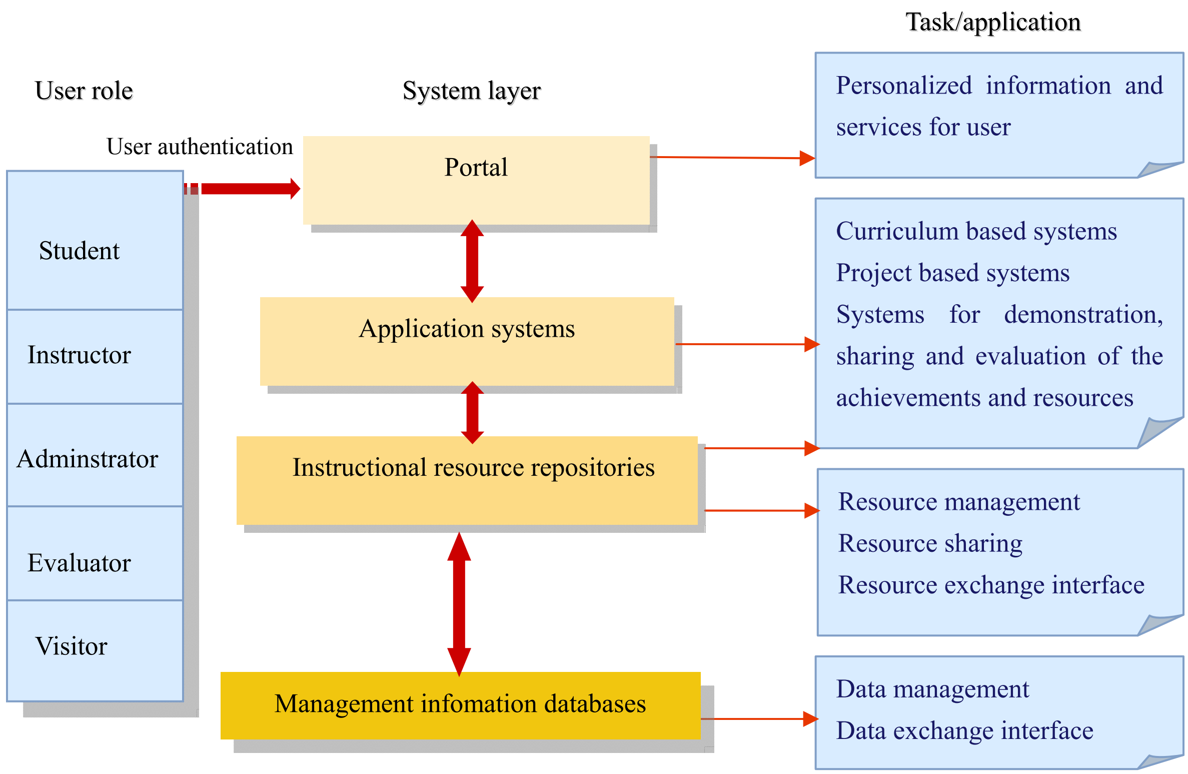

Figure 2 Software architecture of the integrated e-learning environment

The software architecture of the application systems shown in Figure 3 illustrates how to develop various application systems based on component technology and how to integrate them into a whole. At the bottom lies the system component layer, which provides unified user authentication and role-based permission control for the upper layers. The middle layer comprises a variety of common functional components that are managed by a management module and called up by application systems in the top layer. When a new function is needed in the application system, the corresponding components are plugged into the system. The component-based architecture ensures the e-learning environment is technically scalable, thus making it possible to be easily customized to meet the individual building needs of a university and its dynamic expansion needs at different development stages. The J2EE technical approach is adopted during the development of the e-learning environment.

According to the pedagogical framework of the integrated e-learning environment, four technical issues need to be considered to integrate the application systems in the top layer shown in Figure 3.

Integrating different teaching approaches in a single course: Both teaching practices and theories indicate that teaching activities require application of various pedagogical strategies, including a combination of face-to-face and technology-mediated instruction, known as a blended instructional approach (Graham & Dziuban, 2005). It is necessary for the instructor to select the appropriate teaching approach at different stages or for different contents within a single course. In the e-learning environment, two typical instructional systems - the lecturer-centered and the activity-based - are integrated to support instructional activities. Since the two systems share course data (such as student information, teaching team information, course syllabus, leaning resources, performance assessment and course administration etc.), they are usually integrated into one course-based system through shared data tables and JavaBeans (Wikipedia, 2010).

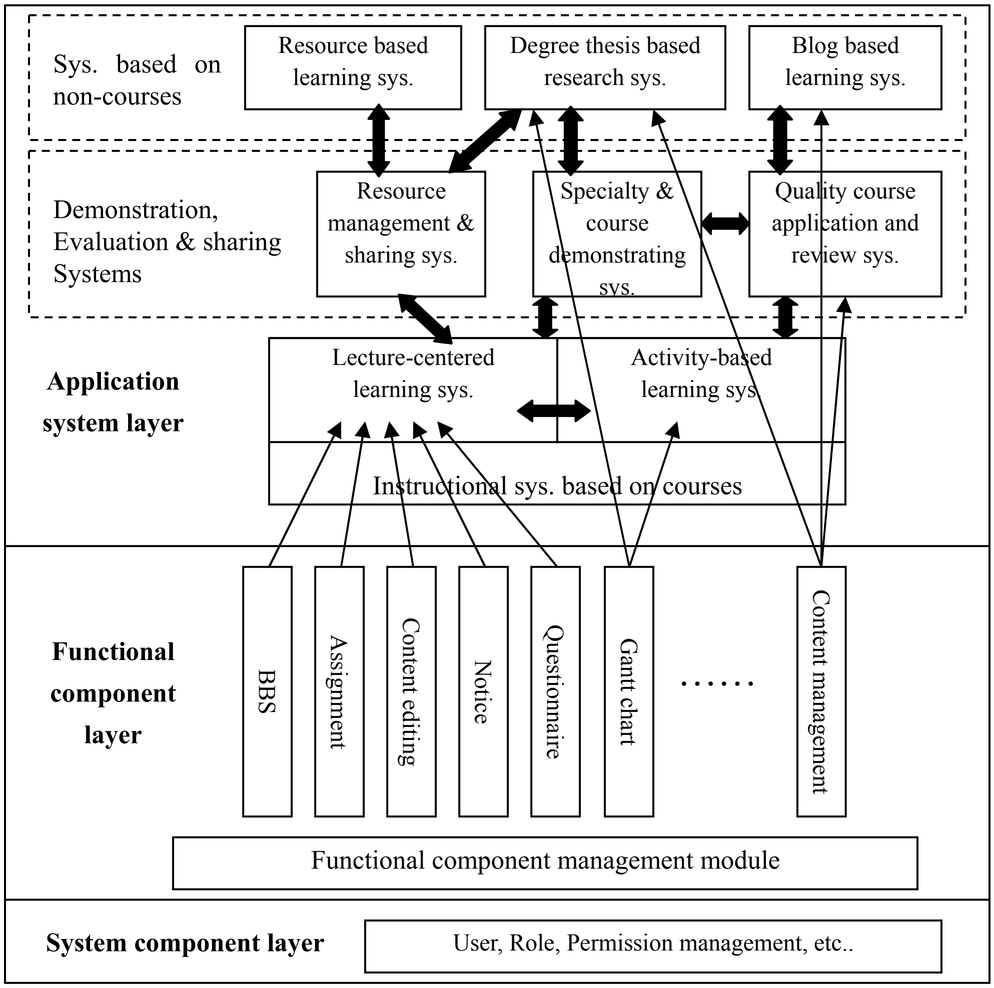

Figure 3 Technical framework of application systems in the e-learning environment

The example in Figure 4 shows two typical instructional systems that are integrated to support instructional activities in a course called Software Engineering. With the lecturer-centered learning system, the instructor publishes the syllabus, calendar, notice and learning materials to the students, communicates with them in the discussion area, and evaluates their learning performance with assignments and exams, etc. At another stage when tasks are assigned to different groups of students, the activity-based learning system is used to assist in this kind of problem-based learning, such as the design and development of a book information management system, which, in the example shown in Figure 4, is selected by six student groups.

Integration of multiple teaching/learning activities centered on a single instructor or student: The instructors and students in universities may involve various teaching/learning activities. It is not viable for instructors and students, as users, to select and log onto the systems one by one and then make relevant operations. Instead, they select appropriate systems for different teaching/learning activities from a unified user interface.

Since the non-curriculum based systems share only a few course data with others, they are integrated with other systems through a loosely-coupled mode, i.e., existing as independent systems and exchanging information through data interfaces. The example in Figure 5 shows, after logging on, an instructor can enter his personalized teaching and learning environments to make selections across systems of course teaching, degree thesis based research, course demonstration, quality course application and instructional resource management and utilization.

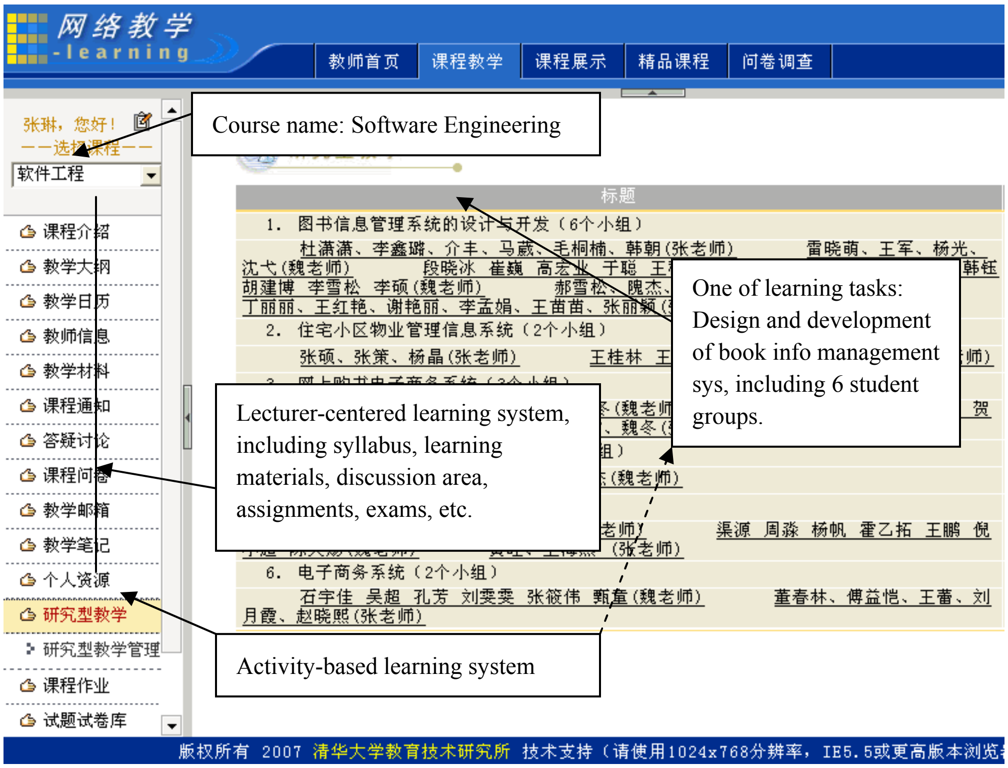

Figure 4 Integration of two instructional approaches in one course

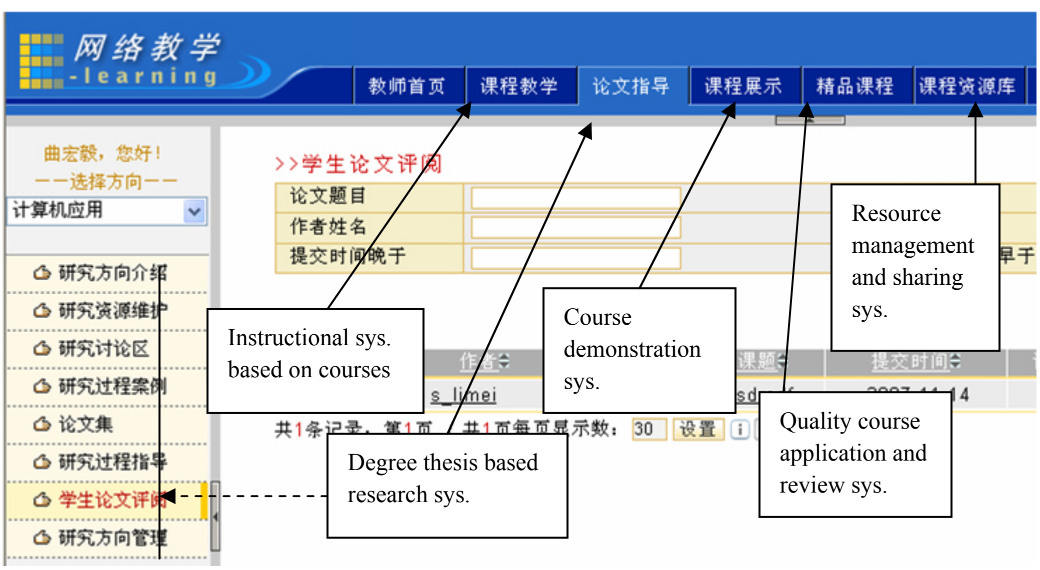

Figure 5 Integrated user interfaces of multiple systems in the e-learning environment

Sharing and quoting instructional resources across different systems: Teaching and learning resources generated during the daily teaching process based on different systems are collected and managed in the resource management system, and shared among multiple systems through a uniform interface. The example in Figure 6 shows the instructor editing learning materials within a course with the instructional system quoting resources either from the resource management and sharing system, or directly from the quality course application and review system.

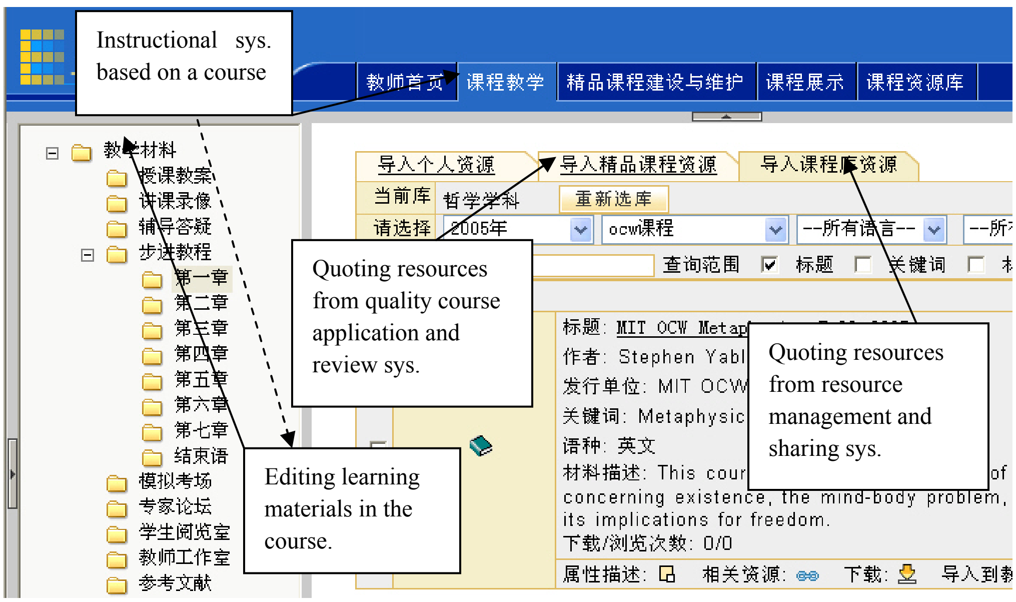

Figure 6 Sharing and quoting learning resources among different systems in the e-learning environment

Exchange of basic data with other related application systems: Basic data, such as information about students, teachers and courses, come from two sources: the unified data center in a digital campus, and related systems like the academic affairs administration system shown in Figure 7.

Figure 7 Exchange of basic data with other related application systems

Integration of outermost systems and inner-layer systems: The achievements and resources for the specialty and curriculum are demonstrated and shared through the outermost systems, which are acquired from the inner-layer systems through the data and resource interfaces. The example in Figure 8 shows the course list in the bachelor degree program Design, Manufacture and Automation of Mechanized Systems being demonstrated through the specialty and course demonstrating system. The course list is acquired from the academic affairs administration system and the course resources from the instructional system.

Figure 8 Integration of outermost systems and inner-layer systems in the e-learning environment

Application of Integrated E-Learning Environment in Chinese Universities

A software system called THEOL developed on the basis of the above pedagogical framework and technical architecture of the integrated e-learning environment has been implemented in over 60 universities in China. THEOL includes the systems discussed above, six of which are listed in Table 1. The dates in the table indicate when the systems were installed in five universities with different rankings located in different geographic areas in China.

In actual fact, the e-learning system was installed in higher ranking universities before the lower ranking universities due to differences in funding, faculty quality, IT popularity, and so forth. However, no university can install all these systems in one go but rather over a period. The software architecture of THEOL is effective at integrating different systems installed on different dates into one whole system.

Table1 Implementation of THEOL in some Chinese universities

University	Course based Instructional Systems		Non-course based Instructional Systems		Demonstration, Evaluation & Sharing Systems		Location, Ranking**
	Lecture-centered course learning sys.	Activity -based learning sys.	Degree thesis based research sys.	Resource management & sharing sys.	Quality course application and review platform	Course and specialty demonstrating sys.	
Nankai	2002.12*	2006.3	-	2002.12	2006.3	2006.3	North China, 13
Northwest A&F	2006.4	2007.3	2010.3	2006.4	2009.8	2009.8	Northwest China, 54
Nanchang	2003.1	2006.8	-	2003.1	2006.8	2008.7	Central China, 71
Yangzhou	2007.2	2007.2	-	2007.2	2008.2	2008.2	East China, 102
Chengdu	2007.12	2007.12	-	2008.10	2007.12	2008.10	Southwest China, 262

* Note: The date indicates when the system was installed on the university's server.

** Note: The data are quoted from China's university ranking announced by the CUAA.NET and the 21st Century Talent Weekly in January, 2010 (Zhao, et al. 2010).

Conclusion

While the utilization of e-learning systems can be scaled up from curriculum to institutional level, the issues of integrating single-function and isolation-built e-learning systems needs to be considered. This model of pedagogical framework and software architecture has been proposed to integrate disparate systems into a single whole learning environment to facilitate diversified e-learning strategies and information exchanges across the systems. The proposed model and principles will be helpful in designing and developing the integrated e-learning environment.

Universities in China differ vastly in terms of the amount of funding, faculty quality, IT popularity, and so forth. As a matter of fact, the number of e-learning systems constructed differs as well. However, it is obvious that the integrated e-learning environment would eradicate the problems of the isolated systems.

The model supplies a pedagogical foundation which allows instructors to integrate ICT into their teaching by different systems, and also supplements students' self-paced learning with a wide range of resources and tools.

The component-based technology and scalable technical framework are conducive to being customized for different universities, and could withstand dynamic expansion needs at different development stages.

The model contributes to the systematic planning of e-learning systems and the long-term sustainable development of the e-learning environment.

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Using Technology for Reflective Practices in Teacher Education

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The teacher education program at a large university has incorporated technology in its curriculum design by integrating technology into theory and practices courses and culminating with student teaching supervision. To use best practice in technology for the teacher education programs, faculty members collaboratively created opportunities for experiencing learning through an online/hybrid course and the utilization of video and audio recording of teaching performance followed by self-analysis and reflection.

Today's preservice teachers become professional educators who teach Kindergarten – 12th grade students in schools across our nation. These teacher candidates need to be prepared for a rapidly changing world in which five out of the ten fastest growing job areas will be computer related (College Planning Network, 1996). The National Council for Accreditation of Teacher Education (NCATE) report titled "Technology and the New Profession Teacher: Preparing for the 21st Century Classroom" illustrates the technology skills and knowledge that new professional teachers must acquire in the teacher education programs in order to be prepared for the 21st century classroom.

In a study designed to determine the most effective methods of technology integration (Sara & Eric, 2003), the authors found that infusion throughout a teacher education program, including field experiences/student teaching, rather than separate training was the most effective method. Recognizing the need to incorporate technology into teacher education programs, universities are beginning to address the training of their preservice teachers in the use of classroom technology in more progressive ways. Some teacher education programs have added a course specifically designed to educate teacher candidates in technology skills and integration strategies (Hargrave & Hsu, 2000). Others have selected to address technology by integrating its use into existing courses in the teacher education program (Cherup & Linklater, 2000).

Rationale

In order to better prepare future K-12 teachers on the use of technology for instructional purposes, the university teacher education faculty must continue their own professional development in this critical area. The teacher education program at a large university has begun to address technology by integrating its use into existing theory and practice courses, student teaching seminars, supervision of student teachers, and induction courses. Most instructors are using varied applications of technology integration in their classes and minimal, if any, collaboration and dialogue exists across faculty, even though they are teaching the same courses. To potentially standardize the goal of using best practice in technology for the teacher education programs, the faculty members who teach the student teaching seminars and capstone and induction courses have created an online/hybrid course for student teachers and first year teachers supported by the induction courses. Online/hybrid options for these courses are ideal for the student teachers and current educators who are located at long distances from campus and who have various school related commitments. This represents a new student population eager to learn via technology. Technology also allows for student teachers to apply reflective practices via the use of video and audio recordings.

There are three major goals for creating capstone/ induction/student teaching seminar courses online. First, novice teachers will be able to acquire technology skills and knowledge to be prepared for the 21st century classroom during the course work. Secondly, faculty members in the teacher education department will design and teach capstone/induction/student teaching seminar courses which align with National Educational Technology Standards (NETS) and NCATE standards in technology so that faculty members and the school administrators can evaluate their teacher candidates' technology acquisition levels more effectively at the end of the program. Third, this course will be a model of a quality online course with the best practice of classroom technology which will impact other teacher education courses and programs.

Timeline of Activities

Spring, 2009-teacher education faculty conducted needs assessment of technology with local partner school teachers (e.g. what kind of technology is most needed to enhance your teaching and student learning, etc). The faculty members piloted the technology curricular components in their seminar and induction courses based on technology standards and teachers' technology needs and made appropriate changes.

Fall, 2009-Winter, 2010- teacher education faculty taught student teaching and capstone/induction courses either online or hybrid method. The faculty ensured that the course requirements (creating student teaching videos, online discussions, and etc) reflect current technologies and teacher practices using technology. Student achievement was measured based upon the exiting school of education elementary standards modified by National and NCATE standards in technology. These standards verified that each of its student teachers is competent in creating and using instructional technology to enhance teaching and learning, including teacher candidates' communication and collaboration, research and information fluency, critical thinking and problem solving, and Digital citizenship. Also, teacher education faculty will evaluate the standardized technology online/hybrid course from student teachers and the 1st year students' feedback.
Spring, 2010-Faculty added video as an additional reflection tool for student teachers.

Results/Conclusions

1) **What kind of online resources were created in the Hybrid and Online Student Teaching Seminar Courses?**

The data will be collected and analyzed as a result of the faculty participation in the activities listed above.

2) **How did capturing student teaching video help student teachers reflect on their lessons?**

Preliminary data is positive, demonstrating a positive impact on the reflection practices of the student teacher. One author reported on Student A's pre-reflection (lesson: Tomas Edison Story) and post-reflection (after the video watching). Student A also wrote about the benefit of watching her video to reflect her teaching so we can use that one as a conclusion. The following is an example of qualitative comments emerging in the data:

Student A said,

> I believe being able to watch myself on video allowed me to have a better concept of my teaching abilities. I think the video was extremely helpful. You always have an idea or picture in your mind of how the lesson went but watching yourself allows you to relive it from a different perspective. I think it reconfirmed what I believe my strengths are and allowed me to see what more I have to work on. I am grateful for the opportunity to see myself on video and I think it is an extremely important and helpful to see yourself from the outside after the assignment.

Student B said,

> At first, I was really unhappy about the way the lesson went. I thought the students were completely out of control and not paying attention. After watching the video I realized, the lesson was not that bad. The students were interacting with each other and communicating their ideas. If I were to do the activity again I would put the chart on the overhead. My back was to the class too much and maybe that's where I lost their attention and had to settle down the class. I also noticed it took a significant amount of time to transition from overhead to the lesson itself. Again, I need to have very clear prompts to guide the students through transitions. I should not assume they know to put their folders away and look at me in the front. I have working on having more of a presence in front of the class to easier transitions.

Student C said,

> I believe being able to watch myself on video allowed me to have a better concept of my teaching abilities. I think the video was extremely helpful. You always have an idea or picture in your mind of how the lesson went but watching yourself allows you to re live it from a different perspective. I think it reconfirmed what I believe my strengths are and allowed me to see what more I have to work on. I am grateful for the opportunity to see myself on video and I think it is an extremely important and helpful to see yourself from the outside after the assignment.

Student D said,

> It helped me to be aware of my body language. There were a lot of things going on in the classroom during that time that were distracting me, but I think I held my own fairly well. I wanted to students to be more self directed in this experiment but I can clearly see myself feeding them the information because I felt pressured on time.

To use best practice in technology for the teacher education programs, these faculty members are creating and studying their collaborative experiences with online/hybrid course and utilization of video for reflective practices for teacher candidates.

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New and Emerging Data Visualization Tools

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Descriptors: Web 2.0, Information Visualization

Sharan Merriam (2009) remarks that "qualitative research has become a mature field of study with its own literature base, research journals, special interest groups, and regularly scheduled conferences" (p. vii). Many researchers who employ qualitative methods prefer to wade through piles of interview transcripts and collections of artifacts, but there are software tools available to help with the data analysis process. The American Evaluation Association ("Qualitative Analysis," 2010) lists thirty-five software tools designed for analyzing various forms of qualitative data: text, audio, and video. These tools range in price from free to thousands of dollars depending on a user's licensing and feature needs. Some tools simply assist with the organization of data or the coordination of tasks between research team members, but some provide features that may aid researchers with data analysis. One of those features, data or information visualization, is the topic of the present discussion.

The phrasing "data visualization" is used in the title of this article to stress the word *data*. The focus of this discussion is the possible usefulness of tools to visualize text data collected during research studies conducted with qualitative methods. There are related and overlapping fields of study involving visualization (e.g. scientific visualization, data visualization, and information visualization). The most appropriate of these fields for the purposes of qualitative research involving text artifacts is *information visualization*. Information visualization is defined as "the use of computer-supported, interactive visual representations of data to amplify cognition" (Card, Mackinlay, & Shneiderman, 1999, p. 6). The purpose of information visualization is to "communicate complex ideas to its audience and inspire its users for new connections" (Chen, 2010, p. 387).

Card, Mackinlay, and Shneiderman consider the foundational period of information visualization to be the period from the introduction of the Silicon Graphics workstation in the 1980s to the end of the 1990s when desktop personal computers' standard configurations became capable of displaying sophisticated graphics. Indeed, what many would consider seminal work (e.g. Tufte, 1983), in this area took place in that time period, though Tufte's work involved static graphics. Visualization is still a topic of interest with David McCandless (TED, 2010) recently offering it to audiences outside of visualization researchers as a solution to information overload, which will allow us "to see the patterns and connections that matter."

The notion of using visualization techniques in qualitative research is not new. For example, Ruberg & Moore (1994) and Horney (1994) applied visualization techniques to analyze discussion data. Some recent examples of visualization in qualitative analysis can be found in the areas of expertise development in online games (Chen, 2009) and the teaching of writing (Sorapure, 2009). The adoption of visualization techniques in qualitative research though has not become widespread, and some qualitative researchers have recently noted a need for visualization tools (Slone, 2009).

Authors have noted benefits of using visualization techniques in qualitative research. Horney notes that visualization techniques have highlighted "areas where data analysis should be reconceptualized" (p. 39) and can "lead researchers into deeper and alternative investigations of their data" (p. 39). Also, visualization techniques for qualitative research data "may address transferability and confirmability" (Slone, 2009, p. 490).

The practice of qualitative research may be a mature field as noted by Merriam (2009), but it continues to evolve. The incorporation of new technologies is one new and expanding area for qualitative research. Chen (2010) notes that research in information visualization using emerging, online, social networking tools is just beginning. The Merlien Institute is organizing an international conference in 2010 ("International conference on Qualitative Research in Web 2.0," 2010) aimed specifically at examining the intersection of Qualitative Research and emerging Web 2.0 tools.

Writer Darcy Dinucci (1999) introduced the term *web 2.0*, which was later popularized by Tim O'Reilly (2005). Web 2.0 is a philosophy of software design describing "many individual tools that have been created with web collaboration, sharing, and/or new information creation in mind" Oliver (2007, p. 55). Many articles have been written about the benefits, or potential benefits, of using Web 2.0 tools in the teaching and learning process, and instructional technology researchers have been key contributors to this area of the professional literature. Qualitative research methods are valuable tools frequently used in research and evaluation of educational and instructional technologies. Therefore, it is time to also apply these new tools to research and evaluation in the field of instructional technology. "Web 2.0 infovis [information visualization] applications can enable us … to producing visual representations of information" (Sorapure, 2009, p. 60). The use of free, online tools allow users to "come to greater insight about the text" (Sorapure, 2009, p. 62). Examples of web 2.0 tools that show promise for use in qualitative research include: wordle (www.wordle.net), IBM's Many Eyes (http://manyeyes.alphaworks.ibm.com/), TextArc (http://www.textarc.org/), and TAPoR (http://portal.tapor.ca/portal/portal), the Text Analysis Portal for Research. These tools can be as simple as word cloud creators (e.g. Wordle) which use simple word frequencies to more complex tools aimed at identifying themes in text (e.g. TAPoR).

The utility of simple tools such as the word cloud generator Wordle for qualitative research may be questioned, but it has proven useful in at least one related context. Sorapure (2009) utilized word clouds in her writing courses and reported that her students were led to "reexamine the influence of her [the student's] own bias" (p. 64) in an analysis of two text artifacts. This shows that there may be potential for qualitative researchers to use it for similar purposes while analyzing data. It is time to design studies to test the efficacy of using tools like the ones mentioned here for qualitative research.

The advent of computer tools and capabilities for creating information visualization appear to have advanced ahead of theoretical groundings (Chen, 2010). As such, the field is an excellent fit for Instructional Technology researchers who are typically viewed as working in a linking science between fields such as Educational Psychology and practitioners. In this venue, Instructional Technologists are positioned well to apply Educational Psychology, emerging online tools, and qualitative research methods to achieve the "insight" (Chen, 2010, p. 388) information visualization hopes to offer its users.

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A Multifunctional Web-Based e-Portfolio System for Special Education

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Abstract

This project explored mandatory features of an e-portfolio system for teachers to construct electronic portfolios effectively, especially for students with intellectual disabilities. Further, a special education e-portfolio system was developed according to the explored features by modifying the open source Moodle course management system. Experts in special education and educational technology were interviewed and surveyed for their responses toward the system. The results showed that the e-portfolio system was accepted by the interviewees.

Keywords: E-portfolio, Technology Integration

Introduction

Traditional pencil and paper assessment in student achievement is to test students' understanding toward the learning content within limited duration. Especially for students with special needs in learning, the pencil and paper assessment is not suitable because these students may have difficulties taking the tests and the results may not reflect student achievements qualitatively. As a result, it called for an integration of various information resources in order to demonstrate learning outcomes from students with special needs. Learning portfolios are often used to facilitate and present students' learning outcome in the fields of special education. A student-centered "portfolio assessment" is commonly used to support special educators in promoting students' self-determination abilities, monitoring learning progresses, and improving course plans (Agran, Blanchard, Wehmeye & Hughes, 2002 ; Demchak & Greenfield, 2000 ; Ezell, Klein & Ezell-Powell, 1999 ; Salend, 1998).

A learning portfolio is commonly composed of evidences toward student learning that are collected regularly based on predetermined learning goals. Different evidences of learning such as test results, artifacts, reflections, and student feedbacks are collected in a learning portfolio to represent the events of learning as students proceed in learning (Arter & Spandel, 1992; Stiggins, 1997). However, the content of a traditional portfolio expends and requires more storage space as various printed documents are collected as time goes by. In addition, printout records and static pictures are not able to present student learning in a dynamic manner that is important to show student achievements in particular motor skills. Meanwhile, managing and updating student artifacts in traditional portfolio can be another issue that hinders the use of traditional learning portfolios.

With the improvement of multimedia and Internet technologies, different formats of media such as digital picture and video can be utilized to represent artifacts of student learning. By integrating digitized artifacts, electronic learning portfolios have become easier to manage and updated and therefore draw more attention from educators and researchers than traditional learning portfolios. However, students with special learning needs may not be able to benefit from a "one size fits all" e-portfolio because each student needs to attain their individualized learning goals. This project intended to construct an e-portfolio system for special education by modifying open-source Moodle™ course management system. Users such as special education teachers and parents were surveyed and interviewed to achieve the usability of the e-portfolio system.

The development of the e-portfolio system

The structure of the system

In order to meet special education teachers' and students' needs, the construction of the system focused on the components for building learning portfolios and assessment of student artifacts rather than the built-in management features. The following components were developed for the prototype: (1) individualized learning objective system, (2) assessment and assessment guidance, (3) manage and input of artifacts, (4) guidance for using this system, and (5) indexing/linkage among objectives, artifacts, and assessment. The structure was determined after discussions with the teachers, parents, and educational technology experts.

The features of the system

There are two major functions ~~of~~ in the prototype system, namely the user and the administrative functions. The components mentioned earlier are work for the administrative function. Learning artifacts can be presented dynamically in either html or Microsoft Word. These standardized digital formats provide convenience for viewing the progress of student learning and are also easier for later editing works. Meanwhile, the html content is organized as weblogs of the class and of individual students to give teachers and parents a clear view regarding the student's learning progress day by day.

The teacher will be able to view all the students in the teacher's class while each parent can only view the portfolio of her/his child. The teachers were able to login to the administrative section to input and manage student artifacts, select learning objectives from a pull down menu, and key in their comments. The same learning objectives can be assigned to different students in the teacher's class. Each student can also have different combinations of learning objectives based on the progress of the student and teacher's decisions. Student artifacts can be stored in text, static image, and video formats. These artifacts are linked and indexed to the pre-determined objectives. Each learning event can be indexed to multiple learning objectives and vice versa. In the assessment section of the system, events of student learning are dated and listed with hyperlink functions. Each link will lead to a web page showing artifacts and related objectives of particular learning events accompanied with grading options and textbox for feedback input. The teacher can then evaluate student learning on the summarized page. An overview page on which digitized artifacts, objectives, and comments from the teacher can be generated automatically to summarize each student's learning progress and achievements.

Evaluation of usability

Four special education/educational technology experts, four special education teachers, and four parents of students with intellectual disabilities were interviewed to evaluate the usability of the system. Questions focused on different perspectives such as the interface design and functions, the ease of use and management, and the content from output web pages were given to the educational technology experts, the teachers, and the parents respectively, to attain the usability of system. The following findings are summarized from the collected comments:

1. The system provides required features for building portfolios electronically. Student portfolios become dynamic feature by presenting learning events in multiple formats of information. Presenting students' learning dynamically provides opportunities for efficient communication between the teacher and the parents.
2. Indexing and linkage of the learning objectives, artifacts, and assessment criteria help individualizing learning goals and achievements, which are important for students with different intellectual disabilities. Meanwhile, matching each special education students' achievement with individualized learning goals and artifacts help teachers to make plans for on-going teaching tasks.
3. The output of the e-portfolio is easy to view and edit, which can be beneficial to promote the implementation of portfolio assessment.
4. The dated digital artifacts with matching objectives not only give the parents easy access to the students' performance in the classrooms but also help the parents to realize their children's learning progress clearly.

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Fostering Virtual Teams in a Learning Organization

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Short Description

Numerous organizations realize that continuous improvement in employee job skills and a business' capacity to expand its learning is essential in today's global competition. An ideal of learning organization was created to meet these needs of the corporate world. Team learning connects individual and organizational learning in such an institute. This literary review aims to identify barriers to team learning, possible means to overcome them and successfully foster virtual teams in a learning organization.

Introduction

To remain competitive an organization must renew its knowledge base and shift its paradigm constantly. A learning organization is supposed to be able to develop groups of competent employees, to produce optimal performance, to deal with the rapid changes in the market and ultimately accomplish superior economic achievement for the organization. Team learning provides the bridge between individual and organizational learning in an organization like this. However, people express concern that if team learning can really happen or be fostered due to the hierarchical bureaucracy and the prevailing culture of individualism that exists in most organizations.

Definition of a Learning Organization

A learning organization is defined by Peter Senge (1994) as an institute where people continuously increase their ability to produce desirable results, their new ideas are open-mindedly encouraged and they have the liberty to learn and achieve together. A learning organization can be beneficial in two different perspectives: for the organization as well as for the employees.

For the organization, it can increase competitive advantage because employees can learn faster than its rivals (Senge, 1994; Tobin, 1993); respond to change promptly because people know how to anticipate changes and how to create the kinds of changes they want (Senge, 1994); ensure superior performance through development of individual employees (Tobin, 1993).

For the employees, it can cultivate mastery of their job skills as well as self-determination and learning strategies; improve quality of work life because employees are in an environment that is open for critiques and recommendations; enhances people's awareness of collaboration and interdependence (Senge, 1994).

Barriers to Team Learning

Organization structures may either help or hinder learning. They affect team learning and put up barriers through (Marquardt & Reynolds, 1994): a) bureaucracy; b) poor communication; c) poor leadership; d) resource utilization or the lack of it; and the e) huge size of the organization.

Team learning is also the most challenging to many people and organizations. The process of learning how to learn collectively is unfamiliar. Most of us have had no training in this. There will be times of frustration and perhaps embarrassment, as the team members develop their collective capabilities.

How to Overcome Barriers and Foster Virtual Teams

A virtual team is a group of people, who might reside in various locations or cultures, involving in a technology-enabled team for the purpose of accomplishing learning or job tasks (Alavi & Yoo, 1997; Desanctis & Poole, 1997; Jarvenpaa & Leidner, 1999).

More and more virtual teams have been used in organizations and higher education as a result of the development of technologies and globalization. They have become an essential process for team learning as well as task completion.

Team Process

To become an effective self-managed learning team requires a group of people to go through four stages of development, in each stage learning and practicing new skills. These stages are (Tobin, 1993): a) Formation, b) Development of team skills, c) Development of management skills, and d) Self-management. The result will be a team that not only manages its work, but also itself.

Virtual teams also go through these stages, but the process moves much faster than in face-to-face teams (Johnson, Suriya, Yoon, Berrett & La Fleur, 2002). This is why using team-building exercises to encourage information exchange, to build trust and establish team identity can be valuable in facilitating this fast process (Jarvenpaa, Knoll, & Leidner, 1998). If the design of team interaction entails goal setting and strategic planning for completing learning or tasks, it is more likely for participants to achieve “shared mental models” (Powell, Piccoli & Ives, 2004).

To ensure the success of a virtual team process, managers, administrators or instructors might also want to reflect on participants’ “psychological profile” and “personality characteristics” during the design of the team. Some of the traditionally honorable features, such as patience, persistence, perseverance as well as tolerance, flexibility and understanding, are also considered virtues for successful team players in this technology-enabled setting (Warkentin, Sayee & Hightower, 1997). These procedures might help mitigate the negative effects caused by ideological barriers.

Communication

The most effective practice suggested by Senge (1994) for team learning emerges from two conversational forms: dialogue and skillful discussion. We need to promote and provide opportunity for these forms of conversation among team members or the whole organization to facilitate team learning.

Similarly, Jarvenpaa, Knoll, & Leidner (1998) concluded from their study that frequent and predictable conversation and regular feedback improve communication effectiveness, and eventually brought about higher trust and virtual team performance.

In addition, to improve communication and collaboration within the virtual team, Warkentin, Sayee & Hightower (1997) suggested utilizing technology-enabled informal face-to-face contact early in the process; and Malhotra etal. (2001); Tan etal.(2000); & Wartkentin & Beranek, (1999) recommended developing a protocol for coordination and employing communication Training interventions.

These measures might help alleviate the negative outcomes caused by: a) bureaucracy; b) poor communication; c) poor leadership; and the e) huge size of the organization.

Technical Expertise

As far as technologies are concerned, virtual teams should be provided with sufficient knowledge searching or building gears and an invigorating environment for community development (Bitter-Rijpkema, Martens & Jochems, 2002).

Virtual teams tend to have a variety of skill levels and sets, and may need to negotiate what specific technology to use for completing learning or job tasks (Sarker & Sahay, 2002). We need to encourage virtual teams to adapt technologies (Maznevski & Chudoba, 2001) because overcoming technical uncertainty and challenges might even bring out the development of trust and collective identity/capabilities (Javenpaa & Leidner, 1999). These suggestions might help moderate the negative consequences caused by **the lack of resources.**

Conclusion

Nowadays, to a large extent, team learning experience has been transferred to an online format. Virtual teams can be one of the building blocks (Powell, Piccoli & Ives, 2004) if a company or higher education institute would make the commitment to become a successful learning organization. The above-mentioned measures might help foster virtual teams and build a foundation for them to thrive in these organizations.

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A Curriculum Analysis of the Online Master of Education in Curriculum and Instructional Technology Program

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Title: A Curriculum Analysis of the Online Master of Education in Curriculum and Instructional Technology Program

Abstract: Starting in the summer of 2004, the department of Curriculum and Instruction at Iowa State University began offering an online Master of Education (M.Ed.) with a specialization in Curriculum and Instructional Technology degree program. All of the required courses were delivered at a distance using a variety of technologies. However, students traveled to campus for a face-to-face session at least once per semester. The purpose of this paper was to provide a detailed curriculum analysis of this degree program using Posner's (2004) curriculum analysis questions: curriculum documentation, curriculum proper, and curriculum in use. We employed a document analysis method, and examined an article published by the curriculum designers, course syllabi, the program website, and recruitment brochures; and interviewed key participants in the development of the program. Based on our analysis, suggestions were made to improve the curriculum and overcome potential weaknesses such as offering students a more diverse and dynamic program of study based on student interests, and providing instructors with training and resources necessary to create successful online learning environments.

Descriptors: Online Education, Curriculum Analysis

Introduction

Starting in the summer of 2004, the department of Curriculum and Instruction at Iowa State University has been offering an online Master of Education (M.Ed.) with a specialization in Curriculum and Instructional Technology degree program. The purpose of this paper was to provide a detailed curriculum analysis of this degree program. Therefore, to identify the scope and focus of the curriculum, a systematic analysis was employed using Posner's (2004) curriculum analysis framework, which poses four sets of questions that let "the analyst tear a curriculum apart into its components" (Posner, 2004, p.18). These questions address *curriculum documentation and origins*; *curriculum proper*; *curriculum in use* and *curriculum critique*. Although the analysis was peculiar to this specific program, the results may be pertinent to similar programs and may provide a baseline for curriculum developers.

The analysis is provided in two phases. First, the curriculum of the degree program is presented so that the reader can gain a better understanding of how the program was designed and implemented. Second, the curriculum is examined in the light of Posner's curriculum analysis framework in order to identify the strengths and weaknesses and so that suggestions for improvement could be made.

Curriculum Overview

As stated in Correia et. al. (2009) the online program was designed in 2003 by the faculty members teaching the same M.Ed. program in a face-to-face format. The reason for creating an online program that mirrored the face-to-face version was to meet the needs of full time K-12 teachers who are spread across rural areas of Iowa and are not able to attend classes in a traditional university setting (Michelini & Yu, 2009).

Using a cohort approach, all students attend required courses at a distance using a variety of synchronous and asynchronous tools. However, students travel to campus for a face-to-face session at least once per semester.

At the program level, a vertical organization is used that divides the program timeline into semesters via academic years. A total of 32 credits are required for successful completion of the 3-year program. The sequence of courses is primarily fixed with the exception of 3 hours of elective credits preferably taken after the first year. The program timeline (Table 1) appears to be layered and progressive with introductory/foundational content placed early in the timeline and more specialized content (i.e. theory and research) appearing later. The organization of the program also requires a capstone course at the end of the third year of the program requiring students to develop a portfolio (CI 599B) that includes compiling both an artifact collection and writing a reflection paper.

Table 1. Program Timeline

Year	Summer	Fall	Spring
1	**CI 615B** - Instructional Technology Seminar (1 credit) **CI 501** - Foundations of Instructional Technology (3 credits)	**C I 505** - Introduction to Using Technology in Learning and Teaching (3 credits)	**C I 507** - Principles and Practices of Distance Education (3 credits)
2	**C I 594** - Contemporary Curriculum Theory and Principles (3 credits)	**C I 503** - Designing Effective Learning Environments (3 credits)	**C I 515** - Action Research in Education (3 credits)
3	**C I 511** - Technology Diffusion, Leadership and Change (3 credits)	**HPC 588** - History of American Education (3 credits)	**C I 599B** - Research Development Project (3 credits)
Additional course work (3 credits) can be taken any time, preferably after the first year.			
Total Credits: 32			

Curriculum Analysis

We employed a document analysis method which included an article published by the curriculum designers, course syllabi, the program website, and recruitment brochures; as well as an interview with one key participant in the development of the curriculum. Based on the analysis, suggestions were made to improve the curriculum and overcome potential weaknesses such as offering students a more diverse and dynamic program of study based on student interests, and providing instructors with training and resources necessary to create successful online learning environments. The following is a detailed curriculum analysis of this degree program's course of study using Posner's (2004) Curriculum Analysis Framework.

Curriculum Documentation and Origins

Curriculum documentation and origins address issues of who develops the curriculum for what reasons, how it is planned out, and how it is affected by social, political, cultural and or economic situations (Posner, 2004). In other words, the curriculum analysis starts with revealing the story behind its development.

We based our analysis of this curriculum on five different types of resources. First, we reviewed the program's website (http://ctlt.iastate.edu/~citmed/) to identify the purpose of the program, target audience, course schedule, tuition, and admission requirements. Second, we consulted informational and marketing materials that are used to advertise the program and present the guidelines for the creative component project that students are expected to complete at the end of their program of study. Third, we reviewed an article written by the curriculum developers that provides an overview of the program and a closer look at the courses each cohort of students are required to take. Fourth, we consulted the Iowa State Course catalogue to gain any additional information about the required courses and their placement within their respective colleges. Fifth, we interviewed the director of the Center for Technology in Learning and Teaching who is one of the lead designers of this curriculum in order to seek any additional undocumented information that would be of relevance for this analysis.

The manner in which the available documents (i.e. website, article) were structured indicated an emphasis on the program of study, with each explaining the courses required for the degree and in what order they need to be taken. As a result, as Posner (2004) states, the developers most likely viewed this curriculum "as a series of courses that the students must get through" (p.11). It is then assumed that after students have progressed through the required courses in a pre-determined order, they will be able to use technology as teachers and leaders in their educational contexts.

The biggest limitation in terms of curriculum documentation was a lack of archived “official” documentation that could be consulted in order to gain a more in-depth analysis of the curriculum. Having to compile different types of materials that provided information in bits and pieces and draw conclusions based on this limited information was not as robust, as preferred for this analysis. Though the program website provided the most details about this curriculum, its target audience is prospective students who are most likely already interested in pursuing an online degree thereby the information it provides is somewhat narrowly focused. It would have been helpful to have access to documentation that stated the goals of the program, as well as any specific objectives outlined during the design process. Regardless, in this current program of study students are required to take pre-defined courses in a pre-determined order, but are not necessarily told why these courses were selected over others particularly since the on-campus format offers students some flexibility with course selection.

In the curriculum development process, Schwab (1971) suggests that the *learners*, the *teachers*, the *subject matter* and the *milieu* should be represented, as they are the four commonplaces of education. The developers of this current curriculum served multiple roles as teachers, subject matter experts, and educational psychologists each raising the concerns shared by Schwab (1971) in terms of over or under representation of each commonplace.

It can be argued that the learner was represented by the faculty members who were directly involved in the development process, with each possessing an extensive background in teacher education, as well as learning theory and educational psychology. Therefore, it can be assumed that their understanding of students, how they learn, and what their needs are, were likely represented.

Teachers are likely to be the best-represented group within this curriculum development team as the developers are also the ones teaching in the online program itself. Thus, they can understand the complexities of online learning, as well as the demands and constraints that might be faced during the implementation of this curriculum. Also, as experts and practitioners in the field of Instructional Technology, the developers have a strong theoretical background in how students learn with technology and what types of practices are required that may not be particularly an issue in a face-to-face classroom environment. However, not all required courses are taught by Curriculum and Instructional Technology faculty, who are already presumably interested in and qualified to take part in distance education and technology initiatives and integration, therefore the level of experience and expertise with online learning environments amongst the other instructors outside of the department vary a great deal.

Students are also required to take several courses that may not have been originally designed or taught online before. Therefore, faculty members may be asked to teach their course online primarily to best-serve the program, each of whom may not be experienced or trained to teach in this type of learning environment. As a result, some faculty members might have little theoretical and practical understanding of online learning principles, however should have been represented in the curriculum design process in order to better serve the incoming students of the program. The curriculum designers likely tried to fill this gap with the hiring and implementation of a distance education coordinator, whose purpose is to assist faculty with the development of materials and organization of their courses for this online program.

The team members also acted as the subject matter experts in the design of this curriculum. As the practitioners of the curriculum, faculty members have the theoretical and practical background about what teachers should know in order to integrate technology in a way that will improve student learning. For example, students are expected to take classes outside of their own specializations, offering them an opportunity to better conceptualize learning theories and develop professionally.

One goal this curriculum claims to meet is offering full time K-12 educators who are spread across the rural areas of Iowa and unable to attend traditional university classrooms an opportunity to pursue a continued and/or graduate education. Nevertheless, this program is not limited to Iowa teachers; anyone who meets the admission requirements may apply to the program. As a result, no one from the community it is intended to serve is represented in the curriculum development process. The curriculum developers analyzed the current educational landscape and identified a need for the program based on their own analysis. For example, Coreia et. al. (2009)

reported that the state of Iowa had a rural population of 1,337,000 out of a total 2,982,000 people. This represents a relatively high percentage of the total population and presents a potential opportunity for reaching out to both teachers and schools in remote locations.

The educational, social and political context at the time of the development of this online M.Ed. program appeared to value the role of technology in schools, and the necessity for preparing teachers with the new 21st century skills that they could then foster unto their own students. For instance, the 1997 National Council for Accreditation of Teacher Education (NCATE) reported, "[t]he nation's teacher education institutions must close the teaching and learning technology gap between where we are and where we need to be. Teacher education institutions must prepare their students to teach in tomorrow's classrooms" (p.ii). Since then there has been a growing expectation for technology integration in all levels of education, and teacher education programs have been considered to be the best and most practical places to educate pre- and in-service teachers on meaningful technology integration practices so they can foster student learning in their own classrooms.

Yet, thus far single educational technology courses have been the most common practice for technology preparation in pre-service teacher education (Hargrave & Hsu, 2000). This single stand-alone course approach may not be as effective for students in learning about what technologies they can use in their particular content areas, as it typically only provides generalized overviews of a range of technology tools (Mehlinger & Powers, 2002). This is also a reason for why the curriculum developers identified a need for more opportunities in Iowa for graduate education in the field of educational technology.

In regards to the design and development of the curriculum elements such as content, characteristics of audience, activities, materials, sequencing principles and evaluation, each are represented to some extent. However, the weight of each planning element was not equal in terms of the information provided by the various curriculum materials analyzed. For instance, the program website emphasizes the list and the sequence of the courses that need to be taken, which also alludes to the focus of the content (or the subject matter). The common instructional theme among all the courses is the extensive use of discussion boards, which are intended to supplant the traditional classroom discussion. These types of forums have both pitfalls (e.g. lack of nonverbal cues) and benefits (e.g. everyone has a voice, time for reflection before posting a response). In general, course materials (i.e. textbooks) are the same as what is being used in the traditional, face-to-face university setting. Evaluation varies with each course, however the most common practice appears to measure learning through project-based activities that require students to apply what they have learned into practical classroom situations.

The Curriculum Proper

The curriculum proper is concerned with the purpose and content of the curriculum and what assumptions each imply (Posner, 2004). Our analysis indicated that an assumed overarching goal of this program is to encourage students to use technology in their own educational situations or contexts so that they can foster learning and provide opportunities for their students to develop skill sets that will help them be successful in the future. After students have completed the required course work and creative component, it is assumed that they will be prepared to apply many of the technology integration concepts learned into their own classrooms.

With limited documentation, it is very difficult to identify an explicitly stated purpose associated with the curriculum. The only statement that can be regarded as a potential purpose statement is provided on the program website. It states "The Master of Education in Curriculum and Instructional Technology program is designed for teachers and other educators to engage in professional development in their knowledge of subject matter, teaching, and technology by incorporating contemporary tools and resources" (Michelini & Yu, 2009). Despite its brevity, this statement encapsulates all four categories (i.e. personal development, socialization, economic productivity, further learning) of educational aims (Posner, 2004).

Professional development is directly related to *personal development* where students will hopefully improve both their technical skills (training) and effective technology integration (education). Correia et. al. (2009) state that students are grouped into cohorts in order to create a supportive and collegial environment that is directly related to the *socialization* aspect of education. However, it also should be noted that socialization in an online environment is quite different than face-to-face environments. The physical distance between the students and the instructor can hinder effective communication since it is essentially dependent on a different, and less-used skill sets. This is why the continuity of a cohort format is considered to be so important in online learning (Correia et. al., 2009).

Economic productivity is primarily related to acquiring job skills in the students target area. Although most students are already full time teachers, earning a Masters degree often provides them opportunities for advancement and future career options. For example, one graduate stated, "While working toward my masters' degree I applied and accepted my current job at the Area Education Agency ... my background and masters in technology is extremely valuable" (Correia et. al., 2009). Finally, *further learning* is one of the basic aims of the program. Namely, it is impossible to teach all the available technologies that can be used in different content areas, or to guess what changes and improvements in technology will happen in coming years. Instead, this curriculum offers students the theoretical framework that will help them explore what is available and what could be done in their own classrooms.

Also, what type of learning objectives are included or emphasized in the curriculum might give an idea about the approach developers took in developing this program. In particular, the learning objectives are represented at the course-level through the individual course syllabi. However, some are presented in a way that cannot be identified fairly easily as individual or personalized learning objectives. Namely, many learning objectives are tangled amongst course overviews and educational goals listed on course-related documentation. For example, three course syllabi (chosen based on availability) were analyzed to find what learning objectives are included and emphasized as representative of the curriculum. For example, the HPC 588 course description (See Appendix A) presents just one overall learning objective after listing the topics that will be covered in the course.

The CI 511 course overview (See Appendix B) is also designed in a similar fashion to the HPC syllabus. After briefly listing the content that will be covered, the instructor concludes with a sentence that summarizes what students will have learned at the end of the course. However, in this example, there is also an emphasis on the application of skills (e.g. providing leadership) in relation to Bloom's (1956) taxonomy of application in the cognitive domain. However, skills like leadership are often not gained by following a "recipe" type of instruction. Students should draw their own conclusions based on their conceptual knowledge acquired throughout the course, and their own attitudes towards how to be leaders in technology integration using their cognitive strategies (Gagne, 1977).

The CI 505 course purpose and approach (See Appendix C), which utilizes a more application-based approach to instruction, also does not provide well-defined learning objectives. The approach that the instructor has taken also reflects a combination of intellectual and skills knowledge as students are expected to apply the conceptual knowledge they have gained and create classroom activities for their learners.

Overall, we can conclude that the curriculum developers do not follow any specific educational psychology model (e.g. Bloom, Gagne, Ryle) in developing their objectives. Rather, they use a combination where they can emphasize what they consider important for their target students, based on each specific course. Each of the course descriptions or overviews appear to be exactly the same as their face-to-face equivalent, resulting in the instructors to continue aiming towards achieving the same educational objectives, despite the course being offered through a different medium. As a result, students complete similar assignments and learn similar material in almost the same amount of time regardless of the medium.

The manner in which the subject matter is represented in the curriculum indicates more of a pedagogical, than behavioral focus. The required classes in the curriculum covers both theoretical foundations (e.g. how people learn) and practical applications (e.g. designing an instructional unit), so it can be concluded that this curriculum conceives of Curriculum and Instructional Technology as a combination of theory and practice. In some courses, the focus is more on theory (e.g. HPC) while in others there is more of a balance between theory and application. For example, in CI 505 after students learn how and why wikis can be used in educational settings, they design a learning activity using this specific technology. This combination of theory and practice indicates a pedagogical agenda that technology needs to be used as an aid to foster student learning rather than being a controlling factor. This emphasizes the point that, in none of the classes offered throughout the program will you find learning about a specific technology taught as an isolated skill. Students are encouraged to explore their options and develop technical skills by working on technology integrated projects, which ideally accomplishes the primary goal of creating similar environments for their own students.

Most content is usually presented through forum discussions and project-based assignments. In all courses, students discuss assigned readings in an asynchronous forum discussion, and complete assignments to show their understanding of the material. Hence, using this approach the instructor takes on a secondary role in the learning environment; however, this does not mean that they do not have influence on what is being learned. Instructors also participate in the discussions, and assist students in co-constructing knowledge, yet the format can limit their ability to interfere when they see a problem in student learning. However, some topics may require explicit teacher lecturing, which can be problematic in online environments. As a solution to this problem, one instructor records PowerPoint presentations with audio tracks and uploads them to a course management system (Correia et. al., 2009). However, thought this may seem like a plausible solution, it still lacks student-to-student/student-to-teacher interaction that a face-to-face classroom provides which is a key aspect to learning. Likewise, an online presence does have different dynamics than a physical presence, and can lack some very important elements necessary for student learning.

With regards to a multicultural view, it can be argued that this curriculum does not represent a multitude of cultures. Most students in the program are practicing teachers across Iowa, which consequently does not represent a multicultural population. There are almost an equal number of males and females in the program, yet they are all typically Iowans. Additionally, very rarely do international on-campus students take these online classes.

Despite the limitations mentioned, multicultural views are represented in the curriculum in two different ways: (1) how the faculty members accommodate the diversity of a student population; and (2) how they help their students form a multiculturalist perspective. To accommodate their students, faculty members encourage the inclusion of views that represent diversity, which incorporates Bank's (1988) idea of multiethnic education. For instance, when discussing the history of education, international students are encouraged to bring in examples from their educational systems and share experiences so that their classmates can have a better conceptualization of other cultures and educational systems.

Another factor impacting the content is technology. Recent developments in technology have provided opportunities for more dynamic online classrooms where students and teachers are able to interact with one another more than ever before. A course management system, like WebCT, provides a repository platform where students and teachers can upload assignments and materials, as well as develop a virtual space for an online community. Web 2.0 tools (e.g. blogs, wikis, social networking) provide user-friendly environments for students to collaborate, reflect and co-construct knowledge. Computer mediated communication tools (e.g. chat, video conferencing) help students and teachers at a distance to have virtual office hours where they can discuss issues and problems. Digital production tools (e.g. video and audio) provide a solution to the lack of face-to-face communication, and provide opportunities for students and teachers to have a virtual presence in an online environment. Using these different types of technologies, faculty members also model what students could do in their own classrooms, as well as enhancing their own classroom communication.

Online education also incorporates some assumptions that underlie the curriculum approach to content and purpose of the program. In distance learning environments, the responsibility for learning rests more on the students as they are expected to be self-directed learners who can manage their time effectively and actively participate in the learning process. As stated earlier, the content delivery is mostly structured around forum discussions where students reflect on readings, comment on each other's ideas, and participate in a collaborative learning environment (Correia, et. al. 2009). In such environments, as Resnick (1983) suggests, rather than passively receiving information, students construct ideas and generate meaning through engaging in reflective discussions. Since most students are practicing teachers, they have preconceptions about their profession and are expected to make connections about what they learn in the courses (in terms of both theory and practice) and their own teaching experiences.

Social interaction is another important element central to learning (Resnick, 1983) via this curriculum. It provides opportunities for students to work collaboratively, engage in constructive criticism, as well as reflect on and revise their own ideas (Posner, 2004). In online classes, most students are aware that their peers will see their contributions, so it is highly likely that they will pay more attention to detail regarding what information they share and how. Also, as required in most courses, they are expected to comment on their peer's entries and ultimately build towards creating a structured, co-constructed knowledge base.

Overall, it might be concluded that a constructivist perspective seems to dominate how learning and teaching is viewed in this program, as well as how activities are structured. However, rather than a conceptual change model, it is closer to a cognitive apprenticeship model where students engage in real life tasks in a contextualized manner with on-demand help by instructors.

In addition to content learning, online learning contributes students' self-development, as it requires students to be self-directed, motivated, and effective time managers. Though they do not have to commit to a regularly scheduled time and place for class, they do have to participate and contribute in other meaningful ways. Being a part of an online community, being able to effectively manage their time, being responsible for their own learning (through readings, discussions, projects), as well as ethical (i.e. cheating) and professional guidelines are all aspects of a hidden curriculum that are not directly addressed in the "official" curriculum.

A common implication related to online learning is the perceived lower quality of education that students receive as a result of being associated with an online degree program. As part of an effort to deemphasize this perception, developers focus on the relatively high retention and graduation rates achieved by the program. Several students of the program also suggest that as a result of good online course design it has allowed them to be successful (Correia, et. al, 2009):

> "I have found this to be much more engaging and meaningful than meeting in person in most of my undergrad courses. I really like being able to participate in a discussion, but having the time to really think through things before 'opening' my mouth, so to speak. Also, there is almost more accountability with a course like this than with a traditional course."

The Curriculum In Use

The curriculum in use is related to how teachers interpret and put the official curriculum into operation. Throughout this implementation process, they need take many frame factors --physical, cultural, temporal, economic, organizational, political-legal, and personal characteristics-- into consideration. These factors might either hinder or facilitate the implementation of the curriculum (Posner, 2004).

In terms of temporal factors**,** the flexible nature of this online program essentially makes each course a 24/7 commitment for a student to be engaged each semester. There is less structure around most asynchronous communication formats with the exception of deadlines. Each course is part of a full-time professor's teaching load and is delivered based on his or her own design and preference.

Physical factors play a different role in online teaching environments. Although they do not require walls and chairs, other tools that would facilitate the learning experience are needed. In this particular curriculum, with the exception of a brief face-to-face meeting associated with some courses, the commitment of any indoor or outdoor facilities is minimal. However, the technological requirements for participating in online courses is much more demanding. It is expected that each student has access to the required equipment associated with each course, which are often already available at most public libraries and universities. It is assumed that the department is already fully equipped to administer this program and students must be prepared for or gain access to the necessary and compatible equipment that may extend beyond a desktop or laptop computer (i.e. webcam, microphone, video conference software/site, etc.)

Regarding the organizational frames, this program does employ a full-time distance education coordinator that serves as a technical support specialist and provides assistance with the acquisition of any specific technical requirements associated with each course. The nature of this program requires a wide range of technologies as both delivery mechanisms and subject matter. A student's ability to seek resources and assistance, from both inside and outside of the university and department when necessary is critical to their success.

Political-legal factors refer to the impact of outside organizations have on the curriculum. For the particular curriculum under analysis, in addition to the accreditation offered by the department, University and state, the courses associated with this program are also affiliated with the traditional M.Ed. graduate program. A limited number of students not associated with this program are able to enroll and participate in these courses for credit towards their own respective programs. These courses are met with the same rigor and valued the same as all other graduate level courses offered. As a result, the associated costs with the implementation of this curriculum range a great deal. First, a staff position (i.e. distance education coordinator) is dedicated to supporting this program. Second, faculty planning and preparation time will vary from traditional implementations of the same course. Third, technical resources must be updated (if necessary) to accommodate the distance education initiatives that each course demands.

In terms of consistency with the teachers' attitudes, beliefs and competencies this curriculum has the advantage of instructors being the developers as well. Most faculty associated with the program have had experience teaching in both traditional and online environments; as well as worked with various technologies in the past, utilizing them to the best of their abilities. However, no formal training associated with online learning and course development is offered to faculty in their preparation for teaching in this program. The staff development necessary to support this program is focused around the distance education coordinator's role, as well as all other university-wide support services. The expectation that all faculty members are of equal technical ability is unrealistic. However, it is assumed that they will seek and receive the appropriate assistance necessary to maintain the effectiveness of their course design and delivery.

Most technologies are already available and accessible to both faculty and students. It is expected that students who enroll in distance education programs have access to some level of technology appropriate for completing the associated coursework. Often a course management software solution is complemented with other technologies used at the discretion of the faculty member.

Mastery of specific technologies are not required to meet the expectations of this program, instead representing how technology can be used to enhance learning is valued. This is expected through the demonstration of leadership, competence, creativity, and understanding of a particular subject matter. Based on how each course is designed, the proper resources and assistance must then be coordinated. The role of the distance education coordinator or the utilization of other university-wide resources is critical in meeting this need.

When considering students' cultural, ethnic or social backgrounds, this program assumes that each student has the ability to effectively participate in an online learning environment. First, students are expected to be able to overcome or accommodate any language or communication barriers associated with an online learning format. This can be especially difficult when both visual and non-visual cues are often relied upon when communicating in order to decode or interpret what and how information is being shared (i.e. the use of slang or acronyms). Second, the practice of "netiquette" is an important component to online learning that all students should consider. Often, common communication characteristics such as tone, expression, physical gestures, etc. are lost in online learning environments which require careful scripting of how and in what manner students share and express their thoughts and opinions. Third, in order to participate in online learning environments certain levels of economical and technical resources are assumed. Though ownership of the various technical aspects required may not be necessary, students are expected to have reliable, consistent and frequent access to the tools necessary to fully participate and contribute in the courses. The value placed on repeated student-to-student/student-to-teacher interactions is great and essential to each course's success.

Though this curriculum remains a fairly new and popular program of study, several collaborative approaches are a part of its continued modification efforts. First, with the direction of curriculum change being handled by faculty members within the program, the potential for biased or discrete influences remains a possibility. However, the curricular focus appears to rest around meeting each instructor's teaching and learning beliefs.

Second, the necessity for teacher growth to occur "by doing" and learning from their peers is also a factor in how courses are taught. The nature of online learning will most likely impact what courses are offered within this program, as well as who is best qualified to teach them with respect to both the content area and online learning principles. Any course a faculty member teaches within this program is included as part of their assigned teaching load with the expectation that they invest the time necessary to offer a successful course.

Third, the ethnographic approach to how students are evaluated also influences the basic structure and change expectations for this program of study. The subjective nature of reflecting on and aligning program artifacts to a set of standards remains the primary benchmark to measuring the effectiveness of the program itself. The CI 599B portfolio course is purposefully placed at the end of a student's program of study and designed as an outlet for them to express their own point of view of their total body of work and how it relates to their goals as a practitioner as suggested by Posner (2004). This reflection and demonstration is then evaluated by the faculty's point of view and their interpretation of what academic growth and competency should look like after participating in this course of study. The reconciliation of the two viewpoints then allows for both faculty and students to validate their experiences in the program and measure their level of effectiveness.

In terms of evaluation of the curriculum, there was little access to data related to this program with the exception of some student feedback, as well as retention and graduation rates. As a result of this minimal dataset, strong conclusions are difficult to draw. However, based on the two previous cohorts who participated in this program the following retention and graduation rates are as follows:

<u>Students beginning in the 2004 Cohort</u>:

Retention: 88% Persistence

Graduation: 7 out of 8 receiving the Masters of Education degree

<u>Students beginning in the 2006 Cohort</u>:

Retention: 92% Persistence

Graduation: 12 out of 13 receiving the Masters of Education degree

The evaluation method used by this curriculum is likely to be a flexible and action-oriented approach. It advertises itself as being an applicable and adaptable graduate program that accounts for the flexibility and dynamic nature of the working professional. The emphasis placed on student-centered learning and relating coursework to individual situations makes it very difficult for a highly measurement-based evaluation to occur.

One outcome concern we continue to have in relation to this curriculum is assessing student-learning gains, versus those who are enrolled in similar, but more traditional graduate programs. Obviously there are a variety of conditional factors that must be considered when attempting to adequately compare the two programs such as equality in student ability, prior knowledge/experiences and the influence a cohort format may have on learning. Ideally, this type of evaluation data could be used in comparing and analyzing how effective information is being shared and later applied by each respective group of students. Though retention and graduation percentages could potentially mark the success of a degree program, a true assessment of work quality and student competency may also be advantageous in verifying if an online learning program is truly beneficial as opposed to its face-to-face counterpart, or vice versa.

Critique and Suggested Revisions

There are numerous strengths and weaknesses associated with this curriculum. First, its strengths include flexibility for serving a greater student population, utilizing a cohort format, and courses taught by full-time faculty.

One of the greatest advantages of online learning and this program is its ability to provide educational opportunities to potential students who might not otherwise attend a traditional University setting for reasons such as geographical, career, family, etc. The flexibility to take classes no matter where you are located in the world during a time that is most convenient to you is a very appealing endeavor for a prospective student, as well as offers an entrepreneurial opportunity for a University to expand its student body. This curriculum is able to offer many of the same graduate-level courses, performance rigor and University accreditation as its face-to-face counterpart with the addition of providing students the option of being enrolled at a distance.

The use of student cohorts is also a potential strength of this program. Since this curriculum is primarily evaluated based on retention and graduation rates, any attempt at enhancing these numbers should be considered an asset. Since most online learning environments can appear to be anonymous and lack a social connection, students are forced to find some type of relationship with a course that encourages them to stay engaged and actively participate. Taking advantage of this program's highly structured program of study makes it possible for a group of students to enter and progress through as a single "class" thereby making it easier for students to make connections with their peers on a repeated basis over several semesters. However, just as this attempt at student continuity can provide a benefit to academic performance, the incestuous nature of the same experiences and ideas being shared over 3 academic years can also be detrimental. Recognizing this, several students who are not part of the program are allowed to enroll in each online course for the purpose of keeping the classes diverse and dynamic in what information is shared and discussed (Correia, et. al, 2009).

Another strength of this program is having the opportunity to work with full-time faculty members who often teach both the face-to-face and online versions of the same course. Hence, online students are not placed at a disadvantage in terms of learning from experts in their respective fields of study. Overcoming the perception that instructors are less than adequate in online courses and that little interaction is ever had amongst students and faculty is critical in ensuring that students of this program are receiving the highest quality of education possible. As stated earlier, since this online program mirrors the face-to-face program and students often learn the very same things that on-campus students do, the program director stated that teaching online has "unofficially" made their face-to-face classes more effective (personal communication). Teaching the same course in two very diverse media forces the instructors to think about their courses differently, as well as how to communicate and employ various instructional techniques. This comprehensive look into their own pedagogy and course material has the potential to make instructors more aware of their own actions and identifying the most effective ways to illustrate or share information.

Next, as part of this curriculum's weaknesses and suggested revisions includes it's rigid course structure (possible solution: provide students more course options) and lack of teacher training in online teaching (possible solution: offering training to all involved faculty).

Though a student cohort system may work very well in an environment that students are already at a disadvantage in getting to know each other, and much of what makes so many online degree programs so popular is its flexible nature in completing courses from a distance the two are difficult to mix. An example of this inflexibility and limitation to being a part of this program is the restriction in what and when students can take various courses. All of the required courses for completing this program are offered once per academic year. This makes it very difficult for students to seek and substitute course alternatives or step away from the program for a period time (i.e. semesters) without penalty. Ironically, though an advantage of enrolling in an online degree program is flexibility, the nature of fixed course scheduling limits it a great deal. In the traditional, face-to-face M.Ed. program students are able to customize and choose courses with much greater ease. This is because of both the lack of schedule rigidity and cohort formatting. For example, in the face-to-face program students are given the option of choosing one of the several courses in the educational leadership area. However, in the online version they lack that option and are limited to only one course. Though each course was likely chosen on the basis of current student characteristics and needs of the target audience, these pre-defined course decisions limit a student's freedom in designing their own program of study.

Another weakness associated with this curriculum is the lack of training provided to faculty members teaching in online environments. Teaching online is neither easier, nor takes less time than face-to-face instruction. Rather, it requires careful planning and detailed course design that provokes and facilitates meaningful discussions, activities, projects. Regardless of the amount of teaching experience in traditional learning environments, developing the skills and characteristics associated online course development and instruction can be challenging and time consuming. Hence, a training module for online teaching strategies offered to the faculty members involved with this curriculum is needed. Just as this curriculum prioritizes the success of its students, preparing and offering faculty members the resources necessary to develop and implement effective online instruction should also be highly valued.

Conclusion

As the phenomenon of online learning remains both a popular trend and challenging aspect of educational quality this curriculum has many promising characteristics moving forward as a result of this analysis. The priority now rests with overcoming potential weaknesses with possible solutions such as; offering students a more diverse and dynamic program of study based on their interests, as well as providing instructors the training and resources necessary to create just as successful online learning environments as face-to-face. Despite this program's continued growth and perceived success, the challenges of online education remain to be ongoing.

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Appendix A

HPC 588 Course Description and Objectives

This course explores the goals, purposes and problems of formal education, primarily at the elementary and secondary levels, in the United States from the colonial period to the present. We will utilize both primary and secondary sources to investigate topics including: varied localized approaches to education during the colonial period and the early republic: the movement fro common schools: the "feminization" of the teaching profession: the rise of the public high school: nineteenth-century forms of race and gender segregation; the growth of educational bureaucracy and vocational education; Depression and Cold War reforms; the desegregation struggle; and increasing federal-government involvement in education. Throughout, we will explore the connection between educational policies and larger social, political, economic and cultural developments. As a result, students will gain a better understanding of the origins and evolution of various current educational practices, policies, issues and dilemmas. (Fairchild, 2008).

Appendix B

CI 511 Course Overview

The purpose of this course is to explore the ways that information age technologies (broadly defined to include computers and related devices, as well as the Internet and other tools and applications) have been integrated into schooling contexts. We will begin by exploring a general model that addresses how innovations are diffused and adopted. We will then focus our attention on how educational change occurs. Finally, we will look at an example of how a particular innovation (use of computers) diffused into educational settings. Studying these perspectives will help us better understand how technology integration is occurring in each of our individual contexts, and to provide leadership to help make the integration process more efficient and effective. (Niederhauser, 2008).

Appendix C

CI 505 Purpose

The purpose of the course is to acquaint the student with current educational applications of digital technologies in teaching and connections of these applications to contemporary learning theory. Emphasis will be placed on both the "how" and "why" of using digital technology in classrooms. Integrating digital technology to improve instruction and create students centered classrooms will be the central theme of the course. In the course, students will be encouraged to connect current learning theory the creation of digital technology classroom activities for students (Thompson, 2009).

CI 505 Approach

This class will be structured using a combination of resources, discussion and student presentations. The course is project-based and almost every week, at the beginning of the semester, students will be asked to create a project (usually a student activity) around a particular topic. Each week, students will receive an agenda for the week and an assignment due at the beginning of the following week in class. The course will use a WebCT site that is used for communication, discussion, sharing resources, student grade information, and course information. In addition, we will use a course Facebook site for communications and teacher/student reflections (Thompson, 2009).

Developing Innovative Lesson Plans: Bridging the Concept and Application of Technology Integration into Classroom

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Abstract

The goal of the project was for the graduate students to be able to develop, co-teach, and asses a series of lessons designed to enhance technology integration in the classroom. The technology selected must serve the learners in the learning process not be the focus of instruction. For each lesson, the following components were required: 1) related state and national technology standards; 2) assessment instruments; 3) detailed teaching plan; 4) instructional activities that integrated multiple learner-centered strategies; 5) evidence of use of problem-solving principles and classroom management techniques; and 6) a list of learning resources used. The graduate students elected to create lesson plans and associated activities that incorporated methods and strategies of problem-based learning, telecollaborative learning, integration of instructional tools (tutorials, software, games, and simulations), and uses of media and online tools from sources such as the World Wide Web. Graduate students selected teaching strategies that enable the technologies to be purposefully integrated into classroom instruction. In addition, the graduate students linked the lesson plans to the Illinois State Learning Standards (ISBE, n.d.), the National Educational Technology Standards for Students (ISTE, 2007), and the National Educational Technology Standards for Teacher (ISTE, 2008). Assessment tools were developed using RubiStar (4teachers.org) and the PBL checklist (4teachers.org). Specifically, assistive learning devices (ADL) were considered in order to serve the students with special needs. Findings and conclusions from the implementation and evaluation of the lesson plans will be detailed, as well as graduate students' and instructor's reflections on the experience and plans for future design and implementation.

Project Background

It is important that graduate students in the Department of Instructional Design and Technology at Western Illinois University gain real-world experiences in providing a supportive, technology-rich environment for K12 student learning. The experience not only enriches the graduate students' understanding of the technology integration and its application in the classroom, but also bridges these two parts as one sustainable process.

Graduate students were enrolled in the *Integration of Computer Based Technology in Schools* course. The course focuses on developing and practicing strategies and methods for integrating learning technologies into classroom and educational administrative environments. This practical approach guided the graduate students to select methods and teaching strategies that enable the technologies to be purposefully integrated into classroom instruction. Moreover, practices of what being written on paper in the form of lesson plan into actual situation would provide empirical evidences of what types of teaching methods and strategies that allow and enable technology to be integrated into classroom. Because of this, the development of innovative lesson plans through systematic phases is foremost, not only to "open the door" for the technology to be integrated into classroom, but also to bridge the theories and the actual application of the selected teaching strategy and its technology.

Learning activities designed in the lesson plan should support the student-centered approach through the implementation of learning strategies and the integration of technologies. To develop lesson plans that encourage the K-12 students to do interesting and fun tasks provide valuable real-world experiences for the graduate students that enrich their professional practices in the future.

Project Goal and Objectives

The goal of the project was for the graduate students to be able to develop, co-teach, and asses a series of lessons designed to enhance technology integration in K-12 settings classroom.

In detail, the objectives of this project were:

(1) To create lesson plans and associated activities that incorporate methods and strategies of problem solving, telecollaborative learning, instructional tools integration and uses of media and online tools for second grade students.
(2) To co-teach three lesson plans designed to enhance the integration of technology into second grade classroom.
(3) To assess the implementation of three lesson plans that incorporate methods and strategies that enable technology to be integrated into second grade classroom.
(4) To reflect the experiences in implementing the three lessons and use the experiences as references for future development and implementation.

Literature Review

Learning Strategies and Technology Integration into Classroom

The technology used in the classroom was not the focus of instruction, but it is a tool that serve the learners in the learning process (Thorsen, 2009). Using technology in this way often requires the teachers to change the way they teach as described by SEIRTEC (2001) in their lesson #5 about "Factors Influencing the Effective Use of Technology for Teaching and Learning" as follows:

> "We have found that when professional development and technical assistance start with a particular teaching or learning strategy that the teachers believe will benefit their students (e.g., project-based learning, cross-curricular thematic units, cooperative learning) and then help teachers discover ways technology is a tool that supports the strategy, teachers are usually eager to try both the new instructional strategy and the technology" (p.14).

Integrating technology into classroom requires the appropriate selection of learning strategies that enable and encourage the technology to be used. Thus, the teachers simultaneously and implement the instructional strategy, as well as use the technology that support the strategy.

Some of the learning strategies that enable the technology to be effectively integrated into classroom are: problem solving, telecollaborative learning, integration of instructional tools (tutorials, software, games, and simulations), and uses of media and online tools from sources such as the World Wide Web.

Problem-solving strategy (also called problem-based learning) is a learning strategy that guides the student to learn from solving the problem. Problem-solving strategy focuses on central concepts and principles of a discipline, involves students as active individuals in solving the problem, uses contextual problems, enables the students to construct their own knowledge, and produces products for their final projects (Thomas, Mergandoller, & Michaelson in Thorsen, 2009). The student then gain knowledge and skills by analyzing the problem, considering all possible factors, providing alternative of solution, and choosing the best solution to solve the problem. In the implementation of problem solving, reality-based and problem-centered materials are used and they often presented by media, such as written cases, videos, and computer-based situation. Students go to the school media center or using computer to access database or content from the experts via the Internet (Smaldino, Lowther, & Russell, 2008).

According to Thirteen Ed Online (2010), collaborative learning is "a method of teaching and learning in which students' team work together to explore a significant question or create a meaningful project" (p. 1). Telecollaborative learning enables the students to collaborate with students or teachers in other places around the world. In this case the role of technology, such as Internet makes the collaboration possible. The Thirteen Ed Online website emphasizes that collaboration can occur without regard to distance or time barriers by using the Internet. For example, e-mails can be sent to students or teachers around the world in order to share or exchange ideas or information. Skype application program can be used to have live conversation, chat and conference.

The instructional tools, such as tutorials, software, games, and simulations, into the classroom can be effectively integrated into the classroom by managing the classroom activities for technology use. By incorporating learning materials into instructional tools above, provides powerful learning experiences for students (Smaldino, et al., 2008). In addition, the use of media and online tools enhance students' learning especially to conduct research or gather information online.

Innovative Lesson Plans

Kizlik (n.d.) stated that "Lesson plans are written by teachers to help them structure the learning for themselves and for the students." In addition, Brown and Green (2006) pointed out that lesson plans contain day-to-day activities that compose a unit. In the lesson plan, the activities are measured in hours or minutes. Innovative lesson plans that integrate technology through appropriate selection of learning strategies enhance students' learning. The EdTechTeacher (2010) website strongly recommended the technology integration projects and activities to engender student creativity and empowerment through various innovative lesson plans.

Methods

For this project, the graduate students used a systematic phases in developing lesson plans for second grade students. The phases include analysis, design, development, implementation, evaluation, and reflection.

Analysis

According to Smith and Ragan (2005), there are three domains of instructional analysis: learner, task and context. In this phase, learners' characteristics, learning content, and environment were analyzed. The learners' characteristics of intended lesson plans were lesson plans for second graders at a private elementary school. All of them had basic skills in computer operation, including clicking, dragging, and listening instruction on how to use the navigation buttons. In addition, the learners have average to high cognitive abilities. Even though some of the learners did not have high performance in every subject, they mastered certain subjects greatly. Moreover, the children were emotionally stabile and socially friendly.

The learning content that had been developed in innovative lesson plans were from the area of social science with topic "Native American Tribe", the area of English language art with selected topic "Christmas around the World" and from the area of math with topic "Regrouping". The content analyses of the topics were as follows:

(1) Native American Tribes

Native American Tribes was a topic in Social Science subject area. Through this lesson, the students learn about the Native American Tribes by listing the name of the tribes, locating on map where the different tribes lived, and describing one of the Native American Tribes.

(2) Christmas Around the World

As a topic in the area of English language art, Christmas around the World lesson allows learners to study how people around the world celebrate their Christmas included traditions (e.g., food, decorations, and rituals). The students also need to analyze the similarities and the differences between their traditions and other countries customs.

(3) Regrouping

The third topic was "Regrouping" in math. Though this lesson, the learning content provides the learners with chances to learn how to regroup ones as tens, count by tens and ones, and count two-digit addition to solve problems in their everyday lives.

The analysis results of the learning environment show that the second grade classroom is located in very safe and convenient place to study. Moreover, the management and position of learning resources and media, especially the availability of computers and Internet accesses support the integration of various technologies in this classroom.

Design and Development

The components of each lesson plan were: 1) related state and national technology standards, 2) assessment instruments, 3) detailed teaching plan, 4) instructional activities that integrated multiple learner-centered strategies, 5) evidence of use of problem-solving principles and classroom management techniques, and 6) a list of learning resources used. The following information detailed the related state and national technology standards, the assessment instruments, the instructional strategies and activities, and technologies being integrated for each lesson plans.

1) Related state and national technology standards

Topic 1: Native American Tribes

The related state and national technology standards for this topic were: (1) the *Illinois State Learning Standards* State Goal 16 (Understand events, trends, individuals and movements shaping the history of Illinois, the United States and other nations) part A.1a and part C.1a and State Goal 17 (Understand world geography and the effects of geography on society with an emphasis on the United States) part A.1b; (2) the *National Educational Technology Standards for Students (s*tandard 3c: evaluate and select information sources and digital tools based on the appropriateness to specific tasks and standard 5b: exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity); and (3) the *National Educational Technology Standards for Teacher* (standard 1d: model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments).

Topic 2: Christmas Around the World

For the Christmas around the world topic, the following state and technology standards were used: (1) the *Illinois State Learning Standards S*tate Goal 3 (Write to communicate for a variety of purposes) part B.1a and part B.1b and State Goal 5 (Use the language arts to acquire, access, and communicate information) part A.1a, A.1b, B.1a, C.1a, and part C.1b; (2) the *National Educational Technology Standards for Students* (standard 3b: locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media, standard 3c: evaluate and select information sources and digital tools based on the appropriateness for specific tasks, standard 3d: process data and report result, standard 5b: exhibit a positive attitude toward using technology that supports collaborative, learning, and productivity); and (3) the N*ational Educational Technology Standards for Teacher* (standard 1b: engage students in exploring real-world issues and solving authentic problems sing digital tools and resources and standard 1c: promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and processes).

Topic 3: Regrouping

The related state and national technology standards for this topic were: (1) the *Illinois State Learning Standards S*tate Goal 6 (Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, and division), patterns, ratios and proportions) part A.1a and State Goal 8 (Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results) part C.1; (2) the *National Educational Technology Standards for Students (s*tandard 6b: select and use applications effectively and productively and standard 5b: exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity); (3) the *National Educational Technology Standards for Teacher (s*tandard 1d: Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments); and (4) the *NCTM Standards and Expectations (n*umber and Operations Standard for Grades Pre-K–12).

2) Assessment instruments

Topic 1: Native American Tribes

For lesson 1, the assessment was given to the learners in order to know whether or not they have reached the lesson goal/objectives. A quiz contains questions referring to the topic was delivered at the end of the lesson (examples of the quizzes and the answers are presented in the students work artifacts). The criterion was the learners answered the questions with at least 75% accuracy to be succeeded in this lesson. Before taking the quiz, the learners involved in ongoing assessment by doing self-assessment using PBL (project-based learning) checklist tool for group K-4. The learners assess themselves by using the PBL check list tool directed by the teacher.

Topic 2: Christmas Around the World

For lesson 2, the rubrics that consisted of statements that reflect learners' achievements were used to access the learners in order to know whether or not they have reached the lesson goal/objectives. The rubric was created online by using the RubiStar assessment tool for the writing (Source: http://www.makeworksheets.com/samples/rubrics/perwriting.html) and the Research Process Rubric for the research (Source: http://www.uwstout.edu/soe/profdev/rubrics/elemresearchrubric.html). The rubric for the research was done during the research process and the rubric for writing was done when the learners doing their writing tasks based on the information from the research. The criteria were the learners did their research and writing tasks with at least 75% accuracy to be succeeded in this lesson. The learners involved in ongoing assessment by doing self-assessment by using the primary grade self-evaluation teamwork rubric (http://www.uwstout.edu/soe/profdev/rubrics.shtml#cooperative). The learners felt that, as team members, they did all their work, helped their group members, listened to their group members' ideas, shared their own idea, and helped their group members to solve the assigned problems.

Topic 3: Regrouping

In order to know whether or not the learners have reached the lesson goal/objectives, the assessment was given to them. The assessment was a rubric that consists of five statements: computation, approach to the problem, explanation, understanding, and organization of thought. The rubric was created online by using the RubiStar assessment tool (http://www.makeworksheets.com/samples/rubrics/math.html).
The rubric was scored at the end of the lesson. To success in this lesson, the learners should achieve at least 75% accuracy.

3) Instructional Strategies and Activities

Topic 1: Native American Tribes

The teaching-learning strategies that were used for this lesson were expository and project-based learning (PBL). Expository strategy is a presentation or telling strategy used during instruction. In the expository learning strategy implementation, the teacher informed the learners the names of the Native American tribes and where they lived. Then, the learners (individually) listed five of the Native American tribes and allocated on the map where they lived. After implementing the expository strategy, the problem-based learning (PBL) strategy was implemented. The problem-based learning strategy focused on knowing the issues, considering all possible factor and finding a solution. Because all ideas are accepted initially, problem solving allows for finding the best possible solution as opposed to the easiest solution or the first solution proposed. Thus, the learners were organized into three groups. Each group consisted of three learners. Each group would responsible to search information of one Native American Tribes. Then they searched the information on the Internet. They discussed and decided the most appropriate information to describe the Native American Tribes that they finding the characteristics, including the food, the clothes, and the shelters of the tribes. At the end, they created reports and took the quizzes.

Topic 2: Christmas Around the World

For this lesson, telecollaborative learning strategy was implemented. Telecollaborative is a strategy of teaching and learning that allows the learning process to be more multi-ways communications, not only between the teacher and the learner, but also communication among the learners or among the teachers across the schools even countries. The most important part is that the collaborative learning empowering the learners to work together and not to compete each other. They learned from one to another. Furthermore, this type of learning supports the development of learners ' social abilities. By implementing this strategy, the learners learned from and with others via the Internet. They learned how to do research, write a report, and work in groups. The learners were organized into groups. The learners researched about Christmas around the world by visiting website related to Christmas celebrations in other parts of the world. Furthermore, they communicated online with people in other countries (Indonesia and Korea) via Skype. They asked questions and took notes. Finally, the learners made a group report and gave it to the teacher.

Topic 3: Regrouping

The strategy used with this lesson was problem-based learning. Through the problem-based learning, the learners learned how to solve problems regarding regrouping in math, and also they learned how to relate it to their everyday lives. Considering that most of the learners needed intensive and more attentions to master this topic, the task was done individually by the learners. The learners listened to teacher's explanation of regrouping tens and ones, counting on tens and ones, and counting by two-digit addition. Then, they practiced one technique by solving the problem presented on the PowerPoint application software and on paper.

4) The Technologies Integration

For the Native American Tribes topic, the following technologies were integrated in this lesson: computers, KidPix application software, and the Internet access to support the teaching and learning processes. For topic number 2 Christmas Around the World, the following technologies were integrated: computers with Internet connections, KidPix application software and Skype to search for information and to have more practice online. Technologies that were integrated in the "Regrouping" lesson were: computer with Internet access to access Math online games and the PowerPoint application program. Beside the listed technologies for each topic, hearing aid and assistive learning devices (ADL) were provided as needed for the learners to have a better and a convenience ways to learn their best.

Implementation

In the implementation phase, the graduate students worked with a cooperating second-grade teacher to implement lesson plans. The cooperation created a mutual relationship with the teacher, allowing the graduate students to apply their instructional design and technology integration skills. The implementation date of the three lesson plans can be seen in table 1 below.

Table 1. Title of the Lesson and the Date Taught.

Lesson Plan	Title of the Lesson	Date Taught
1	Native American Tribes	November 9-10
2	Christmas Around the World	December 1-3
3	Regrouping	November 16-18

Evaluation

In the evaluation phase, the student assessment instruments and the learning strategies used were evaluated.

Findings and Discussion

The findings from this project focus on the success of the technologies that have been integrated and implemented for each lesson.

Topic 1: Native American Tribes

The quiz results indicated that the learners achieved 80%-90% accuracy. This confirmed that the learners completed the lesson successfully since he criterion was at least 75% accuracy. The goals were achieved and met the content and technology standards.

The strategies used for this lesson were appropriate. The implementation of the expository learning strategy at the beginning of the lesson was very helpful in directing the learners to the next method that was problem-solving strategy. Because of this, the learners were more prepared and had description on what they learned and how they are going to solve the problems through research. Implementing problem-solving not only developed learners' analytical thinking, but also enhanced their social abilities. The used of computers, KidPix application software, and the Internet access, supported the teaching and learning processes. The used of computer applications were aligned with both content area and the technology standard for the learners. The teacher integrated the computer application into teaching and learning processes appropriately and meaningfully. The learners were able to use those technologies to support their studies. With computers and KidPix application software in which the U.S. map is displayed on computers screens, the learners were able to locate where the different tribes lived by drawing the pictures and labeling where different tribes lived. With computers and the Internet access, the learners were able to search information of the Native American tribes, including information about their food, clothing and shelter. This technology provides the learners with more resources to get the information related to the topic. The learners were organized both individually and in groups.

Topic 2: Christmas Around the World

The criteria were the learners did their research and writing tasks with at least 75% accuracy to be succeeded in this lesson. The results show that the learners achieved 80%-100%. On their writing criteria, the learners obtained 79%-95%. This meant that the learners completed the lesson successfully. The goals were achieved and met with the content and technology standards.

The strategy used for this lesson was telecollaborative learning. This strategy was used for the first time in this class. The teacher and the learners were excited. This strategy was not only enriched students' knowledge of how people around the world celebrate Christmas, but also improved their research by using interview techniques to collect data. The learners learned how to write and ask questions, record the data, and write reports. Computers with Internet accesses, KidPix application software, and Skype application software were used to support the teaching and learning processes. The used of computer applications were aligned with both content area and the technology standard for the learners. The use of computers with Internet connections, KidPix application software, and Skype to search for information and to have more practice online, supported the teaching and learning processes. The learners had more practices and resources to better understand the topic, to improve their writing and research skills and to work collaboratively for a better and richer learning content as well. Computers with KidPix application software were used to provide the learners with practices writing. The teacher facilitated the learners to use computers with Internet access and Skype in searching and adding information related to the topic, and also in working collaboratively with others online. The learners were organized both individually and in groups. The learners felt that as team members they did all their work, helped their group members, listened to their group members' ideas, shared their own idea, and help their group members to solve the problems.

Topic 3: Regrouping

To achieve success in this lesson, the learners were required to achieve at least 75% accuracy. The results showed that the learners received 75%-100%. It meant that the learners completed the lesson successfully. The goals were achieved and met with the content and technology standards.

The strategy used in this lesson was problem-solving. The problems were presented by using learners s' name. Moreover, the problems were closely related to their daily lives. By using contextual problems the learners easily learned how to solve the problems. The learners were very enthusiastic to learn using the problem-solving method and the PowerPoint presentation. Because of this, the implementation of the problem-solving method for the Math subject area, particularly in regrouping was appropriate. Computers with Internet accesses and PowerPoint application software were used to support the teaching and learning processes. Computer applications used in this lesson were in aligned with the content area that is Mathematics. In addition, it was also in alignment with the technology standards for learners. The use of computers with PowerPoint application software supported the teaching and learning processes. Computers with PowerPoint application software supported learners' learning activities in solving problems and broadening their understanding related to the topic. The use of computers with PowerPoint application software supported the teaching and learning processes by providing an opportunity to the learners in practicing the regrouping concepts. Through the PowerPoint application software, the problems of regrouping were presented in fun and interesting ways. The learners were organized individually.

Conclusion

The implementation of the three lesson plans were reflected for future used and development as follows:

Topic 1: Native American Tribes

When teaching this lesson again, provide more time for the students to do research in order to solve the problems. Also, the selection of the websites used to help the students in searching relevant information need to be determined based on the specific tasks. In addition, the integration of computer into classroom needs to be optimized and related it to other learning resources.

Topic 2: Christmas Around the World

When teaching this lesson again, the time constraint between one country and the others need to be considered. For this lesson, the students interviewed the people in the eastern part of the world at 9:00am of the U.S. time which means 11:00pm of Indonesian time. In addition, provide more time for the students to formulate their questions and how they will organize the questions.

Topic 3: Regrouping

Some factors need to be considered when teaching this lesson again in the future. First, adjust the problems according to the characteristics of the students, especially their backgrounds. By doing this, the lesson will be more meaningful and effective. Second, provide more time for the students to internalize the concepts individually. Third, create or adjust the existing PowerPoint slides that meet with students' needs.

Based on the findings and discussion above, the following conclusions were made:

(1) The lesson plans and associated activities that incorporate methods and strategies of problem solving, telecollaborative learning, instructional tools integration and uses of media and online tools for second grade students were successfully created.
(2) The students had experiences to co-teach the three lesson plans designed to enhance the integration of technology into second grade classroom. To work with a cooperating second-grade teacher to implement lesson plans created a mutual relationship between the graduate students as instructional designer and technologist and the teacher. Moreover, this cooperation allowed the graduate students to apply their instructional design and technology integration skills.
(3) The implementation of the three lesson plans that incorporated the learning strategies and the technologies in the second grade classroom was successful.
(4) The reflection of the experiences in implementing the three lessons can be used as references for future development and implementation.

The following are some lessons learned throughout the project that would benefit the graduate students to develop innovative lesson plans in the future.

(1) Systematic phases in developing lesson plans are very important to step-by-step lead the instructional designers and technologist and the teachers to develop lesson plans.
(2) The whole components of lesson plans should be inline. In addition, some factors need to be considered when we design and redesign lesson plans, such as the actual time needed to do the tasks listed on the lesson plans, contextual learning content in which the lesson plans will be implemented, and the integration of the technologies used in the teaching and learning process should be optimized and related to other learning resources.
(3) To be fully integrated, the technologies used in the teaching and learning process should serve the strategies that have been selected.

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Crossing the Web-3D Divide Using Open Source Tools: Integrating Moodle and Second Life With SLOODLE to Create a Virtual Learning Environment

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Abstract

As universities continue to increase their online presence, they are challenged to re-evaluate their ways of teaching to best utilize the new opportunities that digital technologies offer. While these technologies present a variety of methods for online collaboration, virtual worlds offer the added ability to interact within a realistic graphical environment, situating learners together in the same space and time. These features give participants a highly social and immersive environment within which they can represent their role-play characters through avatars. Integrated as part of a university course, the inherent social characteristics of these spaces create opportunities for interactions that can increase students' motivation to learn. Beginning with a discussion of the pedagogical foundations of virtual learning environments (VLE's), this paper describes the instructional situations that these environments are best suited to teach. Focusing on four components found to be inherent in such spaces - enabling contexts, resources, tools and scaffolds (Hannafin, Hannafin, & Oliver, 1999; Jonassen, 1999) the paper then describes a VLE that integrates Moodle and Second Life with SLOODLE to create a rich social constructivist virtual learning environment for teaching Security Council role-plays within an International Studies university course.

Introduction

What is a Virtual Learning Environment (VLE)? The term can refer to any teaching and learning tool that is transmitted online, but to be valuable, the environment needs to include certain characteristics that are conducive to learning. Dillenbourg (2000) provides seven useful guidelines for thinking about VLEs during the design process:

- The information space has been designed.
- Educational interactions occur in the environment, turning spaces into places.
- The information/social space is explicitly represented. The representation can vary from text to 3D immersive worlds.
- Students are not only active, but also actors. They co-construct the virtual space.
- Virtual learning environments are not restricted to distance education. They can also enrich classroom activities.
- Virtual learning environments integrate heterogeneous technologies and multiple pedagogical approaches.
- Most virtual environments overlap with physical environments.

The 2D virtual environment is currently much more accessible and useful for learning than the 3D environment (Thorne, 2009). Learning management systems such as the open source system Moodle allow accessibility from anywhere in the world, the uploading and sharing of materials, online discussions and chats, the ability to give quizzes, tests, take surveys, record grades, and give and review assignments, and much more. However, literature suggests that 3D virtual worlds can be better suited for experiential learning environments (Jarmon, Traphagan, Mayrath, &Avani, 2008).

Three-dimensional (3D) virtual worlds such as Second Life, Croquet and OpenSim have been described as desktop interactive virtual reality within a chat environment that "offer the illusion of 3D space, avatars that serve as the visual representation of users, and an interactive chat environment for users to communicate with one another (Dickey, 2005)". They have been used for a number of educational purposes in various settings and within diverse disciplines of study (i.e. media arts, education, health and environment, commerce, language, computing and librarianship.) Hew & Cheung's (2010) review of literature on 3-D virtual worlds in K-12 and higher education settings indicates that virtual worlds may be utilized to communicate information between people; to become immersed or embodied within a 3-D environment through an avatar; and to act on an object. There are several benefits of using this technology. Hew & Cheung's (2010) analysis revealed students enjoyed moving around in the 3-D space, meeting new people, and having simulated experiences. However, students are averse to inaccessibility through older and public computers, issues and expectations of using the chat tool, and unfamiliarity with the virtual world software. Pfeil, Ang, and Zaphiris (2009) studied the usage patterns of teachers and learners in the 3D virtual world, Second Life, and identified the following list of challenges that they faced:

- Signing up students into Second Life (SL): Getting students signed up requires preparation and is time-consuming.
- Orientation and navigation in SL: Navigation and orientation in SL is very challenging for first-time users.
- Issues of identity: For groups that have already met face-to-face, group dynamics and familiarity have to be re-established in SL. Additionally, it is difficult for tutors to identify students in SL, track their progress and assess their learning performance.
- Communication patterns in SL: Switching between different communication channels is problematic, as it increases the cognitive load and requires students and tutor to re-adjust.
- Teamwork: More time without the tutor allows for more socialization, but often, tutors are keen on "being here" and observe the student's learning process.
- Assessment: Learning in SL often takes place by playing and exploring, but how can playing and exploring be assessed?
- Accessibility: At the moment, SL is totally inaccessible for students with visual impairments. Additionally, not only mechanical access, but also the social construction of disability in SL impact on the power-distribution within SL.

Pedagogical Foundations

Much of the literature on educational uses of VLEs centers on the constructivist paradigm (Dickey, 2005), and frequently cites the instructional design theories of learning environments (e.g.,Hannafin, Hannafin, & Oliver, 1999; Jonassen, 1999). These theories tend to focus on problem solving in ill-defined domains or situations that value multiple perspectives over one "correct" solution. The Open Learning Environment (Hannafin, et al.) is based on values such as personal inquiry, self-directed learning, and hands-on experiences involving realistic problems that have relevance to the student. Similarly, Jonassen's Constructivist Learning Environment values learning that is based on experiences that are authentic and facilitate conceptual knowledge-making. There is some convergence between the methods that these types of theories offer, and they seem to share at least these four components:

Enabling contexts

Hannafin, et al. (1999) describe these as externally induced, including methods such as case studies, projects, or questions (Jonassen); externally imposed, such as role-plays; or individually generated by students who choose relevant questions on their own. Enabling contexts can help activate prior knowledge relevant to the topic at hand, help learners choose strategies that they have found useful in the past, or provide background information for specific roles that the students are given to play.

Resources

Successful learning environments provide a variety of resources that learners can use – websites, videos, books, articles, and subject matter experts are a few examples. They can be static (e.g., print resources) or dynamic (e.g., interactive charts and diagrams) Learners may have these resources provided to them or may need to research and locate their own.

Tools

These include information processing tools (seeking, collecting, organizing, integrating, or generating tools), manipulation tools, and communication tools (synchronous and/or asynchronous). Information processing tools promote many types of behaviors. These include seeking (e.g., researching, using maps and diagrams); collecting (e.g.,cutting and pasting found information, recording speeches); organizing (e.g., creating outlines); integrating (reflecting); and generating (e.g., creating reports or briefs)

Scaffolds (domain-specific, conceptual, metacognitive, procedural, strategic)

Scaffolds may be provided in different ways: by tools, teachers, subject matter experts, or peers. There are also different types of scaffolds, including procedureal scaffolds that provide direction, conceptual scaffolds that prompt students as they learn content matter, and metacognitive scaffolds.

Potential outcomes include motivation from learning topics that have real-world implications, deep rather than surface learning, and increased critical thinking skills.

The VLE described in this paper consists of the integration between an LMS (learning management system) and a virtual world, each providing some level of support within these four components. The Virtual Model UN (VMUN) Learning Environment in particular is built using the open source LMS Moodle and the virtual world Second Life. These two programs are integrated using an open source application called SLOODLE (Simulation Linked Object Oriented Dynamic Learning Environment), which provides various tools that connect features such as course registration, chat, IM, blogging, and assessment between the two environments.

Role-Play

Role-plays are effective ways to teach and assess learning (e.g., McCarthy & Anderson, 2000; Ip & Linser, 2001), with the goal of helping students consider alternative viewpoints, explore opportunities and barriers, and develop their critical thinking skills (Belloni, 2008). Therefore, they are well-suited as teaching strategies within the framework of social constructivism for virtual learning environments.

Although the use of role-plays and simulations in the classroom is rising, very little attention has yet been paid to the practical application and integration of role-plays into coursework, especially at the university level (Asal, 2005).Furthermore, most educational political science role-play simulations are still performed face-to-face in the classroom. However, a small number of educators have begun using online discussion forums (either separate from or within their organization's learning management system) or dedicated web applications (e.g.,ICONS Project, USIP OSP (United States Institute of Peace Open Simulation Platform)) to supplement the more traditional approaches. This paper argues that these online role-plays can be further enhanced within the framework of an entirely online class through the use of three-dimensional virtual worlds. They offer some important benefits over discussion forums, such as 'presence' (Bronack, Sanders, Cheney, Riedl, Tashner, & Matzen, 2008) and the ability to communicate in real-time chat, IM and voice. According to a recent study involving enactive role-play in Second Life, students "valued the embodied experience afforded by the immersive virtual environment (Jamaludin, A., Chee, Y. & Ho, C., 2009)." During a recent enactment of a Security Council meeting involving the University of Central Florida's Model UN student organization (Figure 1), one participant noted that she was less nervous during the virtual as compared to face-to-face role-plays. This may be a promising area for future research – for example, role-playing in a virtual environment such as Second Life may allow more introverted students to communicate more and have higher performance outcomes (Gao, Noh, & Koehler, 2008).

Figure 1: Security Council Role-Play, January 2009

The Virtual Model UN (VMUN) Learning Environment

Model UN can trace its roots back to the Model League of Nations. It is a simulation of the UN General Assembly as well as other UN bodies. Students play the roles of ambassadors of member UN states to debate topics that are on the UN's agenda. During the role-play exercise, students learn by researching their roles, making speeches, participating in debates, reflecting, and debriefing. These activities require a combination of pedagogical components that can include traditional (e.g., lecture, tutorial) and alternative (e.g., discussion, chat) methods of instruction.

VMUN gives learners a realistic environment closely aligned with the United Nations Security council building. The learning environment provides enabling contexts, resources, tools and scaffolding to meet the learning objectives of the International Organizations course.

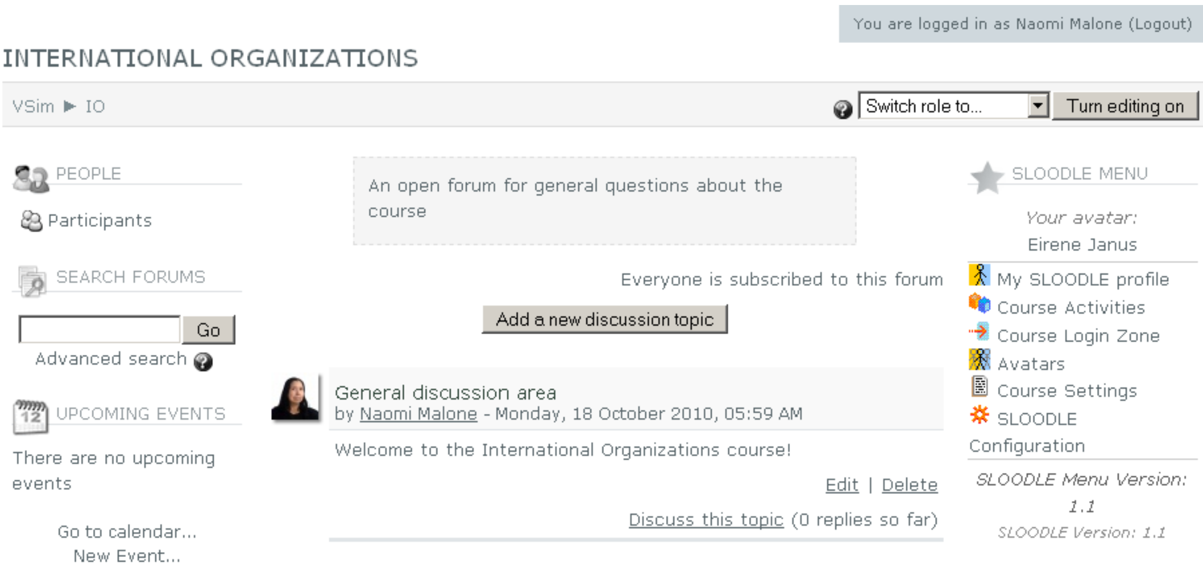

Figure 2 International Organizations Course in Moodle

Two-Dimensional Environment (Moodle)

Moodle is an open source learning management system (LMS) that is also referred to as a VLE. It is highly scalable, making it deployable from small to very large organizations. It includes many features common to LMS's, including activity modules (e.g.,forums, chats, wikis, blogs, and databases) to create social constructivist environments or modules for more traditional elements such as instructional content and assessments (e.g.,choice, quizzes, assignments). It has an extensive community of users and developers, extensive documentation, and a wide variety of plugins to enhance and add features to the default installation.

It provides several of the components necessary for an open learning environment. Within the context of role-play, it houses descriptions of the scenario, information about the roles to be played, and links to resources within and external to Moodle to help the players succeed in their learning objectives. It offers communication tools that offer students the ability to collaborate, create alliances, hold secret negotiations, or contact the instructor. One of these communication tools is linked to the web intercom Sloodle tool, allowing students within Moodle to communicate with others in Second Life.

VLE Integration (SLOODLE)

SLOODLE is also an open source project and offers integrative support for both teachers and learners as they navigate the digital environment. VLE tools such as identity management to keep track of registered students and their avatars, WebIntercom, for real-time, two-way communication between users in Moodle and Second Life, and chat logs to archive and retrieve chat in both environments (Kemp, Livinstone, & Bloomfield, 2009) alleviate several issues cited in the Pfeil, Ang, and Zaphiris study (2009).

The first step of the integration procedure is installing the software into Moodle. This currently requires back-end access to the Moodle installation to transfer the necessary files to the correct folders and then create the database tables by pointing to the Moodle administration page. The exact instructions (which can be found at SLOODLE's Wiki) are beyond the scope of this paper.

Figure 3 The Sloodle Set

After it is installed successfully in Moodle, the SLOODLE Set can be obtained from SLOODLE Island in Second Life. Again, the exact procedure for integrating the set with Moodle can be found on the Wiki. It involves rezzing (bringing the object out of your inventory to the ground at your VLE) and then clicking the box and following the directions. Figure 3 above shows the box successfully integrated with the Moodle course site. The text above the box shows the Moodle website's address, http://slmodelun.org/moodle, and the name of the course, International Organizations. The text "Connect Moodle" and the little button on the top of the Sloodle Set box will turn green.

Once the two environments are communicating with each other, it is possible to click the Sloodle Set box and draw out the tools that are included. The VMUN environment uses two of these tools: the Registration tool, and the WebIntercom.

The registration tool (Figure 4) helps instructors identify their students in Second Life by linking their real life names to their avatars. This feature allows instructors to keep track of their students within both the Moodle and Second Life environments – as noted earlier, one of the frequently cited disadvantages of teaching in Second Life is the difficulty of tracking students within the Second Life environment to align them with their assessments and other content in the 2D environment. Furthermore, assessments given within Second Life using SLOODLE tools such as the quiz chair or Choice are automatically assigned to the correct students in Moodle.

Figure 4: The Sloodle Tool Set & Registration Booth

Three-Dimensional Environment (Second Life)

Virtual worlds, Second Life among them, are drawing scores of educators looking for opportunities to experiment with experiential and constructivist learning spaces. Further, Dede's (1995) research implies that 3D virtual spaces provide a safe environment in which to learn by doing. However, there are some important considerations for design in a three-dimensional space. A recent review of literature on the use of Second Life in K-12 and higher education shows that researches found role-playing to be a worthwhile activity as well as a convergence of four recommendations among them (Inman, Wright & Hartman, 2010):

- Establish a clear connection between the course objectives and activities in Second Life.
- Incorporate technical training and support into any planned Second Life activity.
- Create scaffolded learning activities for students so they can practice inside Second Life and acclimate to the virtual environment.
- Design and construct different spaces to encourage different types of student interaction.

The primary tools and scaffolding required for role-play are related to communication and social connections between the learners and instructors. Moodle provides multiple communication tools: chat, email, discussion forums, wikis and blogs among them. Depending on the learning objectives and the preferences of the instructor, each of the tools can provide an important function of a role-play simulation. The main role-play area of the VMUN environment is the Security Council Room. In Figure 5, the Security Council Room is shown with a WebIntercom (turned on and off by a click of the mouse) set up to record all chats during the meetings. Separate chat sessions can also be set up within Second Life to provide space for private meetings between groups. This is designed by creating chat spaces that are beyond the parameters of each other (to ensure that other groups cannot listen in) and WebIntercom boxes can then be set to record only for the group.

Figure 5: Web Intercom logs chat and connects with chat module in Moodle

Manipulation tools are also important during role-play. For example, Security Council members require some method of calling attention to themselves so that they may get the floor and speak. Tools such as buzzers that can be clicked or banners that can be raised can be used for this purpose.

These are some of the many tools and scaffolds that are available for the design of a virtual learning environment.

Conclusion

VMUN Learning Environment is a work in progress. It is based on a social constructivist pedagogical foundation and designed to include four components that are commonly found in virtual learning environments (Hannafin, et al., 1999). During the VMUN environment's design process, role-play simulations will be run for international studies and political science courses. It is the intent of the authors to begin the next step of the project – evaluation – in the Spring semester, with a planned role-play simulation for an American University Human Rights course. To ensure that the VMUN's design is correctly aligned to its learning objectives, the evaluation process will be based on Hannafin, Hannafin, & Land's (1997) conception of grounded design, with concerted effort put into complying with its four conditions:

- The design must be based in a defensible theoretical framework: the social constructivist framework is a proven and defensible framework.
- Methods must be consistent with the outcomes of research conducted to test, validate, or extend the theories upon which they are based.
- Generalizable – although the Virtual Model UN environment is a specific real-life environment, the methods themselves are generalizable to other teaching strategies within the social constructivist framework, using the components inherent in these environments.

- The design must be validated iteratively through successive implementation – this is the next step in the VMUN project. Each implementation of the environment will provide opportunities to "continuously inform test, validate, or contradict the theoretical framework and assumptions upon which" the environment is based (Hannafin, Hannafin, & Land, 1997, p. 103).

Aligning design to these concepts does not guarantee success. The concepts themselves may be found to need refinement as VMUN is iteratively validated. As Hannafin, Hannafin, Land suggest, it is important to practice the social constructivist ethic within the design process itself by avoiding restricted or rigid perspectives about the methods employed and evince a willingness to adapt and evolve every part of the development cycle.

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Identity and the Educational Community in Multi-User Virtual Environments

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Introduction

Enrollment in online classes is increasing every year as more and more people are returning to college due to the current economic downturn (Parry, 2010). Colleges are offering online classes in several different delivery formats, including the use of online 3D multi-user virtual environments (MUVE). Research has shown that the concept of identity plays a big part in regards to learning. For example, students who are in MUVEs often feel that whatever happens to their avatar in a MUVE happens to them in real life too. This sense of identity leads to immersion within an online environment, which many educators believe causes students to learn better (Gaimster, 2008).

Atkinson (2009) contends that a connection exists between students' real life identities and their online ones. What is most interesting is how identity affects their actions and learning in an online environment. The purpose of this research is to understand how students choose to identify themselves within a 3D virtual environment and how their virtual identities impact the way they behave and learn in this environment.

Literature Review

In real life, identity encompasses a number of factors in regards to how people see themselves, and students and educators are no exception. These factors include "social, cultural, and biological characteristics, as well as shared values, personal histories, and interests" (Buckingham, 2008). Within Second Life (SL), a popular type of online MUVE, the ability to easily change appearance as well join and create social affinity groups adds an additional layer to the concept of identity within the virtual environment. Residents of SL are provided the opportunity to assign themselves a name as well as different characteristics to their avatar, such as gender, race, and social class. The only difference is instead of text-based descriptions, individuals are now provided with 3D renderings of their identity as well as spaces to post their profiles to provide further depth to their online identity. Furthermore, they are provided the ability to construct 3D interactive objects in their environment to create their own unique living situation (Foster, 2007; Sanchez, 2009).

All of these factors reveal the need for online educational researchers to study students in 3D virtual environments. Some studies have already looked at identity and learning in 3D virtual environments, such as the study from Alessandra Talamo and Beatrice Ligorio (2001) which looked at children using 3D virtual environments and how their identity and roles changed while participating in a particular learning project. Sherry Turkle has written many article investigating identity in virtual environments (Au, 2008). However, little research has specifically examined identities of those in the educational community who use 3D virtual environments for learning.

Methodology

The University of Hawai'i currently offers several types of classes online for students to choose from. Sixteen of these classes are taught within SL. These classes include Psychology courses, Library and Information

Sciences courses, and Second Language Studies classes. One of the University of Hawai'i classes taught in SL is an Educational Technology elective where students learn about building learning objects within a 3D virtual environment. The researchers of this study surveyed students of this course taught in SL during summer 2009.

The survey questions were based on a survey from Diehl & Prins' (2008) study about identity in SL. In that study, the authors studied SL's potential for "the construction of identity and development of intercultural literacy." The authors studied the cultural identities of the participants, types of places they visited, the languages they use, and their views toward intercultural understanding. In this study, the authors concluded that "participation in SL enhanced [the] participants' intercultural literacy" and that they "used their avatar's appearance to construct shifting cultural identities."

In comparison, the researchers in this study looked at how the participants' presence and identity within the SL environment affected their learning. However, instead of using convenience sampling when choosing participants as the Diehl and Prins study did, the researchers in this study deliberately chose the students who were in the Educational Technology class to participate in the study. Additionally, the researchers examined the participants' identity in regards to their characteristics as adult learners. This study focused more on personal characteristics such as aging and life phases, situational characteristics, and the types of learning involved rather than on the participants' culture. Furthermore, the researchers chose to only use surveys instead of the three methods that Diehl and Prins used to gather data, which were surveys, interviews, and observations.

The three research questions for this study are:

1. How the participants in the class saw themselves in regards to identity?
2. What affordances they had in the SL environment and how their identity affects these affordances?
3. How their identity impacts their learning within this environment?

The participants first answered basic demographic multiple-choice questions about their sex and marital status in the first part of the survey. Of the nine participants who took the survey, six of the nine were female while the other three identifies themselves as male. The participants' ages ranged from mid 20s to mid 50s. Six of the nine also stated they were married, while two participants labeled themselves as single, and one was divorced. As for their education level, seven out of the 10 identified themselves as graduate students studying in the field of Education, while the other two only labeled themselves as "professionals" in the field of education. In general, all the participants were within the field of education in general.

The second part of the survey focused on open-ended questions about the participants' identity and activities they participated within SL, including in-world activities that were not class related. This part of the survey allowed the participants to answer in paragraph form where they could disclose as much or as little information as they wanted.

Analysis and Findings

Results of this survey were quite informative. The researchers analyzed the data based on the students' identity, their affordances, how their identity affects their actions, and how their identity affects their learning. A discussion of the results follows.

Identity

When asking the participants about their identity, the researchers discovered interesting results. The students chose to talk mostly about their identity in regards to appearance, labels, and community affiliation. It seems that these characteristics are most important to the participants.

With regards to identity itself most of the participants stated that SL has no influence over their real life identity. Instead, their SL avatar is more of an extension of their real life identity. As one participant said:

> "There is research that shows in online forums that some learners interact, communicate, and behave very differently than they do face-to-face. If that is true for me, I am not aware of it. It feels that I've just extended my own personal identity into a new arena."

In other words, the participants felt that their SL and real life identities are the same and that no disconnect existed between the two.

When asked about their SL identity in particular, the participants in the study focused mainly on their appearance, which emphasizes the need for the researchers to ask specifically about the other aspects of their real life identity in future studies, such as their occupation and personal history. Of the data the researchers did collect, they discovered that the participants are not particularly concerned with appearances. Even when they changed appearance on occasion in SL, they stated that it did not affect the way they feel.

Moreover, race did not seem as important to the participants in regards to avatar creation. Although the participants in the study attempted to make their avatar as close to their real life race as possible, it seems that the factor of race was not a major factor in their use of character creation. As one participant mentioned:

> "I have no idea what race my avatar is or how closely that resembles my real coloring. After all, in real life people are just shades not blocks of easily distinguishable color."

Most of the participants chose not to experiment with their avatar's race either. They also felt the SL avatars could not fully represent race perfectly. Interestingly, some of the participants added that they did not feel comfortable taking on another identity that was not similar to their own.

Generally speaking, appearance was not a motivating factor in regards to learning. However, the participants did enjoy the ability to "see" one another in the class or at least a physical-looking digital representation of one another verses having them represented through only a text-based name as with most distance education courses. One participant provided an interesting comment:

> "The biggest surprise for me was a sense of presence. I didn't expect to start of feel as fully emerged in the environment and as I ended up feeling within the first."

In other words, the immersion aspect of learning in SL was more important rather than the aesthetic aspect of it.

In addition to their physical traits, the participants did reveal other details about their identity. Some of the students identified themselves with labels including "parent," "Goth," and "constructivist." Most of the students, however, who took the survey, defined themselves as educators throughout the survey. It seems that their profession as an educator is their identity in a sense or at least a major part of it.

Affordances in 3D MUVEs

When asked about the affordances that they have in SL in general, most of the participants in the study focused on the affordances associated with education while defining themselves as students or educators. Their responses focused on participating in activities, joining groups, following acceptable practices and guidelines within the environment, visiting places, and navigating the SL environment.

Throughout the study, all the students stated that they participated in SL for mostly academic or class related purposes the majority of the time while logged in. For the most part, the participants felt that MUVEs helped educators professionally and they also felt that SL experiences were transferable to real life. As one participant said:

> "From this point out, I see my presence in Second Life, much the same as I see my presence in Twitter, conferences, online social forums. It is becoming part of my personal learning network that I can use to both personally improve my professional knowledge, as well as share with other educators as an emerging place for them to consider for their own personal use, and as a class resource."

The participants in the study did mention that they participated in some non-education related activities though. They stated that some of these activities included socializing and visiting calm, stress-free places.

Students also tended to form relationships and communicate mainly within the educational community and on occasion ventured outside of that community. Some joined groups in SL on their own without prompting from the instructor, but it seems that those who were members of SL before the class started tended to engage in this practice more than the students who signed up for SL only for the purpose of attending the class itself.

Those who had to join SL, in order to attend their class during the summer, usually joined the groups that were required of them. If they did join groups that were not required of them, they mainly join educational groups. One of the participants reflected that:

> "I join some groups that were related to educational technology and learning. [The International Society for Technology in Education group] is a good example of this. I never really considered joining groups that would fall outside of a professional focus."

The students tended to participate mainly within their own education-themed events as well.

The participants saw SL as an extension of their personal learning network also. In other words, educators feel that they are part of a community in SL. They also believe that as a community they need to abide by the rules. Ergo, they saw themselves as members of a "community" in SL. Interestingly; the participants felt that rules in general were necessary within the community groups they were in also.

When the students were asked about visiting other communities in SL, they talked about educational sites or places where they can buy virtual items for free. The UH island, "freebie" sites, and educational sites are a few of the places they talked about. The students did not mention that they looked for ways to make money in-world. This is probably why they went to places that offered virtual items for free. The researchers believe that perhaps this is also a reflection of educators in real life who are not necessarily known for their wealthy lifestyle.

On occasion, the participants visited places in SL for interaction and relaxation. However, they mostly visited educational places required for class. As for technical issues, some found navigation around the SL environment difficult:

> "When other tools are available in real life and would be much quicker to use, I doubt I would use second life instead. I think perhaps in 10 years or so perhaps when there are more resources available that are easily searchable, customizable, and immediately useable, would I consider using it in the classroom. The reason is because SL is not a tool that I can quickly implement and there is a steep learning curve."

Therefore, they felt SL's search tool was not easy to use and had a hard time finding and navigating places they specifically wanted to visit.

As a whole, the participants experienced a sense of community and presence, same as non-educators in SL. They were more adept to staying within their own affinity groups. In addition, their actions in-world was practically similar to the type of behaviors educators' exhibit in real life such as following the rules and looking for free materials to help them with their educational goals.

Identity and Learning

By and large, the participants in the study saw themselves as part of a learning network. They believe SL helps them learn together with others and feel they are part of a global community. One participant remarked that:

> "Being in a place like SL let's you really appreciate how 'small' our world is. SL, like the Internet, truly is the 'Global Village.'"

In other words, SL enhances a sense of self within a social community.

Moreover, most of the participants believe SL is a useful educational tool, yet they are concerned about open access to everyone. The participants felt the need for accessible, collaborative, and community learning for everyone. As one participant mentioned:

> "Yes, I see a great level of utility for experiential learning and for collaborative in SL. I think that the level of tech skills and the computer and bandwidth issues limit its scope for now."

This may have to do with the culture of academia, which emphasizes equal access and education to everyone, in contrast to the private sector, which emphasizes success by those who are financially ahead. Furthermore, they see SL as a place for resources that brings another dimension to learning. They enjoyed the fact that students could try out simulations for career purposes.

SL also allowed the participants to comfortably ask questions since it provides users with various ways to communicate. These include local chat, private chat, voice, and private calls. As one participant said:

> "Until the class we took this summer, I did almost no communication at all [in Second Life]. What I found now is that I feel much more comfortable asking questions of people I don't know, and fell more comfortable setting up small sessions with either voice or chat."

Another interesting aspect is that the participants mostly chose to use the chat feature the most instead of voice when communicating. Probably the use of chat allows the participants to feel more comfortable communicating among each other since it allows users to think about what they want to communicate before typing it out, whereas voice puts them on the spot.

Along with have the ability to communicate with one another in-world, the participants appreciated the time aspect of SL:

> "I think that SL is useful for informal education as the array of resources is so broad. While sometimes finding something is difficult, there are a great many sites to visit that offer self-paced informal education."

In other words, they felt that they could explore and learn at their own pace with or without assistance. Since time is often a valuable asset to busy educators, their desire for self-paced learning is understandable.

Conclusion and Implications

Identity and affordances seemed to play an important factor in the overall learning of the participants. The main characteristic of identity that seemed to affect their learning most was their identity as educators in real life in comparison to their race, gender, or age. Ways that their identity affected their learning include who they chose to communicate and associate themselves with, their pace of learning, and where they visited on their own.

As stated earlier, the majority of the students in the class surveyed mainly stayed within their own community and rarely ventured "outside" their own group. This brings up the questions, "Does this prevent them from learning from others outside their group?" or "Does remaining within their group provide a safe haven for learning where rules and boundaries are more adequately controlled and monitored, allowing for safe learning?"

Implications from the survey reveal that the need for learning objects that promote communication, collaboration, and "sense of place" or immersion is a must when designing lessons, course materials, and environments in MUVEs for students. Also, instructors need to take into consideration the identity of the students they are working with when designing course instruction. Although survey results from the class revealed much in regards to how educators' identity affects their learning, more research is needed to see if this a common trend among other types of educators as well.

The researchers believe they need to ask more about the participants' occupation next time as well as other aspects of their real life such as their life phases and developmental stages of the participants as well as the type of learning they are engaging in within MUVEs. This will help the researchers focus their study on particular aspects of identity that may affect adult learners. In addition, the researchers believe that applying the Characteristics of Adult Learning model from K.P. Cross will help ground them more in their study of identity in this group in future studies.

Furthermore, the researchers believe that possibly SL may appeal more to certain types of educators than others. In other words, SL may not appeal to all educators who try it. More research is needed to determine which types of educators enjoy using MUVEs for learning and socializing. Perhaps future research should examine educators' personal characteristics such as the subject area, and grade level they teach as well.

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Innovation in Guidance and Counseling Management through Networking Model

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Abstract

The purpose of this study was to improve the quality of guidance and counseling management through Networking Model. The model was developed based on students competence and it strictly required collaboration among teachers, counselor, and parents in helping students to solve their problems. The methods used was research and development model of Borg and Gall. The procedures conducted were: (i) premilinary surveying to produce software to be used in assessing students' need; (ii) designing networking model chart; (iii) implementing and evaluating the implementation of the model in several high schools. Data were collected by identifying and analyzing how the networking model improved the quality of guidance and counceling management. The results indicated that the networking model can improve the quality of the management of guidance and counceling in the way that the services provided were based on data and it encouraged collaboration among different expertises in helping students to solve their problems.

Introduction:

The reposition of guidance and counseling which has been declared by the Minsitry of Education in Indonesia, from merely a support to learning program to be an integral part of teaching and learning process has resulted in the need to replace the old model with the new one. To be able to accomodate its new function, the new model should have characteristics such as the abilities to: a) manage all activities integratedly, b) manage information well, c) solve students problem efficiently, and d) organize some connected persons and activities simultaneously. Preliminary studies found that networking model has been proved to be theoretically meet the requirements. However, the model has not been tested necessarily to prove its practical efficiency. In general, the purpose of this study was to improve the quality of guidance and counceling management in some schools. Specifically, the objectives of this study were : (i) to design a software by which students need and competence will be assesed and analysed (ii) Based on the data obtained in the software, to design a model by which all relevant professional persons (expertises) are collaborating in a network system to help students in solving their problems.

Literature Review:

Guidance and counceling in high school is school services that apply students understand themselves and environment and act effectively to be live in a happy life. The services area such as : how the students develop to believe in God, to be mature as a woman and man, to be healthy, to learn in university, have a certain role in community, emotionality, socially and intelectually muture. The purpose of guidance and counceling program are designing learning situation so that every student develop their competencies. The Guidance and counceling program divide as : service, support, assesment and controling. The management system is shown in figure 1.

The concept used to design the new model in this study was taken from the theory of educational management and the theory of guidance and counseling technology at school[2]. It is stated that the success of guidance and counseling management is indicated by criteria such as: (i) planning which is based on students need map, (ii) efficient organization of people and activities, and (iii) motivating counseling and countinuous control[2]. The map of students need comprise aspects such as students': (i) self competence, (ii) social competence, (iii)learning competence, (iv) career competence, (v) family competence, and (vi) religious competence[3].Generally, there are five aspects to be considered as related to networking model in counseling. They are: (i) level of service which comprises: preventive session, pre counseling session and teraphy session; (ii) direction of service which includes: actualization existence, prevention, rehabilitation, development, solving and advocation; (iii) service mode which covers: orientation, information, placement, learning, group guidance, group counseling,individual counseling, consultation, and mediation; (iv) form service such as: class room, group, and individual; and (v) expert, such as: counselor, teacher, parent and other profesional. The New System is shown in Figure 2.

Methodology:

The method used in this study was research and development which was adopted from Borg,Walter (1983). The procedures were as follows: (i) preliminary survey, (ii) model development, (iii) model testing, (iv) model validation, and (v) model socialization. This method was done in three stages. A preliminary survey conducted was data collecting on students need and competence. Data collection was performed through the need assesment software and group discussion. The data obtained were descriptively analysed to be further used in mapping students' profile. The networking model based on students competence was resulted from the preliminary survey. The research question was: how does the networking model improve the quality of guidance and counseling management? The model tested is shown in the Fig.2 and the stages of research and development are shown in Fig.3.

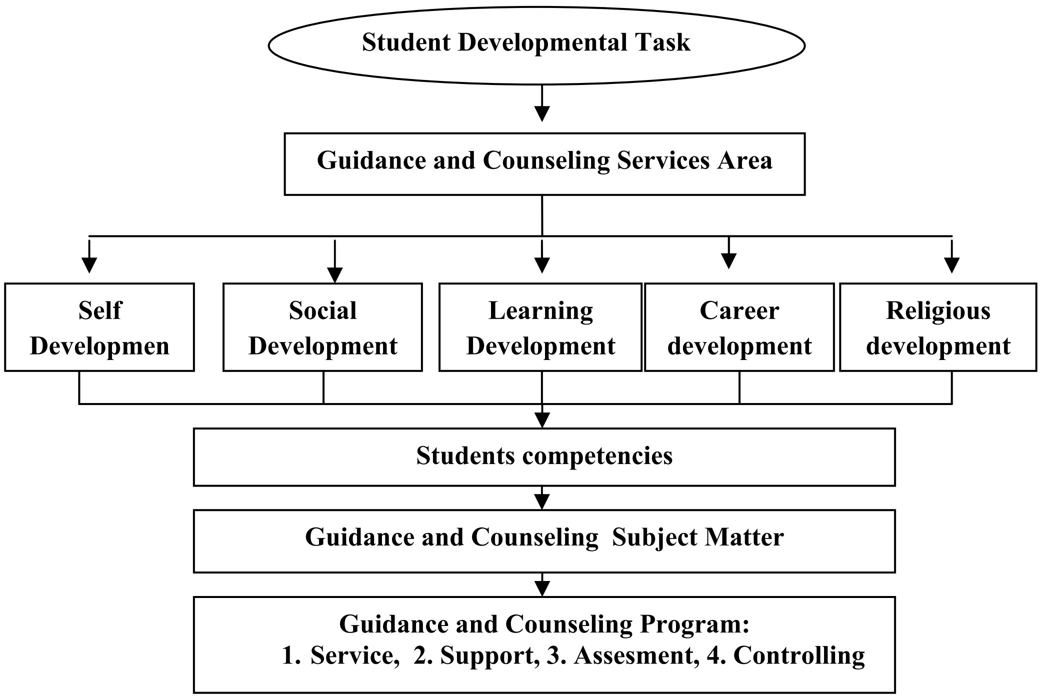
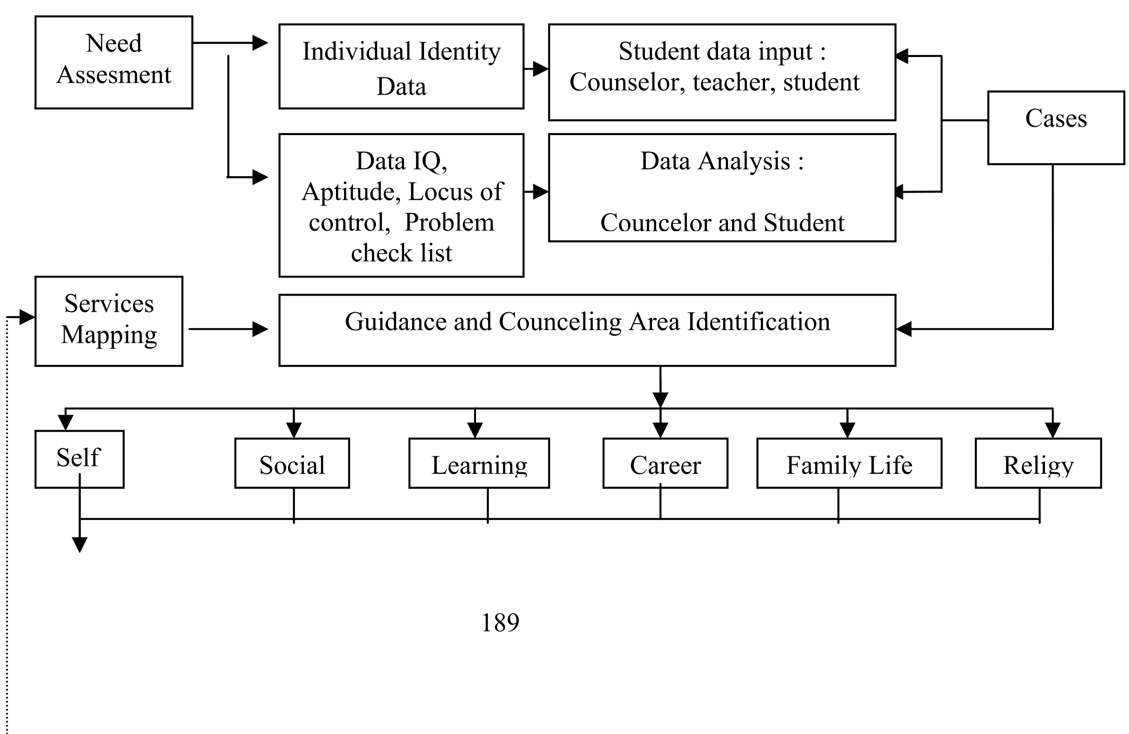


Figure 1 : Management Guidance and Counceling in High School (Depdiknas,2002) [1].



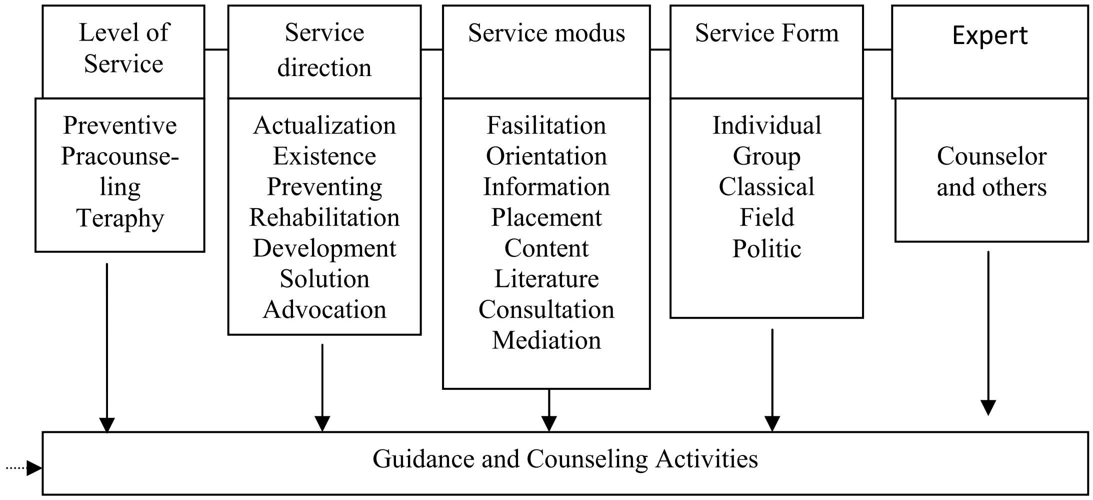


Figure 2 : Guidance and Counseling management model

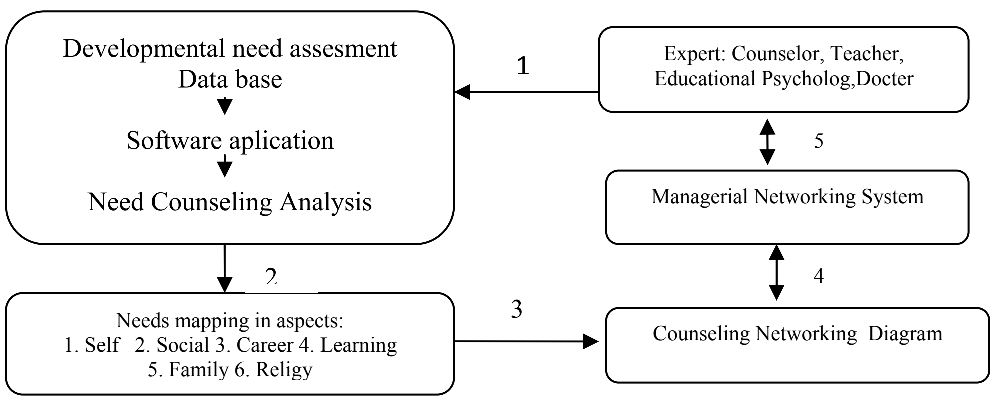


Figure 3 : Networking Management Model

Activities	Method	Goal
First Year : 12 month		
1. Preliminary Survey		
Student counseling need assesment Indicator: Data base Need mapping Data Base Software Analysing counseling need assesment	Interview Questionaire Discuss with: Student, teacher, councelor, staf	Base line data to design management networking model in Medan City
2.Model Design		

Counseling need identification Counseling networking management Design the instruction Try Out	Analysis to : Preliminary survey report Expert judgement	Management Networking Model Instrunction Try Out Model result Model revised
Second Year : 12 month		
Try out Model at High School		
Model validation	Counseling management	Networking management training for school councelor, teacher and other expert
Socialyzing the model	Seminar Workshop	Activities report
Study report	Study anlysis	Design instruction book for counseling networking management

Figure 4 : The Stages of Research and Development

Population in this study was high school in Medan City, Indonesia in year 2009. Samples was collected purposively with characteristics such as follows: the school has one counselor for 150 students, applicable to cooperative in networking model, new school and the school in urban society. The state high school IX of Medan was found to be relevant to those characteristics. The samples of students were chosen randomly for first grade with amount 35 students. The data were collected through data base, need assesment's instrument and counseling report. Methods applied in this study were interview and focus group discussion between teachers, school principles, and student's parents. Collected data were analyzed using percentage method, in addition, student's need asesement were analyzed using software application.

Results and Discussion:

From this study, it has been found that the result of software application could be used as a foundation to networking model design. The model was used in mechanism of counseling management as instructed. The different procedures of conventional models from Networking model is shown in Figure 5.

Conventional Model	**Networking Management Model**
1.Apply form to get student data base	1.Apply software aplication
2.Fill in the form	2.Input database
3.Collect data base	3.Out put database in table and graph forms
4.Analyze data base	4. Print out report sheet
5.Output data base 6. Develop report sheet	

Figure 5: The Management Model Procedures

Results showed that the procedures of new networking model were found to be simpler and shorter than convetional model. In terms of time duration, the new model was only need 30 minutes to get student database, however, the conventional model was need 3 days for each student. In terms of database input, the new networking model was found to be easier than the conventional one. The advance of networking model in terms of out put results, it was pop up with table and graph, whereas could not supported in conventional model. Some of the data base performance were shown in Figure 6.1 to 6.4 as follows :

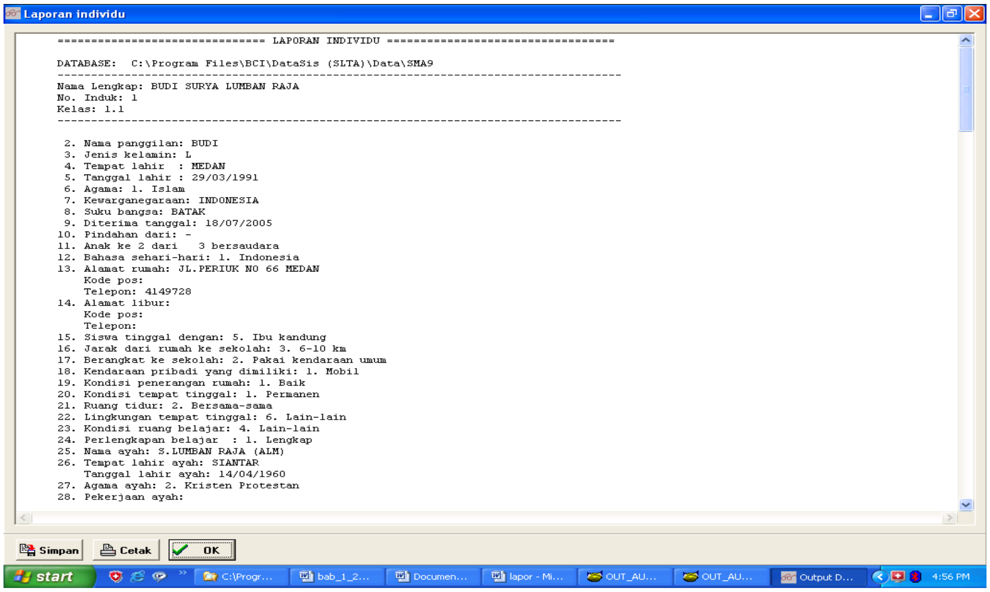


Figure 6.1 : Students' identity input

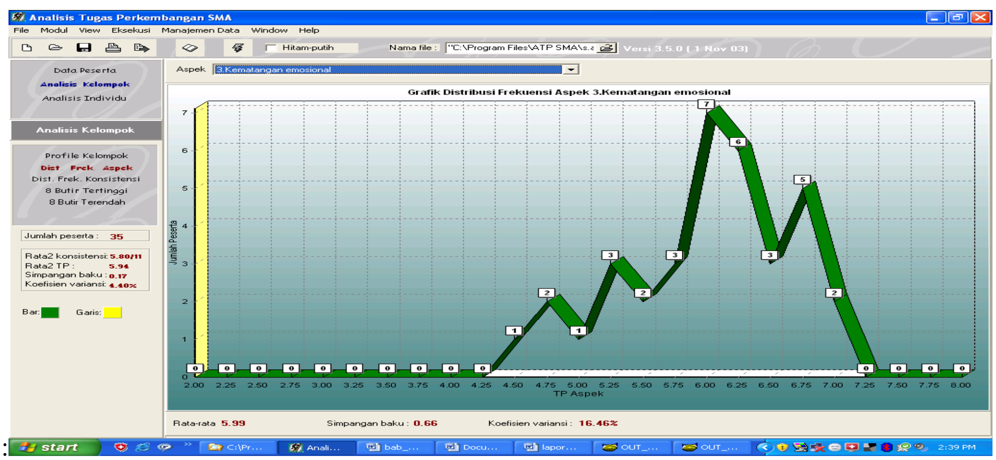


Figure 6.2 : Students' Emotional

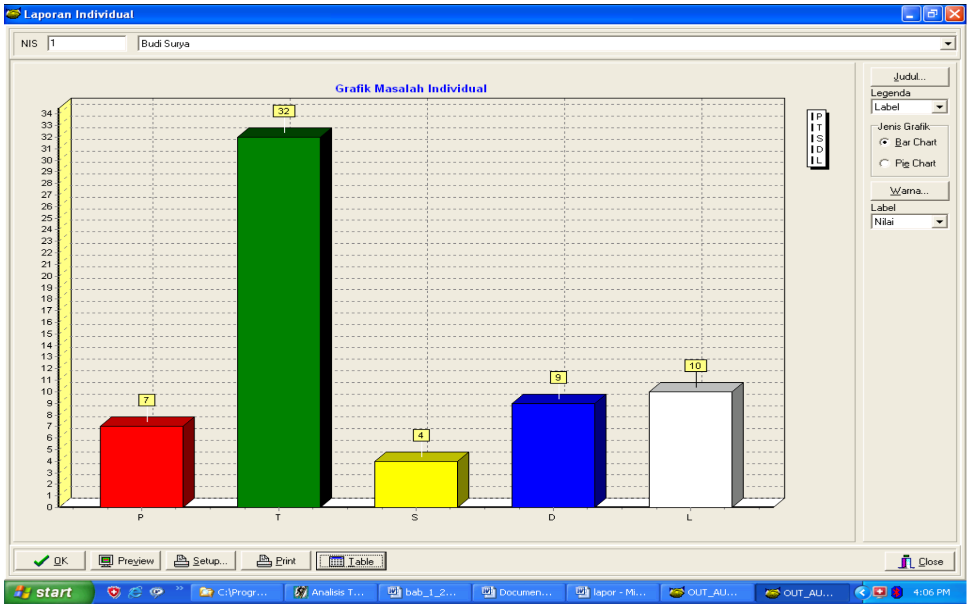


Figure 6.3 : Graph of Student's Individual Problem

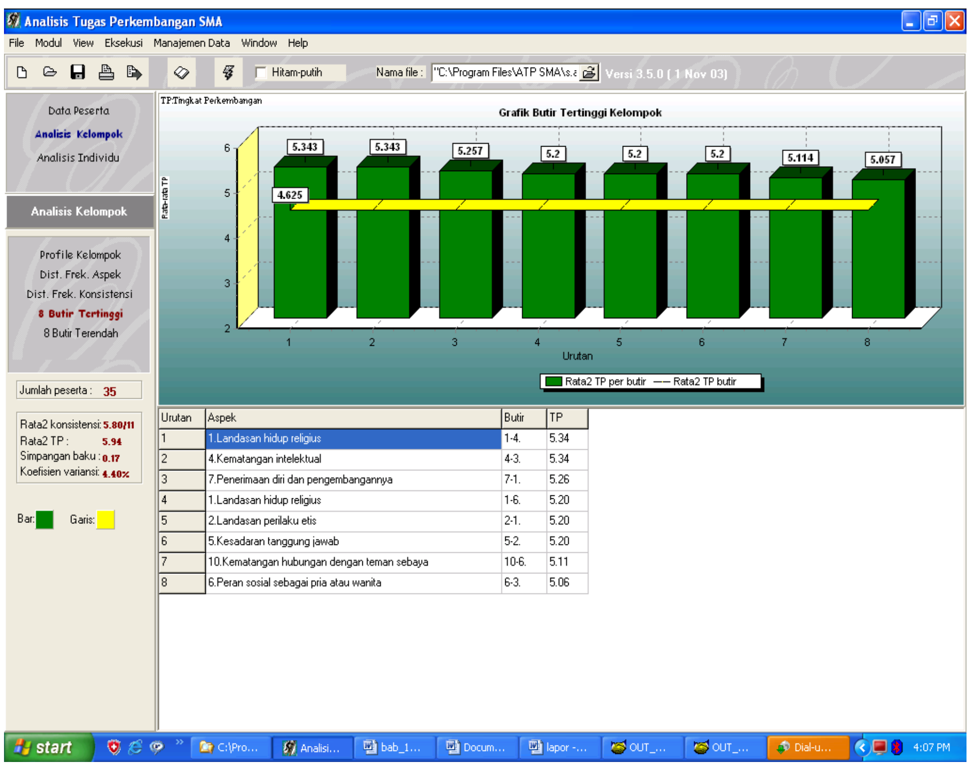


Figure 6.4 : The Distribution of Student's Individual Development

Socialization networking model were applied to to school's principles, teacher , counselor and students. Results showed that the application of software was easy to operate and user friendly. All of them could use the software. Networking model could helped students to know what their counseling needs and they could go to the counselor for counseling activity.

At last, the result showed that networking model could build an effective and efficient management of guidance and counseling. In addition, the model could successfully improve the guidance and counseling activities to help students in solving their problem. The data obtained from the software, i.e students need assesment that could be used to design networking chart. The chart was useful in designing service mechanism. The counselor who evaluated this model found the model could be used to solve students problem effectively in a case of conference system. The teachers commented that this model gave them a chance to understand their students more and as the result, they were able to integrate learning activities and guidance counseling process.

In addition, the principal found that the model could be used to not only in guidance and counseling activities program, but also to the whole school programs. Furthermore, this model could give a chance to teachers, counselors, parents, and experts in communicating with each other, especially in student case conference. Based on the results, it could be stated that the networking model could overcome the weakness of the traditional approach in guidance and counseling in the way that: (i) the services provided in the model were based on comprehensive assessment of students' need and competence, (ii) the activities were more controlable since any single decision was made based on data, (iii) the cooperative interactions between counselor, teacher, parents were developed, (iv) the sense of responsibility as a professional counselor was grew among the counselors, and (v) the more pleasant and conducive atmosphere was established.

Besides that, the networking model provided some beneficial contribution to students, which was never achieved in the traditional model, in the way that it: (i) increasing students' understanding of guidance and counseling activities, (ii) promoting interaction among peers, counselor and lecturers, and (iii) developing self confidence to be successful in careers, and (iv) helping the students in solving their problems efficiently and effectively.

Conclusions:

The networking model could became an alternative response towards the government decision in repositioning the guidance and counseling activities from merely a support to learning program to be an integral part of teaching and learning processes. The new model at the same time was found to be strengthened the role of guidance and counseling in Indonesian schools.

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Instructional design theories on mLearning: Developing a framework

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Abstract

A new discipline, mLearning (i.e. mobile learning), has formed by pairing what was once considered a disruptive technology, i.e. cell phones, with learning. There have been attempts from researchers to establish an mLearning Instructional Design Theory (Sharples et al., 2009), but the field is far from agreeing on one mLearning Instructional Design Theory. This paper provides an overview of mLearning and instructional design theories, and presents a framework for mLearning instructional design theories that instructional designers can use to design and develop instruction on mobile devices.

Introduction

The use of mobile devices continues to evolve and enter many facets of daily life. The field of education and learning is no exception; many educators are eager to explore the potential of the devices that allow learning in the mobile age. The instructional designer has an essential role in mLearning because it is the instructional designer who will design the learning content. With little to no viable mLearning instructional design theories established, it is difficult to measure the effectiveness of instructional design on mobile devices and to measure the learning taking place. Shuler (2009) states that "only once we have a theory for learning with mobile technologies in different settings and different populations can these devices be used to their full potential" (p. 26). This paper helps to build on mLearning research by analyzing the current instructional design theories for mLearning and providing a framework with which to evaluate and build an instructional design theory for mLearning.

Overview of mLearning

mLearning can be described as the "intersection of mobile computing and eLearning: accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment. It is eLearning independent of location in time or space" (Quinn, 2000). However, mLearning as eLearning is only one perspective of mLearning. The other three, technocentric (i.e. focus on mobile devices), augmenting formal education, (i.e. mobile learning as a tool in formal education), and learner-centered (i.e. focus on mobility of learners), offer a different perspective on the purpose of mLearning (Winters, 2006). These perspectives can be compared to the four categories of effective learning: learner-centered, knowledge-centered, assessment-centered, and community-centered (National Research Council, 1999). Regardless of whether you agree with one or all of the perspectives of mLearning, one thing is clear: mLearning can take many different shapes and forms.

Current theories of mLearning

There are three existing theories and/or frameworks of mLearning that are described in this paper. Each adds an important perspective on the instructional design process. Sharples (2000) developed a theory of lifelong learning and a design process, Shih & Mills (2007) developed a mobile learning model, and Sharples et al. (2005) and Wishart (2007) developed evaluation frameworks for an mLearning theory.

Sharples theory of lifelong learning involves eight features. Any instructional design for lifelong learning must be:

- **portable**: available whenever.
- **individual**: adapting to learner's abilities.
- **unobtrusive**: retrieve knowledge without obtruding the situation.
- **available anywhere**: enabling communication.
- **adaptable**: to learner's evolving skills and knowledge.

- **persistent**: possible to manage learning through a lifetime.
- **useful**: suited to everyday needs.
- **intuitive**: easy to use by novices.

(Sharples, 2000)

mLearning must also follow a model of motivational design. One of the most appropriate models is Keller's ARCS model: attention, relevance, confidence and satisfaction (Shih & Mills, 2007). Shih & Mills' mobile learning model includes Keller's ARCS model. Shih & Mills' model involves the following five steps:

1. **attention**: sending a multimedia message to mobile phones to trigger and motivate learners.
2. **relevance**: searching the Web for related information using embedded hyperlinks.
3. **relevance/confidence**: discussing with peers through text, voice, picture, or video.
4. **confidence**: producing a digital story of what they learn by audio or video diary.
5. and **satisfaction**: applying what they learn in a simulated environment.

(Shih & Mills, 2007)

Sharples et al. (2005) and Wishart (2007) both developed evaluation frameworks for an mLearning theory that involve the following questions: *Is it (i.e. mLearning theory) significantly different from current theories of classroom workplace or lifelong learning? Does it account for the mobility of learners? Does it cover both formal and informal learning? Does it theorize learning as a constructive and social process? Does it analyze learning as a personal and situated activity mediated by technology? Does it analyze the dynamic context of learning?* These questions provide a lens through which any mLearning theory can be critiqued and analyzed.

Limitations with the Current Theories of mLearning

It is important to acknowledge that the above three theories and/or frameworks have limitations that must be addressed before a general framework of mLearning can be established. First, Sharples' design process provides an in-depth look at the instructional design process for mobile devices, but it is unclear if this process is for formal, informal, or lifelong learning. Instructional designers must determine the differences in these types of learning situations in order to accommodate our design process.

In the Shih & Mills model, motivation provides a foundation for the design. Although it is imperative that we involve motivation to gain attention, relevance, confidence and satisfaction, instructional designers must not forget the layers of design (Gibbons & Rogers, 2009). It is just as important that we design for the content and data management layers. Just-in-time and customization features are needed to support different learning styles and abilities.

Finally, Sharples et al. and Wishart's evaluation frameworks do not take into account the four perspectives of mLearning discussed earlier. It is necessary to think about the perspective when designing for mLearning.

A Framework for Instructional Design Theories on mLearning

A framework for instructional design theories on mLearning must consider the four perspectives on mLearning. It must include aspects of theories on lifelong learning, motivation, and evaluation. It has to fit within instructional design theory and the layers of design. The framework provided in Figure 1 includes these considerations and can be applied to any instructional design theory on mLearning.

Even though the arrows in the proposed framework indicate a process, this is by no means systematic. The arrows are only used to suggest a general course of action for a novice instructional designer. The novice instructional designer might start with the learning situation. Depending on if the learning is formal, informal, or lifelong, the instructional design theory could be very different. From there, the designer looks at the perspective. Within formal learning, for example, the designer could have a very device-centered, or learner-centered perspective. Again, these differences would change the instructional design theory. Theories of learning are based upon the learning situation. However, in general, mobile learning will follow the theories of lifelong learning. Next, motivation must be considered. What is the designer doing to gain the learner's attention? Is the designer using push features (i.e. text messages)? Once initial planning has been considered, the designer can start a design process. This could vary from user-centered design to a very traditional ADDIE process. Evaluation will help the designer determine if goals have been reached.

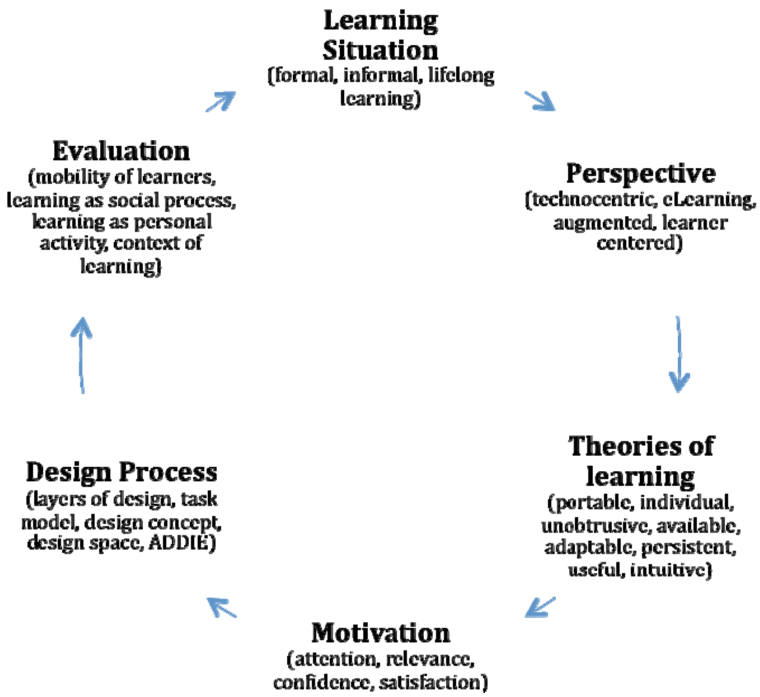

Figure 1: A Framework for Instructional Design Theories on mLearning. The arrows represent the path a novice instructional designer might follow.

Conclusion

mLearning is quickly becoming a bridge between formal, informal and lifelong learning. The instructional designer has an essential role in mLearning because it is the instructional designer who will design the learning content. After investigating the current instructional design theories and issues, this paper provided a framework through which instructional designers can analyze and use instructional design theories for mLearning. Although this framework must be tested and studied further, it provides a starting point for instructional designers in the field of mLearning. Instructional designers can use this framework to create and design meaningful instruction. Future studies must be completed to explain and test this framework.

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Combining lesson planning, visual searching, and communication: A study of a collaborative image-based bookmarking tool

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Abstract

A collaborative image-based bookmarking tool enables multiple educators to work together to create, save, and share a collection of resources for use in a learning activity. The collection of resources can be accessed in any classroom and provide a direct link to many different Internet resources. This paper presents the Cube, an example of such an image-based bookmarking tool, the design process, and questions that must be researched to expand the body of knowledge in this area.

Introduction

Social bookmarking has been a hot Web 2.0 topic ever since the creation of delicious (2010), a bookmarking tool that enables users to tag, save, manage, and share text-based representations of web pages through an online community. In K-12 education, teachers use bookmarking tools to store lesson resources and artifacts that they can access during a lesson (Wepner & Tao, 2002). However, there are problems with using traditional bookmarking tools (e.g. Internet Explorer, Firefox, Safari) or social bookmarking tools (e.g. delicious) in the elementary classroom. First, teachers have resources stored in many different places and need a place to aggregate their Internet resources in one place. Second, teachers lose the attention of their students while they search for bookmarked resources. Finally, traditional text-based bookmarking systems do not enable teachers to preview a resource before accessing it. This paper introduces an image-based bookmarking tool that provides teachers with solutions to these issues.

Rationale

In *About Face 3: The Essentials of Interaction Design*, Cooper, Reimann & Cronin (2007) explain that toolbars in many popular software programs (e.g. Microsoft Office Suite) use butcons (i.e. icons that also serve as buttons) because recognizing images is faster than reading text. An image-based bookmarking system enables teachers to organize Internet resources with clickable visual previews of the resources. By using clickable visual previews, teachers can speed up the recognition process, thus, saving time and keeping students on task. Using clickable visual previews may also provide a novelty effect for students (Gall et al., 2003). In other words, the 'newness' of the visual representation of bookmarks may keep students on task longer than the traditional text-based representations.

Goals of Design

Keeping the rationale in mind, the Cube was designed using a goal-directed design process (Cooper et al., 2007). The goals for the first prototype were as follows:

- Use images as bookmarks to enable teachers to speed up the recognition process and keep students on task,
- Increase collaboration between and among teachers on lesson resources by providing the ability to edit bookmarks on one cube at the same time from different locations and computers,
- Enable teachers to save a set of resources in one location (i.e. one cube),
- During lessons, enable teachers to access Internet resources by clicking on saved image-based bookmarks,
- Allow teachers to access others' cubes in the hopes of finding already made cubes for a particular topic without having to reinvent the wheel for a particular learning activity.

Based on these goals, the design team developed a prototype using Adobe Flash Builder (i.e. Flex) and Adobe Flash Media Server (i.e. Flash Communication Server). Adobe Flash Builder was used to create the environment and Flash Media Server provided the functionality to view and edit a shared cube between and among multiple teachers. The current Cube prototype uses a Flickr API (i.e. application programming interface) that allows users to search within the Flickr images database. A screenshot of the Cube homepage and search box is provided in Figure 1.

Figure 1: The Cube homepage. This figure provides an example of the Cube grid and search box.

Once the search is complete, each Flickr image (i.e. clickable visual preview) is available on the search grid. For example, in Figure 2, searching for 'technology' resulted in the following new search grid on the right side of the screen. The teacher can click and drag a resource from the search grid to the blank grid (i.e. the Cube). Additionally, if the teacher double-clicked on any Flickr image, the Internet resource would be opened in a new window.

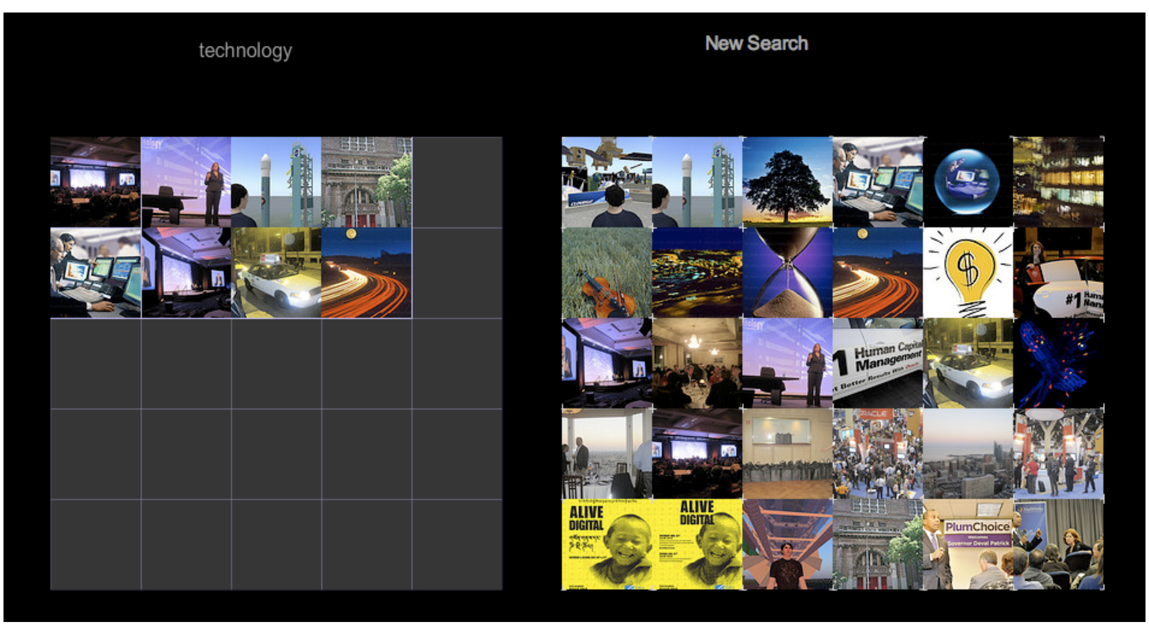

Figure 2: The grid feature in the Cube. This figure provides an example of the search grid after the user enters 'technology' as a search string. The results are the first thirty results from the Flickr image search.

Features of the Cube

The features available in the first prototype of the Cube are listed below and followed by the 'bolded' proposed features for the second prototype (currently in development). The features include:

- Images = Flickr API
- Grid = 5 x 5 cell, two dimensional rectangular grid of resources
- Functionality = click and drag of resources
- Collaboration = editing of shared Cube via Flash Media Server
- **Images = Google API, involves taking screen captures of Internet pages**
- **Images = Documents, involves saving thumbnails of documents**
- **Grid = 5 x 5 cell, three dimensional cube grid of resources**
- **Functionality = upload documents and other files on hard drive**
- **Collaboration = save feature**
- **Collaboration = allow teacher to make cube 'public' so it can be viewed and shared**

The first prototype uses a Flickr API with image search results, but the goal is to have this work with any Internet resource. In the second prototype, text-based results from a Google API will be converted into images using a screen capture feature. The system will continue to be a 5 x 5 grid, however, the design team will modify the two dimensional rectangle into a three dimensional cube. The design team will add upload and save features to improve functionality and collaboration. Users will have the ability to upload a document from a hard drive and the Cube will create a thumbnail preview of the document. Finally, the Cube will include a public option when saving. Therefore, the Cube can be accessed and used by other teachers who are searching for resources on a similar topic.

Conclusion / Future Study

A collaborative image-based bookmarking tool can provide teachers with a shared set of resources. Collaboration and click-and-drag features provide educators with the ability to not only work together to complete a bookmarking page, but to do so easily and intuitively. The design process explained in this paper is the first step in a larger study that will test the use of a collaborative image-based bookmarking tool in an elementary classroom. The following questions must be explored to expand this research and contribute to the body of knowledge: *Will using clickable visual previews as bookmarks increase the speed of teacher recognition of resources? Will elementary students be more capable of staying on task when teachers use an image-based bookmarking system?* In addition to these questions, perceptions and attitudes of using the system must be explored. There is much promise for the use of an image-based bookmarking system in elementary education and the Cube provides a good starting point.

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Video Games: How can their visual conceptual transaction structure be used in instruction?

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Videogame, concept instruction

Abstract

Video games have become a multi-billion dollar industry; people of all ages play games on a daily basis. Game play is immersive, engaging and some would argue addicting. As a result, educators have long wondered if the medium can be used as a tool for education. Unfortunately, the results have been unconvincing and mixed at best. In most cases, educational video games are not particularly educational; they are not engaging; and, worst of all, not fun. In this presentation I suggest that the fundamental reason for the failure of educational video games results from a fundamental misunderstanding of the structure of successful game interaction. A successful video game interaction is based upon what I refer to as a "first-order conceptual transaction". Games that provide an opportunity for this type of transaction have the potential to be engaging. Learning goals that are congruent with a first-order conceptual transaction can successful use a gaming environment for instruction.

Introduction

Video games have become popular with all groups of computer users. They are available in arcades, TV consoles, home computers and mobile devices. The industry that supports these games has surpassed the motion picture industry in terms of its scope and economic impact (Aldrich, 2009). Popularity along with the many and varied types of interactions that can be encountered in these games make them attractive to educators. The educator's desire, of course, is that learners could use the games not only to learn but to enjoy the process as well. These two factors, effectiveness and appeal are often missing from educational experiences (Keller, 1987).

For the purpose of this analysis we are defining video games as computerized games played by manipulating images on a video display in response to an algorithm influenced opponent. Key components of games are goals, rules, challenge, and interaction. Contrast, this definition with some common, related technologies, such as simulations and immersive environments. Simulations are representations, either enhancements or simplifications, of realities. They are environments for experiencing aspects of reality. Simulating generally entails representing certain key attributes or characteristics of a physical or abstract system. Digital immersive environments are artificial, transactive, computer-created scene or 'worlds' within which one can participate. Simulations and digital immersive environments have specifically been left out of the current analysis. In these systems there is often not, or it is often not a as prominent, a manufactured conflict or pre-established objective as there are in games. These definitions are used loosely. There are no clear, unambiguous boundaries. However, we will argue that a stable difference can be found in the predominant form in which concepts are represented in each of these environments.

Conceptualization

Concepts have very specific meaning in instructional design. The term is often used by the general public in a sense that is synonymous with notions or ideas. However, instructional designers generally use the term to indicate a particular type of learning domain (Merrill, 1983). A concept can be defined as the cognitive integration of two or more entities based upon their unifying characteristics (Rand, 1979). Conceptualization is an inductive process that requires one to examine specific instances and generalize them to other members of their class. For example, bowl, table, liberty, and IQ are concepts. The table that I am typing this is a single instance of the concept of table. The concept of table encapsulates every table that ever existed or ever could exist. Conceptualization makes it possible for one to use a instance of a concept even if you have never encountered the particular instance. Induction through conceptualization is critical to cognition. Induction is a constant and every present in conscious experience (Dewey, 1958). Many instructional objectives are concept-based. For example, "distinguish between examples of Victorian and Georgian architecture" or "select the examples of art deco furniture from this showroom." Almost any learning objective will require the learning to make discriminations or generalizations which are hallmarks of the conceptual learning domain.

Any element in a game, simulation, or immersive environment is a concept; these entities represent an instance of a class. For example, a "gun" on the screen is not just a grouping of pixels but is indicative of the class "gun" which has unique attributes and characteristics. Another example might be a mountain on the screen. The mountain only vaguely resemble an actual mountain visually, however, the attributes of the mountain will have a degree of correlation with the concept of mountain, i.e., the image will be a projection upward to a point relative to the surrounding "terrain" and will resist intrusion from other "objects". Part of gameplay is to recognize these entities and react to them according to their class. Transaction with these conceptual entities is the essence of everyday experience and is equally so in these environments.

Teaching concepts

The process behind and the methods encouraging the learning of concepts should be familiar to anyone in the instructional design field. Concepts have been a primary learning domain, Gagne' (1985), Merrill (1983), throughout the history of the instructional design field. The new "Taxonomy of for learning, teaching, and assessing" which extends and revises Bloom's influential taxonomy, has adopted concepts as one of its primary taxonomic classifications as well (Anderson & Krathwohl, 2001).

Concepts are generally taught by declaring their definitions and by providing examples and non-examples of entities within the class; examples being the most important part of the instructional process. Concepts are generally considered to have a hierarchical nature. Describing the hierarchical nature between a concept and its sub-concepts is an effective instructional strategy. It also should be remembered that there is diversity among the kinds and types of concepts which have their own unique instructional strategies. For example, concrete concepts (those that have a physical manifestation) and abstract ones (those that are completely mental) have different characteristics that must be considered when planning instruction.

It is generally recognized that concrete concepts are easier to learn and grasp. However, most concepts used in an academic setting are not concrete, but abstract. In fact, one of the important qualifications for a concept is that it does not need to be real in any sense; concepts do not need to have a material existence. However, they must have a function or serve a purpose. The purpose may be trivial but still must be present. For example, a unicorn and a leprechaun are concepts that describe things that exist only in fiction; nonetheless they serve a narrative function.

In fact, the simplest category of a concept is one that simply exists to be classified and reacted to. These type of concepts are what we describe as "first-order concepts." First-order concepts are those that have no apparent usefulness beyond their ability to be identified; they have unity and little else. However, their unity qualifies them as concepts. A first-order concept's primary function is in the recognition of the concept itself and not its overt functionality or practical usability; being recognized and classified is its function. An example of a first-order concept would be "greeny", which we just made up, meaning everything that manifest the color green. A person wearing a green shirt as well as grass and leaves would qualify. One could reasonably ask the purpose of the concept "greeny" because it is hard to imagine a real-life situation in which color exclusively would be a useful distinguishing trait. However, one could imagine the "greeny" would be useful in an artificial setting, such as a game; it would be a simply construct to provoke reaction.

Concepts in games

Games require users to react (identify, classify, and respond) to a concept simply because it promotes gameplay. Games are the ideal environment for demonstrating the use of a first-order concept because it can be created for no other purpose. Its purpose is to be identified, classified and reacted to in such a fashion that maximizes the interest of the player. First-order concepts have no need to have a corollary in the real world. All they need is to have attributes that can be consistently identified. By using first-order concepts, a game designer can create an infinite number of instances in which players can interact with. These instances can be refined to create sub-concepts that require even more subtle transactions to maintain the player's interest.

A video game will often use names likes ships, monsters, opponents or enemies but those are merely names. Their properties are likely to have no corollary with their designations. Usually, these entities are made up of unique pixel combinations and audio characteristics. For example, in the game Defender the opponent's ships are merely a conglomeration of green dots on the screen that move in a particular pattern. It is a stretch to call these representations ships without guidance from the game itself. The player's job is to recognize them as opponents and then to respond to them (avoid them or shoot them). Note that even "shooting" is only a term in this context. A more accurate description would be that you are creating a line of pixels that will interact with the opponents pixels when their paths intersect. In other words, the player is not shooting and avoiding enemy ships but identifying an entity as a particular concept and reacting and interacting to the presence of that concept. Shooting works as a useful trope in a game setting because it allows the player to concisely make their identifications known across the entirety of the screen. Some entities in a video game will look like real world objects but this is not necessary for game play.

What makes first-order concepts so useful in this setting is that they are infinitely malleable in ways that it is relatively easy to create the experience of "flow." Flow is a "peak experience" or an experience that is associated with being completely and comprehensively involved and in an activity (Csíkszentmihály, 1990). Flow entails a dramatic lowering of inhibition and self-consciousness. In other words, it is a desirable state that is central to the entertainment value of video games. Flow is commonly recognized as the element that is pleasant and even addicting from an experience. First-order concepts are used, not because they lead to knowledge with utility outside the gamespace, but because they are ends in and of themselves. First-order concepts are used by game designers to create engagement with the game and not for some other ends.

One of the primary principles of flow is that a person is continually challenged. The game must continually react to the level of conceptualization achieved by the player to create an experience that continually engaging. This is called making, "Dynamic Difficulty Adjustments (DDA)." There are a number of methods that have been used to implement DDA's including changing the speed in which an instance of a concept is presented, increasing the number of instances which must be responded to, decreasing the time in which an instance must be responded to, and decreasing the size of the pixel representation of the instance, among many other options. Perhaps the player is asked to make a distinction that they weren't previously required to perform. Perhaps the entity will have a slightly different shape or color that must be properly classified for game play to continue. First-order concepts are easily adjusted and can be adjusted infinitely to maintain a flow experience.

More advanced techniques would actually modify the concept or split the concept into two or more distinct sub-concepts which would require unique transactions with the gamer for successful completion. For example, an "enemy ship" on the screen might require a single "blast," however, an "admiral's ship" might require two "blasts." The two ships may have only slight visual differences but those must be detected by the gamer. The addition of the "admiral's ship" as a first-order concept provides and opportunity for a DDA at the conceptual level. One of the primary advantages of using first-order concepts in games is that the DDA can be endlessly manipulated to maintain the gamer's interest. The reward of gameplay is itself and nothing further. However, many educators have attempted to and believe that gameplay can be a means to educational ends.

Second-order concepts and the constraints of reality

Contrast the transaction created by the use of first-order concepts to the type of transaction educators are interested in. The educator is interested, not in transactions as ends in themselves, but in using them as a means to further learning goals. In other words, education is constrained because it is interested in concepts that do have a purpose and a function out of the gamespace. Concepts that are required in reality are second-order concepts. Second-order concepts are not malleable, they are what they are because the describe entities that must be known, classified and identified in real-world transactions. To know them one must respond to them in set and established ways and that restricts the degree of freedom allowed in their use and application.

As it turns out, portraying, interacting and responding to these second-order concepts in gamespace is difficult. Learning second-order concepts has many rewards, most prominently mastery and control of their prevailing conditions and uses, however, their attainment does not necessarily lead to an experience of flow. Their reality simply gets in the way. This is not to suggest that there is a one-to-one correlation between second-order status and lack of flow, just that the lack of freedom in their constitution may create natural barriers to their use in gamespace. A second-order concept is what it is, and it cannot be modified without damaging its conceptual integrity. For example, if one is learning the concept of a "schooner", a game could be designed that would require the learner to recognize examples of schooners in various conditions. However, any display beyond the general characteristics and attributes of the "schooner" would have to be of high fidelity (illustrations or photographs). Mastery would require a large number of these examples and they would have to be manipulated to integrate with the game's theme, style and motif. First-order concepts, since they don't require utility or material manifestation are restrained in this manner. A second-order concept was made for utility not for being manipulated to provide ideal DDA capability. Additionally, once mastery is achieved there is no more possibility of making the event more challenging; first-order concepts are not constrained in this manner.

Further, the difficulty found in second-order concrete concepts is only increased when dealing with second-order abstract concepts. For example, if one were trying to teach "democracy" it would be difficult for learners to engage with that concept in the same way they engage with first-order concepts. With abstract concepts there is simply no visual or auditory representation that can be provided the learner. Abstract concepts are verbal by their nature.

For fear of being reductionist, we want to reiterate that there are game interactions and other similar environments like simulations that can indeed address second-order concepts of all kinds. The distinction we make in this paper is about the "flow" experience that is so easily generated in game space using first-order concepts. It may be possible to create flow using other strategies and tools; however, it is unlikely that many of those will possess the kind of efficiency as those that use first-order conceptualization.

Conclusions

Second-order concepts are more likely to be found in non-game digital environments. Simulations and immersive environments can more readily embraces second-order concepts because they promote a different type of transaction than required for a flow-based game experience. Likewise, there are many types of digital environment experiences, such as strategy games, or simulations that can have alternative types of transactions and game play. Examples include such environments as SimCity and Civilization. However, these environments are beyond the scope of this article in that they are not based upon conceptual transactions. Games, those that are conceptual transaction centric, have used first-order concepts to artificially create compelling gameplay. Game designers and educators should be cognizant of this distinction in their attempts to create games that teach. It is probable that many second-order concepts can be successfully taught through the conceptual transactions provided through gameplay, however, it should also be noted, particularly when reports of stilted game play that many second-order concepts are simply too restricted in their constitution to be adequately taught in gamespace. Educators attempting to design useful games that with second-order concepts should be aware of the inherent disadvantages these types of concepts have and seek strategies that mitigate these barriers.

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Interactive Website for Computer Based Competency Testing and Information Management in the Clinical Laboratory

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Abstract

The purpose of this study was to explore the use of a dynamic interactive website for computer based competency testing in the clinical laboratory. The dynamic interactive website was created using, *ColdFusion* and *Dreamweaver.* The competency testing for the study was designed to be administered to a group of clinical laboratory personnel. For data collection, a Likert survey was designed and administered using the dynamic interactive website. The survey was administered to clinical laboratory personnel and instructors. The answers and information from the competency testing were synchronously gathered and entered into a *Microsoft Access* database by means of the dynamic interactive website. The results from the survey indicated a positive opinion on using a dynamic interactive website. The survey results also indicated that this group of medical laboratory personnel found the interactive website effective and useful and preferred using this website for competency testing over the traditional written testing format.

Descriptors: Interactive Website, Computer Based Competency Testing

Introduction

The advent of Web 2.0 interactivity has brought about an ongoing effort to define and connect the concepts of personal information management and personal information manager. Currently, debate is on Web 3.0 as the platform for information management (Laurent, 2010). A personal information manager is a software application that keeps track of information. Some common examples of personal information managers are Microsoft Outlook, Access database, Excel, Novel Evolution, Lotus Organizer, Kontact, PalmDesktop, etc. Personal information management is the study and action of gathering, maintaining, organizing and retrieving information. There are different types of manageable information such as printed documents, digital documents, web sites, messages, medical records, work-related records, school-related folders, etc. The widespread availability of application such as *ColdFusion*, *Dreamweaver* and *Microsoft Access* makes it possible for most people with minimal or no skills in computer programming to design their own dynamic interactive website for tracking and managing information. Designing and developing an independent interactive website provides autonomy and choice of freedom in deciding what and how information is situated on the site. Designing an interactive website offers the ability to maintain and control the information gathered from an interactive audience. Additionally, it allows for the collection of information to be managed in a private database, information that can later be used for analysis and mining. The main advantages of a dynamic interactive website are the increase abilities to track, manage and present data for a variety of innovative uses.

The focus of this study was to explore the use of a dynamic interactive website for computer based competency testing in the clinical laboratory. The design of the interactive site for this study was based on several premises; concepts of technology integration, learning in a connected world, instructional development, instructional design, and open educational resources.

Research Question

How do Medical Laboratory Scientists in a clinical laboratory perceive the use of an interactive website for computer based competency testing?

Literature Review

The literature review for this paper explored the best educational instructional theories and human performance strategies for designing an effective interactive computer base competency testing for use in the clinical laboratory departments. The method currently used to assess a technologist's ability to accurately report results for both parts of a clinical test is to have the technologist manually perform the first part of the clinical test and then review a hand out with pictures illustrating different types of elements found in the microscopic part. The answers are then graded by comparing them to results obtained by other technologists and establish criteria. This type of assessment is commonly used in most clinical laboratories and doctor's offices. However, this type of assessment is very time consuming in terms of performing, preparing, preserving, and grading. If the test and grading were integrated into a computer base program, thus eliminating preparation and preservation of the test samples, the employees and supervisors would have more time to devote to actual patient care testing. According to the literature review computer based competency testing is more consistent, efficient and effective, compared to the current method of competency testing.

Clinical Laboratories and Competency Testing

One reason for identifying and surveying interactive competency testing is ***because clinical laboratories are in need of a practical and efficient method for competency testing***. The clinical laboratory is an important part of the total health care provided to patients. About 70 percent of all medical diagnoses are made using laboratory results (Mayo, 2009). The Clinical Laboratory Improvement Act of 1988 (CLIA, 1988) mandates that competency testing be done by all employees routinely performing clinical testing at least once a year. Competency testing is also required of all personnel working in the clinical laboratories by the College of American Pathologist (CAP) and the Joint Commission on Accreditation of Health Organizations (JCAHO). Inspectors for these agencies look for proof that competency testing of laboratory personnel are done by two methods: (a) observation and (b) documentation. Medical Laboratory Scientists or Medical Technologists must develop and maintain skills necessary for interpreting and reporting accurate clinical laboratory test results. Tests in the clinical laboratory often consist of two major parts: (a) the manual part and (b) the microscopic part. Integrating computer base competency testing into the employee's routine schedule results in time and resources being better utilized. The current method of assessment involves time for performance in addition to time for preparation and preservation of testing samples. As part of cost saving, many laboratories are also requiring clinical laboratory personnel, who have been working in only one area of the clinical laboratory to retrain as generalists and work in all areas of the laboratory. To determine if the laboratory personnel are qualified, employers are using competency testing. Competency includes more than just knowledge or information. Competency is the utilization of the knowledge in the actual performance of a procedure in a standardized competent manner. Competency is learning how to do something and actually doing it right on a day-to-day basis. Written exams can be used to assess the knowledge and direct observation in a real or simulated setting can be used to assess competency (Norman, 1991). The goal of competency testing is to measure the employee's level of understanding and provide feedback to the employee and employer on their performance. The two types of assessment tests, formative or summative, are conducted. Formative evaluation is typically carried out during the development or improvement of a program or product and conducted more than once for in-house staff with the intent to improve performance. The results normally remain in-house but are sometimes provided to an external evaluator. Many employers are, in an informal sense, constantly doing formative evaluation during their observations of workers (Scriven, 1991). In formative testing the results do not contribute to an employee's grade but are used to improve the employee's knowledge and identify any weaknesses in his or her knowledge and understanding of the work. Summative evaluation, on the other hand, is usually quantitative, which means using numeric scores or letter grades to assess learner's or employee's achievement.

The subjective nature of reading the microscopic part of a test makes it difficult to develop a consistent and valid assessment method. Providing written and consistent grading criteria will help in eliminating the subjectivity in reading the microscopic part of a test and also add validity to the method. With the development and improvement in computer imaging and technology it is now feasible to use color images of actual microscopic test slides. The current method of having the employee review an actual microscopic slide for elements helps with improving competency, but the current manual method is time consuming for both the employee and employer. The current method of doing it is to have the employee submit a written response and then have them wait for the employer to grade it. A computer based competency test will allow the use of digital images of elements for review, making the process more efficient both for testing and grading.

In a meta-analysis of studies, Computer Based Instruction (CBI) in the health professions was reviewed for (a) achievement effects (b) adult learners' long-term retention (c) attitudes toward content and (d) instructional method. The analysis consisted of 47 studies with 10 classified as allied health studies. In 32 of the studies, the students using CBI had higher examination averages (Cohen & Dacanay, 1992). Bruce (1990) found that in clinical laboratory science, computer-assisted instruction is more effective than a correspondence course and as effective as a workshop in providing continuing education. Computer-aided instruction provides a pleasant variation in teaching techniques, saves instructors time, and appears to stimulate active student discussion.

CBI draws from several disciplines such as design theory, learning theories, instructional theories. Williams (2000) states that there were several different views on what learning theories best applied to learning by means of computer based instruction. Behaviorism and constructivism theories have impacted online learning. Currently, most courses are being designed along the constructivism theory. In behaviorism the main point of interest is to produce a desired behavior that is controlled by the environment. The constructive view is to explore how learning is occurring within the environment created.

The early research studies on computer-based instruction compared it with instructor led instruction. The studies tended to view the computer as an independent variable and assumed that the computer itself was affecting the learning process (Thompson, Simonson, & Hargrave, 1993). Current research is more focused on the computer environment and how it has the potential for improving students problem solving and critical thinking (Krange & Ludvigsen, 2008). The new computer environments are promoting the more active and individualized learning on the part of the students as well as encouraging teachers to act as facilitators instead of the sage on stage.

Advantages of computer based instruction includes the ability to reach a much wider audience, the learner's control of pacing and approach, flexibility in instructional methodology, and assessment. However, the effectiveness of computer based instruction depends on developing proper pedagogical delivery of instruction and testing.

Some of the alleged disadvantages of computer based instruction are: (a) it is not as effective as having an actual person teach. CBI studies do not compare equal teaching methods because the resources do not have the pedagogical strategies or knowledge content (Prewitt, 1998) (b) perceived as impersonal and fails to identify learners or learning tasks for which CBI may be most appropriate (Lawson, 1999) (c) there is no significant difference between the level of learning in computer based instruction and the traditional or standard method. CBI users usually devote more time to the common learning goal than their peers so any improvement in performance was due to more effort and not something inherently better in using computers to teach (Williams & Zahed, 2005).

Use of Online Surveys

The use of computers for surveys is fairly new and is still developing. At first creating and administering on-line surveys was very time consuming. It required skills in computer programming and scripting programs. Nowadays we have survey authoring software packages and online survey services such as *Survey Monkey* and *Zoomerang*. The main problem now is that practitioners in the different disciplines do not know all the advantages and disadvantages associated with conducting on-line surveys for their unique and particular area.

The introduction of the Internet and e-mail opened up a new avenue for conducting surveys. Instead of providing the respondent with a paper and pencil survey, a respondent is now given a hyperlink to a Website survey. In an e-mail survey the questionnaire is sent by e-mail, which the respondent fills out and mails back to the interviewer. A web survey provides the capabilities of incorporating multi-media graphics and sound into the instrument.

One major advantage of computer-based surveys is that the computer automates the data entry phase of a survey. This increases the accuracy of data entry and saves times and cost in collating. This advantage is also being utilized in paper surveys by using scannable surveys. In scannable surveys the respondent completes the specially designed form by filling in a circle, oval, or square to show his answer. An optical scanner is then used to record the responses that are then digitized and entered into a computer for easy manipulation.

Mode of Inquiry

This was a descriptive quantitative research study utilizing a Likert survey to gather data. The participants representing a larger population were surveyed only once for this study. The selection of the participants was not random, therefore making the process a non probability method. The independent variable was the use of a dynamic interactive computer base site for competency testing and the depended variable was the opinion on efficacy, preference and usefulness of an interactive website for computer based competency testing and information management in the clinical laboratory.

The main reason for conducting a computer base survey for this study was the convenience and easy of using computer base surveys. The survey for this study was developed using the applications: *ColdFusion, Dreamweaver* and *Microsoft Access.* The reason for designing and developing the survey instead of using one of the many free survey applications available on the internet was personal preference for full control of the final product and the avoidance of relying on generic commercial products. Furthermore, having full control of a website and database encourages creativity and versatility.

Technologies on how we communicate have contributed and made an impact on how we collect data. The data from the survey will be synchronously gathered into an access database once the respondent submits the answers. Because of time constraints the computer base survey was the most appropriate instrument for this study. The multidimensional construct of this survey is the *opinion* of clinical laboratory personnel on the use of an interactive website in the clinical laboratory for information management and clinical competency testing. The *opinion* is a concept or abstract that is not directly observable or measurable. The three measured dimensions of the construct used in this study were (a) efficacy (b) preference and (d) usefulness. The survey was a non-testable Likert scale used to measure the opinions of the respondents. The scale of measurement was ordinal; measurements were not limited to just label items but the underlying order of responses. The opinions provided insight on the judgment or attitude as perceived by the respondents. Italic lettering was used in the survey items to emphasize whether the direction of the question was positively or negatively stated (Cox & Cox, 2008). The survey was cross-sectional intended to collect data from a sample that was drawn from a predetermined population and collected at one point in time. The questions selected were based on personal preference and the literature review on computer based surveys. Several of the questions selected were developed by (McVay, 2001) which are designed to measure comfort with some of the basic skills and components of online learning and testing. In addition, questions from a study that measured the “comfort with online learning” and “self-management of learning” along with the desire for interactivity and effectiveness of online learning were also used (Bures, Abrami, & Amundsen, 2000). In total, the questionnaire contained 52 Likert items that reflect on the attitude object using a 5-point scale ranging from “strongly agree to strongly disagree” with "5 indicating strongly agree and 1 strongly disagree". Included in the survey were reverse questions to cancel out the bias of wanting to agree with everything and increase internal validity. A 5-point scale was used because the majority of the articles reviewed for this study suggested using a 5-point scale to get opinions that are strongly positive, negative or neutral. The answers to the Likert items also were used to develop an index score that indicated direction and intensity. Some demographic information was collected using an additional six questions.

The sample for the survey consisted of a convenient sample of 22 persons who work in clinical laboratories. The sample was a non probability sample that relied on available participants. The population selected for the study was individuals who supervise or had instructional technology experience in the clinical laboratory. The selection preference was geared towards the solicitation of opinions from individuals who would benefit from a dynamic interactive website utilized for competency testing and information management. Of the 22 persons that were asked to participate by e-mail, 20 filled out the survey. It was a 91percent rate of participation which is higher than the average of 50 and is considered good. However, this was probably due to sample size and convenient sampling. Included with the request for participation was a monetary inducement in the form of a McDonald's 10 dollar gift card.

The characteristics of the respondents that participated in the survey lend themselves to computer based surveying. The majority of the individuals work with computers on a daily bases. Most of the respondents are well educated and have at least a bachelor’s degree and are familiar with using the internet. The participants also had access to the internet either at work or home. Since the survey was limited to gathering data and opinions on a dynamic interactive website for competency testing and information management, it was unlikely that confidentiality would be a major issue. The data from the survey was synchronously gathered into a secured database once the respondent submitted their answers.

Data Analysis

Validity is the truthfulness of the survey or whether it measures what you intent to measure. To check for validity of the data collected by the survey an alignment check was conducted as demonstrated by (Cox & Cox, 2008). A matrix was designed in which the guiding questions that were answered occupy one dimension and the questionnaire items the other. Each item was evaluated and checked against the guiding questions each item referred to. Afterwards, validity was checked by cross-referencing the content of the instrument elements with similar elements discussed in the literature review. Further review of the data indicated that content validity was established. The dimensions sampled by the items appeared to be representative of the attribute *opinion*. Furthermore, the correlations between the dimensions appeared low but strong between the items within.

Table 1
Sample Alignment Check
Questions

	1	2	3	4	5	6	7	8	9
Dimension one			X			X			X
Dimension two	X						X		
Dimension three		X			X				
Dimension four				X				X	

Reliability is consistency in measuring what you want to measure. Validity on the other hand is measuring what you intent to measure and implies reliability but reliability does not necessarily implies validity. As part of checking for reliability a descriptive analysis of the data and coefficient alpha was done to check for outliers, missing data, or any other abnormality that would interfere with the data analysis. The descriptive analysis of the data did not show any missing data or outliers.

Assessing Scale Reliability with Coefficient Alpha

The statistical software program used to conduct the data analysis in this study was *PASW Statistics 18*. An item-by-item analysis was performed to determine if coefficient alpha could be improved by removing items. For this analysis all items comprised a good scale so removing items was not necessary.

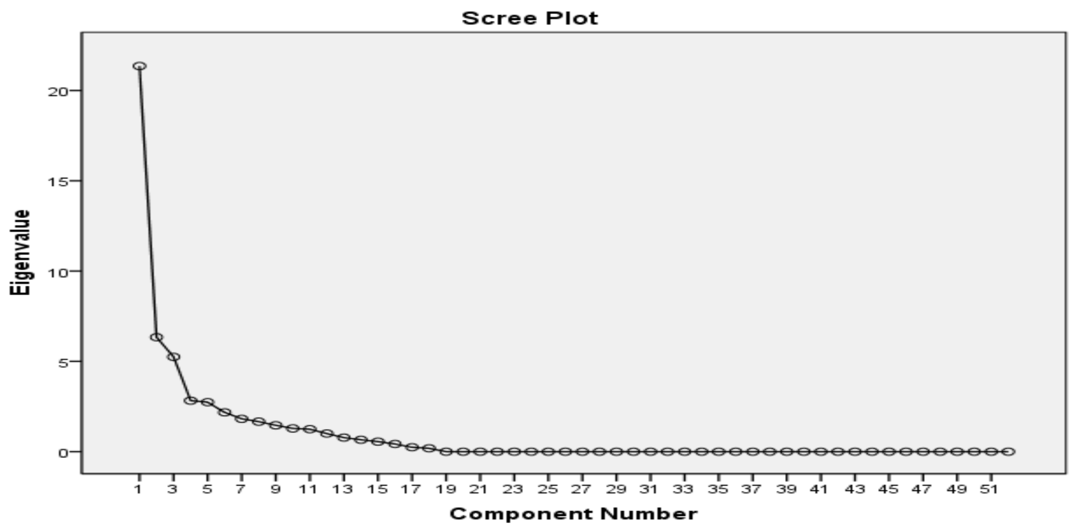
The Coefficient alpha calculated for all the 52 items on the construct was .943 indicting good scale reliability since it is equal or higher than .70 (Cronbach, 1951). The Coefficient alpha calculated for the dimension represented by items 1-13 was .793. The Coefficient alpha calculated for the dimension represented by items 14-26 was .734. The Coefficient alpha calculated for the dimension represented by items 27-40 was .968. The Coefficient alpha calculated for the dimension represented by items 40-52 was .849.

The Pearson correlation coefficient between all pairs of questions demonstrated that all the questions correlate fairly well so there was no need to consider eliminating any question. A scan of the correlation matrix to check the pattern of relationships was conducted. A review of the correlation coefficients did not indicate any values greater the 0.9. Correlated coefficients values greater than 0.9 may indicate singularity of the data which could result in values being highly correlated, causing problems with factor analysis.

As part of the study a communality analysis was performed on the data. The communality measures the percent to variance in a given variable explained by all the factors jointly and may be interpreted as the reliability of the indicator. In general, communalities show for which measured variables the factor analysis is working best and least well. The percent of variance for each indicator in this study did not show the need to eliminate any of them.

A principal component analysis was performed on the data to analyze for any coherent factor structure underlying the items on the survey. The component matrix of the principal component analysis produced the factor loadings results for the study. This was the central output for factor analysis. The factor loadings or component loadings are the correlation coefficients between the variables (rows) and factors (columns). Factor loadings are the basis for imputing a label to the different factors. Loadings above .6 are usually considered "high" and those below .4 are "low." Therefore a high loading corresponds to the type of factor and a low does not. As part of the factor analysis a rotated factor component matrix was also done to achieve a better spread on the loading of the items. The rotated factor matrix analyses yield six factors with Eigen value greater than 2.0 (ranging from 2.175 to 21.352). These six factors accounted for 78.229 of the overall variance. After examining the factor loading of the six factors it was decided to use only the first three factors with the highest number of items loading above 0.40 since these were the factors that had the items evenly spread and appeared to cover the majority of coherent factor structure underlying the survey. The three factor selected were (a) efficacy, (b) perception and (c) usefulness.

Table 2



The scree plot of SPSS data analysis indicated a point of inflexion on the curve. The curve began to tail off between 3 and 4 factors. It also tail off again after 5 factors. It was decided that for this study the retention of 3 factors would be appropriate.

Results

Analysis of the data indicated that certain items that grouped together exhibited high loading on the same factor. It was concluded that these items measured the same construct. Three dimensions (efficacy, perception, and usefulness) were selected based on loading after rotating factor analysis and the resulting reverse coding clusters. Although some items cross loaded the majority exhibited high loading on only one factor. The original dimensions of perception and worthiness were combined into the dimension of usefulness. The basis for combining the two dimensions was after examining the data, a pattern emerge that cluster the questions of perception and worthiness into the dimension of usefulness. Further review of the items indicated that by eliminating and modifying some of the questions on the survey a better set of data could be gathered. Further review of the data also indicated that the goal of data reduction, description of relationship between items and the test theory about the relationship of the dimensions were met.

Discussion and Recommendations

The clinical laboratories are in need of a comprehensive, effective, and efficient computer base competency test to meet the requirements of the accreditation agencies. The literature review indicates that the best methods for evaluating and designing an instructional program, such as a computer-based competency test is to first start with a viable design that is eclectic. The best method to accomplish this goal is to start by evaluating the design of the competency test in a holistic manner utilizing educational theories such as constuctivism. Furthermore, the literature review indicates that the advantages of using computer based instruction outweigh the perceived disadvantages.

The computer application used to set up the interactive site and survey were *Dreamweaver*, *ColdFusion* and *Microsoft's Access* database. These applications were selected because they provide a practical and convenient method of setting up an interactive information management environment on a local or remote server. This capability allows the gathering of data for analysis, collating and grading. The website also facilitated the sending of invitations for participation by e-mail. Twenty-two persons working in the clinical laboratory were invited to take the survey and were directed to the URL of the functional interactive website set up for competency testing.

The results from the survey indicated that the participants felt using dynamic interactive website was preferred, effective and useful for competency testing in the clinical laboratory. In addition the study indicates that research to compare current methods of competency testing and computer based testing is needed. Furthermore, the study also indicates that research on the different ways of using an interactive website for a variety of applications such as on-line surveys, data gathering, local network location, educational instructional design, etc. is also needed.

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Transitioning from Face-to-Face to Online Learning: A Case Study

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Options for online learning are becoming increasingly more available, feasible, and possible for many students pursuing higher education. The increased use of online learning is partly due to the economic reality of shrinking budgets and the increased need of adult learners to pursue professional continuing education (Gunawardena and McIsaac, 1996). With more and more educational institutions offering such options, it is important to explore the decisions made by instructional designers when transitioning from face-to-face to online formats.

The structure of a course is an important consideration in designing an online learning environment; it is also imperative to student satisfaction and achievement. According to Stein (2004), the most important factor in student satisfaction and community formation is the degree of structure in the course. These findings are in contrast to transactional theory that states that low structure, the ability to negotiate with the instructor, and the autonomy that online learning offers, are most valued by students. Structure includes such things as clearly defined objectives, assignments, deadlines, and encouraging dialogue (Stein, 2004).

Another study conducted by Ausburn (2004) confirms and expands these findings. In this study students were asked to rank order eight features of the online learning environments. The results identified the top three features as being (1) Course announcements and reminders from the instructor; (2) Course information documents such as syllabus, outlines, requirements, and grading procedures and; (3) Information about specific assignments and instructions for completing them. An important commonality worth highlighting in each of these top three choices is their function as creators of structure and security (Ausburn, 2004). All three of these features accomplish the task of helping students stay on-task and focused through guidance and confirmation as they progress through a course that is at a distance, which has been shown as a critical component of learner success in distance education.

In an article entitled “The Ideal Online Course” (Carr-Chellman, 2000), various features of online courses are reviewed in the context of how they contribute to creating the ideal in online courses. One such feature explored is the use of peer reviews. Encouraging students to post their work online to make them available for review by their peers provides for an opportunity to learn from their peers in refining their own work and also encourages a high level of intellectual discourse over the approaches and results others have undertaken.

According to Moore and Kearsley (2005) “Distance education is planned learning that normally occurs in a different place from teaching, requiring special course design and instruction techniques, communication through various technologies, and special organizational and administrative arrangements” (p. 2). Each of the components of this definition has been explored in the current study. The construction of the course also closely addressed the elements of multimedia instruction set forth by Martin and Klein (2008) by providing objectives, information, practice with feedback, and review in each learning mission. These elements were taken into immediate consideration when designing the course and its structure. In conducting the current study by analyzing so many aspects of the course, it is hoped that pertinent recommendations can be drawn and contribute to the current body of instructional technology literature and practice.

This study researched the design and development of the course (Richey & Klein, 2007) to examine the analysis, design, development, implementation, and evaluation (ADDIE) of a course as it transitions from face-to-face to a fully online environment. The study addresses the following research questions:

1. What were the design decisions at each stage of the ADDIE model in the execution of the course, and what were the justifications and implications accompanying those decisions?
2. What were student’s attitudes toward the course and its structure, components, and execution?
3. How did the course design, development, implementation, and evaluation change the instructor/designer’s attitude toward the course and teaching it?
4. Did student achievement vary between the face-to-face and online course?

The independent variable in this study is course format. One level of this variable is the face-to-face course conducted in Spring 2009. The other level is the online course that was designed in Spring 2009, and then conducted over Summer Session 2009 and Fall 2009 semesters. From the Spring 2009 running of the face-to-face course to the development and running of Summer Session of the course changes were made to the content and organization of the course.

The criterion variables are student attitudes, designer/instructor attitudes, and student achievement. Student attitudes have been measured across all levels of the independent variable using a survey format with mostly Likert-scale type questions, and a few open-ended questions. Designer/instructor attitudes were measured through self-noting by the two instructor/designers and also apparent in course modifications. Student achievement was measured through overall grades in the course and also grades on comparable projects.

Also of particular importance in this study are the design decisions of the instructors/designers of the course. Both of the people involved in the transition process of this course were teaching during the Spring 2009 semester in the face-to-face environment with one proceeding on to teach Summer Session in the online environment. Elaboration about the design decisions with recommendations at each stage of the ADDIE model are included below in the results and discussion.

Method

Participants

Participants are approximately 125 undergraduate students enrolled in a Computer Literacy course at a large university in the southwest United States. The instructors and also designers of the course are two Teaching Assistants that had taught the course for at least a year and are also doctoral students in an Educational Technology program. The terminal goal of the course is for students to become computer literate. The course has two areas of concentration: (1) discuss issues surrounding computers, software and the use of technology in the classroom and workplace fluently, and (2) use computer applications for productivity, data analysis, and problem solving. Material for both versions of the course is hosted through the university's BlackBoard site. The online version is arranged using a gaming format into five "learning missions" that each have six levels to complete before moving to the next mission. There was also a group mission, midterm mission, and final mission.

Procedures

Two different treatments are explored in this study. The first is the spring semester course in its face-to-face format, and the second is the summer and fall semesters in their online format. Assignments, course objectives, projects, goals, and the course textbook remained the same for both treatments. Participants were assigned to each treatment group through their chosen enrollment in the course.

The materials used and covered in each course were the same. There were 4 main units in the course, Word, PowerPoint, Excel, and ePortfolio (Google sites). Each unit included a chapter reading, discussion, a demonstration, a practice activity, a project, and a quiz. There was also a midterm and final exam as part of the course. In both the Spring 2009 face-to-face course and the Fall 2009 online course, the each unit occurred over 4-5 weeks, with the duration of the entire semester lasting 15 weeks. In the Summer 2009 Course the entire duration of the course was 5 weeks, with each unit occurring over 1-2 weeks.

In each treatment students progressed through the course with the help of the instructor and through the platform of the BlackBoard Course Management System (BB). Each individual instructor, using rubrics, administered grades for discussions, activities, and projects. Quizzes were administered through BB and were scored automatically. The instructor using a rubric also scored both the Midterm and Final. For the online courses, the demonstrations were done using an internet based Microsoft resource that included pertinent features to the course, while in the face-to-face course the demonstrations were done by the instructor.

Materials

The notable difference in the two course designs was the organization of the course. In the face-to-face version of the course units were organized into "Learning Modules" and further grouped by week numbers with the content to be completed that week. In the online version each unit is organized into a "Learning Missions" and arranged further in "Levels" in numeric order pertaining to the order to be completed. Content in each was varied only minimally only to recreate the demonstration in the online environment without an instructor to deliver that live.

The online environment also utilized the use of a course calendar that was embedded on the announcements page in the course BlackBoard site. This was the first thing students viewed when entering the course and it included unit start dates, suggested pacing, and assignment due dates.

Criterion Measures

The criterion variables in this study are student attitudes, designer/instructor attitudes, and student achievement. Student attitudes were measure through a 10-questions survey including eight Likert-type questions about various course attributes, and two open-ended questions allowing participants to give individual feedback. The tool used for this measurement was survey monkey.

Designer/Instructor attitudes were noted during the transition process from face-to-face into online, and also during the semesters in which they instructed the course. With the necessity for an online offering of the course in future semesters it was decided that the course would be evaluated, revised, and reorganized to go online in July 2009. During this process the two designer/instructors applied the ADDIE model to efficiently and effectively transition the course to online.

Student achievement was measured via scores on assignments, quizzes, exams, and projects. The criteria for grading these assignments were consistent through each semester and were adjusted only to incorporate different features of the content taught. Data was archived from Spring 2009, Summer 2009, and Fall 2009 versions of the course to be analyzed.

Results

The survey used in this case study was designed and delivered in Survey Monkey. Students were allowed to participate on a voluntary basis and were asked to answer eight Likert-type questions and two open-ended questions. The results of the survey are displayed in tables 1 through 8. Table 9 displays the final course grade distribution for students in each of the groups.

Table 1

Survey Question 1 - Had you used Microsoft Office 2007 prior to the start of this course?

	Yes	No	n
Summer 2009	66.7%	33.3%	22
Fall 2009	76.9%	23.1%	78

Table 2

Survey Question 2 – Rate your level of proficiency with productivity software prior to starting this course.

	Expert	Above Average	Average	Below Average	No Experience	n
Summer 2009	0%	22.7%	50.0%	22.7%	4.5%	22
Fall 2009	2.5%	40.5%	48.1%	8.9%	0%	79

Table 3
Survey Question 3 – In general how satisfied are you with EDT 321?

	Very Satisfied	Satisfied	Neither	Not Particularly Satisfied	Not Satisfied	n
Summer 2009	36.4%	50.0%	9.1%	4.5%	0%	22
Fall 2009	34.2%	35.4%	12.7%	11.4%	6.3%	79

Table 4
Survey Question 4 – How effective are the course practice activities in helping you to learn how to use the productivity software?

	Very Effective	Somewhat Effective	Neither	Somewhat Not Effective	Not Effective At All	n
Summer 2009	59.1%	36.4%	4.5%	0.0%	0.0%	22
Fall 2009	36.7%	54.4%	3.8%	3.8%	1.3%	79

Table 5
Survey Questions 5 – The instruction has prepared me to successfully complete the project for each Learning Mission.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	n
Summer 2009	45.5%	50.0%	4.5%	0.0%	0.0%	22
Fall 2009	32.9%	43.0%	12.7%	5.1%	6.3%	79

Table 6
Survey Question 6 – The arrangement of the course into learning missions and levels made it easy to progress through.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	n
Summer 2009	50.0%	45.5%	4.5%	0.0%	0.0%	22
Fall 2009	42.9%	45.5%	6.5%	2.6%	2.6%	77

Table 7
Survey Question 7 – The course calendar was useful to have access to throughout the course.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	n
Summer 2009	54.5%	45.5%	0.0%	0.0%	0.0%	22
Fall 2009	67.9%	25.6%	2.6%	1.3%	2.6%	78

Table 8
Survey Question 8 – The use of peer reviews in the course were helpful in my understanding of the project requirements.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	n
Summer 2009	22.7%	27.3%	36.4%	9.1%	4.5%	22
Fall 2009	16.9%	35.1%	16.9%	22.1%	9.1%	77

Table 9
Student Achievement Data – Overall final course grade distribution.

	A	B	C	D	E	I	W	n
Spring 2009	73.6%	13.9%	2.8%	1.4%	2.8%	0.0%	5.6%	72
Summer 2009	64.0%	16.0%	4.0%	0.0%	0.0%	0.0%	16.0%	25
Fall 2009	51.2%	19.0%	10.7%	0.8%	7.4%	0.8%	9.9%	121

There were also two open-ended questions that were answered by 21 of the students in the summer course and 68 in the fall course. A sampling of the responses is below for each question.

Question 9 – What did you find most enjoyable and/or most useful about the course?

- The tools that this course taught and provided are very important in society today, and I am grateful to have been able to know how to use them through this course!
- I really liked how each section of the course was split into learning missions and different levels. Since the course covers so much material I felt that this helped me to manage time and make it seem less daunting. I thought that this in addition to the course calendar that had pacing dates was extremely helpful and useful and was one of the reasons I was able to succeed so well in this course.
- I enjoyed how we had just basic guidelines and we could use our interests and imaginations while creating projects.
- The course calendar.
- Class was great! It required a lot of effort, which is expected but it has been the best online class I have taken. It was easy to know what should be done with the calendar and if you did things that were asked of you, you did well in the class!
- I really appreciated the set up of the course; the way it was separated into the "Learning Missions" made it very easy to follow along. I enjoyed making the Google Site the most.
- The tool practices, it gave me a chance to practice the skills before the test.
- The lay out of the missions and the levels.
- I liked that we were shown some new software and were given projects to help us understand the software. The projects were a new learning experience as well as fun to do. The calendar that showed due dates as well as kept you on track. Great Idea, and it was the first page that you saw when you loaded blackboard.
- There were fun assignments that tapped into my creativity!
- I liked the PowerPoint mission and the group projects. It was fun to create a presentation and to learn how to use all the cool features of PowerPoint.
- The organization of the missions and the tutorials.
- I thought the lessons where they walked you through with instructions of how to use 2007; excel, word and PowerPoint were very helpful. I learned new tricks of how to manipulate the program to work to my advantage.
- The calendar, Great way to stay on track.
- The way the online course was designed was very enjoyable and useful. It made it easy to follow and figure out a daily basis what was expected of me, what assignments I needed to do, the deadlines, everything was great!

- I found doing the tool projects most enjoyable because I was able to be creative.
- I truly enjoyed taking this class in many different ways. I thought the peer reviews were very useful. I thought the class was well organized and the lessons were useful. The videos were also very helpful.

Question 10 – What suggestions do you have to improve and/or change the online EDT 321 course in the future?

- I enjoy doing peer reviews but I wasn't sure I liked how we were assigned groups. While I understand that this was done so everyone had their project reviewed, I felt it was hard to communicate with some people because they may not have been checking blackboard as often as other people. Perhaps more leniency on which we can peer review would help.
- Gear it more towards the diverse population of students. I have no intention to be a teacher, but it seemed every activity related to that profession. Explore more software. Other software exists outside of Microsoft.
- My only suggestions might be to have the projects graded sooner and maybe put more of an explanation under the project instructions, because some of the projects I had no idea where to start and didn't know if I was doing it correctly. Other than that, good! I learned a lot.
- I felt like one in a thousand students in this course. The instructor I had was short with me in my emails about questions and did not ever take the time to fully explain what I was asking. Several of my emails were never even responded to. The peer reviews often left me no closer to understanding the guidelines because my peers would not take the time to actually analyze my project. Also the group project was extremely frustrating and seemed inappropriate for an online course. I did most of the work and everyone got credit for it. The MyLabSchool section of the course was a waste of my money. We used the website maybe four times and it did not help me to better understand the course materials.
- Make instructors more easily accessible and also timelier responses to emails in the future.
- I did like that the learning mission presentations were open to us to choose our own topics, but I would have loved to see examples for the level 5 learning missions. Since the instructions sometimes were so broad, I would have like to see an example of our expectations so we knew we were on the right track. Great course, though!
- I didn't care for the online book. It was expensive and as I understand ASU will not buy back these types of books. I would suggest something that will make it less costly for the students and with resale ability.
- A new textbook... The one we have now seems outdated.
- I am not an education major and really struggled with many of the assignments that were geared towards EDU majors. For example, I had no idea how to write a lesson plan and think that you should have an alternative assignment for those of us that are not seeking careers in the field of education.
- Better instructions and feedback from the teachers....also grade our assignments quicker.
- Unfortunately, I didn't receive strong feedback or help on the peer review. I think this should be deleted. I think if students have questions of not understanding the material. It should be aired in the discussion board and not through email. I received too many emails from students as they "Replied all" and did not include the instructor. Going through the discussion board will include the instructor.

Discussion

This study aimed to explore the design and development of a course that was a face-to-face course and was transitioned to an online course. In its case study design that included student's surveys, instructor impressions, and student achievement data, the course itself and the success of the transition process were analyzed. Overall, the transition seems a success with many favorable ratings and pieces of feedback from students, the instructors, and designers.

Emerging as one of the most interesting features of the course in its redesign and launching in the Summer and Fall semesters was the organization of the material into "Learning Missions" with six "Levels" to complete in each unit before moving to the next. Table 6 shows the results to this question on the survey and there is a favorable (strongly agree or agree) rating from 95.5% of students in the summer course and 88.4% from students in the fall course. The intent of the designers in organizing and naming the content this way was to make it seem more like a game, be less formal in it's naming, and be very easy to follow through knowing the order of completion for tasks. From the results in the survey this seems to have been achieved. Also, in the open-ended question (question 9) students often commented on their affinity for the organization of the course and mentioned the terminology of missions and levels in doing so. This implies that it both was easily understood and also stuck with them throughout the course.

The most surprising finding of the study was how the peer reviews faired. It was hypothesized that the students would be very fond of the peer reviews, find them helpful in learning the criteria they would be assessed upon, and be an effective form of feedback. In the survey they were rated favorably by 50.0% of students and in the fall by 52.0% of students. They were also mentioned often in the open-ended question directed at improvements that could be made to the course. Possible reasons for this could be the way in which they were conducted via the discussion board in BlackBoard may not have been the best tool for an activity such as this. Also, especially in the summer course the time constraints could have created an unfavorable opinion because of some students unresponsiveness affecting others ability to complete the peer reviews.

Another question that addressed a new feature in the online course and yielded valuable results was that focusing on the course calendar. In creating the course calendar the instructor/designer intentions were to create a very clear, concise, and easily accessible overview of the course and it's important due dates. Google calendars was used and embedded because of it's accessibility by all students at the university in coming with their accounts and also because of it's abilities to be updated easily with those changes immediately available to students to view. In the survey questions presented in table 6, students in the summer course gave the course calendar a favorable rating 99.0% of the time and in the fall they did so 93.5% of the time. Some suggestions for improvement included making the course calendar a part of the syllabus rather than as a separate web-based resource, but in large part feedback about the calendar was quite favorable.

The importance of practice was also assessed in the questionnaire to students. Presented in table 4 results indicated that in the summer course 95.5% of students said the course practice activities were either very effective of effective in helping them to learn the productivity software. In the fall course 91.1% felt the same.

Student Achievement was measured through the comparison of the overall course grade distribution from the face-to-face sections of Spring 2009 to the online sections of Summer 2009 and Fall 2009. The same instructor taught these sections. The important points to note here are that the percentage of grades that were an "A" were higher in the face-to-face section than either of the online sections. The percentage of participants receiving a course grade of "B" or "C" were less in the face-to-face than either online section. The number of course withdrawals, "W", was also lowest in the face-to-face sections of the course. The only grade which was assigned more in the face-to-face course was the grade of a "D". Overall, the general distribution of the grades in each of the sections did not vary greatly and followed the same general pattern.

The impressions of the instructors/designers were very positive toward the transition of the course from the face-to-face format to online. The transition took place over approximately 3 weeks where the designers met often and built the course in BB. Much attention was paid to creating the "game-like" structure with the materials organized into "Missions" with "Levels" to be completed. The designers were also careful to include in each mission the objectives, practice, and review. The assessment pieces were only modified slightly to fit the online format. The overall transition process was smooth and successful from the designer perspective and subsequently from the instructor perspective.

Throughout the process of designing this course developing it, teaching it, and collecting and analyzing data several suggestions for future research have surfaced. The one seemingly most exciting and current with the times is the idea of creating a course around a "game-like" structure. Using different models for organization of the material, naming schemes and activities might be worthwhile to explore in the future. Another is experimenting with alternate tools or ways to conduct peer reviews in an online environment to increase student satisfaction in getting feedback from peers. A final recommendation here stemming from this research is the idea of building the course calendar into the syllabus creating more of a study guide in a static form rather than the dynamic web-based route pursued here. It is of course important to keep in mind the limited constrains of this study in it's number of participants, specific audience and content, and information gathered as one proceeds on.

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Effect of Academic Incentive Use with Cooperative Learning Groups on Concept Acquisition and Attitudes

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Abstract

The purpose of this study was to examine the effect of academic incentive use with cooperative learning groups on concept acquisition, and attitudes towards instruction in a classroom assessment course. Forty-four undergraduate students from two sections of the course were randomly assigned to one of two treatments. Then, students in each section were randomly assigned to cooperative learning groups. Both groups received guidelines about working effectively in groups and instructions on writing objective test items. The experimental group was offered an academic incentive; however, the control group was not offered any academic incentive. Results revealed that students in both groups performed, on average, equally on the concept acquisition assessment. But, there was a significant difference between the two groups on confidence ($p = 0.012$). The findings are discussed in terms of cooperative learning elements, instructional material design, and achievement goal as factors likely to have led to the results.

In the last few decades, there has been a growing interest in the use of classroom instructional activities, such as cooperative learning, that allow learners to be active participants in their own learning rather than passive observers (Johnson & Johnson, 1999; Johnson, Johnson, & Smith, 1998b). Many authors have defined cooperative learning and its fundamentals to be successful (Johnson & Johnson, 1999; Johnson, Johnson, & Smith, 1998b; Larry, 1993; Walker, 1996).

Even though the terminologies used to define cooperative learning and its basic elements vary among authors, all the descriptions have a set of common ideas. Johnson and Johnson (1999) definition of cooperative learning and description for its basic elements capture the major thoughts discussed by the other authors.

Johnson and Johnson (1999) defined cooperative learning as a versatile procedure that can be used for diversified purposes. It consists of learners working together (cooperative learning groups) to accomplish shared learning goals that are beneficial to all and to complete specific tasks and assignments. These groups may be used to teach specific content, to ensure active cognitive processing of information during a lecture or demonstration, and to provide long-term support and assistance for academic progress. The essential elements that Johnson and Johnson described for a successful cooperative learning include (a) positive interdependence, (b) individual accountability, (c) face-to-face promotive interaction, (d) social skills, and (e) group processing.

While there have been a number of experimental and quasi-experimental studies that have compared the effects of cooperative learning groups with individual learning, results have varied greatly across studies. In some instances students within cooperative groups learned more and had more positive attitudes toward learning than students who worked individually (Klein & Predimore, 1992; Saner, McCaffrey, Stacher, Klein, & Bell 1994). However, in other cases, students who worked individually demonstrated greater learning and more positive attitudes than those students who worked in cooperative groups (Klein, Erchul, & Pridemore, 1994; Klein & Schnakenbery, 2000). Some other studies have also reported that students who worked in cooperative groups and students who worked individually were equally effective (Carrier & Sales, 1987; Crooks, Klein, Jones, & Dwyer, 1996). Moreover, in those instances in which cooperative learning proved to be superior, the researchers were unable to ascertain which elements of the cooperative learning were primarily responsible for the improvement in learning and attitudes.

Given the mixed results and the difficulty of previous researchers have had isolating those elements of cooperative learning that may be of particular importance, I thought it would be beneficial to conduct a study that focused on academic incentive use with cooperative groups to strengthen one particular element of cooperative learning. As previously noted, one such element involves positive interdependence. Positive interdependence refers to the cooperation when students promote and facilitate each other's efforts to learn (Johnson, Johnson, & Smith, 1998). One way to strengthen positive interdependence is by using joint rewards, such as academic incentives, where all members of a group receive the same reward based on the group performance (Jonhson & Johnson, 1999). An academic incentive is any tangible or intangible reward that is designated to motivate the group of learners to achieve a specified learning goal (Stipek, 2002).

There appears to be a little consensus within the instructional design community as to how much academic incentives affect concept acquisition. Some theorists have emphasized the value of academic incentives in enhancing concept acquisition (e.g., Hay, 1976; Kagan 1992; Johnson & Johnson, 1999). Others, however, have argued that academic incentives for group work are counterproductive and can worsen learning (e.g., Kohn, 1991).

Research related to the effects of academic incentives on learning has also shown conflicting results. Some researchers have supported the idea that academic incentives do not affect learning in cooperative groups (Brewer & Klein, 2006; Klein & Schnackenberg, 2000; Neihoff & Mesch, 1990). Regardless, there is some evidence that appropriate academic incentives have a positive impact on learning when learners use cooperative learning methods (Cole & Smith, 1993; Jensen, Johnson, & Johnson, 2002; Joyce, 1999; O'Donnell 1996).

Theorists also appear to have little agreement on the effect of academic incentives on learner attitudes. Slavin (1991) asserted that academic incentives are necessary to enhance attitude in cooperative group settings. However, Kohn (1991) believed that the academic incentives for group work are ineffective and can deteriorate attitude.

The findings relating to the effects of academic incentives on learner attitudes have also been mixed. Some research has supported the notion that academic incentives improve learner attitude (Johnson, Johnson, & Hollubec, 1994; Webb, 1997). However, other research has indicated that learner attitudes are not affected by the academic incentive in a cooperative group (Adams, Carson, & Hamm, 1990; Klein & Schnackenberg, 2000; Johnson & Johnson, 1996).

Despite the steady growth in the intellectual writing and theorizing around the impact of incentives use with cooperative groups on concept acquisition and attitudes, the research in this area remains very limited. The previously presented studies provide a little clarity and evidence as to the relative effectiveness of incentives within cooperative groups on concept acquisition and learner attitudes.

The purpose of this study was to examine the effect of academic incentive use with cooperative learning groups on acquiring concepts of constructing objective test items, and on attitudes towards instruction for undergraduate students in an introductory classroom assessment course. Specifically, the study compared the experimental and the control group on acquiring the concepts of constructing objective test items and their attitudes towards instruction. The experimental group included cooperative learning groups who were offered bonus points for their post-test grade and each of the individuals grade affected the success of the group as a whole. However, the control group consisted of cooperative learning groups who were not offered any bonus points for their post-test grade and their grade did not affect any other students in the group to which they belong.

Concept acquisition was measured through the administration of a post-test that required learners to demonstrate their understanding and ability to apply the concepts of constructing objective test items. The items on the test measured recalling and applying the concepts. The test was administered at the end of the study, that is, after the given instruction and the practiced activities in a few days.

Learners' attitudes towards instruction were measured through an attitudinal survey based on the Keller's Course Interest Survey (CIS) and the Instructional Materials Motivation Survey (IMMS) at the end of the activities practice. Students' attitudes were measured in terms of attention, relevance, confidence, and satisfaction towards instruction and material. The goal with this instrument is to find out how motivated students were by the lesson (Keller, 2010). This survey required students to report their degree of agreement with variety of different statements concerning their attention, relevance, confidence, and satisfaction.

In this study, I hypothesized that undergraduate students in cooperative learning groups that were offered an academic incentive would do better on recalling and applying concepts of constructing objective test items than undergraduate students in cooperative learning groups who were not offered an academic incentive. This result was expected based on the positive interdependence concept that links the success of the whole group to the individual contributions that are necessary to reach an objective or receive a reward (Johnson & Johnson, 1999). In addition to this concept, the positive reinforcement theory states that a satisfying positive reinforcement (e.g., bonus points) which is contingent upon a response results in strengthening that response (Driscoll, 2005).

I also expected that undergraduate students in cooperative groups that were offered an academic incentive would have better attitudes towards instruction than undergraduate students in cooperative groups that were not offered an academic incentive. Logically, when a student is rewarded for an achievement, he/she feels more motivated, which in turns affects his/her attitudes towards the instruction. In support to this logic, Keller believes that students motives, together with their expectancies (outcome expectations), influence their attitudes because they do not look at rewards in isolation (Driscoll, 2005).

Method

Participants

The participants in this study were 44 undergraduate students who were taking a classroom assessment course at the Florida State University. The study took place during the regularly scheduled periods of the class. Thirty students were white, 6 were black, 5 were Hispanic, and 3 with other ethnic background. The majority of the participants were females. Thirty seven students were females, 6 students were male, and 1 of the student's gender was not indicated. Twenty two of the students were seniors, 20 were juniors, 1 sophomore, and 1 appeared to be a graduate student; even though, the course was an undergraduate course. The participants in the study were all the students in the two sections of the classroom assessment course in the university.

Materials

The same instructional materials and tasks were given to both sections. All students were provided with paper-based guidelines about how to work effectively and efficiently in a team.

These guidelines were distributed by the teacher of every section in the class prior to the instruction session. The students were also supposed to read a chapter that focuses on concepts for constructing objective test items before the following class session. During the instruction session, the instructors used PowerPoint presentation to deliver the instruction focusing on constructing objective test items. The length of the instruction was for around 45 minutes and its purpose was to teach students the concepts for building objective test items. After the instruction, the students worked in cooperative learning groups on a 20 minutes paper-based practice in the classroom to apply the concepts that were covered by the instructors. The intervention (i.e., the academic incentive) was employed in this part of the instruction. The students were allowed to use their books to refer to information from the chapter to stimulate recalling prior information and concepts that were presented by the instructors. Each section in the practice provided guidance and directions for practicing the specified concept. After the practice, a paper-based feedback was provided to students to show them whether or not their answers were correct.

Independent Variables

The independent variable was the use of academic incentive with cooperative learning groups. The first level of the independent variable was cooperative learning groups who were offered an academic incentive (bonus points). The second level of the independent variable was cooperative learning groups who were not offered any academic incentive.

The cooperative learning groups who were offered an academic incentive were told that in order to receive the bonus points each student in the team should get 88% or higher in the post-test and that the success of the group was based on the performance of each individual. Throughout the practice activity in the classroom, I always reminded the students that their success was based on their interdependent performance and encouraged them to work cooperatively on the activity.

The success of cooperative learning groups who were not offered an academic incentive was dependent on individual success and not on the other group members' success. These students were not offered any academic incentive. Before the students started working on the activity in the classroom, I only encouraged them to work cooperatively within their teams.

Dependent Variables

The dependent variables in this study were the learners' acquisition of constructing objective test items concepts, and the learners' attitudes towards instruction.

Learners' acquisition of the concepts was measured through a paper-based post-test. The test was designed to assess the learners' ability to recall and apply the concepts related to constructing objective test items. The test consisted of 18 multiple choice questions. Nine questions measured the students' ability to apply the concepts and 9 questions measured their ability to recall information. One of the test questions that measured the students' ability to apply concepts was: "Which of the following is the best-stated short answer item?" followed by 4 choices: A. Cleveland may be found on ______. B. A person first landed on the moon in ___________. C. The author of Silas Marner is _________ _________. D. The United Nations building is in ________ _______. While one of the questions that measured recalling information was: "Which item type is classified as a supply-type item?" followed by 3 choices: A. Matching. B. Short answer. C. True-false. The test items were selected from the test-bank questions related to the chapter in the instructor manual. The key for the answers from the same manual was used to score the students responses.

The learners' attitudes were measured in terms of attention, relevance, confidence, and satisfaction using a survey that included questions from Keller's Course Interest Survey (CIS) and the Instructional Material Motivation Survey (IMMS). The survey was paper-based and included 24 items, 5 of which related to attention, 7 related to the relevance of the materials and tasks, 7 pertained to learner's confidence, and 5 items relevant to measuring learner's satisfaction. Responses to the items were in the form of a five-point Likert scale.

Procedures

Since the instructors were both willing to give bonus points to their students, the sections were randomly assigned to either the treatment group (students who were offered the academic incentive) or control group (students who were not offered academic incentive). Then, participants in each group were randomly assigned to cooperative groups within their class. The instructors were asked to distribute the guidelines for working in teams to the students and to ask them to read the "constructing objective test items" chapter prior to the instruction and practice session, and to bring their books to class in the following session. Both, the treatment and the control groups, participated in the study over two days, dedicating 1 hour and 50 minutes from the class time for the whole study. On the first day, the students worked on the practice activities, and completed the attitudinal survey after the 45 minute-instruction that was delivered by the instructors, and on the second day, the students completed the post-test. Only students who were present on both days of the study and for whom data were obtained (n=44) were included in the final analysis.

The study was conducted in the classroom assessment course for the undergraduate students with the teacher and the researchers in the class throughout the study. The study for each of the groups was conducted on a different day; however, the days were consecutive and the time between the first day and the second day of the study was equal for both groups. On the first day after the instruction was over, the instructors introduced the research team to the participants and the researchers in return informed the students about the purpose of the study, and described for them the procedures and the lesson materials.

Then, I told the students who their cooperative team members would be to work together on the practice. Before starting on the 20 minutes practice activities, I reminded the students in both groups about the previously distributed guidelines for working effectively and efficiently in a team. Participants offered the academic incentive were also told that the group success was dependent on the success and contribution of every individual in the group and they were highly encouraged to work cooperatively. In order for each student in the team to receive the bonus points, each student in the group had to get 88% or higher on the post-test in order for all the individuals in the group to receive the bonus points.

After working on the practice for 20 minutes, students were given the answers for the practice to see whether or not their answers were correct, and they were asked to discuss the answers with their team members for 5 minutes before returning the practice to the researchers. Then, the students took 10 minutes to answer the attitudinal survey individually, and returned their responses to the researchers. Before leaving the classroom, I reminded the cooperative learning groups who were offered the academic incentive about the importance of individual contribution in the post-test that would take place in the following session. But, the cooperative learning groups who were not offered an academic incentive were just told that in the coming session they would sit for post-test at the beginning of the session.

On the second day of the study, which was 5 days after the instruction and the practice for each group, the students completed individually a 20 minute post-test in the beginning of the session. Before taking the test, I reminded the cooperative groups who were offered the academic incentive about the importance of their contribution in order for their team members to receive the bonus points and about the test directions and time. At the end of the test, the researchers compiled the post-test responses from all the students.

Results

Concept Acquisition

Concept acquisition was measured by a post-test that was administered at the end of the study. The test included items that measured recalling and applying the concepts for constructing objective test items that had been taught. Table 1 presents the means and standard deviations for each group on the concept acquisition skill post-test. A review of data revealed no violation of the assumptions of normality and homogeneity of variance. With alpha set to .05, and with 22 subjects per treatment group, the probability of detecting a small difference between means was .96.

The data were analyzed using analysis of variance (ANOVA). Results of ANOVA revealed that there was no significant main effect for academic incentive on test scores $F(1,42) = 2.59$, $p = .114$. Students in the cooperative groups who were offered an academic incentive did not significantly score higher than the students in the cooperative groups who were not offered an academic incentive. These results did not support the hypothesis that the undergraduate students in the cooperative groups who were offered an academic incentive would do better on recalling and applying concepts of constructing test items than undergraduate students in cooperative groups who were not offered an academic incentive.

Learner's Attitudes

Learner's attitudes towards instruction were measured by having students respond to an attitudinal survey that required them to report their degree of agreement on different statements concerning their level of attention, relevance, confidence, and satisfaction. Table 2 presents the means and standard deviations for each group on the attitudes. The data review for the 4 categories of the attitudes survey revealed no violations for the assumptions of normality and homogeneity of variance. With alpha set at .05, and with 22 subjects per treatment group, the probability of detecting small difference between means for attention, relevance, confidence, and satisfaction was .85.

The data were analyzed using multivariate analysis of variance (MANOVA) followed by one-way ANOVA. Results from MANOVA showed that the groups did not differ significantly on attitudes $F(1,42) = 2.052$. Students in cooperative groups who were offered an academic incentive did not have higher attention, relevance, confidence and satisfaction than students in cooperative groups who were not offered an academic incentive. Results from one-way ANOVA also indicated that the groups did not differ significantly on attention, relevance, and satisfaction $F(1, 42) = 1.35$, $p = .251$; $F(1, 42) = .64$, $p = .427$; and $F(1, 42) = .62$, $p = .437$ respectively. However, one-way ANOVA results revealed that there was a significant effect for the academic incentive on students' confidence between the 2 groups $F(1, 42) = 6.90$, $p < .05$. Students in cooperative groups who were offered an academic incentive had higher confidence than students in cooperative groups who were not offered an academic incentive. The standardized difference between these means was .81 standard deviations. According to Cohen (1997), this is generally considered to be a large effect.

Given that there was no significant difference between groups on attention, relevance, and satisfaction; and a significant difference between groups on confidence, the attitudes results partially support the hypothesis that the undergraduate students in the cooperative groups who were offered an academic incentive would have better attitudes towards instruction than the undergraduate students in the cooperative groups who were not offered an academic incentive.

Discussion

The purpose of this study was to examine the effect of academic incentive use with cooperative learning groups on acquiring concepts of constructing objective test items, and on the attitudes towards instruction for undergraduate students in an introductory classroom assessment course. I provide a discussion of the results as they relate to other research conducted in the area.

The first hypothesis that academic incentive use with cooperative learning groups would have a positive effect on students' performance was not supported. The mean post-test performance for the students who were offered an academic incentive was not significantly higher than students who were not offered an academic incentive. As has been the case in previous studies (Brewer & Klein, 2006; Klein & Schnackenberg, 2000; Neihoff & Mesch, 1990), the non significant effect of academic incentive on students' performance was most likely due to the well-designed instruction that was given to the participants. The effect of positive interdependence is likely to be weak when well-designed instructional materials are used (Brewer & Klein, 2006).

Additionally, why the academic incentive failed to have a positive effect on students' performance can be explained from a variety of standpoints. First, the instructors confirmed that most of the students in this class were careless about the subject matter and were not focused on learning the various concepts for writing test items. The second explanation was most likely related to the absence of other elements that were crucial for the activity to be cooperative. One of these elements was social skills. The students did not have much experience working in teams in this class and they might not have the interpersonal and small group skills that allow them to contribute to the success of the cooperative effort (Johnson & Johnson, 1999). In other words, placing socially unskilled individuals in a group and telling them to cooperate does not guarantee that they will be able to do so effectively.

The third explanation could be related to the high achievement goal (88%). According to Johnson, Johnson, and Smith (1998a), interdependence theory assumes that cooperative efforts are based on intrinsic motivation generated by interpersonal factors and the desire to achieve a significant goal. Since the students were rated by their instructors as being careless towards the class, they might have seen the set achievement grade as very high to achieve and they were not motivated by the academic incentive to attain the goal. In other words, as has been the case in previous research (Klein & Pridemore, 1992; Klein & Schnackenberg, 2000), the students might have not viewed the academic incentive as a motive that was supposed to strengthen positive interdependence or affiliation to the team.

The second hypothesis that academic incentive would enhance students' attitudes towards instruction was partially supported. Academic incentive enhanced students' confidence level; however, it did not significantly affect the attention, relevance, and satisfaction of students between the two groups. Students who were offered the academic incentive felt that they were confident that they learned the subject matter. This finding partially corroborates previous research indicating that academic incentive increases the perception of positive interdependence and in return enhances attitudes (Johnson, Johnson, & Hollubec, 1994; Salvin, 1991; Webb, 1997). In other words, the students who were offered the academic incentive felt confident that they could achieve the goal and receive the reward if they worked cooperatively.

There are a few problems associated with this study. First, the majority of the students in the class were females, which limited the generalizability of results. Second, there were two different instructors who taught the different sections of the course. Even though they had the same teaching experience and they used the same teaching materials; they might have different teaching style. Third, the study took place before the students' midterm exam in few days. They were preparing for the midterm exam and did not care for the study because it did not cover material that would be included in the exam. Finally, the relatively short duration of the treatment may have influenced results in this study. Extending the overall time for instruction may lead to results in favor of cooperative learning not found in this study. In other words, if the treatment was administered for a longer period of time in different sessions of the instruction, the academic incentive could have led to long-term effect and it would have been more possible to get favorable results. This study provides evidence that the students' confidence can be enhanced by offering them an academic incentive when working cooperatively in groups. The study also supports previous studies that suggest that researchers who are comparing cooperative groups while using well structured material do not consistently find differences. Therefore, including higher-order problems on the achievement test could increase the benefits of this instructional strategy because aligning the posttest items with the practice activity and the objectives of the lesson did not lead to significant results.

In light of the growing prevalence of team work in education, future studies should continue to examine the use of incentives with cooperative groups. While findings from the current study do not support the assertion that academic incentives use with cooperative group affects students' achievement, these claims should be tested with lessons that were not designed following an instructional systems approach. Researchers should also examine the effect of students' characteristics and gender to discover which attributes influence achievement and attitudes in a cooperative setting. These suggestions will help us better understand the conditions under which cooperative learning is most effective, determine its appropriate use, and provide a richer picture of the benefits that cooperative learning may provide.

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Table 1

Means and Standard Deviations for Concept Acquisition Test

	Concept Acquisition Post-Test Scores[a]		
Instructional Approach	*n*	*M*	*SD*
Academic Incentive	22	46.20	13.87
No Academic Incentive	22	40.20	10.59
Total	44	86.40	24.46

Note. [a] The maximum possible score was 100 points on the post-test.

Table 2

Means and Standard Deviations for Attitudes

		Attitudes[a]			
		Attention	Relevance	Confidence	Satisfaction
Instructional Approach	n	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Academic Incentive	22	3.40 (.49)	3.70 (.60)	3.98 (.40)	2.80 (.87)
No Academic Incentive	22	3.15 (.82)	3.54 (.70)	3.63 (.47)	2.60 (.80)
Total	44	6.55 (1.31)	7.24 (1.30)	7.61 (.87)	5.40 (1.67)

Note. [a] Measured on a five-point scale ranged from 1(not true) to 5 (very true).

PIES - Personalized Integrated Educational System

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Abstract

Due to the shift from the industrial age to information age, new educational needs require a new paradigm of education, one that is focused on learning rather than sorting students, one in which student progress is based on mastery, not on time. This new paradigm requires that technology serves new roles or functions. Reigeluth, Watson, Watson, Dutta, Chen & Powell (2008) identified four major functions and several secondary functions for technology to serve in the new paradigm. While the authors used the term Learning Management System for a system that serves all those functions, that term is often used to refer to course management systems and other systems that do not serve all those functions. To avoid confusion, we now call this system "PIES – Personalized Integrated Educational System". This paper elaborates on the PIES functions identified by Reigeluth and his colleagues (2008) and addresses issues of system architecture and interfaces, including open educational resources and Web 2.0 tools. The paper describes recent advances in the design of a modern, information-age educational technology system that incorporates many vital functions to meet educational needs, including record keeping, planning, instruction, assessment, communications, administration, and more. It incorporates the latest Web 2.0 tools and resources available. Having a flexible, open-source architecture, it has backward, current, and forward-looking capabilities to guide and assess students' progress and help make available and deliver personalized instruction.

Overview

In recent years, a shift of the education paradigm from the industrial age to the information age has been discussed among educational researchers (Reigeluth & Duffy, 2008; Watson & Reigeluth, 2008). Reigeluth and Carr-Chellman (2009) proposed that a true paradigm shift in education could be realized by two developments: advanced technologies and the advancement of learner-centered psychological principles and methods of instruction. Technology plays a central role in the learner-centered paradigm (Reigeluth & Carr-Chellman, 2009). Reigeluth et al. (2008) identified four major functions and several secondary functions for technology to serve in the new paradigm. While the authors used the term Learning Management System for a system that serves all those functions, that term is often used to refer to course management systems and other systems that do not serve all those functions. To avoid confusion, we now call this system "PIES – Personalized Integrated Educational System".

Moreover, the term "Web 2.0" became popular when O'Reilly Media and MediaLive hosted the first Web 2.0 conference in 2004. In his famous paper *What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software*, O'Reilly elaborated on the term "Web 2.0" (O'Reilly, 2005). A wide variety of Web 2.0 applications have been investigated by practitioners and researchers from different disciplines, including Wikis, Blogs, podcasts, simulations, serious games, virtual reality, mobile devices, social bookmarking, and social networking sites (Berlanga, Sloep, Van Rosmalen, Bitter-Rijpkema, & Koper, 2007; Boyd & Ellison, 2008; Farrelly, 2008). The rapid evolution of Web 2.0 Technologies has generated a new level of communication and interaction among learners.

This paper elaborates on the PIES functions identified by Reigeluth et al. (2008) highlighted in Table 1 and addresses issues of system architecture and interfaces, including application and integration of open educational resources and Web 2.0 technologies.

Table 1.

Four Major Functions & Secondary Functions of an Information-Age PIES identified by Reigeluth et al. (2008)

Record-Keeping	Planning	Instruction	Assessment	Secondary Functions
- Standards Inventory - Personal Attainments Inventory - Personal Characteristic Inventory	- Long Term Goals - Current Options & Requirements - Short-Term Goals - Projects - Teams - Roles - Contracts	- Project Initiation - Instruction - Project Support - Instructional Development	- Presenting Authentic Tasks - Evaluating Student Performances - Providing Immediate Feedback - Certification of Attainments - Developing Students' Assessment - Improving Instruction & Assessment	- Communication - General Student Data - School Personnel Information - PIES Administration

Major Functions of PIES

The four major functions of PIES include *(1) record keeping*, *(2) planning*, *(3) instruction* and *(4) assessment* for student learning.

1. Record keeping: In the new paradigm of education, one of the most important functions is to keep a record of what each student has mastered. Current report cards only serve as tools for sorting the students, and they do not indicate what a student has actually achieved. The record keeping function has a number of sub-functions: (1) *a standards inventory*, which identifies and maps all the required standards and many optional standards in all domains, (2) *a personal attainments inventory*, which portrays the standards each student has mastered, and (3) *a personal characteristics inventory*, which identifies each student's learning styles, profile of multiple intelligences, interests, major life events, and anything else that is useful in improving the learning experience for a student.

2. Planning: Based on the data in the *record keeping* function, decisions must be made to plan for student learning. The *planning* function of PIES has many sub-functions to (1) help students, parents and teachers to set *long term goals;* (2) figure out *current learning options* that will help students to achieve their long term goals; (3) pick some of the current options and set them as *short-term go*als; (4) identify *projects* for achieving the short-term goals*;* (5) set project *teams* based on students' interests; (6) decide on the *roles* that the teacher, parents and others will play to support the student's learning in the projects, and (7) develop a *contract* that identifies goals, projects, teams, roles, deadlines, and milestones.

3. Instruction: The *instruction* function of PIES helps students and teachers to (1) *initiate* each project, (2) provide resources/tools/guidance for *instruction*, (3) provide *project support* by monitoring and managing the project teams, and (4) guide teachers for *developing new instruction,* if needed. These sub-functions provide customized and learner centered instruction to maximize student learning.

4. Assessment: In the new paradigm teaching and testing are fully integrated. The sub-functions help teachers to (1) *present authentic tasks* for student assessment; (2) *evaluate student performances* based on those tasks, (3) generate immediate *feedback* on student performances, (4) provide *certification* when an attainment has been met, (5) *develop student assessments* such as rubrics, tests, etc., and (6) *improve instruction and assessments* based on their effectiveness.

Secondary Functions of PIES

There are also some secondary functions that are not directly related with student learning but can play a great role in facilitating student learning. (1) The *communication* function involves teacher communication and collaboration with other teachers, with students' parents, and with students. It also allows students to communicate and collaborate with each other to facilitate their learning. As mentioned at the beginning of this paper, Web 2.0 technologies integrated in PIES will help generate a new level of communication and interaction among students, teachers, and parents. (2) The g*eneral student data* function provides access to such data as the student's name, address, birth date, parent information, health information, attendance, student's mentor and other teachers, records of major life events, the school or learning community the student belongs to, the student's home room, and community organizations with which the student is involved. With this function, PIES will gather, secure and allow convenient management of data such as those described above in order to support the learner-centered learning environment. (3) The *school personnel information* function provides access to such information as a staff member's name and address, assigned students, certifications and awards received, professional development plan and progress, and the teacher's physical location. Appropriate management of the school personnel information will support the role of teachers as facilitators, coaches, and mentors that is required in a learner-centered environment (McCombs & Whisler, 1997). (4) The *PIES administration* function oversees the whole system, including restricted access to sensitive information about students.

System Architecture and Interfaces

The PIES concept is envisioned to be a comprehensive, fully-featured, open-source software application that is free for anyone to develop, modify, and redistribute. Many of the functions and features mentioned could be developed into an actual working PIES application using and combining smaller, separate and currently available open source applications. Some of these applications might include Linux (base operating system), MySQL (database), Drupal (content management), Moodle (base LMS - if it can be extended), and Firefox or Flock (web browser). PIES would also include smaller built-in applications for chat, playing and authoring media, collaboration and social networking, and data integration and analysis.

In terms of instructional content, PIES would also provide easy portal access to the growing number of open educational resource (OER) repositories such as Curriki, Connexions, TeacherTube and MERLOT. OERs are free educational resources that have been developed by a growing community of teachers, authors, and content producers, and are also open to customization and continual improvement for individualized student instruction. This cost-effective open curriculum of free resources would be owned by public taxpayer dollars and allow school funds to be released from textbooks and other commercial products and put toward more worthy education expenses like teacher salary and other more urgent expenses that better serve student needs (Wiley, 2009). The quality of this OER content may be easily peer-reviewed and rated by users.

PIES would offer a flexible, customizable, easy-to-use, homepage interface such as in Elgg, Facebook, Ning, and iGoogle that would connect all PIES functions. The layout, basic functions, and preferences (RSS, text messages, chat, email, built-in media player, discussion boards, records of student attainments, teacher and course evaluations) would be highly customizable. The interface provides teachers and students with progress data, time on task, and many other metrics, while providing for social interaction and the "network effect" (Bush, 2009) of powerful mass-participation and collaboration. PIES would be ported and available to any internet-enabled device (PC, laptop, cell phone, PDA, etc.). Content could be downloaded, stored and made available "offline" for use without Internet access. All of these components of PIES are illustrated in Figures 1, 2, 3 and 4 below.

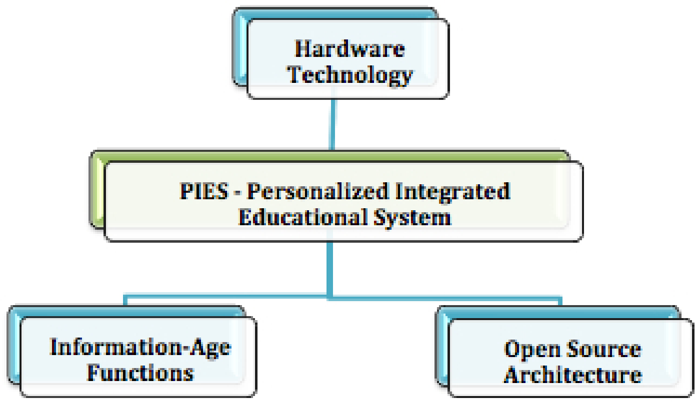

Figure 1. PIES- General Components

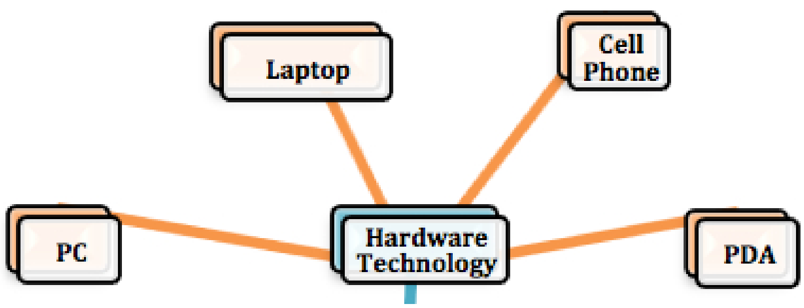

Figure 2. PIES – Hardware Technology Components

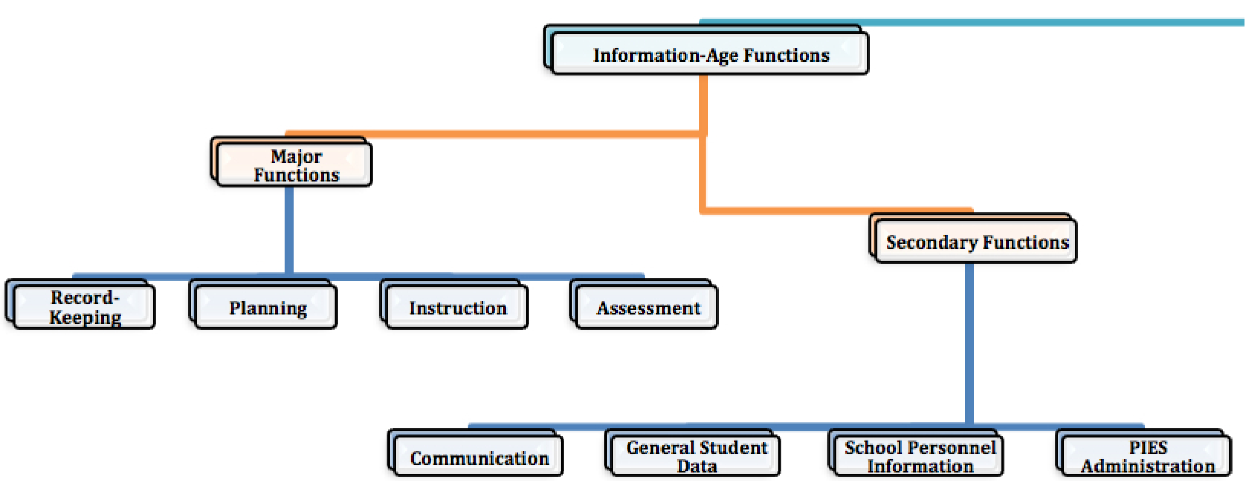

Figure 3. PIES – Information-Age Functions

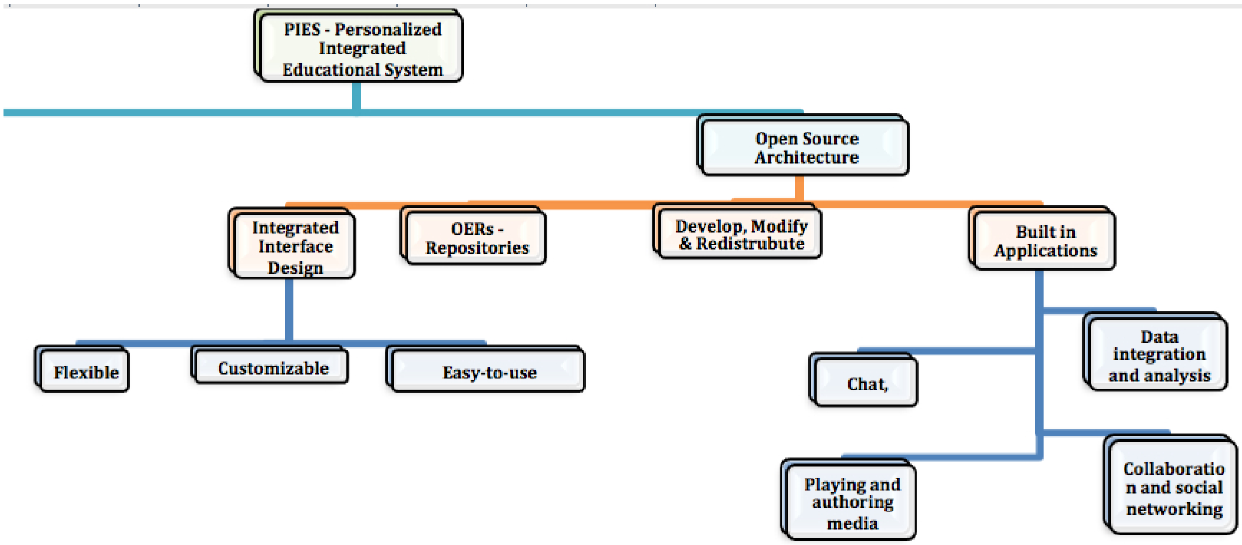

Figure 4. PIES – Open Source Architecture

Future Activities

Based on the PIES conceptual framework and design architecture, additional work needs to be done to further design and develop PIES. To this end, a group of researchers in our research group is in the process of finding funding to design and develop a true PIES, which will incorporate information-age functions and open educational resources in one integrated platform.

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Old Social Networking Meets New Social Networking: An Ecological Perspective

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Purpose

The purpose of this report is to describe the impact of a technology diffusion initiative at a private university in a large urban area. The university is a teaching university, rather than a research university, thus there is a strong focus on personal interactions with members of the community. The goal of the technology diffusion initiative described here is to infuse technology into the environment in an effort to aid in preparing students to develop the technical skills necessary to be successful in the 21st century.

The researchers have begun implementing technology diffusion practices that build off the social nature of the community in order to diffuse technology into the environment. Our technology diffusion initiative is inline with Bronfenbrenner's (2005) bioecological model of human development that views human development within a complex system of relationships affected by multiple levels of the surrounding environment. With the use of Web 2.0 technologies becoming more mainstream, the researchers see promise in their technology diffusion initiative, as we are able to skillfully match the social nature of the faculty and students within the university environment with contemporary technology tools and are able to successfully enhance technology diffusion in a way that complements the university environment.

Background

The need for faculty development is consistently identified as a primary factor influencing the adoption of new instructional technologies in higher education. Although needs have been assessed, and workshops are designed to meet these needs, workshops are not very well attended. Additionally, few faculty implement what they have learned at these workshops in their own classroom. The extant literature suggests that faculty are resistant to attending workshops because:

1. Programs are developed without any knowledge of or consideration for how faculty learn and grow (Chism, 2004); and
2. Psychosocial factors influence the willingness of faculty to attend group workshops. (Cravener, 1999).

The observations regarding the resistance of faculty to attending workshops described abovecould have a negative impact in preparing students to develop the technological skills necessary to be successful in the 21st Century.

The researchers employ Zhao, Lei, and Frank's "The Social Life of Technology: An Ecological Analysis of Technology Diffusion in Schools" (2006) as the initial framework for their initiative. Zhao et al's (2006) framework builds off of Bronfenbrenner's model of human development and applies the model to technology diffusion. As Zhao et al's framework takes into consideration the dynamic nature of the environment in which technology is being adopted, and the context into which the technology is being diffused.

Additionally, the researchers provide two different perspectives for their initiatives. One perspective is that of a faculty member in the School of Education, which addresses instructional practices that promote technology diffusion. The other perspective is that of a senior instructional designer at the same university, which addresses faculty development practices that promote technology diffusion. For each type of initiative, instructional practices are discussed first followed by professional development. Data is gathered at different points during the initiative in order to determine the effectiveness of the different elements of our initiative. Data is gathered in the form of end-of-course evaluations, professional development surveys, and personal correspondence.

The Initiative

Focus on Building Networks of Teachers.

Instructional Practices

- *Use Web 2.0 technologies.* The researchers have begun using Web 2.0 technologies in some of their classes so that part of the learning takes place outside of course management systems. The purpose of this practice is to foster the building of a network of teachers inside and outside of the classroom. By having some of the instructional activities take place outside of class, students are enabled to continue the learning and collaboration long after the class is complete. In teacher education courses this enables a network of teachers to evolve and grow.

  Based on the feedback from students who have used Web 2.0 tools in their online courses, we have found that many students continue to use the Web 2.0 technologies outside of class. In some cases the students use the technology for other courses. For instance, students continue to use social bookmarking in other courses as they continue to share resources with others well after the online class is complete. Furthermore, other students use Web 2.0 technologies in their professional lives. For example students are using blogs and social bookmarking to communicate and share with parents and other teachers' in their professional environment. These are just two examples of the important ways that our technology diffusion initiative has impacted students' use of technology long after class work is complete.

Faculty Development

- *Attend Departmental Faculty Meetings.* Traditionally, instructional designers do not attend departmental faculty meetings. Rather Instructional Designers invite faculty to attend workshops and training sessions based on perceived need or faculty responses to surveys. This is similar to networking in business, in which connecting one person with another person for the right reason is a powerful networking tool (Levin, 2003). In an analogous manner, the ability to create connections between a person's professional development needs with the appropriate professional development resource is critical to technology diffusion in education. By attending faculty meetings, the senior instructional designer can better understand the needs of faculty by embedding themselves in the faculty discussions and connecting faculty with the appropriate professional development tools.

  The faculty feedback is positive because the designer was able to tailor their professional development to very unique subject-specific needs. The senior designer has made a concerted effort to attend faculty meetings with the purpose of listening to faculty needs, and following through by designing custom training to meet faculty needs.

Give the Idea Some Time and Encourage Play

Instructional Practices

- *Pre-Instruction for Online Classes.* One instructional method that the researchers are beginning to implement is the use of pre-instruction for some classes. Prior to the beginning of a class, students are asked to explore specific Web 2.0 technologies that they will use in class. This affords the student some time to explore the technology without the deadlines, and without the other stressors typically associated with using the new tools for instructional purposes. Additionally, pre-instruction gives the student time to fully understand how to use the tool.

  For instance, prior to an online technology class, students are asked to create a blog and a social bookmarking site. The goal is that by the time the class begins, the students will be familiar with the blog and social bookmarking tools so that they can then focus on the instruction rather than how to post a message or create a bookmark.

  Based on feedback from students who participated in the pre-instruction, students found the pre-instruction to be very helpful and students encourage the continuation of such practices. Suggestions based on the feedback is to provide instruction for specific tasks are similar to the tasks that they will be conducting online. This allows students the time to practice specific tasks with the technology prior to the start of the course.

Faculty Development

- *Follow-ups.* The instructional designer contacts workshop participants several days after a workshop to further encourage the use of a technology for instruction, and to answer follow-up questions. This gives workshop attendees time to think about what they have learned in the workshop, and allows them time to further explore the technology. The follow-ups help to assure that the workshop participants are able to apply what they learned at the workshop, and provide the extra support necessary for implementation. This also allows workshop participants to see that the workshop facilitator wants to put action into their words (Levin, 2003).

  Feedback indicated that faculty appreciated the reminders, and the additional support, to help them initiate their instructional efforts subsequent to the workshop.

- *Taste of Technology.* The instructional designer provides 'Tastes of Technology' seminars where they take 15 minutes to discuss a new technology and showcase its use. The attendees have the opportunity to discuss other possible uses of the showcased technology. Based upon the discussion generated from the seminar, further workshops or training are designed if there is sufficient interest.

  Feedback regarding the Tastes of Technology indicated that the information was immediately applicable. Feedback also indicated an appreciation for the abbreviated workshop. The faculty were able to learn about the technology in a short, concentrated seminar. Feedback indicated that it was useful information by didn't require a major commitment of time.

- *Hybrid Professional Development.* Offer a Web 2.0 Tools for Teaching, Learning, and Research hybrid course. The success of hybrid courses in formal education environments has spurred the motivation for this professional development initiative (Bernard, R. M., Abrami, P. C., Lou, Y., Borkokhovski, E., Wade, A., Wozney, L., Wallet, P. A., Fiset, M., and Huang, B. 2004; Rovai and Jordan, 2005; U.S. Department of Education, 2009). Begin the professional development in a face-to-face environment and then allow participants time to interact and learn from the content online.

  Faculty appreciated the flexibility offered by this type of professional development, especially being able to work at their own pace online and the ability to ask questions during the face-to-face meetings. The hybrid professional development participants did express the desire for the course to be longer, so that they had more time between sessions. At the time of this writing, the hybrid professional development courses are four weeks in duration.

Connect to Existing Practices, Find the Right Niche, and Treat Computers as Part of the Existing Pedagogical Ecology.

Instructional Practices

- *Create Dynamic Instruction.* In order to foster the adoption of technology for instruction, it is important to make sure that the given technology actually meets the needs of those in the instructional environment. People will not adopt a technology if they can not use it. Thus, the researchers have incorporated into some of their courses, dynamic projects that are customizable to the professional needs of the students.

  The use of customizable projects was greatly received by students. Feedback indicated that many of the students utilized the projects in their professional situation as soon as their professional situation allowed. Additionally, feedback from students indicated that they plan on making additional projects for other aspects of their professional situation based on the course projects. This indicates that once they were able to create a successful and usable project for their own professional situation, the students see other venues in which they are able to incorporate other projects/technology into their professional situation. An outcome that often times one can only hope for in a best case scenario, and which we realize here.

- *Use the Language of the Students.* The researchers have implemented the use of social bookmarking tools that utilize tagging. This way students and teachers can share resources using terms that are not "techno jargon" but rather the terms are familiar to the students and relevant to their teaching. The use of a social bookmarking tools that utilize tagging is one of the great examples of how technology can be diffused into the environment by using the language of the community.

Feedback from students suggested that tagging is a difficult concept to understand initially. However, once students become more familiar with the concept, and once they see the benefits, they are able to utilize the tag feature more effectively. Extensive instruction on creating tags is necessary for this type of instructional practice to be effective. The extra training is warranted given the positive outcome.

- *Focus on the Instruction not the Technology.* The researchers have designed some of their courses to focus on *how* the technology can be used in the classroom rather than focusing on the technology itself.

While every effort was made to focus on the instructional use of the technology, feedback indicated that students focus on the technology itself, as compared to the use of the technology, perhaps one of the biggest hurdles with all technology application, inside the classroom or out.

Faculty Development

- *Partnerships.* Partner with faculty to teach their students the applications of technologies that are used in their classes for completing activities and projects. By becoming a resource for teachers and responding to requests from faculty, instructional designers become valuable resources in their environment (Levin, 2003). Thus, instructional designers are able to lead the way with technology diffusion.

Faculty appreciated making their own projects at their own pace that they could immediately apply to their instructional environments.

- *Focus on Faculty Needs Not the Technology.* Faculty development initiatives are designed based on faculty needs not technology tools. Design and delivery of opportunities customized to faculty needs by department, and individual follow up with each participant after group training has been delivered.

Feedback expressed by the faculty indicated that faculty liked the customized training based on the faculty meetings and their unique instructional needs. They indicated that they were able to apply immediately what they learned.

Conclusion

By blending traditional social networking with modern technologies that enable social networking the researchers intend to increase the use of technology for instruction at their university. The feedback that has been received indicates that forward progress is being made with the technology diffusion initiatives. In regards to teacher education course, our technology diffusion initiative has had important impacts in the professional lives of our students long after class work is complete. Similar results have been found with the faculty development aspect of this report as faculty are using technology in their classes long after the professional development initiatives are over.

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Survey of commercial off-the-shelf video games, benefits and barriers in formal educational settings

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Abstract

This paper examines the use of commercial-off-the-shelf (COTS) games in formal educational settings. A survey method was employed to determine which COTS video games are appropriated for formal educational settings, and the benefits and barriers to integration in formal educational settings. Ninety-nine members of the Special Interest Group of Games and Simulations (SIGGS) in the International Society for Technology in Education (ISTE) responded to the survey. The results suggest that greatest benefits to integrating COTS videos games include developing cognitive skills, teaching complex problem-solving, accepting and learning from mistakes, and learning by doing. The greatest barriers include teachers' background in games and technology, perception of games, lack of financial resources, alignment with the curriculum, lack of evidence to support their use, and lack of time to integrate into the classroom. Conclusions are provided.

Keywords: Commercial-off-the-shelf, formal educational settings, benefits, barriers.

Introduction

In recent years, attention has been placed on the utility of commercial-off-the-shelf (COTS) video games in formal and informal educational settings (Becker, & Jocaobsen, 2005; Becker, 2006; Sanford, Ulicsak, Facer, & Rudd, 2006; Ertzberger, 2008; Charsky & Mims, 2008), particularly for military training applications (Barlow, Morrison, & Easton, 2002; Morrison & Barlow, 2004; Fong, 2006). COTS video games can be purchased from brick-and-mortar businesses, online, and via catalogs. COTS video games, unlike serious games (Michael & Chen, 2005), are not designed for the sole purpose of training, educating or informing, but rather for the primary goal of entertainment. Some COTS video games are deemed appropriate for formal educational settings (Sanford, Ulicsak, Facer, & Rudd, 2006). Charsky and Mims (2008) note "creating game-based learning environments or experiences using COTS games is becoming an increasingly tenable, valuable, and popular instructional strategy" (p. 38). COTS video games for formal educational settings should exhibit broad appropriateness for school settings, engage players with authentic content and challenges, and show the presence of clear causal relationships between game variables (Sanford, Ulicsak, Facer, & Rudd, 2006).

However, as discussed by Becker (2006), there remains resistance to the use of COTS games in formal educational settings. Squire (2003) suggests that integrating games into formal educational settings potentially raises as many problems as it solves. COTS video games may not appeal to every student equally (Ke, 2008) and students may be distracted by game-playing, and consequently, not achieve the educational goals (Miller, Lehman, & Koedinger, 1999). Egenfeldt-Nielsen (2004) states there are numerous barriers to successfully integrating games; including scheduling, setting, class expectations, teacher background, genre knowledge, technical problems, teacher preparation, perception of games, class size, and priority issues – all of which place a tremendous burden on teachers. Thus, the use of COTS video games in formal educational setting remains a topic of debate among researchers and educators alike.

Commercial-Off-The-Shelf Games in Education

Becker and Jacobsen (2005) surveyed 109 educators about the utility of computer and video games in a classroom setting. Fifty-seven percent of their respondents had used computer or video games in their classroom practice. More than half of the educators indicated that the teachers themselves, either through their own efforts, through professional development opportunities, or through help from their students or nearby colleagues provided the greatest amount of help in integrating computer or video games into their classroom practice. When asked about barriers, more than 70% of the respondents indicated that there was not enough time to integrate games, not enough classroom computers, not enough games within the schools, or that integrating games was not a school priority.

Ertzberger (2008) surveyed 390 educators from 110 different schools about the utility of video games as instructional tools. His results suggest the most important factors in promoting the use of video games are the games alignment to curriculum, reliability of the technology, and hands on training available. Results indicate the biggest deterrents to the use of video games were the expense of video games, lack of time to create video games, lack of relevance to curriculum, and lack of the needed technology. Participants boasted the ability to individualize instruction, and increase motivation as benefits to video game use.

Future Lab, a non-profit organization for innovation in teaching, conducted a survey of primary and secondary teachers' (N = 1,000) attitudes towards games in education (Future Lab, 2005). Their survey was not specifically about COTS video games. Their findings suggest that 72% of the teachers do not play video games in their leisure time and 69% have not used games in their classrooms for educational purposes. Though 59% of the teachers would consider using games in their classroom, 49% of same population see the largest integration barrier as access to equipment (Future Lab, 2005).

Kerbitchi (2009) examined factors affecting teachers' adoption of computer games using a case study method. The results were compared with the existing literature on the adoption of educational software, and the barriers in the use of educational computer games in formal K-12 settings. The findings showed that adoption attributes for the games and other educational software had a similar pattern from high to low significance on relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003) and that the game adoption factors were more inclusive than the barriers of using the computer games.

While these studies have certainly informed educational research, they leave much to be desired. None one of the aforementioned studies specifically examined the role of COTS video games in formal educational settings. Further, in another study, the results confirmed that the majority of the educators were not gamers (72%) and had not integrated games into their classrooms (69%). These findings are alarming and confirm there is a dearth of existing research examining role of COTS video games in formal educational settings.

Research Questions

Therefore, this research sought to address the following research questions:

1. What commercial-off-the-shelf video games do professionals deem appropriate for formal educational settings?
2. What are the benefits of integrating commercial-off-the-shelf games in formal educational settings?
3. What are the barriers to integrating commercial-off-the-shelf games in formal educational settings?

Method

Participants

Participants included members of the Special Interest Group of Games and Simulations (SIGGS) in the International Society for Technology in Education (ISTE). One-hundred fifty-four participants opened the survey, and of those participants, *N*=137 provided a response to at least one item. During this period, the SIGGS had approximately 1,400 members, which is a response rate of approximately 10%. Those participants that did not complete at least 75% of the survey items were removed from the analysis resulting in a final set of *n*=99 participants.

As can be gleaned in Table 1, approximately 68% of the participants were female. The majority of the participants are in the age range of 36 to 65 years old. More than 80% of the participants reported salary ranges from $30,000 to $100,000 per year. More than 80% of the participants reported a White/Caucasian ethnicity. One hundred percent of the sample held at least a bachelors degree with approximately 49% holding a masters degree.

Table 1. Demographic characteristics of sample.

Category	n	%
Gender		
Female	67	67.68
Male	31	31.31
Age Range		
0-25	3	3.03
26-35	15	15.15
36-45	27	27.27
46-55	27	27.27

Category	n	%
56-65	24	24.24
>65	2	2.02
Salary Range		
N/A	6	6.06
0 - $30;000	1	1.01
$30;001 - $50;000	18	18.18
$50;001 - $75;000	37	37.37
$75;001 - $100;000	26	26.26
$100;001 - $150;000	7	7.07
> $150;000	2	2.02
Ethnicity		
Asian	2	2.02
Black/African American	3	3.03
Hawaiian/Pacific Islander	2	2.02
Hispanic/Latino	2	2.02
White/Caucasian	84	84.85
Other	6	6.06
Highest Degree Earned		
Bachelors Degree	23	23.23
Masters Degree	49	49.49
Specialist Degree	5	5.05
Doctorate Degree	22	22.22

Ninety-six percent of the participants were from the United States with the remaining from Canada. Approximately 68% of the participants reported playing computer games and 51% reported playing video games. The job titles of the participants represented a wide range of careers from teachers to college professors to educational technologists. Participants reported an average of 15.36 years (*SD* = 9.35) in educational technology-related professions.

Instrument

The instrument was divided into four sections: background information, COTS, COTS barriers, and COTS benefits. The background information section included items pertaining to age, gender, ethnicity, salary range, educational attainment, game play information, and job title information. The COTS section included 19 popular COTS games for multiple platforms derived from multiple sources (Kirriemuir, 2005; Prensky, 2010) and with a response scale of Very Appropriate, Appropriate, Neutral, Inappropriate, and Very Inappropriate.

The COTS games barriers section included 23 potential barriers to the integration of COTS games in formal educational settings with a response scale of Very Significant Barrier, Significant Barrier, Neutral, Insignificant Barrier, and Very Insignificant Barrier. Finally, the COTS games benefits section included 18 potential benefits of integrating COTS games into a formal educational setting with a response scale of Very Significant Benefit, Significant Benefit, Neutral, Insignificant Benefit, and Very Insignificant Benefit. Both the COTS games benefits and barriers scales were derived from previous research (Becker, & Jocaobsen, 2005; Ertzberger, 2008). All scales also included a Do not Know option.

Procedures

The survey was made accessible in a web-based format using SelectSurvey. The survey was available during a three-week period, and during this time, two reminder emails were sent to members of the SIGGS. Participants were informed the purpose of this project was to examine characteristics related to the use of COTS games in formal educational settings.

Data Analysis

This study employed a mixed-method approach (Tashakkori & Teddlie, 1998) involving both quantitative and qualitative procedures used concurrently and independently. Quantitative analyses of the data included descriptive analysis of response frequencies and measures of variation and central tendency (Knupfer & McLellan, 1996), and internal consistency reliability analysis (Cronbach's alpha). Three open-ended survey items were included in the instrument for the purpose of gaining further insight into COTS games, benefits and barriers. The data were analyzed using a constant comparative method (Glaser, 1965; Glaser, 1967).

Results

The results of this research must be viewed in light of its limitations. The sample had a low response rate. Prior research suggests that average online response rates fall somewhere within the range of 24% – 39% (Cook et al., 2000, Sheehan, 2001). Our research only achieved 10% response rate. This low response rate may not accurately represent the perceptions of the population. Additionally, the survey itself is a limitation. The questions were few and the content of a limited nature. Further research is necessary to validate an instrument for wide scale use. In light of these limitations, this research has resulted in several interesting findings.

Commercial-off-the-shelf (COTS) Video Games

The internal consistency reliability for the scale was high at α = .89. As can be seen in Table **2**, many of the participants were not familiar with a handful of the COTS games listed in the survey. Big Brain Academy, Brain Age, and Oregon Trail had item averages at or above 4.0, indicating that those that were aware of the games, deemed them appropriate for a formal educational setting. Other games, however, had high averages (> 3.5), including Civilization III, DimensionM, Railroad Tycoon, Rise of Nations, The Sims, Wii Sports, and Zoo Tycoon. The only game clearly identified as not appropriate was the Grand Theft Auto series with an item average of 1.83 (*SD* = 1.22).

Table 2. COTS games scale with descriptive statistics.

COTS Game	**n**	**DK**	**VI**	**I**	**N**	**A**	**VA**	**M***	**SD***
Big Brain Academy	95	64.65	1.01	0.00	6.06	11.11	13.13	4.13	0.96
Brain Age	95	60.61	2.02	0.00	5.05	15.15	13.13	4.06	1.03
Civilization III	93	42.42	3.03	1.01	8.08	29.29	10.10	3.82	0.97
Dimension M	92	69.70	3.03	1.01	4.04	9.09	6.06	3.61	1.31
Endless Ocean	92	60.61	9.09	1.01	4.04	12.12	6.06	3.16	1.53
Grand Theft Auto	91	20.20	42.42	13.13	5.05	8.08	3.03	1.83	1.22
Guitar Hero	91	19.19	7.07	15.15	19.19	24.24	7.07	3.13	1.15
Half-Life	91	47.47	6.06	5.05	12.12	9.09	12.12	3.36	1.37
Oregon Trail	89	18.18	1.01	1.01	5.05	30.30	34.34	4.34	0.79
Railroad Tycoon	89	39.39	1.01	1.01	8.08	28.28	12.12	3.98	0.82
Rise of Nations	89	42.42	1.01	3.03	5.05	26.26	12.12	3.96	0.91
Simcity	89	27.27	3.03	4.04	13.13	25.25	17.17	3.79	1.07
Super Mario Galaxy	89	39.39	3.03	16.16	20.20	9.09	2.02	2.82	0.94
The Sims	89	34.34	2.02	6.06	18.18	20.20	9.09	3.51	1.02
The Legend of Zelda	89	51.52	5.05	8.08	16.16	6.06	3.03	2.84	1.10
Trauma Center: Under the Knife	88	52.53	6.06	3.03	9.09	13.13	5.05	3.22	1.29
Wii Sports	86	21.21	1.01	4.04	16.16	30.30	14.14	3.80	0.90
World of Warcraft	80	41.41	9.09	10.10	13.13	5.05	2.02	2.51	1.14
Zoo Tycoon	64	31.31	1.01	1.01	8.08	13.13	10.10	3.91	0.98

*n=Number of respondents, DK = Do not Know, VI = Very Inappropriate, I = Inappropriate, N = Neutral, A = Appropriate, VA = Very Appropriate, M = Item average, SD = Item Standard deviation, *Note the average and standard deviations do not include the Do not Know response.*

Participants also had the option of listing COTS games that were not listed in the scale. These responses are summarized in Table **3**. Only those with two or more responses are shown. In total, 22 unique games were provided. Of the 99 participants, only 23 provided a response with an average of 5.13 words (SD = 4.74). Of those listed, both Spore and Risk occurred most.

Table 3. Other COTS games listed.

COTS Game	n
Age of Empires	2
Spore	3
Risk	3
Math Blaster	2
Carmen San Diego	2
Making History	2

Benefits to COTS Video Games

The internal consistency reliability for the scale was also high at α = .93. Table 4 shows the results. The highest rated item averages (> 4.0) for the support of COTS in formal educational settings are to develop cognitive skills (M = 4.31, SD = 0.64), develop spatial relation skills (M = 4.14, SD = 0.72), develop motor skills (M = 4.12, SD = 0.73), knowledge acquisition (M = 4.18, SD = 0.76), increase memory capacity (M = 4.02, SD = 0.85), teaching complex problem-solving (M = 4.45, SD = 0.66), increase creativity (M = 4.15, SD = 0.91), transfer knowledge to real-world situations (M = 4.17, SD = 0.77), accept and learn from mistakes (M = 4.28, SD = 0.75), learning by doing (M = 4.26, SD = 0.70), increase self-esteem and self-confidence (M = 4.00, SD = 0.88), incorporate technology student's use every day (M = 4.18, SD = 0.83), and to promote differentiated instruction (M = 4.17, SD = 0.81). Notably, none of the potential benefit listed are below the central point (3.0).

Table 4. Benefits to COTS video games.

Benefit	n	DK	VIB	IB	N	IB	VIB	M*	SD*
Eliminate the digital generation gap	98	4.04	1.01	6.06	21.21	45.45	21.21	3.84	0.88
Develop cognitive skills	98	2.02	0.00	1.01	6.06	51.52	38.38	4.31	0.64
Develop spatial relations skills	98	3.03	0.00	3.03	10.10	53.54	29.29	4.14	0.72
Develop motor skills	98	3.03	0.00	1.01	11.11	55.56	27.27	4.12	0.73
Knowledge acquisition	98	1.01	0.00	2.02	15.15	44.44	36.36	4.18	0.76
Increase memory capacity	98	5.05	0.00	4.04	20.20	39.39	30.30	4.02	0.85
Teach complex problem solving	98	0.00	0.00	1.01	6.06	39.39	52.53	4.45	0.66
Increase creativity	98	1.01	1.01	4.04	15.15	36.36	41.41	4.15	0.91
Transfer of knowledge to real-world situations	98	3.03	0.00	2.02	17.17	39.39	37.37	4.17	0.79
Accept and learn from mistakes	98	3.03	0.00	1.01	14.14	37.37	43.43	4.28	0.75
Learning by doing	98	3.03	0.00	0.00	14.14	42.42	39.39	4.26	0.70
Increase self-esteem and self-confidence	98	3.03	1.01	4.04	18.18	43.43	29.29	4.00	0.88
Promote social skills	98	5.05	6.06	8.08	21.21	37.37	21.21	3.63	1.12
Teach students how to role-play	96	3.03	1.01	5.05	25.25	45.45	17.17	3.77	0.85
Incorporating technology that student's use everyday	90	1.01	0.00	4.04	12.12	37.37	36.36	4.18	0.83
COTS games used as part of a reward system (i.e. work completion, etc.)	98	5.05	10.10	4.04	32.32	34.34	13.13	3.39	1.12

Benefit	n	DK	VIB	IB	N	IB	VIB	M*	SD*
Promotes healthy competition	96	5.05	2.02	7.07	26.26	41.41	15.15	3.66	0.92
Promotes differentiation of instruction	96	6.06	1.01	1.01	14.14	40.40	34.34	4.17	0.81

*n=Number of respondents, DK = Do not Know, VIB = Very Insignificant Benefit, IB = Insignificant Benefit, N = Neutral, SB = Significant Benefit, VIB = Very Significant Benefit, M = Item average, SD = Item Standard deviation, *Note the average and standard deviations do not include the Do not Know response.*

Participants also had the option of listing potential benefits not listed in the scale. Eighteen participants provided free-form responses averaging 11.05 (*SD*=9.94) words in length. Results suggest, in addition to those listed, increased communication among students and teachers, increased teamwork and collaboration among students, stealth assessment, and students learning the design of games themselves are additional potential benefits.

Barriers to COTS Video Games

The Cronbach;s alpha was high at α = .92. Table 5 shows the results. The greatest barriers (4 >) to the integration of COTS games include teachers' background in games and technology (*M* = 4.33; *SD* = 0.86), perception of games (*M* = 4.23; *SD* = 0.85), lack of financial resources (*M* = 4.13; *SD* = 1.01), alignment with the curriculum (*M* = 4.09; *SD* = 1.00), lack of evidence to support their use (*M* = 4.04; *SD* = 0.89), and lack of time to integrate into the classroom (*M* = 4.23; *SD* = 0.85).

Table 5. Barriers to COTS video games.

Barrier	n	DK	VIB	IB	N	IB	VIB	M	SD
Lack of parental consent	99	6.06	3.03	13.13	27.27	33.33	17.17	3.52	1.05
Parental perceptions about games	99	5.05	4.04	7.07	17.17	38.38	28.28	3.84	1.07
COTS game ratings	99	14.14	1.01	11.11	29.29	34.34	10.10	3.48	0.91
Lack of access to technology	99	2.02	3.03	11.11	12.12	30.30	41.41	3.98	1.14
Lack of administrative support	99	3.03	3.03	8.08	15.15	31.31	39.39	3.99	1.09
Teacher's background in games and technology	99	1.01	2.02	2.02	7.07	38.38	49.49	4.33	0.86
Perception of games	99	2.02	2.02	2.02	8.08	45.45	40.40	4.23	0.85
Training regarding the new technology	99	2.02	3.03	7.07	12.12	48.48	27.27	3.92	0.99
Technology reliability	99	1.01	4.04	14.14	24.24	36.36	20.20	3.55	1.09
Lack of financial resources	99	2.02	2.02	6.06	13.13	32.32	44.44	4.13	1.01
Alignment of curriculum	99	3.03	1.01	7.07	16.16	30.30	42.42	4.09	1.00
Lack of evidence to support their use	99	2.02	1.01	6.06	12.12	47.47	31.31	4.04	0.89
Lack of technical support	99	1.01	1.01	10.10	25.25	40.40	22.22	3.73	0.96
Lack of time to familiarize oneself with the technology	99	2.02	2.02	5.05	15.15	48.48	27.27	3.96	0.91
Lack of time to integrate into classroom	99	3.03	0.00	7.07	15.15	43.43	31.31	4.02	0.88
Class expectations	99	3.03	2.02	8.08	27.27	44.44	15.15	3.65	0.92
Class size	99	3.03	6.06	11.11	24.24	39.39	16.16	3.50	1.10
Lack of student motivation	99	2.02	21.21	31.31	25.25	15.15	5.05	2.51	1.15
Lack of teacher motivation	99	3.03	3.03	10.10	14.14	40.40	29.29	3.85	1.07
Lack of access to professional development	99	3.03	3.03	7.07	18.18	46.46	22.22	3.80	0.98
Lack of access to technology outside of schools	98	3.03	4.04	15.15	28.28	28.28	20.20	3.47	1.12

Barrier	n	DK	VIB	IB	N	IB	VIB	M	SD
Conflict between teacher's interests and teacher's responsibilities	87	5.05	0.00	10.10	16.16	40.40	16.16	3.76	0.91
Concern for how students will be affected by the integration of games into the classroom	87	4.04	2.02	17.17	25.25	30.30	9.09	3.33	1.00

*n=Number of respondents, DK = Do not Know, VIB = Very Insignificant Barrier, IB = Insignificant Barrier, N = Neutral, SB = Significant Barrier, VIB = Very Significant Barrier, M = Item average, SD = Item Standard deviation, *Note the average and standard deviations do not include the Do not Know response.*

Participants also had the option of listing potential barriers not listed in the scale. Twelve participants provided responses with an average length of 16.08 (*SD*=19.28) words. Additional barriers to integrating COTS video games include gender issues, equity issues for students with special needs (e.g., visually impaired), lack of games aligned with standardized tests, unhealthy competition, and Internet safety.

Discussion

One respondent captured the essence of perhaps the most significant barrier to using COTS video games in formal settings by stating "I must teach to these academic standards; my principal will give me a bad evaluation if I am not teaching the standards and we are playing games instead" (Respondent, 2009). This statement reiterates the ongoing challenge educators face in attempting to pioneer innovative instructional approaches employing technology. The perception of COTS video games is itself a major barrier as confirmed by our findings. Educators must make the case to leadership of the value of integrating COTS video games in the classroom. This inevitably requires more evidence to substantiate the use of COTS video games, which was identified as another significant barrier. We believe these findings, at minimum, make a call to educators and researchers alike to spearhead this complicated domain.

The results of our research corroborate the findings of prior research. For instance, lack of time to integrate into the curriculum was perceived as a major barrier in Becker and Jocaobsen findings and in our own results. Additionally, Ertzberger (2008) found that lack of alignment to the curriculum and lack of financial resources were also significant barriers. Our findings provide further evidence of these barriers in integrating video games in formal educational settings. In addition, our research has identified a teachers' background in games and technology, perception of games in general, and lack of evidence to support their use as significant barriers.

In exploring potential benefits, the greatest benefits identified include developing cognitive skills, teaching complex problem-solving, accepting and learning from mistakes, and learning by doing. Additionally, qualitative findings suggested increased communication among students and teachers, increased teamwork and collaboration among students, stealth assessment, and students learning the design of games themselves are additional potential benefits. These findings are analogous to prior research suggesting video games are a tool to "use action instead of explanation, create personal motivation and satisfaction, provide interactive decision-making context" (Kebritchi, 2008, p. 15), and can promote collaboration among learners (Kaptelin & Cole, 2002). While this research has explored the many perceived benefits of COTS video games, further research is necessary to examine the efficacy of these benefits in experimental and quasi-experimental settings. Put simply, more research is necessary.

Our research has also identified COTS video games that are deemed appropriate for formal educational settings. These games include Big Brain Academy, Brain Age, Oregon Trail Civilization III, DimensionM, Railroad Tycoon, Rise of Nations, The Sims, Wii Sports, and Zoo Tycoon. These games are a list of tools that educators can choose to employ in their classrooms. Further, the list also provides a list of appropriate games to investigate from a research perspective as more evidence to substantiate their use is indispensable.

We believe that our findings should be used to create a larger validated instrument that can be used on a wider audience of educational professionals on the benefits and barriers to integrating COTS video games. This paper has documented a dearth of literature on the use of COTS video games in educational settings. Our instrumentation is a starting place for researchers to document and validate a tool to collect this pertinent information from education professionals.

As noted by Charsky and Mims (2008), "COTS game are not a panacea, just a strategy with which we, and others, have had success; a strategy that may be successful for some educators, especially those educators who are already playing video games outside of work." COTS video games should be perceived as one tool among many different instructional strategies - a tool that has the potential to truly engage our students.

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Rudeness in the Classroom: A Survey of College Students' Perceptions of Inappropriate Use of Technology

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Descriptors:
Etiquette survey
Technology use

Introduction and Background

Technology tools are commonly used in many ways and in various environments in our society. We marvel that technology can make our lives more pleasant by helping us easily take care of chores. We can make and take phone calls, send and receive text and email messages, and take pictures and send them whether we are in an office, on the street, or in a car. We can listen to music anytime and anywhere. The Dick Tracy 2-Way Wrist Radio (and later the 2-Way Wrist TV) is not just a comic book idea anymore. Technology tools are quickly evolving and changing the way we live.

Our new technology tools enable us to be connected 24 hours a day, blurring the boundaries between our business lives and our personal lives ("Available all the time," 2009) and obscuring the boundaries between public and private spaces (Wei & Leung, 1999). We take our mobile (also referred to as cell) phones everywhere. When we are at the office, we want to stay connected with family members. When we are with family members, we want to stay connected with our business associates.

As new technologies become part of our culture, it is not always clear what is considered to be appropriate and polite behavior. Srivastava (2006*)* cited a 2003 survey in which half the Americans polled thought that mobile phone users were generally discourteous. Another survey from that same year reported that 71% of mobile phone users were late for social events because they could easily text or phone to make updated arrangements (Srivastava). Emily Post's rules may be a thing of the past. Faculty at the Wharton School suggest that in the future rules of etiquette may be determined by organizations and individuals, with consideration to generational differences about the use of the Internet ("Available All the Time," 2009).

For example, there are some guidelines that are considered "old rules for the courteous use of a cell phone" (Elgan, 2010) and include the avoidance of *texting* or accepting a call during face-to-face conversations unless one has asked permission to do so. One's voice should be lowered when speaking in public spaces and one should avoid personal topics if others can hear the conversation. Elgan posits that as cell phone use becomes more ubiquitous and we use cell phones in new ways, additional rules may be necessary. For example, Elgan suggests making sure that the pictures that are displayed on Facebook are tasteful to all because they could be displayed on a cell phone during a business meeting. Elgan also suggests that cell phone users be mindful that tagging people in the Facebook arena could cause them embarrassment if those pictures appeared in places that were unintended after they were posted.

Many schools (including New York City public schools) ban the use of cell phones because they are found to be disruptive and promote cheating. However, since the tragedies of September 11 and Columbine, school districts are reconsidering their usefulness since students bring their cell phones to school so that they can stay in contact with their parents ("Cell Phones in the Classroom," 2010).

Professors in an urban university have recently noted the unwelcome presence of cell phones in their classes as students *text* each other during class. This silent strumming of the thumbs is considered rude by the professors. Do students view this as inappropriate behavior or has this become acceptable among the younger generation? Are professors being "old-fashioned" in demanding that the cell phones be stashed and silenced during class? Are the rules of etiquette changing?

Inappropriate uses of technology abound, regardless of etiquette issues. For example, a professor reports that one of her students cited information from the professor's Web site in a grant proposal (that was funded by the Department of Education) without acknowledging the source. Students purchase papers from the Internet, rather than writing the papers themselves. The purpose of this research is to share the results of a survey of college students to determine their perceptions of appropriate and inappropriate technology use. We explore whether new technology etiquette is cultural, generational or gendered.

The present research builds upon prior work by one of the authors. Rosenfeld and Novemsky (2007) investigated professors' perceptions of inappropriate email use. When asked whether they had received inappropriate email, generational differences were found for faculty under age 40 and over age 40, and marginally significant differences were found for gender and frequency of receiving inappropriate email. In another study, Rosenfeld and Novemsky (2009) surveyed college students and faculty with regard to etiquette and the use of electronic communications. The results of that study reported that 68% of the participants thought that it was impolite to multitask in front of another person.

The present survey asks graduate and undergraduate college students questions about their perceptions of appropriate/inappropriate technology use. Questions revolve around *texting* and cell phone use in class and public places. We look at gender, age, marital status, education, occupation, student status, ethnicity, and place of birth to ascertain if these variables have a negative or positive correlation with student perceptions.

Participants

Our survey consists of 129 students in a school of education in a northeastern urban college. Forty-one students are on the undergraduate level and 86 are on the graduate level. The students range in age from 20-59 years and are grouped in the following age categories: Eighty students (62%) are between 20-29 years old, 27 students (30%) are between 30-39 years old, 15 students (12%) are between 40-49 years old, and 7 students are between 50-59 years old. The majority of the students were born in the United States (61%), with representation from Middle Central America/Caribbean (16%), and South America (8%). Ethnically, 36% are Caucasian, 27% are Black Non-Hispanic, 12% are Hispanic/Latino, and 12% are Asian. Approximately 57% of the students are single, 12% are single parents, 16% are married with no children, and 15% are married with children.

Instrumentation

Each student was asked to respond to an open-ended "Etiquette Survey" (Rosenfeld & O'Connor-Petruso, 2010). The questions consisted of three parts: demographic information, self-attitude rating scale concerning texting and cell phone use in class and public places, and cell phone use in the classroom in which they are currently teaching.

Method

At the onset of the Spring and Fall 2010 semesters, students were asked to complete a 23 item Etiquette Survey. Research questions included items such as whether it is appropriate to text in class during a class discussion, lecture, or collaborative work time; whether it is appropriate to text while speaking with a colleague or superior; whether it is appropriate to make/take a cell phone call during a meal at a restaurant, during a conference/meeting with an instructor or while other people are present, or in a waiting room (such as a dentist's or doctor's office); whether it is appropriate to discuss personal topics in public places such as the library, a museum and/or restaurant. The teachers (n=58) were also asked about their use, their colleagues' use, and their students' use of cell phones during the school day.

Analysis

The data were analyzed using IBM's Statistical Programming of the Social Sciences (SPSS) version 19. Descriptive statistics and nonparametric correlations were run to ascertain frequencies and linkages. Common themes emerging from the students' open-ended comments on the Etiquette Survey were grouped and reported.

Results

There are no significant linkages between demographics and text and cell phone use and preferences. However, one demographic variable, age range, emerges as salient concerning *texting* in the classroom and cell phone use in public places.

Approximately 44% of the students ranging in age from 20-29 years and 30% of students ranging in age from 30-39 years believe it is appropriate at times to text in the classroom. The most common reason given is "in emergency...urgent message." Additional common comments include "if you are finished with your work," " if your colleagues don't mind," "if responses are short," "childcare, family....friends," "texting is the only way to stay awake," "if the phone is not visible and you can keep your eyes on the professor."

The age group over 50 years reports that it is inappropriate to text in the classroom. Several students comment that it is "disrespectful to the professor," and that they "needed to pay attention."

Approximately 83% of all students report that it is appropriate at times to use cell phones in restaurants and 76% purport that it is acceptable if you are in a waiting room - such as that of a doctor or dentist. Reasons cited for using their cell phones are "emergency," "depends on the restaurant and who [sic] you are with," "as long as you are quiet," and "if it is a long wait...or bored." Approximately 49% of students ranging in age from 20 -29 years report that it is appropriate at times, again using the aforementioned reasons, to discuss personal topics on their cell phones in public places such as libraries, museums, and restaurants. The other age groups have insignificant or nonexistent numbers.

Out of the 58 (P-K-12) teachers who took the "Etiquette Survey," 97% report that they use their cell phones during the school day (primarily lunch time or a break) and relay that approximately 90% of their colleagues use cell phones. One teacher complains about her principal "texting during meetings." There are no significant numbers of students using cell phones during the school day.

Discussion & Implications

The data suggest that there may be generational differences in perceptions of appropriate etiquette for cell phone use in classrooms. Whereas 44% of the 20-29 year olds and 30% of the 30-39 year olds feel that there “are times” it is acceptable to text in a classroom, none of the participants in the oldest age group think it is ever appropriate. The older students feel it is disrespectful and distracting to use cell phones in class. The authors concur with these findings, noting that younger students almost always are responsible for the unwelcome *texting* that occurs in their classes.

Almost half of the 20-29 year olds think it is appropriate to use a cell phone in public places to discuss personal topics, whereas the other age groups do not share this perception. Interestingly, there seem to be no other differences in perceptions of cell phone use among race, gender, educational level, marital status, or cultural groups.

Srivastava (2006) suggests that learning to use a new technology can be compared to learning a new language. Just as young people pick up a language more quickly than older folks, teenagers appear to be the most avid users of technology, including mobile phones. Srivastava points out that because communication technologies have evolved so quickly, the ways humans interact with them need to be updated. The guidelines for communicating privately in a public space and the appropriateness of being contacted, communicating, and ending a conversation – whether in *text* or in verbal mode in various places – need to be addressed. Established and traditional norms of social behavior are challenged by the use of the mobile phone.

Reaney (2009) reports that rules governing cell phone etiquette are still being formed. Reaney cites an ethnographer and an etiquette expert who suggest that cell phone etiquette rules may differ by locality. They propose that in the future etiquette rules will have increasing relevance, but what will be deemed appropriate in any given situation will likely be challenging to determine.

The present study seems to reflect these ideas. It is important for all who interact with new technologies to try to establish some guidelines for their use since there does not seem to be a consensus regarding appropriate technology etiquette. It is apparent that what may be appropriate for one generation may not be perceived in the same way by another generation. To avoid conflict in the classroom, guidelines should be given or at the very least, appropriateness should be discussed to alert all involved and to maintain a civil and courteous classroom atmosphere.

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Identification with characters in learning games – Does it have a positive effect on learning?

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Abstract: The use of games for learning is discussed in almost all kinds of educational institution. However, empirical evidence for positive effects on learning with these games is still rare. The study described here concentrates mainly on the aspect of identification with a character and its influence on learning. Firstly, the theoretical basis will be discussed; and secondly, empirical findings from a qualitative study in 2009 are looked at and a quantitative study with a learning adventure is addressed.

Keywords: digital game-based learning, identification, learning, empirical study

Introduction:

Serious Games are designed not only to entertain players but also to enhance learning. However, an empirical study clarified that the combination of digital games and educational content by no means yields the often postulated advantages. The results of the study show that pupils who played a learning adventure did not learn more or better from it. Indeed, game players had far worse results than those who dealt with the learning sections of the game alone (Seelhammer 2008). Therefore, the question is: which elements of digital learning adventures hinder the learning process and which have a positive influence?

Theoretical Basis:

One major element is the character which is directly embedded in the game and with whom the player has to work cognitively and emotionally. This can lead to identification with the character. The direct implementation of actions which are carried out by the player and realized by the character can additionally enhance the relationship between them. The enjoyment of identification itself results from the wish to control the relationship with the character.

Along with para-social interaction and interrelationship, imitation, and affinity, identification is a primarily imaginative inner process which leads to an alteration of self-perception while playing (Hefner, Klimmt & Vorderer 2007), as the player adopts the identity, goals, emotions, and perspectives of the media character. In contrast to para-social interaction, identification can be seen as an affiliation of the player with the character. Recipients "become" the character, and feel they are part of the game, experiencing feelings like fear or suspense (Cohen 2006).

As with TV characters, computer players can identify with game characters. A study showed that players ascribed to themselves qualities of the played character, such as strength, courage and humor, though the change in self-perception was temporary. That change had positive effects on players who had a lower self-esteem before. This resulted in a longer abidance in the game, as well as a more extensive examination of the content. In this context, the concept of interactivity - which conveys motivation, informing, understanding, retaining, transfer, and organization of the learning process - plays an important role. The appropriate convergence of interactive actions can enhance identification because player and character carry out the same operations. When the output does not correspond to the input, identification can lessen. As a result, the player is not engaged in the content and may be irritated by the lack of corresponding actions. Likewise, the perspective of the character used can influence identification. Additionally, it has to be clarified what influence emotions and feelings have on the identification with game characters. We would hypothesize that players identify more with characters who have an emotional depth and show feelings while performing than with characters that are only "hollow" figures.

In the same way, the process of motivation can be supported through identification with a character. Players would concentrate longer on the (learning) content of the game and, therefore, actively increase their knowledge through problem solving and exploration of the game environment. Hence, what kind of influence the process of identification has on the motivation to continue staying in the game and the learning process has to be empirically proven.

Research Questions:

Based on these theoretical considerations, the empirical study investigates the influence of identification with characters in learning adventures on the learning process. Current studies concerning identification with characters in learning adventures are sparse. One study deals with identification in a first-person shooter game and its influence on the behavior of the players (Hefner, Klimmt & Vorderer 2007). However, the possible influence of identification on learning was not part of this or any other study.

Concerning these assumptions, two main research questions should be revised.

1. What kind of influence does the identification with a character of a learning game have on the learning process?
2. What kind of influence does the identification with a character of a learning game have on the motivation to continue playing the game?

Empirical Study:

The first empirical findings were gathered from a qualitative study in September, 2009, where girls, aged 10-14, played a mathematical learning adventure. The girls were observed and afterwards guideline interviewed. The recorded and transcribed statements were researched for similarities on identification, learning, interest in mathematics, and the game itself. Results concerning the character showed that the girls talked with their characters and referred to them, mostly female, as "I". That is an implication for a development of a relationship between player and character. In the first half of 2010, there will be a quantitative study with the learning game "Tong Pak Fu and Chou Heung", which is a probability fantasy. Thereafter, this learning content will be put into another gaming situation with changing main characters from which the player can choose, in order to have a look at identification and its influence on learning. The first results from this are expected at the end of the summer, 2010.

Goal:

The aim of this research is to give designers and authors guidelines on how to create and design the main characters of learning games with which the players can identify. If gamers can identify themselves with characters, the following goals can be reached: efficient learning, escalation of motivation, continued learning with the game, more time spent in the learning environment, and active use of new knowledge which can be transferred to the real world.

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Can We Manage The Load Together?

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Abstract

This research was designed to explore the impact of either backward fading or collaboration on fraction learning of children with special needs. In order to perform the given tasks, a computer software DigiTile, which has the ability to serve multiuser interface with one computer, were provided to children. Analysis of quantitative data collected through pre and post tests and observation sheets indicated that backward fading and collaboration groups in the study demonstrated significantly better performances when compared with the control group. In addition, Collaboration group also outperformed backward fading group. These results also supported by the interviews conducted with the participants.

Introduction

Instructional settings have been ever exposed to new technological advances like computers. After 1995, because of increased availability of microcomputers and the Internet, computers as instructional media became prevalent (Reiser, 2002). In the literature, there are studies exemplifying the significance and no-significance of computers as instructional media. While studies mainly focus on integration of computers into mainstream school settings, some research deals with integration of them into settings for children with special needs (CSN). Studies indicate that these children seem to profit from the use of computers in the areas of recognition, support and the enhancement of motivation, self-confidence, and self-esteem (Keates, Clarkson, &Robinson, 2002). Also, they enjoy playing and experience a sense of solidarity at the computer (Brodin & Lindstrand, 2000).

It could be essential to increase participation among children who find speaking difficult or who are unable to verbally contribute to group settings. In order to increase this participation, the environment should be designed to principles of collaboration defined as "coordinated, synchronous activity that is a result of a continued attempt to construct and maintain a shared conception of a problem" (Roschelle & Teasley, 1995, p.70). Because of interactive features, computers can enable educators to set collaborative learning environments. The goal of computer supported collaborative learning (CSCL) is mainly provide environments to enhance contribution of students for mutual knowledge gaining and sharing (Prinsen, 2009).

The design of the instructional messages is very crucial when limited capacity of working memory is considered. Cognitive load theory (CLT) emerged to suggest certain guidelines showing how to diminish cognitive overload. It basically offers series of evidence-based guidelines to make use of maximum capacity of mind for learning (Clark, Nguyen, & Sweller, 2006). Guideline 19 written by those authors is related to gradual learning process by introducing worked example, carrying on with completion example, and then practicing with full problem. Authors called this process "transition from worked examples to problem assignments with backwards fading" (Clark et al., 2006, p. 197).

In the light of this, the focus of the study is to investigate the effect of "backward fading" and CSCL environment through the use of a fraction learning software DigiTile. To achieve this, the following research questions will be investigated;

- Do post-test scores differ for CSN who attended backward fading condition, who attended control condition, and who attended collaboration condition assuming no prior differences in the pre-test scores among groups?
- Is there any relationship between post-test scores and the number of correctly completed tasks?

- Is there any relationship between total time spent to complete tasks and involvement of one of the interventions?
- What are perceptions of CSN about collaboration or backward-fading technique or working with computers?

Methodology

This research has a quasi-experimental design with both qualitative and quantitative nature. The data collected by the use of pre and post-tests was analyzed by quantitative techniques, and collection and analyze of voice recording constitutes qualitative part of the study.

54 children participated to the study. There are 24 female and 30 male students. Among them, 16 students were included in collaborative intervention; 19 students were in backward fading condition; and the rest were control group without any collaboration and any fading. These children are attending a school for CSN. They mainly have learning difficulties at different levels. In addition, they are joining regular classroom activities of mainstream schools. To determine which students are able to complete tasks given during the study, their teachers helped about their learning difficulties.

Four instruments were used for data collection: (i) pre & post tests; (ii) tasks; (iii) observation sheet; (iv) interview guideline. Pre-test and post-test are the instruments for describing existing fraction knowledge before and after the use of DigiTile. Questions assess specifically equivalence and comparison of fraction numbers.

The second instrument is composed of tasks designed to be performed by DigiTile. There are 6 tasks altogether in two sets; 3 for fraction comparison in one set and 3 for equivalent fractions in the other set. Each set in backward fading condition has three levels: worked example, completion task and full practice. Other two groups engaged only full practice either alone or collaboratively.

The third instrument is the observation sheet including different check points showing trials, attention, confusion, time, interaction, correctness, and collaboration. Number of the trials a student makes before finding a correct answer or giving up trying is counted by use of this observation sheet. Observer is also enabled by this sheet to make comments and give grades on student attention, interaction and confusion during the activity, and trace the evidences of occurrence of collaboration among peers. The completion time and correctness of students is also evaluated via observation sheet. The last instrument is the interview guideline designed to find out students' perceptions about collaboration feeling about task difficulty.

DigiTile is developed for children to help their understanding about fractions. It is a program to help through motivation and playful learning. It helps children to form representations about fractions that mediate their thinking. The importance of computer supported collaborative learning is to include instant feedback, self-control stimuli, bright colors and sounds and interactive aspects. DigiTile is an application which has these characteristics apart from sound and poses tasks for children and also includes instant feedback, self-control stimuli, bright colors and interactive aspects and poses tasks for children. It is computer software combining interactive learning environment with collaboration which aims to enhance understanding of fractions, proportions and symmetry. It requires children to move mosaic tiles onto a grid to complete given challenges. The feedback for fractions appears in the areas at the sides of the table while children are moving tiles. Children were given tasks to complete using DigiTile while working alone or with each other.

Procedures

One week before intervention, students were given pre-test and training about use of DigiTile. Backward fading group was first shown a worked example performed in DigiTile. Then they were asked to complete one step, and finally to make full problem solving. Meanwhile, control group was only given a full practice task. Another group (collaboration group) was asked to complete a full practice activity but at this time students tried to complete the task with their peers. Table 1 summarizes procedures of the data collection. While students were working on the tasks, two researchers rated their performance-related data and they also took some field notes. However, for this study only some parts of these data were used because of time limitations. Each session was voice recorded. Interviews took place after the termination of each session to learn their perceptions about the collaboration and/or DigiTile.

Table 1
Summary of data collection procedure

Backward fading	Single Control	Collaboration
Single performance Worked example Completion example Full practice	Single performance Full practice	Peer performance Full practice

Results

Collected quantitative data was analyzed with the utilization of SPSS 15.0. Analysis of covariance (ANCOVA) was run to understand the effects of either CSCL or backward fading on the fraction learning of CSN by taking pre-test scores as constant. Pre-test scores were taken as covariate because the starting knowledge levels and academic backgrounds were diverse, thus their gained knowledge were analyzed in this way. To make sure the appropriateness of the data analysis model, all assumptions were checked and no violations were found in terms of normality, homogeneity of variance, outliers, linear relationship, and homogeneity of regression coefficient. No interaction was detected between covariate and dependent variable [$F(2, 48)=.38$, $p>.05$]. Results of the analysis showed that being in one of the intervention groups [$F(2,50) = 28.53$, $p=.000$, $\eta^2 = .53$] or scores of pre-test [$F(1,50) = 147.83$, $p=.000$, $\eta^2 = .75$] have significant effect on scores of post-test. Effect sizes offer large values (Field, 2005) meaning that 53% of variance was explained by the mean difference of intervention groups if pre-test scores were considered as constant. There is a summary of results in Table 2.

We applied Sidak correction for confidence interval adjustment. Table 3 summarizes the results of this correction. It is seen that there is significant mean differences of post-test scores between groups. To explore the effect of interventions, alpha was adjusted at the level of .025 and Bonferronni procedure was utilized to understand contrast analysis results. Like Sidak test, Bonferronni produced significant differences between intervention types in terms of post-test results (Table 3), too.

Results of the ANCOVA obviously indicate that there are meaningful mean differences of post-test scores of participants involved one of three conditions after controlling their pre-test scores. As pairwise comparisons revealed, all of each two conditions have also significant mean difference. Collaboration condition group had higher post-test scores than either single control group or backward fading group. On the other hand, backward fading group did better on post-test than single control group did.

Table 2

Summary Table of ANCOVA Results with Dependent Variable of Post-test Scores With Pre-test Scores

Source	SS	df	MS	F	η^2
Covariate	105.56	1	105.56	147.83*	.75
Between	40.74	2	20.37	28.53*	.53
Error (Within)	35.70	50	.71		
Total	609.75	54			

$p< .05$, η^2 =effect size

Table-3

Pairwise Comparisons with Sidak Adjustment for Multiple Comparisons

Intervention	*Intervention*	*MD*	*SE*	*Sig*

Sidak	Backward Fading	Backward Fading	1.33*	.29	.00
		Control	-.80*	.29	.03
	Control	Backward Fading	-1.33*	.29	.00
		Collaboration	-2.13*	.30	.00
	Collaboration	Backward Fading	.80*	.29	.03
		Control	2.13*	.30	.00

**p* < .05

Results of the ANCOVA obviously indicate that there are meaningful mean differences of post-test scores of participants involved one of three conditions after controlling their pre-test scores. As pairwise comparisons revealed, all of each two conditions have also significant mean difference. Collaboration condition group had higher post-test scores than either single control group or backward fading group. On the other hand, backward fading group did better on post-test than single control group did.

As further analysis, we ran a correlation between post-test scores of CSN and correctly completed task amount. The relationship was found significant (r =.42, p<.01), i.e. as the number of successfully completed tasks increased, CSN's post-test scores on geometry also increased (Table 4).

Table 4
Correlation Table Between Post-Test Scores of CSN and Correctly Completed Task Amount

		Posttest	Correctness
Correctness	Pearson Correlation	.42(**)	1
	Sig. (2-tailed)	.001	
	N	54	54

** Correlation is significant at the 0.01 level (2-tailed).

To reach a deeper understanding for the results of quantitative analysis, qualitative data collected through the interviews were also analyzed. In general, except for five students (two from control group, two from collaboration group, and one from backward fading group) found the activities easy. On the other hand, two students from control group expressed the difficulty level as moderately difficult. Only one student thought the activities were moderately easy for him.

During the study, students were exposed two different tasks about comparison and equivalence of fractions. When students were asked which type of the activity is hardest and easiest, equivalence of fractions tasks was seen as the hardest, and comparison of fractions tasks was seen as easiest.

Motivation of CSN is an important element in terms of success of the study. Working with computers and its multimedia abilities provides researchers with plenty of opportunities to motivate children in such studies. It was also approved by the children interviewed. They expressed their positive opinions about the interventions because studying with computers prevented them to get bored while studying.

There was a distinction between students working with peers and working alone in terms of definition of their feelings about DigiTile. Students working with pairs used words like "fun", "enjoyment" and "entertaining". They also found working with pair enjoyable and just one student expressed his preference to work alone. On the other hand, students working alone describe their feelings around the word "computer". For instance, one of them said "I will use this program if I had a *computer* in my home", and one other said "it was nice to use *computer* and playing with colors in the activities". They were also judgmental and task oriented when answering the question about overall thought about the study. Especially children in backward fading group generally expressed ease-of-doing. The followings are the comments of two students:

I completed tasks although they were *difficult.*

I finished all the tasks because they were very *easy*.

They thought it was positive for them if tasks were firstly performed by the teacher. Meanwhile, children from control group did not even motioned about the tasks and processes; they only said that using computers were *enjoyable*.

Discussion and Conclusion

Findings obtained through the study demonstrated that backward fading and collaboration are significant contributors to fraction learning of CSN. Studies comparing backward fading and problem solving generally exist in the literature. Our study can be regarded as similar since given full practice tasks have the nature of problem solving. Although there are some researches indicating superior effects of backward fading when compared other variables like problem solving or forward fading (Renkl & Atkinson, 2003; Renkl, Atkinson, Maier, & Staley, 2002), in some situations like far transfer, any difference between backward fading and other methods was not observed (Moreno,Reisslein, & Ozogul, 2009).

According to the findings, collaboration group outperformed backward fading group. Three possible reasons can be mentioned about this situation. Firstly, students in the collaboration groups might be provided with scaffolding by their peers. Secondly, testing and re-testing children in one week period could manipulate the test results. That is, if post-test was conducted after more than one week period, more reliable comparisons among the post-test results of the groups could be gained. The reason is that backward fading might not produce close results when compared problem solving in terms of near transfer but in terms of far transfer (Moreno, Reisslein, & Ozogul, 2009).

Thirdly, another possible explanation could be related with the difficulty levels of the given tasks. For both group of the comparison and equivalence tasks, we firstly assigned easier task, and then harder one. The increasing task difficulty may have side effects on the data collected through the pre and post tests. According to the study conducted by Smith (1999), students made more mistakes when they given whole task training, but when task difficulties were kept constant, increased mistakes were observed in backward fading training. Although this result is not parallel with our finding, data obtained from interviews directs us a similar conclusion. Nearly all of the children from backward fading group found activities easy, and they do not indicate the sense of changing difficulty levels through activities. So, as Smith resulted, perception of constant level of task difficulty might lead backward fading group get relatively lower scores from post-test. The result yields the need for more effort to find out which group made more mistakes in which task.

Our findings about the existence of a relationship between involvement to one of the interventions and total time spent is in line with the results of Paas & Van Merrienboer's (1994) study about worked examples first vs. conventional problems first conditions. Similar to our results, the former condition was found requiring less time. Backward fading also seem to have worked well for these students with special needs. Weber (1978) found the positive effect of backward chaining studying with mentally retarded adults. This study is also an example of the advantage of this technique with respect to time.

Another prominent result indicated by the research is that collaboration is effective in fraction learning with CSN. In today's classes, predominantly single user computers are being used. Single use of computers limits children because the control is only in one user. This leads to frustration because not all children can interact with computers equally (Stewart, J., E. Rayborn, B. Bederson, A. Druin, 1998). Sometimes it causes discussions among children about turn taking issues. Also, the others may find it difficult to follow what the child in control is doing. This is especially an important issue for CSN because of the difficulty to maintain attention in an activity. They are often distracted easily and unable to sit long enough to complete a task. If they cannot find the opportunity to interact with the display, they may not maintain their attention on the task hence it limits their learning. Using two mice in this study eliminated the control of one child. Both children had the opportunity to interact with the display and make changes on it simultaneously. This led to increase in collaboration and incorporation of the child to the task those enhanced the fraction learning.

Furthermore, children with learning difficulties, autistic spectrum disorders, speech and language problems or who are shy or stutter may have passive role in single user display because they cannot contribute verbally. However, in a shareable interface they may find the opportunity to interact with the display without speaking which makes them active learners (Rogers, Lim, Hazlewood and Marshall, 2008). Parallel with this, interviews with CSN from collaboration group indicated similarly that using computers (in a sharable environment with two mouse) during tasks is fun although they generally avoid interacting with their peers by speaking.

Also, these results supported the finding that being aware of what each other is doing is an important determinant in successful collaboration (Dourish and Bellotti, 1992, cited in Rogers and Lindley, 2004) which result in better learning. It can be concluded that collaboration is beneficial for CSN. This is because both their academic and social needs are addressed (Hasselbring, 2000). Also, research has shown that students of all ability levels learn more when they are involved in such knowledge construction activities (Collins, Hawkins and Carver, 1991). Children who have learning and attention difficulties are supported in a collaborative learning environment where they can have an active role and feel a part of the task. These activities may support equal opportunities for children, social skills and learning.

Computer-based activities those have visual activities and feedback mechanism are used to increase children's attention to a task (Cardona et.al., 2000). In this study, DigiTile provide the children a visual and colorful representation of fractions which led to attract their attention to the task. Positive effect of visually appealing computerized environment on attention was supported by the interview results with CSN. CSN needs seem to enjoy playing and experience a sense of solidarity at the computer (Brodin and Lindstrand, 2000). Our findings from the interviews support these studies, because students frequently brought on the computer related enjoyment. Since such perceptions could have increased their motivations, further data can be included for further dimensions of the study.

In conclusion, this study underlines positive effects of collaboration and backward fading on fraction learning of CSN in a computerized environment. It also highlights the way for researches about possible effects of these methods for learning of subjects other than fraction learning. Working with children with different mental disorders is also necessary to reach more generalizable findings. There are some limitations which probably affected the reliability of the results. Short period between pre and post-tests is the most important limitation of the study. In addition, lack of a retention test, relatively inadequate number of participants can be counted as barriers preventing the researchers to conclude more generalizable results.

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Formative Evaluation of Web-based Internet Search Scaffolding Tool

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Abstract

This study aims to evaluate Web-Based Internet Search Scaffolding Tool (WISST) that has been developed to help students search purposefully in the Internet through certain scaffolding strategies implemented in the tool. 45 6th, 7th and 8th grade students and 4 experts participated in this study. The data were collected through focus group method, the target groups' perceived usability problems were detected and their solutions were gathered

Introduction

Children constitute an important part of current Internet users. Literature shows that they generally use the Web as an information source especially for school assignments (Large, Beheshti, Nesset, & Bowler, 2004; Large & Beheshti, 2005). While engaging in search tasks within the Web environment, children usually confront with adult specific interfaces. Therefore, interaction can turn into a maze. This commonly happens in the utilization of such search engines as Google because they serve for general purpose searches. The technology behind such tools does not matter if the results do not appeal or satisfy the user (Chau, Qin, Zhou, Tseng, & Chen, 2008). In addition to the tool itself, there are other factors influencing the search performance of users. The initiation and the flow of the search process depend on the user's understanding of the information they are requested (Lucas & Topi, 2004). For example, novice users generally do not plan before starting, and they visit the links in the list they find without evaluating them critically (Quintana, Zhang, & Krajcik, 2005). Because of that it is essential to guide them in the search process.

Searching the Internet, which requires decisions to be made to access relevant information, does not always generate intended results (Fang & Salvendy, 2000). Use of metacognitive skills is essential to examine high density information in the Internet. Especially primary school children face certain difficulties in this process. As a result of learner-centered paradigm, performance assignments requiring Internet search are given to the students frequently. However, providing guidance and scaffolding for children and helping them use their metacognitive skills throughout the search process is essential (Sendurur & Yildirim, 2008). In this study, to provide support for the elementary school students in the search process a "Web-based Internet Search Scaffolding Tool" (WISST) developed. WISST was designed in the light of Quintana et al.'s (2005) framework. This tool aims to scaffold students throughout Web searching process by emphasizing certain metacognitive skills improvement with the help of "asking question", "searching", "evaluating and reading", and "synthesizing" steps. In this study, only the first usability evaluation process and related findings will be presented.

In this study, first, it is aimed to find out common Internet search habits of target users. Then, development and user-centered iterative evaluation processes of WISST, target users' recommendations for improving WISST, and their perceived usability problems of the tool were presented.

Method

Iterative design approach was used in designing WISST. Qualitative methods were used to collect the relevant data. Usability evaluation of WISST was conducted with the primary users. WISST was designed for 6th to 8th grade students. Therefore, 45 6th, 7th, and 8th grade volunteers (15 students from each grade level) from one of the elementary school in Ankara, Turkey participated in this study. Even though the real users provide valuable feedback in the design process, they are not the designers (Oosterholt, Kusano, & Vries, 1996). In order to understand the target users' opinions, focus group interviews were conducted. First, students were asked to describe how they search the Internet. Then, the interface of WISST was projected and students were allowed to discover the functions of elements in the interface. After being informed of the real functions, they discussed what to be changed and drew or wrote their suggestion on cardboards. The interview sessions were tape-recorded.

WISST

According to Quintana et al. (2005), through an online inquiry, children experience certain cognitive phases. The inquiry starts with asking questions, then the searching occurs, and then evaluating and reading comes. Synthesizing is the final cognitive step. The authors suggested that those steps can be scaffolded by certain approaches. Web-based scaffolding approach utilized in WISST focused on these approaches. According to suggested framework some of the metacognitive strategies applied in designing WISST can be summarized as follows (Quintana et al., 2005, p. 237):

- Asking question: Provide driving questions; help to integrate results of multiple searches in one space.
- Searching: Encourage users to find rich resources; make search steps visible; help users to decide on keywords before searching; show the search history.
- Evaluating and reading: provide a prompted notepad; show users their goals; provide users with a list of evaluation criteria.
- Synthesizing: Encourage users to compare and contrast information across different resources; describe the criteria they should use; prompt users to reflect on different aspects of information.

Procedure and Data Collection

Iterative design begins with design, testing and measuring, and continues with redesign, retest and re-measuring. These steps continue in a loop and stop when the satisfactory results are gathered (Shackel, 1991). Since the final product will be used in real educational context, the formative evaluation was conducted in a public school. The iterative design will continue until the usability evaluations results indicate satisfactory findings. In this study, only the first usability evaluation process will be described.

The focus group sessions took place in a public school in Ankara, Turkey. In this school, there are two computer laboratories. 45 volunteers participated in the study and three focus group sessions one for each grade level was conducted. Each focus group lasted two 40-minutes consecutive sessions. The interface of WISST was projected on a screen. First, the students were asked to describe the way they follow to complete their performance homework. Then, without explaining the overall functions and aims of the software, they were allowed to discuss and find usability issues, problems they face, and their preferences of the program with peers by facilitation of the researcher. Throughout the sessions, the researcher explained the function of software, helping them about the use or aim of the program, and answering children's questions. The software was only projected on a screen. They were asked to express their first impressions and irritated items or functions. In the second session, blank cardboards were given to the students, and they were encouraged to draw or write their preferences of the software, and suggestions to solve the perceived usability problems. The sessions were tape recorded.

Data Analysis

The focus group session records were transcribed, analyzed, and coded to diagnose users' Internet search habits, and perceived usability problems about WISST prototype. The data gathered through group sessions were supported through analysis of drawings or essays of the students. In addition, those data were used to diagnose the solutions suggested by the target users by calculating the frequencies and determining the common concepts reported by the students.

Findings

Internet Search Habits

Preferences: All participants conduct Internet search at least two times in a week to complete their performance homework. However, 3 students in sixth grade do not have a computer at home. The remaining students have computers at home, and use it actively. The most preferred search engine by the students is Google because of its ease of use and option provided for Turkish search.

Experienced Difficulties: All groups complained about broken links in the Web. Both 6th and 7th graders mentioned about the difficulty in accessing specific information due to misleading links or irrelevant list of results. In addition, 6th graders stated that they were confused easily and lost frequently within the result list.

Keywords: All participants found that deciding the keywords was easy. They generally use more than one keyword at once and just put a space between them.

Search Patterns: Without any exception, all target users stated that they start searching by extracting keywords from the performance homework question. Then, they enter those keywords in Google. When results are listed: (i) All 6th graders and 4 8th grade students read explanations under links one by one in the given order; (ii) All 7th graders and the majority (9 students) of the 8th graders reported that they scan the titles; (iii) 2 8th grade students just click the first link. When they investigate the sites their strategies do not differ, i.e. they all benefit from titles on the pages. If the titles are appropriate, they continue to read. In addition, 7th graders use the titles as a reliability criterion. They indicate that if the site includes all the needed titles (the same with or similar to those in the homework), it can be inferred that the site is reliable. While 6th graders have no criteria for reliability of sites, 8th graders prefer to compare one site with another, and if the sites provide the same information, they mention that it is a sign for reliability of that site. Finally, all 6th graders prefer direct copying and pasting strategy to complete the work, but half of 7th and 8th graders stated that they generally feel that it is needed to add certain explanations to the copied and pasted information.

Perceived Usability Problems

Almost all users' guesses about the aim of the software were on point or close to the point. However, the menu titled "Arama" (search) revealed some problems. Five 6th graders anticipated that it was just a title. The rest of those group claimed that it allowed managing account options. Despite guessing the functions of the menu correctly, other groups pointed the visibility problem of the menu. Figure 1 demonstrates close and open positions of "Arama" menu.

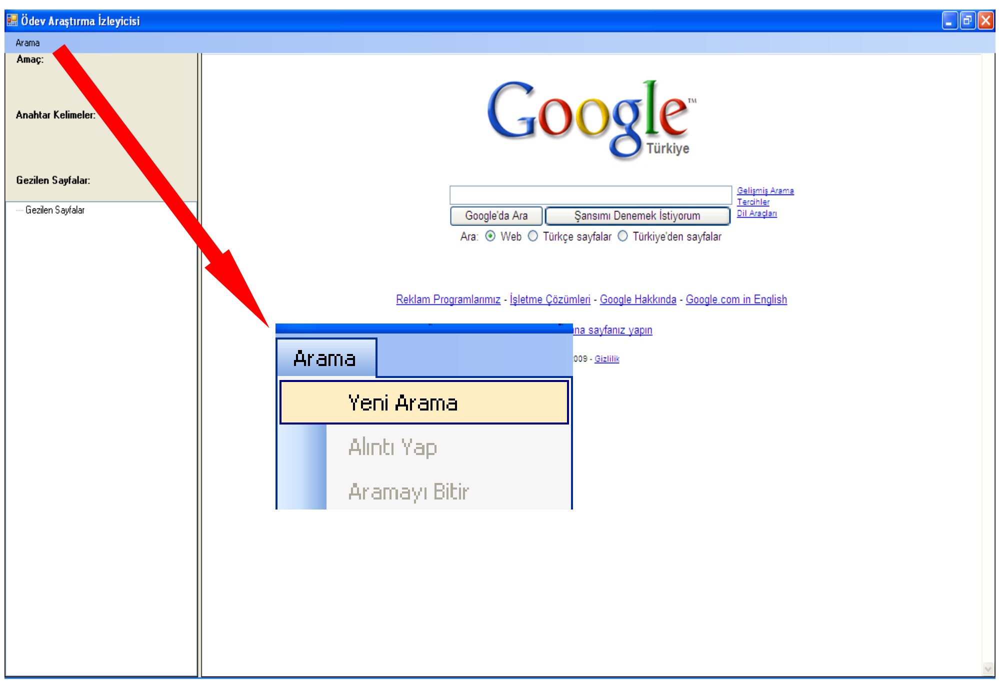

Figure 1

Another perceived problem by the target users is related with pop-up windows requiring user input. Except for majority of 7th and 8th graders, the rest of the students found the questions posed by the tool too many and unnecessary. They stated that they did not need those questions. Indeed, 6th graders directly stated that copying and pasting do not require such questions, thus there is no need to think about the details. However, they also mentioned that it could be helpful if the sites were investigated well. Majority of all groups also stated that some questions in the termination part could help to judge the quality of the information in the site. An example of pop-up window and the questions can be seen in Figure 2.

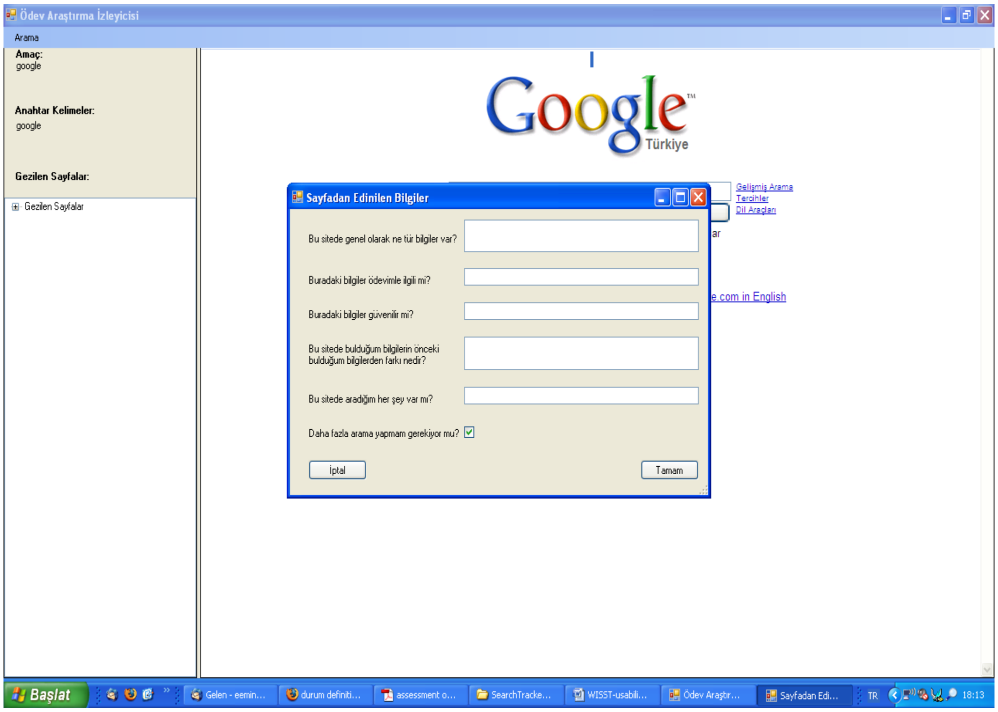

Figure 2

"Alıntı Yap" (quotation) option of menu was also perceived as a problem by target users. Majority of 6th graders, two students from 7th grade and one student from 8th grade found "quotation" in this software difficult since they already do not either add any additional idea or reexamine previous quotations. Other users, on the other hand, found using "quotation" easier because they do not need to minimize the search window, and then to open or to maximize another document. In this way, time could be saved as indicated by some 8th graders.

The Participants' Recommendations

The participants' recommendations were as follows:

- 34 users suggested color modifications: 14 users favored blue; 12 users green; 8 users red.
- 14 users suggested icon-based or button-based horizontal version of menu in order to make accessibility of "start" and "finish" types of functions easier and visible.
- 12 users wanted the inclusion of some visuals like cartoon characters.
- 8 users proposed that the left panel should be moved top or bottom of the screen because of the demand for large search space.
- 7 users pointed the need for a space for note taking in addition to quotation part.
- 7 users demanded certain amount of customization of their accounts.
- 5 users wanted to change the fonts, styles, and colors of texts.
- 2 users suggested a help option.

Discussion

The findings clearly imply that design of software is not or should not be a one-shot process. Especially, involvement of target users in the early stages of design contributes to decide on what to do next with the interface. By considering that importance, the process started with analysis of users' Internet search habits. Although there are some slight differences between different grade levels, a common search pattern of the participants can be inferred from the findings of this study. They generally do not prefer to conduct detailed search. Most of them stop when they find all in one no matter whether it is the first Web site visited. However, some students who are either 7th or 8th graders reported that in order to be sure whether that information is adequate or not, they visit a second site and if the titles or information included are the same with the previous one, then they decide on terminating the search process.

All students face some difficulties during searching (Bar-Ilan & Belous, 2007). Findings suggested that broken links are the most common problems the students face. Unlike other levels, 6th graders experience more confusion during Internet search. This might be related with the amount of previous experience. On the other hand, they all search for ready-to-use and specific information, but this is considerably hard for especially 6th graders. This finding is consistent with previous research done regardless of age (Chau et al., 2008; Large & Beheshti, 2000). Titles and explanations serve as visual cues about the information or website for the majority. Based on those, they decide on which ways to go in their search. For completion of performance homework, they generally prefer copy-paste strategy. Unlike 6th graders, about half of the other groups sometimes add their own words. It can be concluded based on the findings that the amount of previous experience affects the patterns of Internet search, and that might be the reason for why 6th graders' answers differ from the others.

Focus group analysis revealed that the appearance and functionality of menu have certain problems. Students were irritated with the placement and background of it. In other words, they perceived it as just a title because of being located on a blue bar. Some students found the questions on the pop-up windows unnecessary and time consuming. This is because they just start searching by entering keywords and continue with copy-paste. However, others who prefer to organize or add something of their own found those questions as a checklist to control. "Quotation" function of menu was also perceived as a problem by especially 6th graders, but others found it easier due to elimination of a few steps.

Conclusion

This study explained the first usability evaluation process of WISST prototype. Focus group methodology allowed understanding the Internet search habits and strategies of target users. Moreover, users' suggestions provided valuable feedback especially about cosmetic features of the prototype as well as perceptions of problematic features. Based on the findings of this study, the tool will be improved, and then another usability evaluation will be conducted with the improved tool. While conducting this usability evaluation, the functions of the tool were limited, and this resulted with lack of hands on user testing. Considering this limitation, for the next iteration, first the target group can use the improved tool to search for a performance-homework, and then focus group sessions can be conducted. This process can provide rich data about the tool and its functions that will lead to develop better Web-Based Internet Search Scaffolding Tool.

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Teaching Creativity and Innovation through Manufacturing Partnerships and NSF Support

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Introduction

Csikszentmihalyi (2006) noted "creativity is no longer a luxury for the few, but . . . a necessity for all" (p. xviii). Learning organizations appear to agree, as a variety of 21st Century Learning Skills (North Central Regional Education Laboratory and the Partnership for 21st Century Skills) have included concepts such as "thinking a problem-solving skills," "inventive thinking," "high productivity," "using digital technology and communication tools," and "learning academic content through real-world examples" in their standards. In *Tough Choices or Tough Times* from the National Center on Education and the Economy, McWilliam (2008) explained "the 21st century is a world in which comfort with ideas and abstractions is the passport to a good job, in which creativity and innovation are the keys to the good life, in which high levels of education – a very different kind of education than most of us have had – are going to be the only security there is" (p. 67).

Innovation Partnerships for Teachers (IPT) is one of a three-component NSF-sponsored project which supports an online course designed for teachers to engage in pedagogies and technologies associated with creativity, innovation, and invention. The other two components of the grant include the Manufacturers Innovation Leadership Program (MILP) to connect leader-managers from small- and medium-sized manufacturing (SMM) firms with university scholars and K12 teachers and the Innovation Scholars Program to create multi-disciplinary teams of senior college students and faculty who will produce and process innovation projects with small manufacturers.

Conceptual Framework

The conceptual framework upon which the IPT project is based was developed in 1995 through the pioneer efforts of the Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation (Smithsonian Institution, 2006). The Center, part of the National Museum of American History of the Smithsonian Institution, focused its attention on developing programs aimed at youth interested in the study and exploration of innovation and invention and its impact on American society. Within that context, the IPT project focuses on the interaction among teachers, students and experienced business practioners, each of whom, learning together, understand that innovation begins with the learning process of creative problem solving. Specifically, IPT develops an Internet-delivered pedagogy course for K12 teacher to enhance their understanding of and abilities to design, develop, and deliver rich lessons that engage students in creativity and innovation technologies. The course features authentic issues in teachers' and students' day-to-day lives. This is significant, because 21st Century Skills for learning call for students understanding how to live and work in a global economy, and innovation technologies and creativity open exciting career opportunities in such an economy.

IPT places what students learn in the classroom within the broader context of the economics of real life. Course activities are designed using the following tools:

- National learning standards for appropriate subjects and grade levels,
- Partnerships with small- and medium-sized manufacturers (SMMs),
- Team-based innovation problem solving that addresses creativity in new product development,
- Business, engineering, and communications issues associated with innovation,
- Design and rapid prototyping, and
- Partnerships with university faculty and university students who will be available as resources to mentor K12 students as they learn the innovation process.

It is this process – innovation, that is essential for living and succeeding in a global society. Through innovation, students also learn that manufacturing within the global economy is an exciting and attractive career choice in their professional futures. This is the same realization that causes business communities to be attracted to schools, offering expertise and financial support.

Program Objectives

The objectives of the IPT program include:

1. Develop a three-credit hour Master's level web-based course in pedagogy that emphasizes creativity and innovation in solving ill-structured manufacturing problems for K-12 teachers.
2. Each participating teacher will produce two authentic, problem-based lesson plans using innovation technologies and manufacturing concepts to use in their classrooms and share with other teachers via the project website.
3. Encourage the creation of school-manufacturing business partnerships to further creativity and innovation technologies in teaching and learning.
4. Impact teachers' attitudes and awareness of teaching creativity and innovation technologies and manufacturing as a significant economic force and career choice.
5. Use Design-Based Research Methodology to assess the project's design, development, and effectiveness.

Defining Creativity and Innovation

Within the respective disciplines in which the concept of creative or creativity is employed, researchers have attempted to define the concept relative to the discipline itself. Markman (2009), co-editor of the book *Tools for Innovation*, indicates that creativity is using language to speak sentences that have never been spoken before, or expressing thoughts that have never been expressed. Creativity within the science and engineering disciplines includes discoveries of new knowledge in science and medicine, invention of new technology, composing beautiful music, or analyzing a situation in law, philosophy, or history in a new way (Standler 1998). Finally, creativity in education has been referred to as the "ability to produce work that is both novel and appropriate" (Sternberg & Lubart, 1999). Craft (2005) views creativity as the ability to see possibilities that others haven't noticed, while Esquivel (1995) explains it as the critical process involved in the generation of new ideas. In an operationally problem-oriented definition, Torrance (1962) defined creativity as: A process of becoming sensitive to a problem, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypothesis about these deficiencies; testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results. Ultimately, regardless of how the particular discipline defines creativity, it is essentially recognized as how best practice and imaginative ideas can be applied in diverse situations.

The critical or defining attributes of creativity were best described in a classic study by Taylor and Williams (1966), which proposed the existence of five typologies for creativity. These were expressive, productive, inventive, innovative, and emergenative. They explain that expressive creativity is spontaneous and often observed in children while scientists or artists generally illustrate productive creativity. Problem solving or creation, such as improving technology is an example of inventive creativity. Innovative creativity requires the capacity to improve, invent, or reinvent an existing object through conceptualization skills. Finally, emergenative creativity discovers or opens a surge of ideas to explore and develop new inventions.

What makes a person employable in our digital, globalized society? McWilliam (2008) found that the key factors for employability of 21st century workers include:

- Personal attributes (such as motivation and adaptability)
- Communication (such as emphasizing and speaking non-English languages)
- Teamwork
- Initiative and enterprise (including 'being creative')
- Problem solving (such as developing creative, innovative solutions)
- Planning and organizing
- Self-management (including intellectual property
- Life-long learning
- Familiarity with technology

The call for a more creative workforce rings loudly in politics and society (Seltzer and Bentley 1999; Leadbeater, 1999; Landry, 2000; Florida, 2002). The role digitally enhanced environments play in fostering creativity have generated a great deal of research (Cunningham, 2002; Hartley, 2004; Howkins, 2001; Caves, 2000). Pink (2006) details how our future workers will be performing work that is focused on creative solutions to problems and synthesis of ideas and concepts.

According to research, creative and innovative people possess the characteristics and dispositions necessary to be this type of employee: intrinsic motivation (Amabile 1983, Deci & Ryan 1985, Hennessey 1999, Hennessey & Amabile 1998, Urdan 1997, and Henderson 2004); risk taking (Perkins 1981, McWilliam 2008); pattern recognition (Perkins 1981); exploration (Henderson 2004, McWilliam 2008, Perkins 1981); problem solving (Perkins 1981, Henderson 2004, McWilliam 2008); creation of analogies and mental models (Perkins 1981); and thrive in an environment where unpredictability and complexity are the norm (McWilliam 2008).

Henderson (2004) and Runco (2004) agreed that inventors possess the aforementioned characteristics and, in addition, display characteristics of investment of time and effort, tenacity, problem-finding vision, problem-solving focus, confidence in abilities, and immersion in a responsive environment.

The Course: Innovation Technologies and Creativity in Teaching

The "theme" for this course is *Innovation Island*, selected specifically to give participants (K12 teachers) a sense of relaxation, play, and fun. The island is home to four main learning areas: Investigation Station, Manufacturing Marina, Classroom Ecosystem, and Pedagogy Pavilion. Areas for learning support include a Welcome Center, Resources, Collaboration, and Career Planning. The course site is non-linear in nature but students could be guided through in a linear approach. Following is an explanation of the course learning areas.

The Welcome Center presents some basic background knowledge including definitions of innovation, creativity, invention, and manufacturing and characteristics of creative, innovative learners. The course syllabus and FAQs are also housed here. The Resources room includes links to additional learning materials including presentation of different models of teaching creativity and innovation. Career Planning offers resources related to opportunities in manufacturing, invention, innovation and creativity.

Investigation Station

Investigation Station is the spot for teachers to learn problem solving through authentic challenges. "Problems are solved by hard work and persistence - by moving away from falsity, not moving towards the Truth. We learn more from failed experiments than from confirming ones" (McWilliam, 2008, p.192).

The investigations in this section are organized into the "Think, Play, Do" innovation schema (Dodgson, Gann & Salter, 2005). Unlike the traditional sequences of research, development, and engineering, the Think, Play, Do process is characterized by highly fluid boundaries, with thinking, playing, and doing occurring at all stages of the innovation process. Participants are be presented with authentic challenges and guided through the problem solving process from problem finding through brainstorming through pattern identification problem solving (Getz & Lubart 1999, Adams 1972, Faste 1972, Mafarquhar 1999, Baillie 2006, Perkins 1981).

Michalko (2006) offers a wealth of activities designed to challenge thinking habits and increase creativity. Activities like SCAMPER, a questioning technique to determine the strength of an idea, and mind-mapping are presented in this section of the course.

Manufacturing Marina

The goal for this section of the course is to move participants from creative thinking into the realm of excellent problem solvers who discover novel solutions (Henderson, 2004). Participants will be asked to involve themselves in the inventing process, from brainstorming, to idea generation, to rapid prototyping, to management of an innovation. Dodgson, Gann & Salter (2005) differentiate between innovation technologies, information communication technologies, and operations and manufacturing technologies. Table 1 lists the features of each of these types of technologies and their uses.

Innovation Technologies (IvT)	Information & Communication Technologies (ICT)	Operations & Manufacturing Technologies (OMT)
Function: to create	Function: to enable	Function: to implement

Search tools	Computers and servers	Computer Numerical Control (CNC)
Modeling and simulation	Open systems	Flexible Manufacturing System (FMS)
Visualization/virtual reality	Bandwidth	Computer Aided Design (CAD)
Rapid prototyping	Sensors	Computer Aided Manufacturing (CAM)
	Internet/WWW	Computer Integrated Manufacturing (CIM)
	Wifi/3G	Common Industrial Protocol (CIP)
	Electronic Data Interchange	

Table 1. Differentiation between generic types of technology

Bull & Garofalo (2009) claim "the second half [of the digital revolution] involves the round trip back from bits to atoms to enable the creation of tangible materials based on digital designs. We will build upon their work with digital fabrication by setting up "Innovation Stations" for participants to use in learning. Each station will include a computer, auto-cad software, a color printer, and a computer-controlled die-cutting machine that shapes paper, cardboard, vinyl, or other similar materials. Bull (2009) offers examples of how digital fabrication is being used in content areas:

- Science: Use geological and earth science resources to construct models depicting certain phenomena
- Math: Create 3D shapes for geometry concepts
- Elementary: use static cling inkject film to produce customized Colorforms-like sets for storyboarding projects in language arts or social studies instruction.

The possibilities for enhancing student learning with digital fabrication tools are limitless and will give teachers a glimpse into the world of invention and manufacturing. Student motivation and ownership in conceptual learning will increase as well.

Through the course, participating teachers will have the opportunity to use an "Innovation Station" and develop content-rich lessons for their own students. Additionally, they will develop a business plan to partner with one or more of the grant project's SMMs with the goal of setting up an Innovation Station in their own classroom.

Classroom Ecosystem

Regarding definitions of creativity, Csikszentmihalyi (1988) noted the key question is not "what is creativity", but "where is creativity." Other researchers include social, cultural or historical dimensions in their conceptions of creativity as well (Amabile & Tighe, 1993; Gardner, 1993; Sternberg & Lubart, 1991; Csikszentmihalyi, 1996), emphasizing the importance of the environment's contribution to the development of creative potential. Henderson (2004) hypothesized features of a formative environment from studies revealing the importance of classroom environments that support inventive behavior, while McWilliam (2008) quoted John Bruer, president of the James S. McDonnell Foundation, as articulating the need to value, create and sustain environments that are low in threat and high in challenge.

Uden & Damiani (2007) differentiated between a natural ecosystem as "a biological community of interacting organisms and their physical environment" and a business ecosystem as "a network of buyers, suppliers and makers of related products or services and their socio-economic environment that includes institutional and regulatory framework" (p. 114). Xia (2006) notes that the term ecology is not merely a biological term but a scientific term that "shows concern for man's goal, function and future, but also for the ecosystem, the diversity of life and the creatures' activity environment" (p. 57). In this sense, the classroom can be described as an ecosystem, a systemized whole consisting of living creatures and the environment in which they exist. Xia (2006) describes further:

> There exists not only close correlation and interdependence among the living creatures, but also close correlation and interdependence between the living creatures and the environment or other non-biotic factors in this system; they form the life community in coexistence and cooperation. In the classroom ecosystem, teacher and students are the biotic factors. Both the instructor (the teacher) and the educated (the students) are human beings – the highest form separated from animals in the biosphere, and are members with responsibility and capability of giving rational answers to rational questions. The teacher and the students are interdependent and interactive. Either of the two is indispensable in constituting the curriculum and the teaching activity system. The curriculum and the teaching activity cannot function without specific environment. There exist close correlation and widespread interaction between the teacher, students and the classroom environment, and the various biotic factors in the classroom environment. (p. 60)

While the teacher and students are biotic elements in a classroom ecosystem, the non-biotic elements exert significant influence on the learning that occurs. Non-biotic elements include:

- Natural factors: colors of various objects, natural lighting in the classroom, temperature and noise;
- Space and time factor: organization of classroom space and teaching time, rhythm, and efficiency;
- Facility factor: infrastructure such as desks, chairs, platform, whiteboard;
- Information factor: the novelty, richness, scientific-ness and vividness of information transmission and exchange;
- Cultural element: the nutrient of the classroom that feeds the whole ecosystem;
- Organization factor: different organization forms have different characteristics in influencing students in terms of classroom interaction, exchanges, participation and competition;
- Emotional factor: Positive and rich emotion can promote the understanding process and the will process, and help in the full development of individual character;
- Interpersonal factor: learners and teachers form a complex interpersonal relationship through multi-directional exchanges, which permeate and eventually affect the classroom atmosphere, classroom activity and the learning process; and
- Public opinion factor: different views that arise from teaching questions or contradictions, which affect each other. (Xia, 2006, p. 61)

Creativity and innovation can either thrive or die depending on the classroom ecosystem. In this course module, participating teachers will conduct a thorough evaluation of their current classroom ecosystem and design plans to optimize that ecosystem for creative, innovative teaching and learning.

Pedagogy Pavilion

To develop a classroom into an actual learning ecosystem, social and physical factors are not the only elements that need attention. Pedagogy must enter the equation as well. Bowkett (2007) suggested that teachers must have the capacity to make trouble for familiar thinking and the capacity to work with difference rather than move to resolve it. The irony of this is how different it is from conventional schools of pedagogical thought. McWilliam expanded that notion into a description of teachers he calls “Meddlers-in-the-Middle” (between the “Sage-on-the-Stage” and the “Guide-on-the-Side”). The Meddlers-in-the-Middle:

- see themselves as designers of learning opportunities (focus on using content to create new knowledge, rather than memorize),
- employ clear strategies for helping students know what to do when they don’t know what to do,
- are good at setting up experiments that might fail,
- help kids fail without shame,
- are capable users of digital technologies but don’t rely on it to teach for them,
- are pleased to learn about technology from students,
- have a good understanding of the culture of all kids (value diversity),
- can bring subject, technology, and culture together, and
- invite noise, uncertainty, and argument as part of the fun of learning. (p. 108)

She also suggests that the Meddler-in-the-Middle spends less time giving instructions and more time spent being a usefully ignorant team member in the thick of the action and less time being a custodial risk minimizer and more time spent being an experimenter, risk-taker and learner (McWilliam, 2008, p. 88).

This section of the course is designed for participating teachers to learn and develop characteristics of the creative, innovative teacher and begin to employ pedagogies to foster these skills in their students. Pink (2005) suggests that a curriculum of creativity moves from the old to the new (Table 2).

OLD	NEW
Function	Design
Focus	Symphony
Seriousness	Play
Argument	Story
Logic	Empathy
Accumulation	Meaning

Table 2. Description of changes to creativity curriculum from old to new

In embracing new pedagogy, it is necessary to consider assessment of student learning, whether it is consensual assessment (Balchin, 2006; McWilliam, 2008), self-assessment (Cowan, 2006); by the process or product (Cowan, 2006) or purpose (Stables & Kimbell, 2007); or through conceptualization, schematization, and execution (Cowdroy & deGraff, 2005).

The role of the teacher is to foster a classroom ecosystem in which new pedagogy can thrive; this begins with the teacher's capacity to recognize, represent, articulate, and evaluate his or her own creativity and innovation (Cowan, 2006; Wisdom, 2006; Baillie, 2006; Jackson & Sinclair, 2006; McWilliam, 2008). The *Innovation Technologies and Creativity in Teaching* course as an element of the Innovative Partnerships for Teachers project is designed to immerse teachers in innovation technologies and creativity in the classroom.

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Transition of Multiple Master Level Programs From Traditional Face-To-Face Delivery to Online Delivery – A First-Year Evaluation

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Abstract

What are some of the factors that affect the success (or lack of) of an institution of higher learning when an institution decides to move multiple, master level programs from a traditional face-to-face offering to distance education delivery? Funded in part by resources from the federal government, a university in deep South Texas attempts to increase both accessibility to coursework and quality of instruction in several advanced degree programs to help boost employment opportunities for traditionally disenfranchised students. The sheer scale of such an endeavor brings with it its own, embedded problems. But other complicating factors, not necessarily unique to this project, up the complexity level of such an attempt. Two of these factors are the diversity of faculty members, of whom less than 5% are from the United States originally, and the challenge of coordinating activities involving faculty in the United States, Europe and Asia. This report is intended to provide a snapshot of anticipated and unanticipated successes and setbacks at the end of the first year of implementation from an evaluator's perspective. Lessons learned are discussed.

Background

Ever since the lower Rio Grande Valley (RGV) in remote South Texas became part of the United States at the conclusion of the Mexican-American war in 1848, the area has been ripe with possibility and fraught with difficulties and disappointments. Currently the poverty rate as of 2008 in this area exceeds 37% according to City-Data.Com. The median income of this area is below $28,000 per household as compared to a national average that exceeds $38,000 per household (US Census, 2008). Median age for the lower Rio Grande Valley averages below 24 years as compared to a national average that exceeds 34 years (ibid).

Education is the key to tapping into the vast heretofore undeveloped human potential of the region. However, taken as a group, Hispanics account for less than 6 % of recipients of master level degrees (National Center for Educational Statistics, 2007). When one disaggregates the data to look specifically at Mexican-Americans, and further look at degree recipients in areas such as advanced mathematics and computer science, this 6% significantly diminishes even further.

Introduction

With the help of some federal resources, a local university has decided to move three of its master level programs from traditional, face-to-face delivery to initially hybrid delivery, to transition to fully online delivery. This decision to move master level programs initially to a hybrid format for delivery and ultimately to a completely online delivery format was made in large part from a needs analysis that showed that the overwhelming majority of those students who already held degrees at the undergraduate level were employed in full-time professions that made their seeking an advanced degree problematic at best.

There are currently three master level degree programs involved in making this transition from face-to-face to online delivery. Those programs are: a master degree in mathematics, a master degree in computer science, and a master degree in interpretation and translation (Spanish to English, English to Spanish). While each of these three programs has its own set of unique characteristics in terms of content and traditional forms of instruction, it became apparent that certain design factors and implementation factors permeated all three of these degrees. Specifically those factors are as follows (phrased and interrogative form).

1. How does one transition faculty members from face-to-face to online instruction?
2. What types of instructional tools are effective (and ineffective) when trying to reach end users who, for the most part, have English as their second language?
3. And finally, what is the impact on the institution in the tradeoff between the strain on existing resources and the gain in student enrollment at the master level?

A further, complicating variable was the ethnicity of the faculty members themselves. Of the more than 25 faculty members involved in this project, only one is native to the United States. One other faculty member is from Australia, and even though English is his first language, his accent is considered by most local residents to be that of a foreign language. Another complicating variable is the distances involved. In one of the degrees, the degree in translation and interpretation, the majority of the faculty work in institutions outside the United States, specifically Ireland and Spain.

Literature Review

When hybrid course offerings are compared to traditional, face-to-face course offerings, the effectiveness of the hybrid courses is no longer in doubt; in fact, there is significant research that shows hybrid courses to be superior to face-to-face courses (Dziuban, Hartman, and Moskal, 2004; Johnson ,2000; Moor, 2004; Jones, 2009, Vaughan, 2007). However, there is still significant discussion as to what form courses should take as they migrate from face-to-face to hybrid and into completely online delivery. When developers step back and look at program development as compared to single course development, prevailing logic is that all courses in a degree program should be designed with a common scheme to both the "look" of the courses in the program and to the methods of instructional delivery. While students in a traditional program can transition easily between different instructors' methods for delivering instruction and use of various types of tools of instruction, students in hybrid and distance education courses can become much more easily disoriented and subsequently confused by a variety of instructors' delivery styles and instructional approaches (Amrein-Beardsley, 2007; Boyle, 2003). This need for consistency among courses in a program creates the need for each faculty member in that program to not only adopt similar course structure but also similar instructional styles. But having all faculty members and a program on the "same page" in terms of instructional look and feel as well as instructional methodologies is no simple task. Anecdotally one can say this is akin to trying to herd cats, especially when the "cats" all possess advanced degrees and in many cases at this particular University, numerous accolades in their respective academic areas. Effective training becomes more critical than ever. Coordination of such training, particularly when it involves intercontinental scheduling, becomes a significant challenge.

Existing research supports the idea that moving into a hybrid or online format should not displace lecture format altogether (Boyle, 2003; Khine, 2003; O'Toole, 2003). But inclusion of lecture format into online delivery raises two, practical problems: the delivery quality of the lecture files to remote users, and the auditory accessibility to those remote users of lectures delivered by faculty with discernible, foreign accents. It is a common, if misplaced, complaint among American undergraduates that having a faculty member lecture to those undergraduates when the faculty member has a noticeable foreign accent makes attentiveness to that lecture content difficult at best (Kavas & Kavas, 2008). The nature of the content in advanced mathematics, computer science, and linguistics courses makes audio discern ability all the more important in online materials in those materials are delivered in lecture format. There are tools that enable listeners to easily follow faculty members who present their lectures in an online format. But if standardization in course content and delivery is recommended as earlier noted, then getting faculty "buy in" to using lecture delivery that is enhanced by speech recognition tools, etc. becomes all the more urgent and yet problematic among a highly diverse faculty.

In advanced degree programs such as computer science and mathematics that inherently entail abstract symbolic manipulation, the need for students to interact in real time (traditionally in labs or in study groups) must be met if those students are going to succeed in meeting the demands of challenging coursework. The same needs of students for real-time interaction literally speak for themselves in a translation and interpretation degree program.

The tools for virtual online meetings are rapidly becoming ubiquitous and students are more and more expecting the use of such tools in hybrid and distance education courses. One only need think of the Super Bowl in 2010 and the commercial advertising GoLive meetings during that televised event as an example of the ever-increasing presence of online conference management systems. While these types of conference facilitation tools can provide a significant amount of value added to individual courses in a program collectively, getting faculty to systematically use these tools, particularly when those faculty are not native speakers of English and English will be the predominant language of instruction in audio environment, can be an extremely difficult undertaking.

The current project of moving three master level degree programs initially into a hybrid and then into an online environment is currently completing its first semester of implementation. The process for this migration at this point is as follows. Two courses will be piloted in each of the three master level programs. These two courses in each program are initially designed to use the same tools and the same form of content delivery. Training is being provided to respective faculty members by having University staff travel to foreign universities when necessary and deliver training in a face-to-face environment. However, when the project scales up as it will have to do to meet the needs of a total of 36 course offerings in the three respective degree programs, effective faculty training will require the development of modules that faculty can access in a "just in time" fashion. The successes and "non-successes" of various types of training sessions and faculty members' usage of various types of tools is currently being documented so that subsequent modifications can be made when necessary.

The ethnicity of the faculty members for the six pilot courses were as follows: two faculty members from the People's Republic of China; one faculty member from South Korea; one faculty member from Germany; and two faculty members from Spain. Four of the faculty members involved in the programs were located on campus at the University of South Texas. Of the two remaining faculty members, one faculty members delivered a course from Spain and the other faculty member at delivered a course from Ireland. Faculty members involved in the mathematics degree and in the computer science degree all reside within driving distance of the University. Faculty members involved in the translation degree reside in Ireland and Spain for the most part, but routinely moved to other countries in Europe and North America. Training for faculty members in all three programs was absolutely essential since the large majority of the faculty members involved had either designed and online course north taught in online course. The mathematics and the translation programs benefited significantly, however, from the inclusion of one faculty member in each program who had considerable experience in designing, developing, implementing and evaluating online courses. The computer science program, while having no faculty members experienced in any aspect of distance education, had a co-principal investigator who likewise had years of experience in program development and implementation in online education. This also indicated how the distance factor imposed to the transition process.

To sum up, this project of moving a total of 36 courses in each master program from its traditional offering into a hybrid offering and then into a completely online offering is in its first year of implementation. The project is highly ambitious not only in its scope but in its attempt to develop and deliver the highest quality instruction possible for an intended audience of traditionally disenfranchised Mexican-Americans. Participating faculty in this project, with one exception, come from countries other than the United States. These faculty members bring a wealth of experience, both professional and personal, to the project. At the same time these faculty members come from cultures steeped in tradition, especially the understanding of what traditions of education entail. Documenting and reporting upon efforts in helping these faculty members make the transition from traditional to virtual instruction is both timely and appropriate as universities around the world continue to make the transition to online instructional domains.

Method

Evaluation of the first iteration of the project (the course offerings for the first semester) looked at the following factors: training for faculty members, course design, course delivery, and student outcomes. Data were collected from the following sources: attendance at, and monitoring of, faculty training sessions; accessibility to all stages of individual course development for the evaluator, from initial planning meetings through "course launch" on the first day of the semester; evaluator's inclusion in the courses; evaluator's access to results of students' assessments in individual courses, final grades, and students' evaluations of courses and instructors. Data consisted of direct observation of training sessions, viewing video archives of training sessions that occurred abroad, inclusion of electronic conversations between individual faculty members and their assigned instructional designers as courses were negotiated and developed, inclusion in various forms of communications common to online and hybrid courses (e.g., announcements, broadcast e-mails, discussion boards, archived videos).

Prior to the initial course offering in the three programs, faculty members who were offering the initial programs' courses attended at least 10 meetings to familiarize themselves with the multiplicity of issues involved in moving courses from a traditional format into a hybrid or completely online format. These were not training sessions where participants would learn how to use discussion boards for example. These meetings were more of a strategic bent, where issues ranging from student recruitment to standardize course design were raised and discussed. Each meeting would have a very specific agenda. Notes would be taken. Action items were proposed and previous activities were evaluated. The evaluator had full access to all these meetings and took notes accordingly. Those meetings involving the translation program were video-archived since these meetings could not occur on the University campus, with two exceptions.

The two instructional designers were assigned to these three programs. The instructional designers included the evaluator in their correspondences with faculty members when those correspondences involved in the issues related to design courses and instructional strategies. At the beginning of the semester, the evaluator was included in each course and was allowed full access to all components of each course. Individual instructors would not send specific correspondences between a student and an instructor to the evaluator, as is in keeping with the instructor student confidentiality. However, one faculty member in particular would routinely summarize larger issues that an individual interaction with the student represented and would send that synopsis of the evaluator. These "abridged e-mails" turned out to be quite a boon for uncovering institutional shortcomings in the institutional approach to distance education.

The evaluator was allowed to peruse assessments (grades) and individual learning modules as long as the confidentiality of the student was not violated. Therefore, the evaluator was given access to final grades and student evaluations.

Findings

Each program had a series of initial meetings of which the purpose was to address strategic issues. Since there were a relatively small number of faculty involved in these initial course offerings, scheduling these meetings was not excessively difficult, even for those faculty members who reside abroad. These meetings appeared highly beneficial in raising problematic issues and addressing those issues before they became systemic problems. Those issues involved matters routinely encountered in programs moving from a traditional format to a hybrid format or completely online format. Faculty members in the pilot course offerings in all three programs were included in the discussions of the benefits of including a standardized instructional approach and course structure for the initial courses in each program and for subsequent courses that would be developed in each of those programs. The predictable resistance to the perception that faculty freedom was somehow being stripped away, or at least homogenized, was addressed in a satisfactory fashion and all participants in the pilot program saw the wisdom, and more importantly, the benefit to the students, for a similar "look and feel" in each course.

Training became less complicated since the initial courses in each program would have the same course structure and embedded instructional strategies. Each program benefited significantly from the presence of highly experienced individuals in distance education (two faculty members and one co-principal investigator). Those individuals could explain to their peer faculty members the wisdom of using a standardized approach that still allowed individual instructors to exercise their academic and scholastic freedoms. Training sessions could then be delivered "lockstep" in which a specific topic germane to each program could be explored in depth, rather than having to work with each individual faculty member and address specific issues to whatever design decisions that faculty member may be making. On two occasions, however, the lead faculty member in the translation program had to go abroad, to Spain and to Ireland, to help deliver training sessions in person. The course management system being used, Blackboard, proved problematic to faculty members who could not be in the same room as their trainers, at least for initial sessions. On one of these trips, the lead faculty member had to take an instructional designer, incurring an extra cost, but ensuring successful training.

There were two significant barriers to success in these initial course offerings, each obstacle specific to a particular program. The first obstacle turned out to be a language barrier. Those professors with a foreign accent have been educated in their advanced degrees in the United States. In small meetings, or in one-to-one conversations, their version of American English is easy to understand. However, their accents often became incomprehensible when they would present lectures and have those lectures turned into video archives for their hybrid classes. The evaluator never sat in on a particular, traditional face-to-face class that these professors were offering in which the video archives were recorded. But the evaluator has spent numerous hours in person with these professors on some of the archives. There was a significant difference in the perceived quality of their usage of American English between their face-to-face conversations and the video archives. This difference in quality substantially reduced the instructional capacity of the archive lectures. A solution was developed and implemented towards the end of the pilot semester in which the archive lectures were still available for student access. But modules were developed to complement those archive lectures. Each module contained all the elements of sound instructional design, interactive quizzes, Flash animations when appropriate, but most importantly, uses a Native American English voiceover instead of the professor's voice. The professor would write a script to complement contents of the module and the narrator would read from that script. This approach to design of instruction was more time-consuming and resource intensive, but significant in improved students' satisfaction with audio quality, and assisting those students in mastering instructional objectives embedded in each module.

Predictably, faculty in the translation program had no issues regarding language usage or accents, other than an oddity found in common language usage in different cultures. Professors had to be sensitive to specific word usage. For instance, the meaning of specific Spanish word in Barcelona may not have the same meaning in Mexico City. The issues that plague the translation program were institutional. As mentioned, the University is located in far South Texas. The institution has developed a provincial attitude due to its remoteness. Issues, such as student applications for admissions, financial aid, and course registration, have all been traditionally done in a face-to-face environment. Moving a course from a face-to-face delivery mode to an online delivery mode involves one set of issues. Moving an institution into a position where it can support multiple online program offerings involves a completely different set of issues. Because the computer science program and the mathematics program were focusing upon recruiting students within driving distance of the campus, institutional support for distance education students did not significantly impact those programs, at least during the pilot course offerings. But, students applying from other parts of the state or other parts of the country or from other countries encountered an unusual mix of aggravation. Some of the types of difficulties that students and professors in Spain and Ireland encountered are as follows.

In the application for admission process, students are required to supply student visas if they are from a foreign country. No provision had been made for students who are going to take online degrees and never set foot on campus. Applying for financial aid required face-to-face counseling, highly problematic for students located some hundred miles away. The institution did not appeared prepared for distance education professors who reside in different countries in terms of expediting work visas or direct deposit to bank accounts.

Conclusion

Ideally, an institution will have 2 to 4 years to prepare for moving a master level program from a traditional delivery methodology into an online format. However, most institutions simply don't have that luxury of affording the requisite amount of time for in-depth planning. Faculty members, typically in areas such as foreign languages, mathematics and computer science are more and more representing a global community rather than a regional population, even at smaller universities in remote areas such as South Texas. Instructional issues, delivery media, authentic assessment are only some of the issues involved in transitioning a program from a traditional format to a completely online format. One can think of a tripod when conceptualizing the needs of a distance education program. One leg represents the instructional component, one leg represents the technological demand both for delivering and receiving instruction, and the third leg represents the administrative components of any institute of higher education that service faculty and students, and must be prepared to service faculty and students at a distance. While distance education has been mainstream in United States universities for at least 10 years and most issues have been effectively addressed, offering online advanced degree programs to local, national and international students, from faculty members who represent a microcosm of the United Nations is still new territory. From the evaluator's perspective, each program needs a champion in the initial course offerings. In this context, each faculty member involved needs to be a team player first, an award-winning academic second. If resources permit, all components of the institution that support academic programs need to have a designated contact person who can be reached at and have a solution to a problem within 24 hours.

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An Immersive Security Education Environment (I-SEE)

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Abstract

An Immersive Security Education Environment is a serious game running on the Second Life environment. The purpose of the game is to allow players to experience various information security mechanisms and attacks when they do not have appropriate security protection. In this game, teams of students will play against each other trying to gain the highest scores in all three major areas- *Money, Information Security, and Product Diversity*. Teams operate their own online stores selling computer equipments that they have to purchase them online. Teams have to engage in a scavenger hunt activity to find Second Life objects and their associated quizzes to earn the rights to use various information security mechanisms. In addition, each team has to set up appropriate security mechanisms for their online stores to avoid being cyber-attacked. Playing this game will provide a unique learning experience that players cannot find from the lesson in the classroom or from the textbook.

Introduction

Information security knowledge and skills are important for all Internet users. Most of us use the Internet to share personal and other sensitive information without thinking much about security. For example, when you purchase products online, do you always check that website's privacy policy? Do you check if a seller's website implements any security features to protect your information? It is likely that the answers to these two questions are "maybe" or "rarely". At Penn State University, we developed a novel experiential learning module offer a course that provides basic information security education. During the course, instructors will discuss key information security concepts and security mechanisms such as port blocking, firewalls, and cryptography through traditional lectures. However, there is little evidence that the lecture format is an effective learning approach for information security topics. One of the challenges for the instructor is to provide real-life experiences to the students. Essentially, this is the underlying motivation for the development of this game. Playing a game is an activity of improving skills in order to overcome challenges from the rules of the game. Therefore, game playing is one of fundamental learning experiences (Juul, 2005). The game was designed and developed by a group of Information Sciences and Technology (IST) instructors and students. The game was used in the classroom for a few years and received positive responses from students. Furthermore, the students' learning performance has been increased in terms of test scores and their knowledge. In this paper, the structure of the game and the game design will be presented.

Rationale

All Internet users need to have basic information security education. However, information security education primarily focuses on the technical aspect of information security. In addition, most of the contents are delivered as abstract concepts without much attention on their meaning in real-life contexts. Therefore, these learning experiences have very little impact on users' information security behaviors. To address these limitations, we will discuss the use of a simulation game using an integrated Web and Second Life environment to educate users about safe online behaviors. Simulations can enhance safely, provide experiences not readily available in reality, modify time frames, make rare events more common, control the complexity of the learning situation for instructional benefit, and save money (Alessi & Trollip, 2001). In this simulation, students are given a scenario in which they have to compete with others to make their online stores and private information as secured as possible. The game also provides an opportunity to measure their understanding of information security concepts. In addition, fun is the most important factor, which will motivate students to learn more effectively.

Structure of the Game

Scenario: You and your team members have been put in charge of opening a new virtual store in Second Life. Your main missions are

- Build a secure IT infrastructure for your new store
- Stock the store with goods purchased from trustworthy e-commerce Websites
- Sell products to customers
- Securely protect information assets (e.g., password, credit card information, customer information)

Challenges:

- All tasks need to be accomplished within a limited budget
- Your team competes against other teams
- Random attacks will be launched against common information security vulnerabilities
- No single best strategy to protect information assets

How to play the game:

- Each team will receive the team assets:
  - Password protected team site
  - Credit card with $5,000 (see Figure1)
  - Attractive avatar
  - gmail account (see Figure 2)
  - Second Life store space (Figure 3)

Figure 1: Credit Card

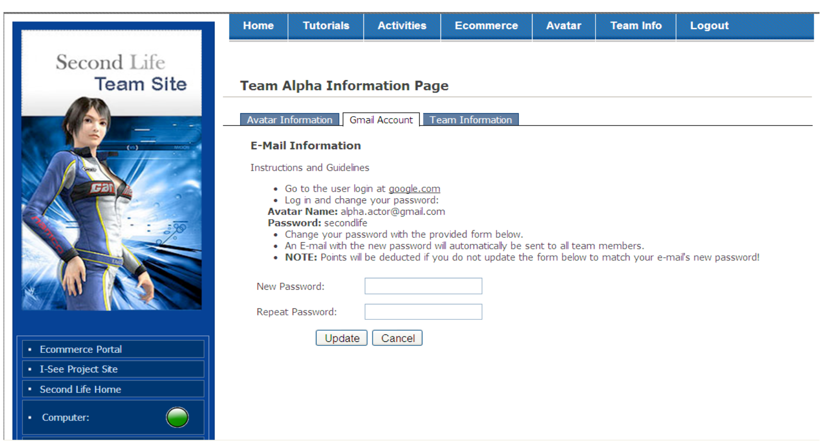


Figure 2: gmail account

Figure 3: Second Life store space

What should a player do in the game?

- The player will perform router and firewall configuration of their online store.
- The player will set up security countermeasures such as port blocking, CAPTCHA, out-of-band, security images, and clipping for the online store.
- The player will protect their online store from security attacks such as spam, password cracking, website defacement, zero-day attack, and port scanning.
- The player will also practice safe online behaviors such as careful choices of stores to purchase products, password choices, privacy policy, and access controls.

Followings are the tasks that the player performs:

Task1: The players have to purchase IT equipments for their store. There are four stores that sell IT equipment. However, ach store has different levels of security. (see Figure 4)

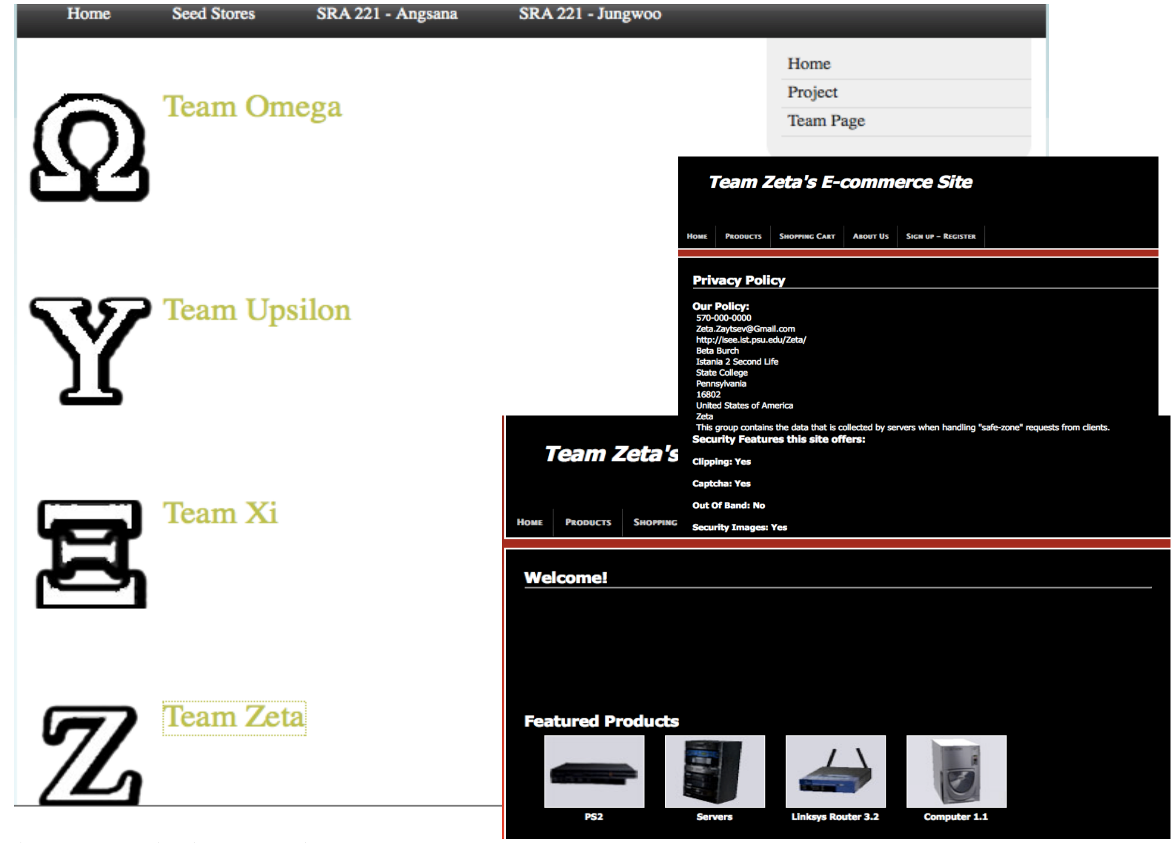


Figure 4: Purchasing IT equipments

After the products are received, the players have to set up the IT equipment and configure the router. (see Figure 5)

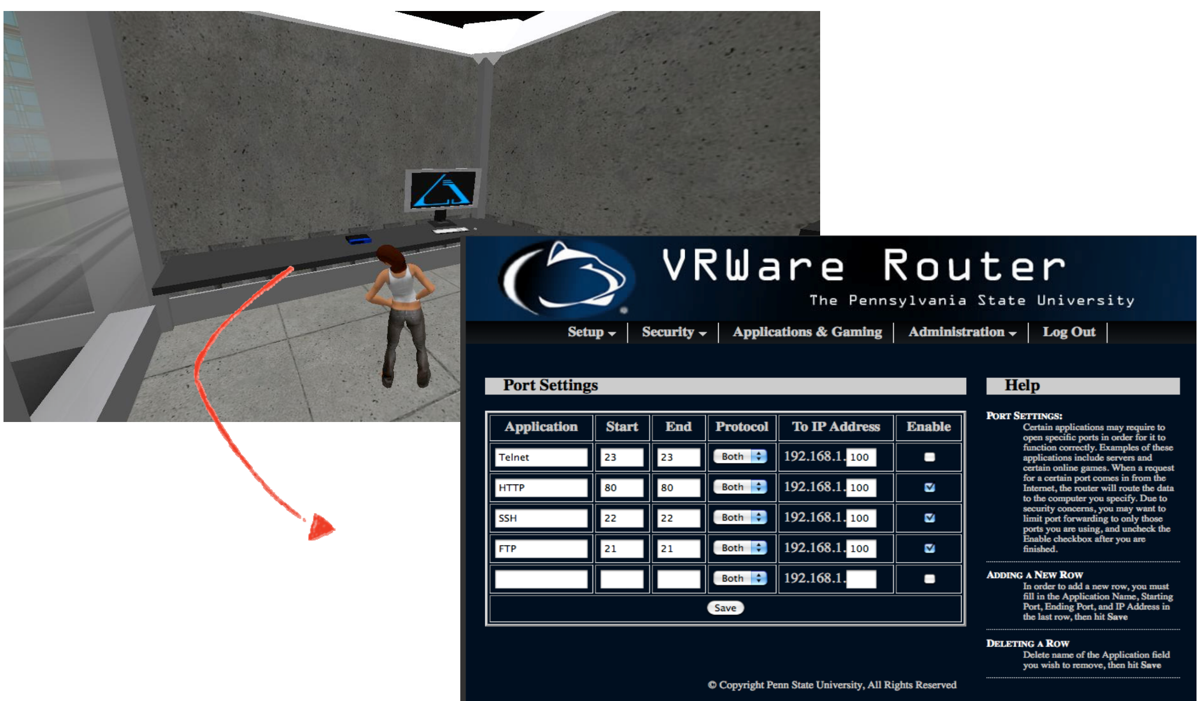


Figure 5: Set Router Configuration

Then, the players have to set up their online store as well as engage in a scavenger hunt (See Figure 6) in order to gain security features for their online store. The security features include CAPTCHA, Security image, P3P, Out of band, and Clipping. They have to take a quiz for each security feature and get at least 80% of the test in order to ear the right to use a security feature. (see Figure 7)

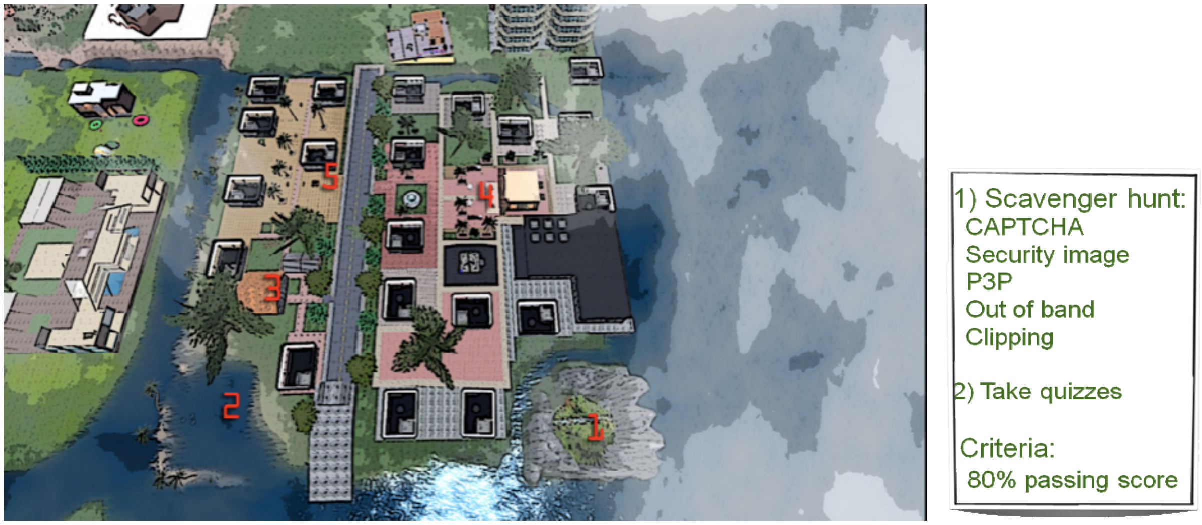
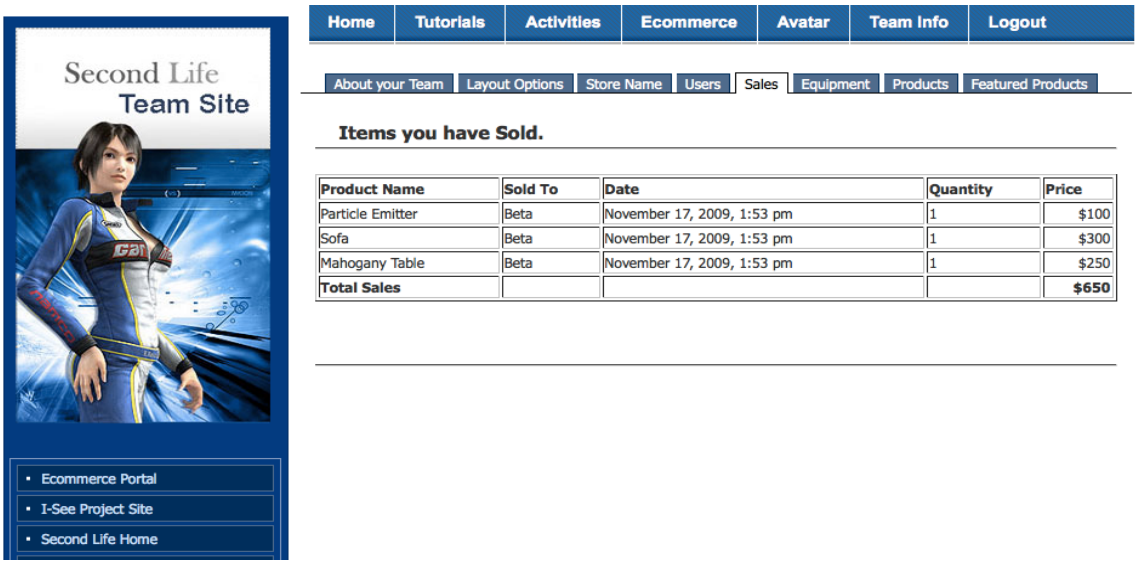


Figure 6: Scavenger hunt

Figure 7: Out of Band Quiz sample

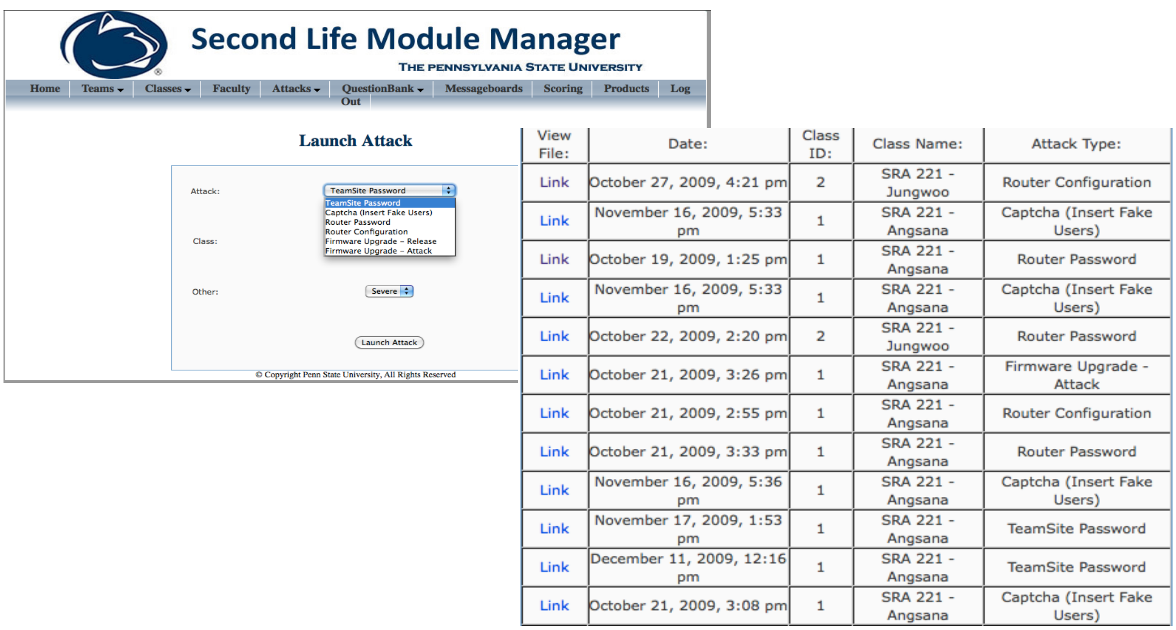
After the store is set, the players will start buying and selling products. (see Figure 8)



Product Name	Sold To	Date	Quantity	Price
Particle Emitter	Beta	November 17, 2009, 1:53 pm	1	$100
Sofa	Beta	November 17, 2009, 1:53 pm	1	$300
Mahogany Table	Beta	November 17, 2009, 1:53 pm	1	$250
Total Sales				$650

Figure 8: Buy and Sell Products

At this point, the instructor will act as an attacker and start launching security attacks to student teams. (see Figure 9)



View File:	Date:	Class ID:	Class Name:	Attack Type:
Link	October 27, 2009, 4:21 pm	2	SRA 221 - Jungwoo	Router Configuration
Link	November 16, 2009, 5:33 pm	1	SRA 221 - Angsana	Captcha (Insert Fake Users)
Link	October 19, 2009, 1:25 pm	1	SRA 221 - Angsana	Router Password
Link	November 16, 2009, 5:33 pm	1	SRA 221 - Angsana	Captcha (Insert Fake Users)
Link	October 22, 2009, 2:20 pm	2	SRA 221 - Jungwoo	Router Password
Link	October 21, 2009, 3:26 pm	1	SRA 221 - Angsana	Firmware Upgrade - Attack
Link	October 21, 2009, 2:55 pm	1	SRA 221 - Angsana	Router Configuration
Link	October 21, 2009, 3:33 pm	1	SRA 221 - Angsana	Router Password
Link	November 16, 2009, 5:36 pm	1	SRA 221 - Angsana	Captcha (Insert Fake Users)
Link	November 17, 2009, 1:53 pm	1	SRA 221 - Angsana	TeamSite Password
Link	December 11, 2009, 12:16 pm	1	SRA 221 - Angsana	TeamSite Password
Link	October 21, 2009, 3:08 pm	1	SRA 221 - Angsana	Captcha (Insert Fake Users)

Figure 9: Security attacks

If student teams fail an attack, they have to contact a consultant to resolve the consequences of an attack. that the consultant will charge $500 fee to solve each failure. (see Figure 10)

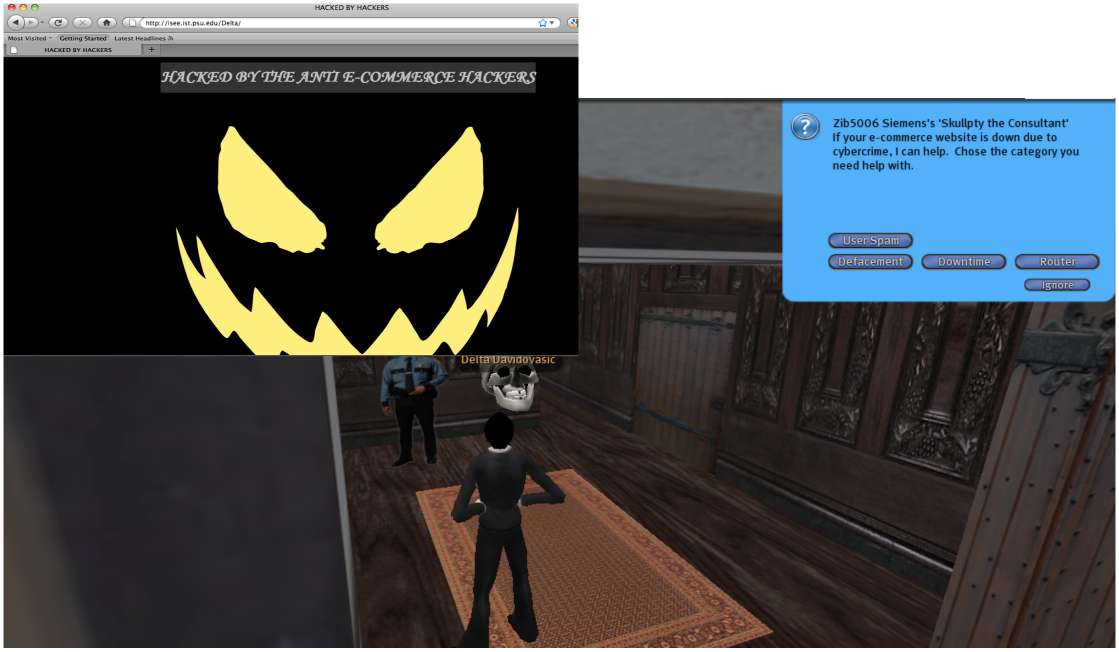


Figure 10: Attack Recovery

At the end of the game, every team will receive a score card explaining the detailed of the breakdown of their information security scores. (see Table 1 and 2)

TeamName: Alpha
Money: 2950
Total number of products: 8
Total Score: 44.375 %

Site Score	Router Score	Survival Score	Shopping Score
• Team PW strength: 0% • Clipping: 0% • Captcha: 0% • Security Image: 15% • OutOfBand: 15%	• Router Password Strength: 12.5% • Firewall: 0% • Firmware: 25% • Port configuration: 0%	• Times Down: 1(-5%) • Times Defaced: 2(-10%) • Number of Fake Users: (-0%)	Beta's Site Score: 30%
• P3P quiz: 0% • P3P Policy: 15%			Upsilon's Site Score: 0%
			Zeta's Site Score: 0%
Site Score: 45%	• Router Score: 37.5%	Survial Score: 85%	Total Shopping Score: 10%

Table 1: Team Alpha sample score sheet

TeamName: Beta
Money: 4250
Total number of products: 10
Total Score: 50.625 %

Site Score	Router Score	Survival Score	Shopping Score
• Team PW strength: 15% • Clipping: 0% • Captcha: 0% • Security Image: 0% • OutOfBand: 0%	• Router Password Strength: 0% • Firewall: 25% • Firmware: 25% • Port configuration: 12.5%	• Times Down: 1(-5%) • Times Defaced: 0(-0%) • Number of Fake Users: (-0%)	Alpha's Site Score: 45%
• P3P quiz: 0% • P3P Policy: 15%			Xi's Site Score: 0%
			Zeta's Site Score: 0%
Site Score: 30%	• Router Score: 62.5%	Survial Score: 95%	Total Shopping Score: 15%

Table 2 Team Beta sample score sheet

Evaluation Criteria

Each team will be evaluated based on money balance, information security score, and diversity of products in their store. They can view their score and money balance on the score board in the middle of the island during the game.(see Figure 11)

Figure 11: Scoreboard

At the end of the game, the winner will be announced and rewarded with bonus points.

Conclusion

The Immersive Security Education Environment (I-SEE) is a project that uses an integrated Web and Second Life environment to educate users about various information security mechanisms, safe online behaviors, and the consequences of security attacks. The collaborative team structure enables learners to engage in enjoyable and competitive learning environment. In the future, the in-depth behaviors of the learners will be investigated and the game design will be tested with broader types of audiences.

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The University of Toledo VLab
Another Piece of the Distance Education Puzzle

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Abstract

In today's increasingly technological world, students are requiring more and more specialized computer software to complete their studies and to obtain real world, hands-on experience. While this is a challenge for on-campus, traditional computer labs, it is even more difficult for distance education. The University of Toledo has built VLab, a collection of highly customized virtual machines available to students around the clock, from anywhere in the world.

Introduction

The term "distance education" often provokes thoughts of content delivery, such as text, video and audio materials, to students at a remote location. Technologies such as e-mail, message boards, wikis and content management systems are enabling educators and learners to share information more rapidly than using traditional means such as correspondence. These technologies are all vital to educators in today's high speed, competitive and "global" world. Yet, there are additional aspects of distance education that these technologies simply do not address. Consider the following excerpt from Wikipedia on the definition of distance learning:

Distance education, or distance learning, is a field of education that focuses on the pedagogy, technology, and instructional system designs that aim to deliver education to students who are not physically "on site" in a traditional classroom or campus. It has been described as "a process to create and provide access to learning when the source of information and the learners are separated by time and distance, or both." In other words, distance learning is the process of creating an educational experience of equal qualitative value for the learner to best suit their needs outside the classroom. Distance education courses that require a physical on-site presence for any reason including the taking of examinations is considered to be a hybrid or blended course of study, (Honeyman and Miller, 1993)."

With this definition in mind, consider for a moment the tools students require to be successful in their "educational experience". Surely, regardless the field of study, most students will require the use of computers and, more specifically, application software. At the University of Toledo, students rely on Maple for learning mathematics, SAS and SPSS to analyze statistics, ArcGIS when studying geography, Microsoft Office for a variety of purposes; and the list goes on and on. A typical university today might utilize dozens or even hundreds of applications, many of which are highly specialized for specific fields of study, and expect students to demonstrate some level of competency in using these tools. When we consider this aspect of the educational experience, we find a challenge in providing effective distance education. If what we are trying to deliver to students is not simply content, but content coupled with the hands-on application using computer software, how do we do it? This question is at the heart of this paper.

Traditionally we've had two options to address this issue: The first is to have students purchase the software and install it on their own personal computers. The challenge with this method is that software is often prohibitively expensive and might serve little purpose to a student once a course is complete. In addition, there will undoubtedly be technical issues with system requirements and configuration that will affect the learning experience. The second option is to provide content remotely and require students to come on-site to use a computer lab. When we consider the definition of distance learning above, this option really shifts us away from distance learning to a hybrid or blended model. In this paper we are proposing a third option, one that attempts to address the shortcomings of the others, and provide a solution for this increasingly important component to distance education.

The University of Toledo

The University of Toledo consists of more than 20,000 students studying across multiple disciplines as well as a 300-bed teaching hospital. To address the needs discussed in the last section, we've essentially built a private cloud using an assortment of VMware technologies. This will be discussed further in the following section titled "Technology". We call our cloud "VLab" (http://www.utoledo.edu/it/vlab), and it is essentially a collection of virtual machines tailored to the specific configurations of each of our colleges. The primary goal of VLab is to tear down the time restrictions and physical boundaries of existing physical computer labs. This collection of virtual lab computers can be accessed via the internet from anywhere in the world, around the clock, using a variety of end-point devices such as Microsoft Windows PCs, Macs, thin clients, and mobile phones. Once connected through a secure, encrypted tunnel, students are presented with their own virtual machine, fully configured with the university-owned software they need to be successful. Students taking DL courses are now able to obtain media from Blackboard, our content management system, and then complete assignments requiring the use of specialized applications using a virtual lab; all without setting foot on campus.

Today, we have approximately 1,000 virtual machines running nearly three dozen unique configurations for individual colleges and specific courses. While remote access for students to our VLab has been the primary focus, we've found a variety of other uses for this technology. Our dormitory lab computers, for example, have all been replaced with Wyse thin client devices which provide access to the VLab virtual machines. This configuration provides our students with a unified computing experience whether they're on or off campus. It has also saved individual departments on hardware acquisition and support costs, in addition to reducing energy consumption by approximately 50% (Coyne, 2008) in these areas. A similar configuration is being used to deliver a more stable, secure computing environment for nearly half of the UT medical center hospital. At the time of this writing there are more than 600 thin client devices throughout the UT enterprise that are being used to connect to the private cloud infrastructure.

Technology

Private Cloud

The term "private cloud" has been defined several ways. Consider the following examples:

"Cloud computing is Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand, like the electricity grid (Wikimedia, 2010)."

"Private cloud (also called internal cloud or corporate cloud) is a marketing term for a proprietary computing architecture that provides hosted services to a limited number of people behind a firewall (TechTarget, 2009)*."*

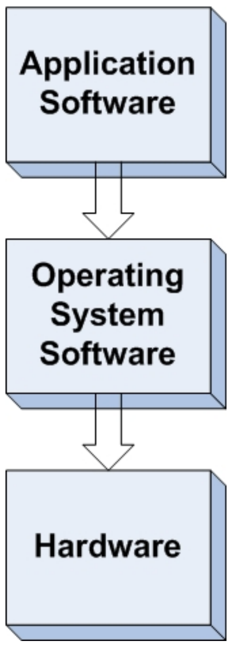
VLab is all of this. As you'll see in more detail below, there is a great deal of technology, both hardware and software, driving the virtual lab environment. But none of this is seen by student. They simply browse to a web page, begin accessing compute resources as needed, and then close the page when they're done, freeing up those resources for the next person.

Virtual Machine

Before we go any further it is important to understand what a virtual machine is and how it differs from traditional computers. Wikipedia defines virtual machines as either system virtual machines or process virtual machines (Wikimedia Foundations, Inc., 2010). In this document I will only be discussing system virtual machines which, from this point forward, will be referred to as either "virtual machines" or simply "VMs". To understand what virtual machines are, let's first take a brief look at how traditional, physical computers work.

There are two primary components to a computer: hardware and software. Hardware is anything that you can touch such as the, keyboard, mouse, or hard drive. Software refers to any program that makes the computer *do* something. Today, most computers are first loaded with operating system software such as Microsoft Windows or Apple OS X. The operating system controls interaction between the various hardware components (such as a video card and memory) and applications that are installed (such as a word processor or statistical package). Below is a simple visual showing the relationship between hardware, operating system software, and application software.

Figure 1 - Logical layers of a traditional computer



With traditional computers, we see one physical machine (hardware) running one operating system and one or more applications. With a virtual machine however, we separate the hardware, add a virtualization layer (also known as a hypervisor) and gain the ability to run multiple operating system instances on a single piece of hardware. We are effectively turning one physical machine in to several computers. In the virtualization world, the new model looks like this:

Now that we've established our definition of a virtual machine, let's look at some of the technology we use to build and manage them for VLab.

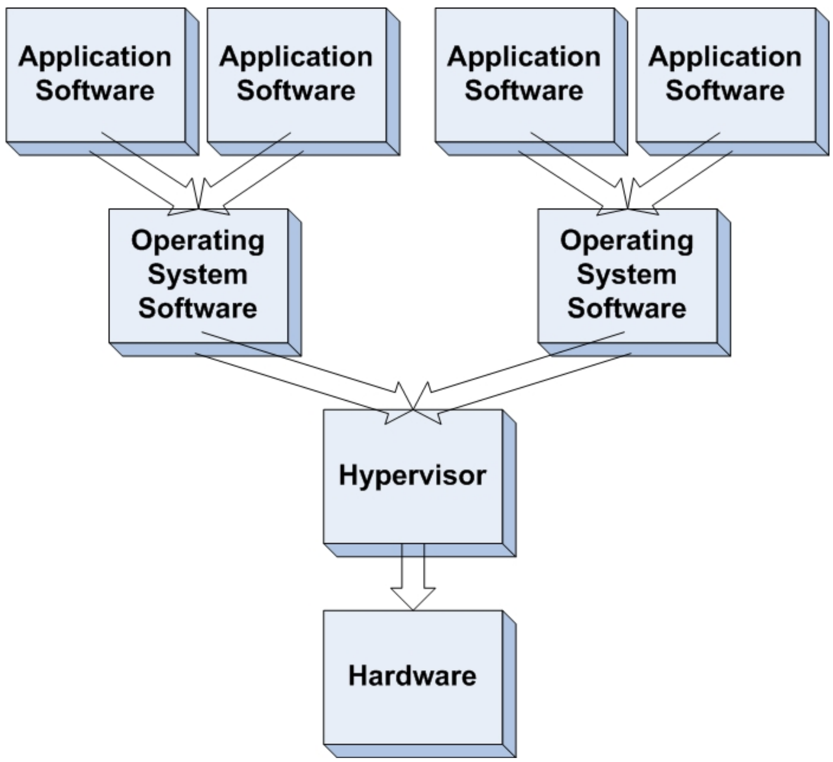
VMware View

VMware View is at the core of VLab. This product is used for provisioning, managing, and brokering virtual machines. The importance of these concepts is described below. View has a significant advantage over competing products such as Microsoft Terminal Services and Citrix because of its unique approach to virtualization.

Rather than taking a single operating system and application configuration, slicing it up, and sharing "sessions" between multiple users, View gives each user his/her own virtual machine. In fact, it presents the ability to provide a brand new virtual machine to each user *every time* they access the virtual lab. This is a fully automated process, relieving pressure from the IT support staff. This configuration is one we rely on heavily in order to ensure the best possible experience for our students.

Each virtual machine is complete with an operating system, a set of applications, and a custom configuration to match the needs of the college or specific course. The hardware (processor, memory, and storage) resources are shared between active virtual machines and are allocated dynamically. The ability to be infinitely flexible in configurations while managing the entire environment with a single tool is what made View our product of choice.

Figure 2 – Logical layers of a virtual machine



Provisioning

Provisioning refers to the process of creating and destroying virtual machines. VMware View allows an IT administrator to rapidly create one or hundreds of virtual machines in a matter of minutes. View relies on templates to create collections of virtual machines called pools. Each pool can use a unique template giving the VMs it contains the specific attributes required by the users who will be entitled to use them. These attributes include but are not limited to operating system, application suite, and the amount of hardware resources that can be allocated. Once a pool is created, provisioning is a fully automated process. Virtual machines can be automatically destroyed when a user is done with them and new VMs can be generated in their place.

Managing

Managing the lifecycle of computers can be a daunting task. A significant amount of IT resources are spent reinstalling operating system and application software in traditional computer labs. Updates often require planned outages and a great deal of redundant human effort. The following is a quote from the Gartner group about total cost of ownership of a traditional PC: *"For a large company, the cost of purchasing a desktop PC may be only $1,200, but, kept for four years, the total cost of ownership (TCO) could be as much as $5,867* ***per year****, according to (Gartner, Inc., 2010)"* VMware View provides a single management interface to manage all virtual machine pools. Templates can be updated offline and used to rebuild pools of VMs with minimal effort and no user downtime. This feature frees IT resources to work on higher level, strategic initiatives, dramatically reduces TCO of individual machines, and improves student experience.

Brokering

By definition, the virtual machines in our private cloud are all housed behind the university firewall. This protects the devices from malicious software and unauthorized access. The View Connection Broker provides a means for authenticating the user against Microsoft Active Directory, verifying their entitlement(s), and managing the session traffic between their end-point device and the virtual machine.

VMware ESX

VMware ESX is a proprietary operating system that creates the hypervisor layer and makes virtualization on the x86 server architecture possible. The University of Toledo has virtualized nearly fifty percent of its server infrastructure over the last five years using this technology. At the time of this writing we have just over 260 virtualized servers running on approximately thirty-five physical devices and this number is growing all the time.

VMware View builds on the existing ESX infrastructure to build virtual machines. Because we already had an existing ESX infrastructure for server virtualization, it was a relatively simple step to start vitualizing the desktop and to build the VLab.

Conclusion

While opinions certainly differ on the role distance education will play in the future of education, I think it is safe to say that its prevalence will continue to increase as it has in recent years. Educators will need to embrace technology that empowers students to be efficient and effective learners outside of the classroom as well as in. Building a private cloud infrastructure on VMware technology has proved to be an effective means of doing just this. While there are technical limitations to every solution, we are finding that one of our biggest challenges is keeping up with the demand for more infrastructure and more virtual machines. As an IT professional, this is the best kind of problem to have.

Figure 3 below provides an overview of the components required to build VLab. It also illustrates the process flow for both provisioning virtual machines (in red) and connecting to them (in blue).

Figure 3 – VLab Architecture Design

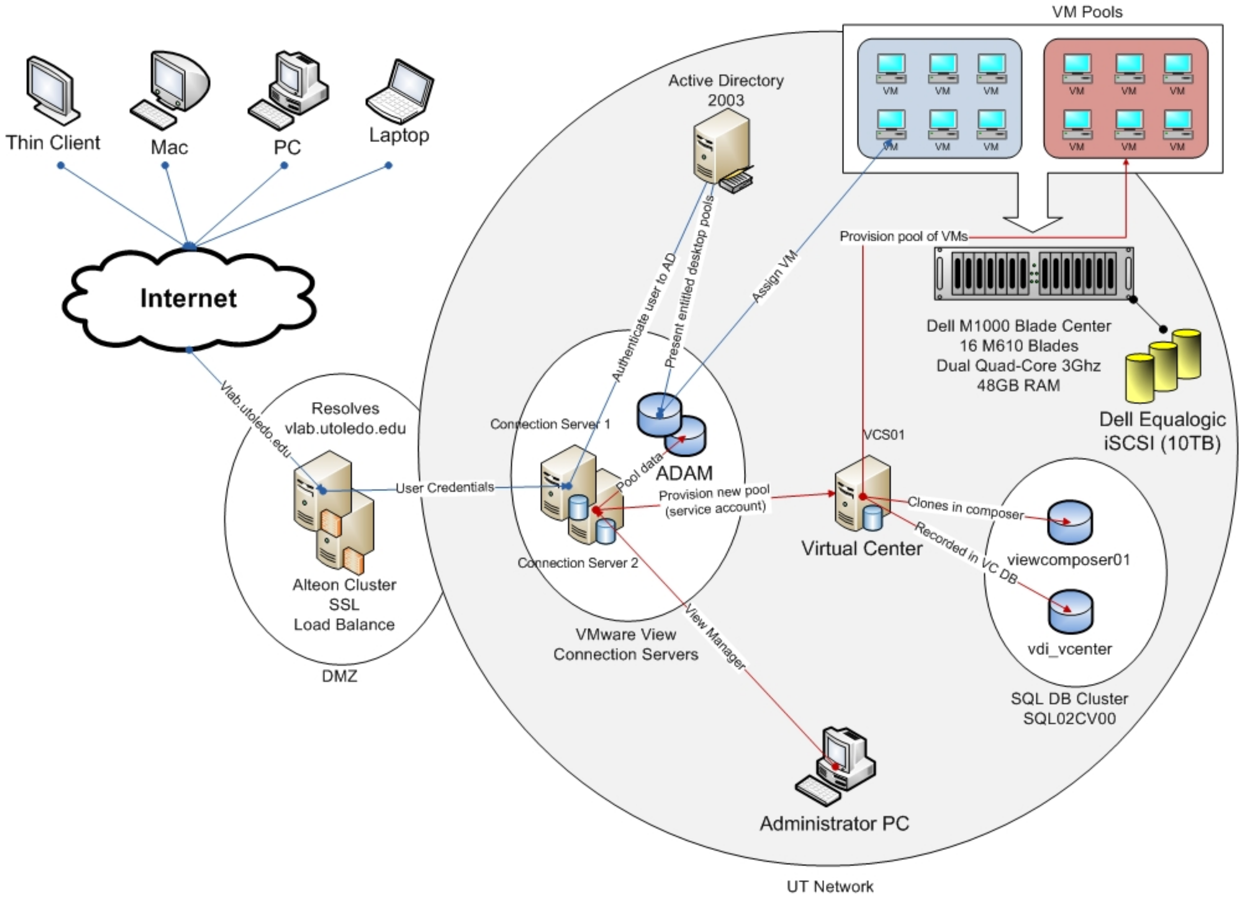


Figure 4 – Power Study Results

The following data are the result of a UT power study conducted by Jeffrey Coyne in Information Technology with the help of UT electricians. The original data have been modified minimally for easier display. All measured wattage has been rounded off to the nearest whole number. All costs have been rounded to the nearest cent. Some columns that were not applicable to the topic at hand were removed.

Device Type	Power Off	Low Utilization	High Utilization	Screen Saver	Monitor Off
Wyse Terminal	2	13	13	13.000	13
Dell Optiplex 755	7	49	84	53.000	48
Dell Optiplex 755 Energy Star	7	41	76	46.000	41

Scenario Two: 24/7/365 student lab OR hospital

In both 24/7/365 computer labs as well as in the hospital, computers are often left on all the time. With these assumptions in mind the following compares the Dell Optiplex 755 Energy Star with the Wyse terminals used in our evaluation.

Dell Optiplex 755 Energy Star

Daily - Formula = High utilization + Low Utilization + Screen Saver + Idle (Monitor off)

	Hours	Kilowatts	$/Kilowatt hour	Total
	High Utilization			
	6	0.076	0.075	0.034
	Low Utilization			
	6	0.041	0.075	0.018
	Screen Saver			
	12	0.046	0.075	0.041
Totals for one business day:	**24**			**0.094**
			Seven day week:	7.000
Total for work week:				**0.658**
	One week	**Weeks in a year**	**Number of PCs**	**Total**
Grand total for one year:	**$0.66**	**52**	**500**	**$17,117.10**

Wyse V10L Terminal

Weekday - Formula = Standard Utilization

	Hours	Kilowatts	$/Kilowatt hour	Total
	Standard Utilization			
Total for one business day:	24	0.013	0.075	0.023
			Seven day week:	7.000
Total for work week:				**0.164**
	One week	**Weeks in a year**	**Number of PCs**	**Total**
Total for one year terminals:	**$0.16**	**52**	**500**	**$4,258.80**
24/7/365 Blade Center - Formula = Standard Utilization				
	Standard Utilization			
	24	4.266	0.075	7.6788
			Days in a year:	365.000
Total for one year servers:				**$2,802.76**
Grand total for one year:				**$7,061.56**

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Text messaging communication at college: A case study

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Abstract: Because of its reasonable service price and ease of use, text-messaging is popular in Indonesia. Users do not have to own high-end features cellphones and lots of pocket money to be able to use text-message services. The use of text-messaging affects the way people communicate with one another. When text-message communication, which is casual-informal, intersects with formal communication between college professors and students, many different perspectives can affect the communication process. This paper aims to provide perspectives from college professors and students at the University of Tanjungpura about the appropriateness of using text-messages for college communication. The original paper was unpublished and written in *Bahasa Indonesia* (Indonesian Language). The challenge for rewriting this paper is to make sure that translation of text-message quotations from Indonesia into English can be ascertained by readers with the same meaning as in the original language.

Introduction

The popularity of text-messaging in Indonesia continues to grow in recent years. Availability of Twitter, Instant Messaging (IM) and Facebook (FB) on cellphone has not replaced the popularity of standard text messaging. Compared with Twitter, IM, and FB, standard text messaging is much easier to use. It does not require technical skill and it does not have a complicated navigation system. Texting only needs users to be familiar with basic features and keypad of their cellphone. Because of its ease in use, accessibility, and low prices, text messaging is not easily replaced by new cellphone technologies (Sanders, 2010).

Owning a cellphone for people in Asia, including Indonesia, is more common than owning a laptop or a computer (Cheng, 2010). The reason why cellphones have become a common personal device for most of the people in Asia is due to its lower price. Accompanied with the cellphone, users have to purchase communication services from the Cellular Telecommunication Services Providers (CTSP). Sending-receiving text messages, sending-receiving multimedia messages, having outgoing and incoming calls, and accessing Internet are services provided by the CTSP. Text-messaging is a service that has recently increased vastly in almost all Asian countries (Katz & Aakhus, 2002; Ling & Baron, 2007; Lipscomb, Totten, Cook, & Lesch, 2007).

In Indonesia, the growth of the number of text-messaging users can be tracked from CTSP providers, such as Telkomsel, Indosat, and proXL. From the year 2008 to 2009, Telkomsel, the pioneer of CTSP in Indonesia, recorded a 21 percent increase in use of text-messaging traffic (Telkomsel, 2009). Indosat as one of Telkomsel's competitors recorded an increase of 50 percent text-message users during the year 2009 (Software Pulsa Elektrik Elektra, 2009). In the first quarter of 2010, pro-XL recorded a 55 percent increase in the company's text messaging service (ProXL Press Release, 2010). The growth of the number of text message users is a stunning standpoint for CTSP opportunity to gain profits.

For the community, cellphones and other mobile devices have created an additional identity for the person who uses these devices. Various concepts were used to describe this identity. Levinson (2004) called this identity "mobile hearth". Watkins (2009) named this identity "net generation" and "digital native". In an almost similar idea, Stald (2008) used the term "mobile identity". In this paper, we choose to use the term "mobile identity". Mobile identity, as in other human identities known well in psychology, has positive and negative elements. The positive elements of mobile identity are real-time interaction, better technology literacies, knowledge-able, connectivity-collaboration, responsibility, and respect others. In contrast, the negative elements are impatience, information overload, over use of intelligence to commit a crime, difficulty in differentiating between public and personal business, an increase irresponsible behavior, and no respect to others.

Mobile identity is processed into social interaction situation. In the social interaction situation, mobile identity is valued by the society based on acceptable social rules. Despite some commonality, every society has unique social rules. Acceptable social rules in one society may be unacceptable in another society. To be more specific, the way a person does the text messaging may not be similar from one society to another. That is what seems to be appropriate in one society may be the opposite one for the other an appropriate way on text messaging in one society maybe inappropriate in another society. Therefore, forming a convention on text messaging will hopefully make the difference clearly understandable.

Regarding appropriateness, two values of text messaging are worth discussing. They are first, the elements of language use and secondly the safety of people who use text messaging. When analyzing perceptions about text messaging communication behavior, as a part of mobile identity, we discovered that there are possibilities of disagreement about what appropriate action is and what inappropriate action is. A society can value more to language use of text messaging and another society may value more to the safety of text messaging (The & Surmiyati, 2010). Forming a convention as a guideline for members to act in the right manner is important.

Many important aspects of text messaging communication revealed in prior researches, but these researches left out attention to the text messaging convention. Kasesniemi (2003) started to reveal the adolescent social reasons in using cellphone. Turlow and Mckay (2003) gave attention to linguistic and communication standard practice in text messaging. Bell (2006) proposed the fact that young people have reasons to using text message instead of calling. Lipscomb et al. (2007) pointed the importance of paying attention to the ethic of text messaging in a different place and time. Ling & Baron (2007) focused on the use of text messaging and instant messaging in the United States. Tsoukanelis (2008) concerned on the usability and safety of using cellphone for texting. White and Kilker (2008) captured the social uses and gratification of text messaging.

This paper tries to move forward on looking at the convention of text messaging communication, especially in college. Studying the convention of text messaging is challenging. First, researches on text messaging will help for filling limited resources in this area. Second, relativity of values will influence society on developing the convention. Third, translating examples of text message quotation from the original language which is *Bahasa Indonesia* (Indonesian Language) into English will be possible to cause the change in meaning. In observance of the challenges, we strive to admit the limitation of this research.

In college, code of conduct can be used as a reference to assemble text message communication convention. In most of the United State code of conduct, convention about text messaging has been covered on code of conduct item about communication. In contrast, colleges in Indonesia just started to set in order about this convention. Based on this research, we would like to form a foundation for establishing a college code of conduct that in the future can be a model for another college or university to implement the same initiative.

Purpose and research questions

The aim of this paper is to provide perspectives from college professors and students at the University of Tanjungpura about the appropriateness of using text messages for college communication. The research questions discussed in this paper are:

1. What college activities can and cannot be communicated with text messaging?
2. How do the professors interpret text messages from students?
3. How do the students interpret the preference of their professors on receiving the text messages?
4. What actions should the college apply for having a convention on text messaging communication?

Method

For rewriting this paper, we used data collected in 2005. Text messages from students addressed to the University of Tanjungpura professors are the major data of this research. Authors and three colleagues initiated to collect samples of text messages written by students. The samples chosen were those categorized as “inappropriate” or have caused a problem of understanding. Those collections then motivated us to write this paper. Further expectation is that the results of discussion will bring new idea of proposing a recommendation to improve the code of conduct in the University of Tanjungpura.

Seven students were voluntarily involved as respondents. Their involvement was for the purpose of raising a discussion of what their opinion are about text messaging. Each student was interviewed in an informal situation once for approximately 15 - 20 minutes. Following the interview, authors and students had a group for discussion. The involvement of these students was to pursue a balance view of perspective between parties, the professors and the students.

For the first time, a section of the results from our paper was translated into English and brought to the Ed-Media Conference 2010. Four major themes used to describe the most concern of college professor in this paper. From this conference, we saw that our participants were curious about what the text messages look like. We excluded text message quotations in the first version translated paper because we struggled with worries of misinterpreting the original text messages.

After having some consultation sessions with writing center tutors at the University of Hawai'i, finally we have a solution to disclose examples data in this paper. Original text message examples and students opinion will be presented in italic. Translation will be followed the original data. In the translation, we adjusted the sentence structure to make it enable to understand. There are contingencies that the meaning of the original text will change by the sentence structure adjustment. However, we tried the best adjustment to avoid this contingency happened.

Results

Text messaging at college

Using text-message for college persistence is known in Indonesia as "akademik sms" (academic sms). It functions to fulfill several purposes, like registration, tuition payment, and announcement. However, in the University of Tanjungpura, academic sms has not been implemented. In our data collection discussion, we talked over several functionalities that likely to be implemented in our campus. From the discussion, we reached agreement and also have some disagreements. In addition, we identified detention factors for implementing academic-sms.

We reached agreement that registration and tuition payment, college announcement, and grade checking services will have benefit to campus if these services are implemented. The following are the benefits that we consider to be obtained:

1. Students will be able to save time for a better activity than to spend their time queuing in front of bank counter and registration center.
2. Students can do the registration and keep getting the update from campus while they are away on vacation.
3. Campus announcement boards can be used to post pertinent information flyers, such as academic competition, scholarship, and jobs vacancies rather than just for announcing the grades.
4. Increasing students' confidentiality by keeping the grade private only for personal information when it is sent directly to the owner cellphone.

While as, we could not come to an agreement when the issue is related to using text message to advertise courses and send out paper/thesis defense invitation. Advertising courses with a text message is considered doing an extraordinary useless job for the professors. The reason lies behind this is that even without text message advertisement services, students will automatically take the course, because majority of the courses are required. Therefore, we more agree if text message is used to announce important campus events, such as music and dance festival schedules, technology and education exhibition advertisement, or seminar and public talk sessions. In term of classes' purposes, text-message announcement services are better used for sending out information about class cancellation, class rescheduling, and friendly reminder from professors to students about assignment due.

Sending out invitation for committee members to attend paper or thesis defense was also an issue that we cannot coincided. Paper or thesis defense invitation sent to committee members is a formal document. This document is supposed to be sent in a printed version. The invitation should be sent with the copy of paper/thesis in advance, at least a week before the defense. Moreover, if the university keeps itself with the current system by requiring students to submit printed version paper or thesis for defense, invitation should be sent out using printed copy as well. But, there is also a possibility to change the system, such as to combine printed invitation with text message or email. Later, if the campus decides to implement information and communication technology widely, electronic invitation by email and text message can be adapted.

After identifying academic sms functions that can and cannot be implemented in the University of Tanjungpura, we also exchanged notions on detention factors for implementing academic sms. Three essential detention factors for the implementation are:

1. Process to introduce, make the technology adaptable and user friendly for faculty and students, and reached the level of integration will need some times.
2. The efficiency and benefit of academic sms should be analyzed in comparison with Internet services that also raise its popularity on providing academic services.
3. The delay in processing and sending out information on time can happen because of some undisciplined faculty delay on finishing their grading.

The professor interpretation

Senders and receivers will probably have a different interpretation about context of text messages. In this section, we focus on interpretation made by professors of students' text messages they received. We grouped the discussion into five topics associated with the use of greeting, abbreviation, small and capital letters, emotional symbol, and clear sentences.

Although texting is casual and informal, it does not mean that it is allowed to abandon ethics and dignity in written communication. In our opinion, highly related with Indonesian culture which is value more on a respect of younger people to an elder, students must show their respect to their professors by opening and closing the messages with greeting. In practice, students rarely put greeting on the text message they send to their professors. They are more straightforward in writing their requests or purposes. For examples:

Bpk di Kantor kah sekarang

Mr., are you in your office right now?

Ini (nama) kpn sy bisa ketemu dgn bpk?

This is (name), when I can see you sir?

Saya ijin sakit hari ini

I [want] a permit [to not attend in class because I am] sick today

The examples above amongst the professors will be considered less polite. Those Professors will appreciate more to text-message that is started and ended with salutations. Having no salutation will give an impression that the students have no respect to their professors. That is why we think that texting a greeting is not difficult. Students can use simple and appropriate salutation like:

Pagi/Siang/Malam Bpk/Bu

Morning/Afternoon/Evening Sir/Mam

Ass. (Abbreviation for Assalamualaikum)

Peace be with you, an Islamic way on greeting people

Trims (abbreviation for terima kasih)

Thank you

Wass. (Abbreviation for wassalam)

Regards, an Islamic way on ending a meeting.

Using abbreviation for a text message is common. This common does not mean that student could overuse the abbreviation. Overusing the abbreviation will make the text message become unclear. For example (Underline used to indicate the abbreviation):

sy tak th di mana t4 ktr Bpk skrg? Apa di MM or di FE?

I do not know where is your office, Sir? Is there in MM or in FE?

In this text message *the* abbreviation of "sy" could be interpreted as "saya" (I), people named "sy", or abbreviation for "sekretaris yayasan" (Foundation Secretary). "t4" in this message sender idea is "tempat" (place). The message sender used the number 4 which is in Indonesian pronounce as "empat" with the letter "t" to abbreviate the way writing the word "tempat".

This overuse will bother the professor as they have to spend more time understanding the intention or the message of the sender. Even more, sometimes the professor has to consult the text-message with their colleague. Another example for overuse of abbreviation in student text-message is:

Klu bs, kamek ke rmh bu t/ ambil skrg soalnya Pk. -name- nak brgkt ke Stg besok lusa. Trims & maaf sdh merptkan bu.

If [allowed], we would like to go to your house mam for taking [it] now because Mr. -name - will be departing the day after tomorrow. Thank you and sorry have bothered you mam.

In this text message, the abbreviation "bs" can be interpreted as "bisa" (can [I]) or "besok" (tomorrow). "Stg" in this message is also unclear. What the message receiver can guess is it may be related with the name of the place.

We also found that, in writing their text messages, students, mostly, did not pay attention to punctuation and the transitional from small to capital letter. For example:

saya ke kmps now bpk di situ gak s'bab saya mau ttd krs yg hrs diserah ke acd hr ini jg

I will go to campus right now are you there sir because I want you to sign my courses registration from which has to be submitted to the academic section today.

Sometimes, students write the entire text message in capital letter and without careful attention to punctuation. Writing in capital letter for faculty members is impolite manner, because they feel like being shouted or being given an order by the message senders. For example:

> *BOLEH KAH SAYA KUMPUL TGS HARI INI SBAB SAYA ABSEN KMR*
>
> CAN I SUBMIT MY ASSIGNMENT TODAY BECAUSE I WAS ABSENT YESTERDAY?

Using emotional symbol is acceptable for sending a personal message to friends, but will not be acceptable for semi-formal and formal communication in college. The use of emotional symbol on text message will result in a different impression for receivers. Therefore, in this group discussion, we all agree that students are not supposed to include emotional symbol on their text message addressed to the faculty. In fact, faculties receive lots of text message contained emotional symbol such as (Underline used to indicate the emotional symbol):

> *Pagi ini sudah saya trima surat recom-nya Bu. Trims byk ya. Ibu memang dosen plg baik* <u>:-D</u>
>
> This morning I got the recommendation letter Miss. Thank you. Miss is the best lecturer [Laugh]
>
> B*aru saja pulang dr Jkt Pak*<u>(-:</u> *Bisa saya ke ktr utk konsl. mt kul. besko Pak* <u>%-)</u>
>
> Just got back from Jakarta [smile] can I go to your office to have consultation tomorrow sir [confused]

Besides the faculty perspectives, opinions from students are considered important to be included in this study. In the following section, the data was synthesized from limited participants (7 voluntary participants) used to give a foundation about what the student may think about their text messages.

The student interpretation

Before we start to discuss the major themes revealed from the interview, we would like to present students opinion about the relationship between professor and student in the college where the research take place. By knowing opinion from students about their relationship with their professor in campus will give a sense about the difference between students and professor perspective on text messaging communication.

The professors want students to respect them as an elder. This respect is represented by students' action and behavior. For example, students concrete action is by giving a greeting to the professor when they come across each other, knocking at the professor's office door to get permission to get into the professor office, are not straightforward in showing encounter/disagreement with the professor lecturer, following the rule that is made by the professor. Inharmonious personal relationship between student and professor can affect to the accomplishment of the course. In other words, students will often fail the course if they do not pay attention to their action and behavior. Students' action and behavior are counted as affective domain of the campus education system, because in Indonesia, the education aspects consist of "pendidikan dan pengajaran" (teaching and education). Teaching relates with delivery knowledge and skills, while education relates with guiding students to compromise with society norms and values. Students' opinions have illuminated the student-professor relationship that can affect their perception of the convention of text messaging.

According to our respondents students seldom send text message to their professor especially if they do not really feel that the message is important. However, even though they feel that their message is important and deserve to get quick responds, they do not hope too much that their text message will be responded. Experiencing non responded text-message is not something unusual. The following examples show students perception about why their messages were not responded:

> *Kamek tak tahu pastilah nape tak dibalas...banyak kemungkinan, mungkin gak Bapak tuh lagi sibuk, atau lagi ke luar kota, atau gak emang tak penting kali sms kamek...hahaha*
>
> We are unsure why [the text-message] do not get reply...[There are] many possibilities, probably the professor was busy, or he is out of town, or [probably] our text-message is unimportant. [Laughing]
>
> *Sebagai mahasiswa yah kita musti paham, kadang dosen tuh sibuk, punya keluarga, kerja, riset, seminar, dan macam-macam lah kesibukan. Jadi belum tentu sms kita itu dibalas.*
>
> As a student, we are supposed to understand [that] professors are sometimes busy, [because] they have family [to take care of], work, research, seminar, and other activities. So, [that is maybe the reason] our text message are not responded.

Besides non responded text message, considering the appropriate time to send the message is also important. Some professors demand-this and mention it clearly during the class session. For example:

Ibu (nama), dosen (matakuliah) saya mengingat supaya mahasiswa tidak menelpon atau sms jika sudah lewat jam 10 malam. Sebab, HP ibu tuh sudah dimatikan jika dia pergi tidur.

> Mr. (name), [who teach] (course name), reminded students not to call or texting her after 10 pm. Because, she will turn off the cellphone if she goes to bed.

Saya rasa sms antara pagi ...mungkin jam 8 udah boleh kali, sampe sore lah. Jam kator atau jam kerjanya dosen tuh kan tidak ada masalah.

> I feel [we are able to] send text-message [to our professors] from morning ...about 8 [am], probably will be allowed, until after noon. [We are allowed to do so] because that was their office hour. Thus there will be no problem.

The next theme that is frequently mentioned by students is about asking permission to miss the class. Text message is a convenient tool to let professor know if the students are unfortunately, have to miss the class. However, most of the professors do not like this. For examples:

Dosen saya mengingatkan agar tidak menggunakan sms untuk minta ijin. Jika sakit, maka surat keterangan dokter dibawa pada pertemuan berikutnya. Untuk ijin tugas, surat keterangan dari kantor bisa di fax ke kantornya dan nanti dibawa lagi satu copy ketika masuk.

> My professor reminded students not to use text-message to get permission [not attending the class]. If students are sick, medical notice from doctor must be brought to class in the next class [session]. For student [who have to] commit on official duty, official letter from their office can be facsimile to the professor office and extra copy must be brought to class if they attend the class later.

Teman saya tetap dianggap tidak masuk walaupun sudah minta ijin lewat sms. Kata dosennya, tidak sah ijin itu pake sms.

> My friend was considered absent, although he has requested a permission to miss the class by sending text message. This was so because the professor stated that [he did not counted] text-message as a legitimate way to have a permission.

Last theme that we consider important to be included in this section is about the felicitousness of students to ask their professor preference about text-messaging communication. To ask about professor preference is important when professor did not clearly inform the rule on their syllabus. Students tend to agree to ask the professor about this regulation. For examples:

Tidak salah untuk menanyakannya jika dosen tidak menyebutkannya di dalam syllabus. Bahkan itu sangat penting ketika dosen itu tidak pake syllabus. Karena sulit untuk menebak keinginan dosen. Biasanya kalau dosennya killer, kita cuma tanya-tanya ke senior tentang maunya Bapak atau Ibu itu.

> It is not wrong to ask the professor if they did not mention the rule of text- messaging on their syllabus. Moreover, [asking professor preference] is important if they do not [hand on] syllabus. Because what the professor want is hard to guess. Generally, if the professor is “killer”, we will ask senior about what that Mr. or Mrs. want.

Maunya kita sih bisa bertanya langsung, tetapi lebih sering kita tanya sama yang sudah pernah ngambil matakuliah itu aja. Kalau matakuliahnya wajib yah apa boleh buat, ikuti saja maunya dosen itu. yang penting kan kita lulus.

> We want to be able to ask [it] directly, but more often we ask senior student who have ever taken the course. If the course is a required one, we will just follow what the professor want us to do as long as we pass the course [will be more important].

After looking at students and professor opinion, in the following section we will discuss recommendation for the college to develop a convention to regulate the text messaging communication.

Having a convention

What seems to be a salient consideration is for a college action to regulate text messaging communication in in the college’s code of conduct. The regulation then may be taken as a reference for those departments and classes to decide whether the type of text messaging is in accordance with the regulation stated in the code of conduct. Further action is to incorporate the convention within the departments’ guideline. More specifically, this convention can be inserted within the syllabus guidelines by the professors or teachers. If for example, a disagreement of text messaging convention exists, the solution may be referred to the established guideline of convention.

Some colleges prefer to have a convention by proclaiming a ban of not to use cellphone and text messaging for communication between professors and students. In our opinion, banning the use of cellphone and text messaging for college communication is not a convention. A convention should be a solution that brings convenience in communication for both professors and students. Therefore, banning the use of cellphone and text messaging does surely not solve this problem. If the banning is enforced, the within campus use of cellphone will probably solved but there will not be any guarantee for the similar case of out of campus. As an educational institution, college or university is supposed to develop a convention that regulate about good manners on communication, including text messaging.

The University of Tanjungpura has two alternatives for having a convention of communication in the university code of conduct. First, rector, as the leader, calls college professors and researchers to conduct a research. The research collects data from professors, staff, students, alumni, and society opinion about suitable communication convention for college. Based on research results, the university has a senate meeting for revising the old code of conduct. Second, initiative action can starts from professors or students. Professors or students, or together, have a meeting for discussion. In this meeting, participants discuss and make a document of problems, concerns, and solutions about communication convention. The results from discussion are brought by the group to the rector and the university senate for follow up.

Although currently, in a college level, there is no exact convention about text messaging, professor and student could start to have it for their classes. Inside the syllabus, the formal written mention of text messaging convention can be inserted. Wisely, the professor may repeat it again during class sessions. This is good to inform those students who may not be able to attend the class at the very first session and those students that move from another section or another class. They will be aware of what they have to be committed to in order to have a mutual convenience of communication. If the professor did not mention their preferences on their syllabus, students could ask the professor. Usually, when students start to ask about it, the professor will say what they prefer or open a forum for discussion on an agreement for the class.

Conclusion

Communication with text message in college is unavoidable situation in the digital era. Proclaiming a ban of not to use cell-phone and text messaging will not solve the problem regarding the issue of inconvenience or convenience feeling for communication between professors and students. Several factors have been identified as a cause of the inconvenience for communication between professors and students in the University of Tanjungpura. First, different perceptions between the student as the text message sender with the professor as the text message receivers about the content of text message. Second, there happen to be preferences amongst professors in receiving text message. Lastly, the college did not have a convention about communication stated on its code of conduct. Therefore, we highly recommend the college to consider having a convention on this matter. Before the college have the convention, professor and student may start having an agreement on what preferences of text message model they would accept to be incorporated in their class.

A salient notice about this research is to cordially state our limitation. First, the number of respondents is small that makes it less possible to be generalized as true. Secondly, there may be a different interpretation of meaning toward the messages discussed in this study due to the translation problem done by two different sources; Indonesian and English. Thirdly, this study was conducted as a pilot study which may not reveal the real essence of the problem discussed.

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Supporting Self-directed Learning In Online Environments: Implications From Investigations Of Informal Social Networking Sites

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Descriptors: Self-Directed Learning; Social Networking; Guided Participation; Argumentation; Legitimate Peripheral Participation

Introduction

The growing popularity of social media and Web 2.0 technologies in online education has led to expectations of greater interactivity and self-directed learning. However those expectations have not necessarily meshed with reality. Part of this gap has been due to not fully appreciating the difference between the personal or recreational contexts in which Millenial students generally use social media (e.g., personal) and formal learning environments (e.g., classroom) where participation is linked to a consequential, academic metric. We are interested in what can be learned from analyzing how everyday, informal online social worlds create networks and spaces for participation. Within the context of a popular social networking site, we present an investigation that focuses on patterns related to two questions: (1) How can we characterize patterns of self-directed knowledge sharing on the site? (2) How do experts facilitate knowledge sharing and self-direction within the site?

The Context

The CarTalk (cartalk.com) discussion board forums came about as a result of the CarTalk radio program, which has been a very successful call-in show since the 1970s. The program is made available through National Public Radio and has been widely recognized for not only helping non-experts with their automotive problems, but also doing so in an entertaining way. Its wide success has spawned a vibrant Web-based community that features active discussion boards where fans gather to discuss automotive problems and issues. Perhaps not surprisingly, the CarTalk community also offers many other ways to participate and engage fellow community members (e.g., discuss past shows, tackle the weekly “Puzzler” question, participate in contests, and contribute to a CarTalk photo album). These characteristics establish CarTalk as a Community of Practice (Wenger, McDermott & Snyder 2002).

Theoretical Perspectives

In this paper, we briefly define levels of membership and then consider three general theoretical frames: Legitimate Peripheral Participation (e.g., Lave & Wenger), arguing-to-learn (e.g., Adriessen, et al. 2003; Jonassen & Kim 2010), and guided participation (e.g., Rogoff 1998).

Defining Levels of Membership

Within the CarTalk community, we generally construct a focus around two levels of membership: (1) Initiator and (2) Expert. An Initiator is the participant who poses a question to the community at-large regarding a specific automotive problem or issue for which they seek assistance. The Expert corresponds to any participant who offers feedback designed to assist them in this endeavor.

Legitimate Peripheral Participation

Towards developing an understanding of the dynamic between Initiator and Expert in the CarTalk community, Lave and Wenger's concept of Legitimate Peripheral Participation (LPP) appears particularly relevant because of the way in which it "provides a way to speak about the relations between newcomers and old-timers." LPP also considers "the process by which newcomers become part of a community of practice" (p. 29). In CarTalk, since one of the central purposes for the community is to help non-expert vehicle owners troubleshoot problems, many of the threads are initiated by "newcomers."

As they enter into this network, the "old-timers" typically find the need for more details and so engage in a conversation with the newcomer by requesting more details regarding the nature of their problem, and from there begins an interactive exchange that builds the thread. This process is inherently a social one in which learning how to "talk within a community of practice" assumes as much importance, if not more, than an understanding of discrete tools or facts. Lave and Wenger describe this as the difference between "Talking about a practice" versus "Talking within a practice" (p. 109). In other words, meaningful participation involves more than knowledge of the subject matter content, but also knowledge of the discursive context. LPP is an analytic tool that directs our focus towards these social practices and interactions and their role in building a participant's unique identity within that community.

Central to Lave and Wenger's concept of LPP is peripherality. On its face, the word "peripheral" suggests notions of being on the margins, and when one thinks of periphery as it relates to a community, the common perception is that those members who exist in those margins or peripheries represent lesser positions of power or influence in that community structure. However, Lave and Wenger envision peripheral participation in a different way. They explain that "… it's not meant to suggest a disconnectedness from the 'practice of interest'" (p. 37), nor is it intended to reduce social contexts to a simple binary where the center and periphery are seen as diametric opposites.

Argumentation

The second frame of our analysis incorporates argumentation. Common understandings of the word "argument" generally envision it as two ideological adversaries going up against one another where one will be ultimately determined the winner. In this light, argumentation does not seem conducive to learning. Andriessen clarifies this further in relating to people's perception of argumentation vis-a-vis the popular media.

Many people think that arguing interferes with learning. They link argumentation to a certain type of oppositional argument that is increasingly prevalent in our media culture (p. 443).

In this context, Andriessen explains that "the goal is not to work together toward a common position, but simply to score points" (p. 443). To serve the needs of learning, he introduces a distinctly collaborative form of argumentation in which participants are "arguing to learn." This model promotes four types of benefits:

1. Elaboration, reasoning, and reflection

2. Knowledge of argumentative structures
3. Development of social awareness and general collaborative ability
4. Knowledge of group participation norms given that many groups abide by implicit or explicit rules of argumentation (pp. 443-44)

In online contexts, Jonassen and Kim (2010) point to discussion boards as one of the most common venues for collaborative argumentation and problem-solving strategies. One specific type of collaborative argumentation is "presumptive" which centers on a "… goal-directed and interactive dialogue" where "participants reason together to advance arguments by proving or disproving presumptions" (p. 444). This same sort of goal-directed, presumptive argumentation appears in CarTalk where different Experts argue the details of diagnoses and proposed solutions.

Guided Participation

Our third theoretical frame relies on Guided Participation. Rogoff asserts that Guided Participation is not a model or technique but centers on

> "… the processes and systems of involvement between people as they communicate and coordinate efforts while participating in culturally valued activity" (Rogoff 1995, p. 142).

Rogoff further clarifies Guided Participation by seeing it as three, interacting planes: personal, interpersonal, and community/organizational. Rather than hierarchical levels, Rogoff stresses that these should be seen as interacting planes because while they may vary in degrees of intensity, they nevertheless inform one another in significant ways (Rogoff 1998, p. 688). In a context that bears considerable similarity to our focus, Heo and Breuleux (2009) use the Interpersonal Plane to investigate interactions among participants in an informal community of online food service professionals.

Methodology

We consider this to be an initial, exploratory case study whose orientation is primarily qualitative by relying on Grounded Theory (Glaser & Strauss) and where the CarTalk discussion board network serves as our unit of study (Yin, 1993; Stake, 2000). Our quantitative component includes basic frequency counts. Our exploratory sample consists of approximately 52 threads that occurred between approximately March 31-April 6, 2010. We did not restrict our sample to any specific categories of discussion and so it encompassed a broad range of topics related to vehicle maintenance and repair. Ultimately, our analysis generated seven interpretive categories.

Code	Description
Story-Sharing	Expert provides knowledge to an Initiator by way of a personal or professional learning experience
Vetting of Ideas	Expert attempts diagnosis of Initiator's problem by presenting idea or theory for examination by community members; it often involves argumentation among experts
Precedent	Expert references and elaborates on previously stated

	opinion, analysis, or proposed solution
Explicit Instruction	Expert provides explicit series or sequenced set of instructions related to troubleshooting or resolving problem; it also includes instructions presented as "if-then" statements
Tacit Instruction	Expert provides background information or general knowledge related to the problem, but not specific steps for troubleshooting it
Facilitating Question	Expert asks Initiator for further details that are considered crucial to diagnosing and troubleshooting problem
Resource Sharing	Expert includes reference to external link or source

Findings

Among these categories, the three which show the highest frequency are Explicit Instruction, Precedent, and Vetting of Ideas. It is perhaps quite understandable that Explicit Instruction would show the highest frequency since the nature of the CarTalk community is to help people solve mechanical problems that typically require careful attention to the sequence with which a solution is carried out. Precedent appears as more of a surprising result because of the potential for suggesting levels of community cohesion and sustainability. In this context of our analysis, Precedent reveals two significant details: (1) Experts validating the efforts of others in the community, and (2) Experts using argumentation to learn the reasons for the legitimacy of a specific position (e.g., solution to a problem). The Vetting of Ideas involves collaborative experimentation. This celebrates the prototypical mechanic who loves to tinker under the hood. Unlike the lone, tinkering mechanic, however, the CarTalk community plays a vital role as a feedback mechanism.

	Code	Frequency
1	Story-Sharing	56
2	Vetting of Ideas	129
3	Precedent	162
4	Explicit Instruction	220
5	Tacit Instruction	118
6	Facilitating Question	92
7	Resource Sharing	27

Code 1: Story Sharing

In one example of Story Sharing, the Initiator shares a story about a neighbor who has had difficulties getting a local car dealership to honor a warranty since the original owner was taken over by another company. The Initiator further explains that the new owner will only honor repairs under warranty if the neighbor can present a copy of the repair receipt. The Initiator believes this claim is specious, but is not absolutely certain and so turns to the CarTalk community for feedback.

The specific instance of Story-Sharing occurs about two-thirds of the way into the discussion thread when an Expert relays his own story about confusion over a warranty. Specifically, he explains a major engine problem with his first car, but since the dealership had closed by the time this happened, he thought that the warranty would be useless. Many years later, while in the process of re-organizing some old files, he came across the old paperwork from this "first car" experience. Upon closer examination, he realized that what he had originally believed to be the warranty was actually an insurance policy that was handled by a company completely separate from the dealership. He continues to explain that where originally he was inclined to blame the dealership, this subsequent discovery showed him that this was not the case. Notable here is the Expert's use of a story to establish a sense of shared connection with the Initiator and to convey the value of considering an alternative viewpoint.

Code 2: Vetting of Ideas

We saw participants engage in Vetting of Ideas when Experts attempted to diagnose an Initiator's problem by presenting an idea or theory for examination by community members. In many of the discussion threads, we also observed Experts engage in strategies of "Arguing to Learn" (Andriessen, 2006; Jonassen & Kim 2010) as they debated the merits of competing solutions.

One excerpt we analyzed comes from a rather extensive discussion with a deceptively simple beginning. The discussion begins with the Initiator relaying an incident in which he assisted a couple whose car battery had died. In relaying the details of what he did, he explains that it was an older car and required more than jumper cables. To work around this obstacle, he did what computer aficionados would call a "hack" (e.g., hackaday.com) in which he manipulated a coil wire near the engine in a particular way that successfully restarted the engine. He explains that he learned this hack from his father, but confessed that he had no idea why it worked. Logically, he chose to title the thread, "Why does it work?"

The question sparks an engaging debate about what underlying electronics and physics might explain the hack. At a relatively early point in the thread, one Expert interjects with a fairly strong dissenting opinion by asserting that the solution does not involve a complex interaction of electronics but rather a simple release of excess gas pressure that happened when the Initiator manipulated the wire. Although his language suggests a strong belief in his position, he concludes by noting his openness to competing viewpoints — a key characteristic of Vetting. So with Vetting we often see this two-pronged nature in which argumentation and exploration (of ideas or theories) go hand-in-hand.

Code 3: Precedent

Somewhat related to Vetting of Ideas were instances of Precedent when Experts would publicly recognize the contribution made by a previous participant. In most situations, the recognition would surface in the form of a compliment regarding the accuracy of a specific assertion or the appropriateness of a recommended solution to a problem. Periodically, it might also assume the form of an elaboration or a disagreement.

In one example, the Initiator relays a problem of a sticky gas pedal and efforts to fix it by cleaning the butterfly valve (flow regulator); however he is tentative about implementing this corrective action and specifically worries that it might result in more harm than good. In the ensuing discussion thread, some Experts tentatively legitimize the Initiator's proposed solution, but acknowledge potential dangers to the throttle plate. At the end of the thread, we observe one Expert use part of his first sentence to explicitly recognize the accuracy of a previous Expert's recommendation regarding this potential danger (i.e., the throttle plate). This scenario illustrates how an Expert draws the Initiator's attention to the resources of the community already in existence (i.e., Precedent) and implies a conscious awareness of the community as a knowledge base.

Code 4: Explicit Instruction

Explicit Instruction emerges as one of our broader categories as it can assume the form of sequenced instructions or "if-then" statements. In one discussion thread we analyzed, the Initiator requests help for a car that has difficulty starting when he turns the ignition. He further explains that sometimes he has to rev the engine up to around 2000 RPM to prevent it from turning off, but when he does this, a strong scent of gasoline and plumes of "white colored exhaust" emerge. In developing a solution, one Expert expresses confusion about the specific nature of the ignition problem (e.g., "Does it crank and crank and crank and just won't fire up?") and accordingly, wants to probe for more details in order to generate a more accurate diagnosis.

Several noteworthy features emerge in this instance of Explicit Instruction. First, the Expert organizes his response in relation to the Initiator's concerns by using a conditional structure. In the first paragraph, he specifies the condition of *not* smelling the gasoline and begins the second paragraph the converse – not smelling the gasoline. He constructs these condition-based instructions in the form of "if-then" statements (e.g., "If you don't smell gasoline, … [then] turn the key to start … [conversely] If you smell gasoline … [then] pop the hood …"). Also noteworthy is how subsequent instructions are expressed in the form of short imperatives (e.g., "turn the key", "pop the hood", "look at both ends"). These are commonly recognized characteristics of well-written instructions (Barker 2003). Finally, the Expert's response also indicates a desire to extend the length of this conversational exchange by requesting an update from the Initiator after he implements these instructions. This suggests how requests for updates sustain the overall life of the thread.

Code 5: Tacit Instruction

We recognize Tacit Instruction emerging in threads where an Expert provides background information or general knowledge related to the problem, but does not go so far as to present specific steps for troubleshooting it.

In one discussion thread we analyzed, the Initiator requests help on a problem with lug nuts on her van. She conveys how she discovered that they had not been properly tightened after a recent trip to a service center. After having them fixed, she expresses concern that her van may have sustained some other type of damage during the time between the initial problem and subsequent repair. As the Experts consider her problem, their conversation generally gravitates towards a discussion of best practices regarding if and when lug nuts should be retightened after installation. About halfway through the discussion, one Expert suggests that they should be retightened after 100 miles. In response to this point, the Initiator expresses being unaware of this "best practice." In the next thread, another Expert clarifies the earlier point by explaining that this 100-mile rule applies only to vehicles with aluminum alloy wheels.

Notable in this segment of the thread is how the Expert who offers the clarifying information is not responding to a direct question posed by the Initiator nor explicit instructions; rather it is background information that explains the context to which the 100-mile rule applies.

Code 6: Facilitating Question

An instance of a Facilitating Question occurs when an Expert asks an Initiator for further details that are considered crucial to diagnosing and troubleshooting problem (e.g., type of car, weather conditions, duration of problem).

In one discussion thread that represented a fairly typical pattern, the Initiator is thinking about buying a used car and plans to take it to a mechanic to have it looked at for potential problems. Before he does this, though, he wants to have a specific checklist of items for the mechanic to investigate and asks the community for help in doing this. Before any Experts in the community begin to recommend criteria for the checklist, the first reply appears as a Facilitating Question that asks for fundamental details about the vehicle (e.g., make, model, year, and mileage).

Facilitating Questions arguably represent one of the clearest indicators for distinguishing Initiator from Expert. If not immediately, then fairly early in the progression of the discussion, we observe an Expert ask for further details regarding the vehicle in question. By directing Initiators to first identifying core details of the vehicle, they emphasize the importance of diagnosis.

Code 7: Resource Sharing

As the term suggests, Resource Sharing occurs when an Expert includes an external hyperlink or source. In CarTalk, where participation is completely voluntary, we consider this noteworthy because Experts are taking additional initiative to find a resource that falls within the general parameters of the Initiator's request.

In one discussion thread of this type, the Initiator describes a problem related to jump-starting a car. The specific problem he describes is that he is unable to properly attach the clamp to the positive side of the battery terminal because it is in an extremely narrow space. In one of the responses, an Expert suggests the possibility of a jump-starting it with a remote device. Interesting here is how he arrived at the suggestion of a remote terminal since the Initiator did not specify the vehicle's make and model, and the implication is that a comparatively small percentage of cars accommodate this option. One possible explanation is the identifying tags that the Initiator originally put into his post. Tags are keywords that function as additional metadata for electronic communication and are commonly offered as options in discussion board forums. Typically, tags are used to facilitate retrieval, but in this case, the Expert may have used them to deduce further contextual details. By seeing the tags "Porsche" and "911", he may have deduced that remote terminals are an option that Porsche 911 vehicles can accommodate. Indeed, later in the discussion the Initiator expresses appreciation for the remote terminal proposal and a likely intent to purchase one.

Conclusions & Implications

As an exploratory study, our conclusions are necessarily tentative. With this in mind, though, we see two patterns that show potential for enhancing our understanding of knowledge sharing and self-directed learning in online environments. In CarTalk, we frequently see Experts use argumentation as a means to share and facilitate knowledge; however, a critical component to this is the Initiator whose question sets that activity in motion. On the second front, Story-Sharing emerges as a potential lens for gaining greater insights into self-directed learning. Some

Experts opt to embed directive advice within broader personal narratives that further contextualize solutions. Additional context may enrich an Initiator's understanding and instill a desire to learn more.

The argumentation that occurs among the Experts reveals an interesting connection to peripheral participation (Lave & Wenger). In the course of responding to an Initiator, the Experts, as described earlier, frequently forward different arguments as to what they believe is the best solution to the Initiator's problem. In some cases, these positions exhibit considerably different approaches, while in others, they differ by small degrees. What is notable in this then is that learning appears to happen as much as among the Experts as it does among the Initiators. In this light, the Initiators play important roles in further expanding the learning of the Experts since it is their initial question that served as the opportunity for that learning to take place. While the Initiators in CarTalk may be viewed by the Experts as peripheral participants, especially those posting a question for the first time, they nevertheless play a valuable role in the development of that community of practice. But to what degree are the Experts aware of this peripheral impact? Would it change the nature of their interactions with the Initiators? These questions merit further investigation.

Elements of self-directed learning appear to surface in story-sharing. On first thought, it would seem more logical that Initiators would be more likely to engage in storytelling since they would presumably lack the same level of technical vocabulary as Experts and would compensate by explaining it through stories. Yet we observed Experts regularly resort to stories as a way of connecting to Initiators. They would intersperse their answers with anecdotes from their own personal experiences as a professional mechanic or a self-taught "Do-It-Yourselfer" (DIY'er). As we saw in the Story-Sharing example, the Expert used a personal story as a way to reach out and establish a sense of shared experience. Only after first making this attempt at a personal connection, does the Expert move towards the more practical goal of offering more directive feedback. The stories that are shared and told by DIY'ers represent an intriguing constituent of the CarTalk community as they bring an intrinsic passion to the topic. Indeed, a simple web search can reveal a vast DIY culture that has spawned a whole range of communities that offer support and informal instruction on a wide range of topics (e.g., Instructables.com, Lifehacker.com). DIY culture has also attracted the attention of academic researchers. For example the Instructables website represents an offshoot of an MIT Media Lab project, and more recently, the Living Environments Lab at Carnegie Mellon has studied more than 2000 people involved with DIY projects (e.g., Dorkbot, Etsy). While DIY'ers certainly possess an intrinsic passion for their topic, what is more interesting is their enthusiasm for sharing it. What factors encourage this enthusiasm for sharing? What audience does the DIY'er have in mind when sharing? How does this shape the style and substance of the artifact that is shared?

Overall, our initial case study encourages more attention to the impact of peripheral participation and story-sharing. Peripheral participation suggests moving away from binaries of high activity and low activity cliques and more attention towards the impact of certain discursive acts (e.g., questions). Story-Sharing may suggest the benefits of extending reflection to a more public space. It may suggest that knowledge-building is not just about aggregating facts but accommodating affective elements that allow participants to argue about what they mean.

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Using a Mentoring Model to Facilitate Technology Integration into Teacher Education Courses

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Abstract

This proposal describes the technology mentoring experience of a graduate student and faculty member at a mid-western university in the U.S. The purpose of this case study was to understand how student technology mentors can facilitate faculty members' movement through the Innovation-Decision Process (Rogers, 2003) when considering adoption of social networking tools into teaching. Findings suggest that technology mentors play a critical role in helping faculty members overcome obstacles during the Innovation-Decision Process and serve as imperative communication channels during the process.

Descriptors: technology mentoring, social networking, innovation-decision process

Purpose and Importance of the Study

Web 2.0 offers opportunities for information- sharing, collaboration, and social networking that are unrivaled in our history (Gale, 2008). As these tools become increasingly present, opportunities for their implementation into teaching and learning become more innovative and engaging. However, such tools are often not utilized in classrooms due to the small number of teacher-education programs with faculty who are modeling instructional methods that integrate the use of such tools into their teaching (Carlson & Gooden, 1999; OTA, 1995). This lack of modeling is exacerbated by the fact that schools are spending only a small percentage of technology dollars on professional development (Ansell & Park, 2003) despite the fact that teachers say they need more of it (Hutchison & Reinking, 2010). The current study describes how one mid-western university implemented a technology mentoring program for faculty to encourage the adoption of Web 2.0 social networking tools into their instruction. This alternative form of professional development paired graduate students in a technology mentoring course with faculty members who were considering adopting social networking technology innovations into their instruction.

This purpose of this study was to explore how student technology mentors can facilitate faculty members' movement through the Innovation-Decision Process (Rogers, 2003) when considering adoption of Web 2.0 innovations. The Innovation-Decision Process comes from Rogers's (2003) Diffusion of Innovations Theory which describes a model for studying the adoption of technology in higher education and educational environments. His theory posits that those considering technology adoption move through five stages: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. When proper communication and support occur in each stage, there are more opportunities for adopters to fully adopt the new technology.

The goal of the mentoring process was for faculty members to increase their implementation of technology into teacher education courses. Increasing technology integration, particularly with new tools, is important because faculty members in teacher education programs serve as important models for pre-service teachers on how to integrate technology into teaching. The hope of the mentors was that they would be able to support faculty members' movement through the Innovation Decision Process (Rogers, 2003) in a way that made technology adoption both easier and more likely. This study examines the experience of one mentor-mentee pair.

Methods and Data Sources

This study utilizes a single case study approach (Yin, 2009) to gain an understanding of how a student technology mentor and faculty mentee experience the exploration of technology innovations through the lens of the Innovation-Decision process (Rogers, 2003). The following research question guides this study: How can a student technology mentor support movement through the Innovation-Decision Process (Rogers, 2003) for a faculty member who is considering adopting Social Networking tools into her instruction? The participants were a doctoral student in a Curriculum and Instructional Technology program and a faculty member in a department of Curriculum and instruction at a mid-western university. The doctoral student served as a technology mentor for the faculty member as part of a technology mentoring course. Students in this course are paired with a faculty member and each pair spends one hour every week working on technology related developments.

This program provides faculty member an individualized approach to professional development because each faculty member can choose the focus area based on his/her interests (Zachariades & Roberts, 1995). The current study reports the experience of one mentor-mentee pair. The data sources for this study include personal reflections by the student posted to a blog and feedback from peers in the technology-mentoring course. Reflections were posted weekly and included information such as personal feelings about the mentoring experiences, frustration faced during the meetings, specific procedures or steps for each module or program, and observations about the meetings with the faculty member. Data was analyzed using constant comparative methods (Strauss & Corbin, 1998). Postings were initially analyzed to identify themes and look for evidence of movement through the Innovation-Decision Process. Codes were developed for emerging themes and evidence. Codes and themes were further refined until no new ideas emerged from the data.

Results

Results from this study demonstrate how a student technology mentor can enhance and facilitate a faculty member's progress through the Innovation-Decision process (Rogers, 2003) when considering if and how to implement a technology innovation into their teaching. Results from the current study indicate that student technology mentors can serve vital roles in supporting movement through the process, particularly when a faculty member faces obstacles in any part of the process. An additional theme that emerged from the data was communication.

How Technology Mentors Support the Innovation-Decision Process

This section provides evidence for how the student technology mentor in this case study supported the faculty member's movement through the Innovation-Decision Process. It is divided into sections that describe each stage.

Support During the Knowledge Stage

In the current case, the student technology mentor helped the faculty mentee gain knowledge about the advantages of disadvantages of using social networking tools as a replacement for traditional course management systems throughout the knowledge stage. The technology mentor played an important role in this stage because she introduced the faculty member to Ning, a social networking tool that the faculty member was familiar with but not as a replacement for a course management tool. The faculty member had previously decided that Ning would not suit her needs because she had not viewed it as a course management system. The technology mentor helped the faculty member overcome this obstacle by providing her with knowledge about how Ning could be used to suit her needs, despite the faculty member's previous notions about it. The following quote from the student's reflection notes demonstrates how the technology mentor supported the faculty member in the knowledge stage.

> *10/13/09. The faculty member and I started to explore Ning. Later on, the faculty mentee surprisingly found out that she has an account in Ning already. And then I showed her how to use some features in Ning. She is an active learner, and she always wanted to experience the steps on her own. That's very positive and kept me wanting to show her more things than was on the planned agenda.*
>
> *During the meetings, the faculty mentee gained a lot of knowledge in using Ning's features. Although she did not have enough time to construct everything required to use Ning in her classes, she tried her best to test every feature right away and absorb the knowledge using hands-on experiences.*

Support During the Persuasion and Decision Stages

In the persuasion and decision stages the student technology mentor played a critical role as a communication channel for the faculty mentee as she negotiated her feelings toward the new technology innovations introduced by the mentor. Individuals typically form negative or positive attitudes about an innovation during the persuasion stage. In this case, the technology mentor facilitated a positive attitude toward the technology innovation by helping the faculty member overcome the obstacles that initially caused the faculty member to view social networking tools negatively. Further the mentor supported the faculty member through the decision stage by acting as a communication channel as the faculty member struggled with her feelings about the disadvantages of the social networking tool under consideration. This excerpt from the mentor student's reflection illustrates the faculty members' movement through the persuasion and decision stages.

> *In late October 2009, I started to share with my faculty mentee how to use Ning as a course management tool and provided some teaching ideas. When the faculty mentee saw the layout of Ning, she was attracted by the fact that it includes the blog feature. So, students can create their own blog entries and are able to see classmates' blogs as long as they are in the same network. Compared with Moodle, this feature is more flexible than Moodle's features. Before that meeting, I was confident that the faculty mentee would use Moodle for her next semester's teaching, but she chose Ning instead of Moodle. This is the characteristic of the decision stage. In this stage, individuals prefer to try the innovation in their own situation and then reach the adoption decision. The faculty mentee had to think carefully about her course and consider the content of the course before she made her decision.*

Support During the Implementation Stage

In this stage, the student mentor promoted the integration of the social networking site, Ning, into the faculty member's courses by supporting the faculty member's use of the innovation in her own context and diffusing uncertainties about the new technology. The mentor again served a critical role in helping the faculty member overcome obstacles that were not anticipated.

Support During the Confirmation Stage

Finally, during the confirmation stage, the student mentor confirmed the faculty member's decision to implement the technology innovation by providing technological and affective support to the mentee. Again the mentor served as an important communication channel for the faculty member as she looked for confirmation that her decision was appropriate each time she struggled through an obstacle. The following excerpt is from the mentoring student's reflection at the end of the semester.

> *The importance of interpersonal communication channels and support continues at the confirmation stage of the innovation-decision process. Individuals look for supportive messages that confirm their decisions. Because using Ning as a CMS was still new to the Dr. Smith, she would ask me for confirmation and kept asking questions. Whenever she expressed her concerns and we figured out ways to address them, Dr. Smith (pseudonym) would seem more confident about her decision. At the end, The investigated programs during with the semester were Web 2.0 applications, Moodle, Ning, Google Map, Second Life, Wimba Tool, WebCT and Mac software. Dr. Smith made her decision about using Ning for her children's literature course. However, she needed to wait until her students were enrolled in her class and then she could start to make arrangement on how she would run her course.*

Communication

An unanticipated theme emerged from the data in addition to the evidence of how the technology mentor supported the Innovation-Decision Process. The idea of good communication was prominent in the student reflections and class discussions and played an important role while implementing the new innovation. As mentioned in the five stages of Innovation-Decision process, the mentor always served as an important communication channel. In the whole process, the mentor established several communication methods which facilitated faculty member's innovation. Weekly meetings with face-to-face demonstration provided the faculty member chances to ask questions. E-mails and Facebook discussion also allowed the mentoring pair to interact with each other after each meeting. Moreover, the communication was not restricted to only between the mentoring pair, but the whole community in the same department through the class Facebook page that was established for the group. Blog entries with comments from peers about the mentoring experiences served as an important communication tool for the technology mentor. Because communication was encouraged and facilitated through multiple modes of digital response, new ideas about technology integration also emerged. This kind of environment also changed the dynamics of learning and mentoring. Everyone become the agent of change in the process of technology integration.

Discussion

The main purpose of the Innovation-Decision process is to motivate individuals to reduce their uncertainty about an innovation and its outcomes. Although providing customized mentoring to faculty for technology integration through student mentors is a unique approach to professional development, the findings of this study confirmed that the new mentoring program was successful in helping the faculty member integrate technology into her classes. The faculty member was motivated to learn more because the goal was well customized and organized. Plus, by following the Innovation-Decision process model, the mentoring pair was able to fully experience each stage to make sure whether the new tool fulfilled the instructional need. The faculty member also received just-in-time support from student mentor. After implementing the tool, the weekly demonstration helped the faculty member to understand each feature and allowed her to explore. This approach also helped to decrease the faculty member mentee's uncertainty about instructional technologies. This approach may have worked so well because of the social nature of the process, supporting Roger's (2003) idea that "diffusion is a very social process that involves interpersonal communication relationships" (p.19). Both the mentor and mentee were engaged in conversation and reflection about the innovation. Without the opportunity for interaction with others about the project, the faculty member may have taken a longer time to complete the innovation or may even have withdrawn in the middle of the process. The support and communication channel from the community helped the faculty member see the value of experimenting with new tools. Furthermore, the ease of use of Web 2.0 also reinforced faculty member's confidence level for implementation. At the end, the mentoring pair was able to create an ideal pilot model which was helpful for integrating social networking into literacy course as a course management system.

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Implementing an Online M.S. Degree Program in Instructional Technology: Promises and Pitfalls

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Abstract

This paper shares the authors' experiences in developing and implementing an Online Master of Science (M.S.) degree program in Instructional Technology (IT), the WebIT program, at The University of Tennessee (UT), during 2008 2010. The paper focuses on the organization, implementation and funding of the degree program rather than details of the curriculum design. The overall attrition rate in the first WebIT cohort (N=25) was 56%; 12 students withdrew from the program and 2 students were removed from the program due to academic difficulties. Data and interpretations regarding possible links between program organization and attrition are discussed.

Keywords: Online graduate program design, Online program attrition

Implementing an Online M.S. Degree Program in Instructional Technology: Promises and Pitfalls

The purpose of this paper is to share the authors' experiences in developing and implementing an Online Master of Science (M.S.) degree program in Instructional Technology (IT), the WebIT program, at The University of Tennessee (UT), during 2008-2010. The focus of the paper will be on bigger picture issues of the organization and implementation of such an effort rather than the details of the curriculum design. This paper was written following the completion of the first cohort cycle of the program, a two-year period in which a group of students who were recruited during the Spring semester of 2008 completed their Masters degree work in Instructional Technology, at the end of the Spring semester of 2010. The first students to matriculate in the WebIT program constituted the WebIT1 cohort.

The College of Education, Health and Human Sciences (CEHHS), the Department of Educational Psychology and Counseling (EPC) and the UT Department of Distance Education and Independent Study (DEIS) provided startup funding for the WebIT project. Startup funding for the program consisted of approximately $12,000 and the allocation of existing personnel resources, as follows: (a) three Graduate Teaching Associate (GTA) positions, (b) a half-time assignment for one faculty member to coordinate the WebIT development and implementation efforts, (c) a summer workshop ($2000), (d) personnel support ($5000), and (e) a server to run the Moodle Course Management System ($5000) (Moodle Trust, 1999).

The online curriculum for WebIT was planned as a variation of the existing M.S. in Instructional Technology curriculum at The University of Tennessee. The primary difference between the two versions of the curriculum was that the online curriculum would be delivered via a combination of Computer-Mediated Communication (CMC) tools with limited face-to-face (f2f) contact between students and instructors, whereas the on-campus curriculum is predominantly f2f with students and faculty engaging in limited online interaction to augment weekly classroom-based meetings. Existing IT courses were redesigned for delivery using a suite of CMC tools selected by the faculty. The courses taught during WebIT1 used a combination of Internet e-mail, listservs, Moodle (Moodle Trust, 1999), Wimba (Wimba Incorporated, 2009) and specialized websites to constitute the WebIT virtual classroom environment. The WebIT program was designed to be collaborative in nature. Each course was actively led by an instructor, and each WebIT1 student was expected to engage in a combination of individual and socially-mediated instructional activities such as those described by Chandler, Levin & Levin (2002); Kowch & Schwier (1997); Levin, Levin & Chandler (2001); Levin & Waddoups (2000); Angelino, Williams & Natvig (2007) and Palloff & Pratt (2007).

Three advanced graduate students in Instructional Technology were hired as GTAs and served as the primary instructors for the WebIT1 sections of the M.S. curriculum, but the courses were taught in collaboration with IT faculty. The IT faculty actively mentored the GTAs (who served as apprentice online instructors) and monitored the WebIT courses as part of their ongoing teaching responsibilities. During each semester two GTAs were assigned instructional responsibilities while the third was dedicated to providing technical support to students and instructors. IT faculty taught on-campus sections of the same M.S. courses at the same time as WebIT online courses were taught so faculty and GTAs could collaborate on teaching activities and responsibilities.

Curriculum Delivery Model

Cohort admission model. The cohort program design model is often described in the literature (Levin, et al., 2001; Levin & Waddoups, 2000) as being beneficial because it promotes *close-knit* working relationships among students in online programs. This characteristic is thought to be important because these relationships constitute a kind of learning community that can provide a dynamic and supportive social structure for individual learners (Chyung, Winiecki & Fenner, 1998; Obrien, 2002; Rovai & Wighting, 2005; Wegerif, 1998). Individuals without such relationships can experience a sense of social isolation that Carr (2000) characterizes as being *lost-in-cyberspace*. Rovai and Downey (2010) contend that "Students in distance learning programs may be more likely to experience isolation and alienation from the institution because of their physical separation from the school and its services and from other students" (p. 145).

The WebIT faculty selected a cohort program model for the WebIT program as opposed to an open-enrollment program model because the cohort model is group-based and facilitates the development of intra-group, supportive, working relationships among the members of the cohort. Such a structure seems to offer better opportunities for supporting students' academic engagement and reducing the sense of personal isolation reported by some online students (Chandler, et al., 2002; Chyung, et al., 1998; Palloff & Pratt, 2007).

Cohort pacing. A very critical aspect of an academic program is how much time and effort are required by the student to complete the program. Masters degree programs typically seem to vary between 24 and 36 semester credit hours. Thus, completing a typical Masters degree program can take a student between one and three years. UT Masters degree-seeking students typically take two years to complete the on-campus M.S. in IT degree program. However, there is a fair amount of variance around that average. Many factors influence the pace at which on-campus students pursue academic work and the time required to complete the M.S. degree program.

During the Spring of 2008, just prior to starting WebIT, the IT faculty conducted a Needs Analysis (via online survey) to determine the level of interest among potential students for an online M.S. degree program in IT offered by UT. The targeted population was K-12 teachers from across the state of Tennessee. A group of 122 self-selected respondents completed the survey. These respondents represented 25 of the 98 counties in Tennessee (25%) and half of them (50%) lived more than 100 miles from Knoxville, while nearly one-third of them (30%) resided more than 200 miles from Knoxville.

Ninety respondents (74%) in this sample indicated that they would prefer to complete an online M.S. program in less than two years. Seventy-one respondents (58%) indicated that they would prefer having the option of taking longer than two years. When asked if they would be willing to take two courses per semester for two years, 52 respondents (42%) said that they would be willing to work at that pace to complete an online M.S. program in IT. While these data are not perfectly clear, one logical interpretation is that the students would prefer an online program that provides options so that they can "set their own pace" (79%). Nearly three-quarters (74%) would prefer to complete the program faster, but more than half (58%) would work longer, if necessary. In terms of the two-year pacing, it is hard to know if these responses were influenced more by the overall duration of the commitment or the six-hour per semester effort obligation. Logically, most students would wish to finish faster, whenever possible, but concern about the amount of work that such a pace might require is the likely explanation for the lower rate of agreement (42%) regarding taking two courses per term for two years.

These Needs Analysis data, our experiences with our on-campus student population, and our limitations in personnel capacity led to the decision to deliver the WebIT program in a two-year-long cohort format. Students began the program by taking one course in the initial Summer semester. During each of the five subsequent semesters of the program, students completed two semester-long courses.

WebIT curriculum. The WebIT program consists of 11 semester-length (3 credit) courses, 33 graduate credit hours. The first iteration of the program, WebIT1, was delivered over a two-year period, beginning in the Summer of 2008. The curriculum for the WebIT1 cohort is shown in Table 1.

Table 1

Curriculum Sequence for the WebIT1 Cohort

Term	Course Number	Course Name	Credit Hours
June, 2008		On-campus, 3-day orientation workshop	
Summer (July, 2008)	IT 575	Internet: Implications for Teaching and Learning	3
Fall, 2008	IT 521	Computer Applications in Education	3
	IT 573	Introduction to Multimedia	3
Spring, 2009	IT 570	Instructional Systems Design	3
	IT 576	Advanced Interactive Multimedia for Instruction	3
Summer (June-July, 2009)	IT 578	Instructional Media Development	3
	CS 504	Teachers, Schools and Society	3
Fall, 2009	IT 566	Administering Instructional Media: Networks and CMC tools	3
	EP 532	Online Collaborative Learning	3
Spring, 2010	IT 577	Internet-Mediated Collaborative Learning	3
	EP 582	Educational Research Fundamentals	3
Total			33

Distance Education Program Funding Model at UT

The theory. The funding model for Distance Education (DE) programs at UT is a unique process that is separate and distinct from the two other funding models (annual fiscal-year and summer school) that operate on the campus. The DE funding model is more entrepreneurial than either of the other two funding models because it is based upon a mechanism that directly links the tuition revenue generated by student enrollments to the academic department that delivers the instructional program.

Academic departments at UT that choose to offer DE programs receive compensation for the effort that is based upon the number of students served, the number of hours delivered, and a dollar-multiplier directly related to the amount of tuition paid for each credit hour by each student. The academic department delivering the program does not receive the entire amount of tuition paid by the student, but the academic department does receive a significant proportion of the tuition paid by each student. This proportion (approximately 76% of the campus base tuition rate was returned to the WebIT program) was stable during the WebIT1 cohort but has since been decreased and is subject to further changes. The funds generated by student tuition payments in an academic year are paid out to the academic department at the beginning of the next academic year, i.e., one year in arrears. Each Fall semester, the campus pays a *lump sum* to the academic department that represents the total revenue that was generated by the program through the delivery of the DE curriculum during the previous academic year.

The reality. The WebIT admissions committee admitted 25 students to the WebIT1 cohort. Prior to the summer workshop, two students dropped out of the program, so 23 students attended the required face-to-face (f2f) workshop in June, 2008. Prior to summer enrollment in the first WebIT course, two other students dropped out of the program. One student dropped out of the summer course. During the Fall of 2008, three students dropped out. During Spring 2009, four more students dropped out. In addition, one student was removed from the program for poor academic performance. During the Fall of 2009, one additional student was removed from the program due to poor academic performance. Eleven students enrolled for each of the two courses offered in the final semester of WebIT1, Spring semester, 2010. Eleven students completed the WebIT M.S. degree program at the end of Spring semester, 2010.

Table 2 summarizes the student attrition data for the WebIT1 cohort . Three findings from these data are fairly obvious: (a) four students (29% of those who dropped) were lost before the academic portion of the WebIT program began, (b) only one student was lost from the program during the second year, and (c) the reasons provided by students for dropping the program conform to two broad categories often mentioned in the literature as: personal and institutional variables (Kember, 1989; Moore, Bartkovich, Fetzner & Ison, 2002; Rovai & Wighting, 2010; Tinto, 1993).

The attrition data also generally conform to those shared by Chyung, et al. (1998). The students described in her study dropped early in the academic program and for reasons similar to those shared by the students who dropped out of the WebIT program.

Table 2

WebIT1 Cohort Student Attrition Data

Student Number	Term Dropped	Reason
1	Pre-Workshop	None Given
2	Pre-Workshop	None Given
3	Pre-Enrollment	Program Emphasis Mismatch
4	Pre-Enrollment	Inability to secure financial aid
5	Summer 08 (1)	Busy Personal Schedule
6	Fall 08 (2)	Program Emphasis Mismatch
7	Fall 08 (2)	Personal Health Problems
8	Fall 08 (2)	Pace of work; Personal Issues
9	Spring 09 (3)	Time Management Problems; Personal Issues
10	Spring 09 (3)	Loss of Financial Aid Support; Family Responsibilities
11	Spring 09 (3)	Family Responsibilities
12	Spring 09 (3)	Pace of work; Family Responsibilities
13	Spring 09 (3)	Admission revoked for poor academic performance; Pace of work; Family Responsibilities
14	Fall 09 (5)	Admission revoked for poor academic performance

Note. Numbers in parenthesis indicate the semester (1-6) during which students were lost from the WebIT program.

The characteristics of the UT funding model and the attrition associated with the WebIT1 cohort present unique challenges for maintaining the WebIT program. Because the funding formula itself is not stable, cash flow is highly constrained and enrollments can be unpredictable, it is nearly impossible to predict the level of funding that will be available to support the program in subsequent years. Based on WebIT1, a strong first year will likely generate sufficient funds to deliver a second year; but a weak second year may not generate sufficient funds to start another WebIT cohort. Therefore, the success of the WebIT program, in terms of its self-sufficiency and maintainability, is dependent upon two factors that are highly unpredictable from year-to-year.

Promises Realized During the WebIT1 Cohort

What WebIT offers UT. The WebIT program offers great potential for the Instructional Technology programs at The University of Tennessee. Based upon our experiences with WebIT1, all of this potential was realized and could likely be maintained in future. First, WebIT offers the prospect of being able to reach beyond the boundaries of the campus to recruit students who otherwise would not be able to matriculate at UT. Second, WebIT provides the opportunity to construct a research laboratory for examining many issues related to the successful design and implementation of online degree programs and electronically-mediated, collaborative learning environments. Third, the WebIT program provides an ideal vehicle for helping our senior doctoral students obtain critical, real-world experience as teachers in electronically-mediated instructional environments. Fourth, the WebIT program offers the IT faculty an opportunity to acquire additional fiscal resources to support doctoral students and faculty in the Instructional Technology programs at UT.

What WebIT offers the students. Based upon both faculty and student perceptions, the cohort structure was highly valued by students and, though slightly more costly to maintain (initial workshop expenses, program coordinator and additional, special course sections for cohort members) the cohort model seems justified as a programmatic structure that helps address the unique needs of distance learners (Rovai and Downey, 2010; Rovai & Wighting, 2005). Without a cohort structure, it is possible that program attrition might have been higher, but this is purely conjecture. What we know is that the successful WebIT1 students reported a strong preference for the cohort organization.

Though attrition was high during the first year of the WebIT program, the students who chose to continue in the WebIT program appear to have bonded to a degree that is difficult to compare with students in open-enrollment programs. They voluntarily participated in two, f2f, optional professional development activities (the annual Tennessee Educational Technology Conference in 2008 and 2009) and demonstrated their knowledge and skills by making presentations and assisting others in making presentations.

It is not clear to what extent the friendships among cohort members begun during WebIT1 will last beyond the completion of the WebIT program, but it was evident to the WebIT faculty and GTAs that the members of the cohort group valued one another and enjoyed their involvement as members of the cohort. In response to an Exit Survey question that asked each of the WebIT1 students about the potential likelihood of his/her maintaining any relationships with other members of the cohort beyond the completion of the WebIT program, 10 of the 11 WebIT1 students (91%) who completed the program, provided an affirmative response. A typical response was the following: “Yes. Many of the relationships I have formed will continue through friendships as well as perhaps professionally [*sic*]”.

The members of the WebIT1 cohort appeared to exhibit a level of comfort with one another that is more often seen among people who have worked closely together for many years, which seems remarkable given the relatively short duration of their acquaintance during the WebIT program. The cohort group dynamic evident in WebIT1 provided a sharp contrast to the group dynamic typically observed among students in f2f M.S. courses populated through open enrollment.

Pitfalls Encountered During the WebIT1 Cohort

Though a number of minor problems were identified and resolved during the implementation of the first cycle of the WebIT program, two significant problems were identified that defy simple solutions. The first problem is that of student attrition. The second is the nature of the funding model for the WebIT program. These two problems are related but each requires a unique solution to improve the viability of the WebIT program.

Student attrition. During the WebIT1 cohort, the WebIT program experienced an attrition rate of 56% (40% during the completion of academic coursework). This is similar to attrition rates reported by others in recent years (Bowser, 1992; Chyung, et al., 1998; Diaz, 2002; Kember, 1989; Moore, et al., 2002; O'Brien, 2002; Rovai & Downey, 2005; Rovai & Wighting, 2010) but obviously not what was desired. One possible interpretation of the high rate of attrition is that the WebIT program is simply too rigorous. A second possible interpretation is that the pre-matriculation workload expectations of the WebIT students was inconsistent with the reality of what was required to be successful in the WebIT program. A third possible interpretation is that the structure of the WebIT program was not sufficiently supportive or conducive to the development of a community of learners, i.e., the WebIT program did not succeed in promoting student engagement and developing a sense of community among all participants. Undoubtedly, there are other possible explanations for why WebIT student attrition was so high, but given the experiences of others in this regard, it is highly likely that the high rate of attrition experienced during the WebIT program is directly related to some combination of these three critical factors.

Additionally, several program-specific characteristics also likely influenced student decisions regarding persistence. The program sequence for WebIT1 was a rigid, two-year timeline that required students to participate in a specific sequence of courses offered at a fixed pace (2 courses per semester) over a specific period of time (2 years). For those unable to set such a pace, it may have been easier to find an instructional program that was more flexible in this regard.

Our interpretation of the high attrition rate experienced during WebIT1 is that the WebIT program was challenging and pushed students to adopt a pace of work that is beyond what a significant fraction of them could manage, given their significant personal, family and work-related responsibilities. Advertising media in the United States are rampant with messages aimed at potential online students who, for whatever reason, cannot disengage from their work or personal situation and physically attend an institution of higher learning. These messages seek to convince potential students of the *convenience* of online degree programs. Many online programs are extolled as being *anytime and anywhere* but they fail to accurately portray the many challenges involved for students seeking to use new media, new tools and new social conventions (all of which require significant time to learn) in order to master a new content; while at the same time remaining fully engaged in their everyday lives.

DE funding for WebIT at UT. The second significant problem that the WebIT program encountered during the first cohort cycle is related to the characteristics of the UT DE funding model. Three main problems surfaced for the WebIT program in connection with this funding model. The first problem is that the EPC Department was required to fund the entire first year of the WebIT program because no tuition-return funds would be available until the beginning of the following academic year. The second problem is that since summer school is funded separately at UT, the first summer WebIT course had no source of funding. The third problem is the requirement that all tuition-return funds paid to the academic department at the start of the academic year *must* be expended during that academic year.

Of these problems, the third is the most problematic for running a small-scale entrepreneurial program like WebIT. Failure to resolve the third problem, coupled with inconsistent student enrollment, would likely trigger a recurrence of all three problems in each successive cohort cycle. The requirement to spend all tuition-return funds in the same academic year in which they are generated means that a program like WebIT cannot adequately manage funds from year-to-year, to ensure program continuity. The amount of tuition-return generated in AY 08-09 (first year) and provided to the EPC Department to run WebIT in AY 09-10 (second year) was approximately double what was *minimally* required to run the WebIT program during the second academic year. However, the loss of students during AY 08-09 (first year) meant that the funding generated during AY 09-10 (second year) that would be available to start the *second* WebIT cohort (WebIT2) in AY 10-11, would be insufficient to fund the minimal requirements to run the first year of the second WebIT cohort (WebIT2).

Without a funding model that would permit the WebIT program to *bank* funds in times when the tuition-return exceeds expenditures and use those funds to address program requirements in times of need, the EPC Department would continually be placed in the position of having to find funds to *jump-start* new WebIT cohorts. Likewise, the EPC Department would reap the fiscal reward of absorbing all of the excess tuition-return every other year. The latter outcome would not be problematic for the EPC Department, but the oscillation between *feast and famine* is problematic and counter-productive to the concept that entrepreneurial DE programs such as WebIT should operate on a self-sufficient basis. Further, the campus DE funding model does not allow for the most logical and timely application of program resources to the solution of program problems, such as long-term planning.

Obviously, these two problems, student attrition and funding model, are related. Using the UT DE funding model, high attrition during the first year of a two-year cohort can create a funding problem for the first year of the subsequent cohort and would require that the academic department continually find ways to fund the first year of subsequent two-year cohorts. The WebIT program could increase enrollments slightly, but larger numbers of online students (without additional instructional resources) will likely generate other problems (Angelino, et al., 2007; Palloff & Pratt, 2007; Tomei, 2006) and may not sufficiently address the funding shortfall issue. Larger course enrollments might generate an environment where less student-teacher interaction and support are possible, thus increasing the *lost-in-cyberspace* effect and resulting in even larger attrition that, in turn, would result in lowered tuition revenues.

At present, the WebIT initiative at UT is under review to determine whether or not it will be possible to deliver the program in a manner that is both educationally and fiscally sound. The WebIT1 students provided a wealth of information to inform these deliberations and the members of the IT faculty are analyzing these data to determine the feasibility of continuing the WebIT initiative.

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Design for Cyberlearning – Improving Collaborations in Team Design

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Abstract

Interdisciplinary team design has potential to create interactive environment and quality instruction for cyberlearning. There are limited researches on how instructional designers collaborate in practice. This qualitative study explores the role of instructional designers in collaborative design, how they collaborate, and the desired skills. The initial data analysis shows 1) instructional designers play a central role in team design; 2) they use formal and informal channels to communicate; and 3) the desired collaboration skills include negotiation, problem-solving, time-management, and facilitation.

Introduction

Cyberlearning has become the main stream of education (Allen & Seaman, 2008). Educators need to understand who their students are, how they learn, and what they need to know in order to support students to be successful in this fast-changing world. Rapid advances in technology, neuroscience, and learning science open new ways to efficient and effective instructional design practice to provide students' better cyberlearning experience and promote meaningful learning in cyber environments.

Cyberlearning calls for a more interactive environment, learn centered focus, prompt feedback, and an engaging and effective online learning community (Institute for Higher Education Policy, 2000; Kearsley. 2001; Palloff & Pratt, 2001). Recent development of instructional design models suggest that interdisciplinary team design can be a successful approach for online course design and development. In this collaborative design approach, team members share expertise, "learn from one another, broaden their knowledge, and appreciate the strengths which the other members bring to the table" (Care and Scanlan, 2001, p. 6). Although many studies have been done regarding what instructional designers actually do in an instructional design practice and these studies seem to focus on individual instructional designers (Christensen & Osguthorpe, 2004; Pieters & Bergman, 1995; Rowland, 1992; Winer & Vazquez-Abad, 1995), little research was found on how to make instructional designer's collaboration more effective in a team design. This qualitative study is designed to investigate how instructional designers collaborate with other experts in a team design and what collaboration skills are expected to make such collaboration effective.

Literature Review

Team design has been suggested by many organizations and researchers as a method to ensure the quality of education provided by institutions (SREB, 2001; Care & Scanlan, 2001; Levy, 2003)). For example, the Southern Regional Education Board (2001) encourages institutions and states to build an instructional design team for a quality online environment. Such a team might consist of the instructional designer, graphic/interface designer, technical support personnel, content expert, direct instructor, information resource personnel, mentors/tutors, and assessor. The instructor, however, remains at the center of the team to guarantee academic integrity, with the assistance from other partners. Levy (2003) suggested an organizational structure change in online educational program. This change should involve different people who do different jobs. Care and Scanlan (2001) have also advocated an Interdisciplinary Team Model where various participants meet as a team on a regular basis to develop the course, solve problems, and discuss issues as course development unfolded. The participants are content specialist, instructional designer, student representative, media specialist, program director, and external faculty member.

In instructional design practice, subject matter experts, instructors, technologists or other personnel may all serve in the capacity of experts to inform instructional design. Smith and Ragan (2005) strongly recommend that instructional designers build relationships with experts and obtain rich and accurate information from them through venues such as interview. Dick, Carey, and Carey (2008) introduced the idea of instructional design in teamwork to design, develop, and implement teaching and training. Thus, communication and collaboration skills are critical for team functioning throughout the instructional design process and the eventual generation and delivery of products and service.

Methodology

In order to investigate how the team design approach works in instructional design practice, this case study was conducted and guided by the following research questions:

1.# What roles do instructional designer and other experts play in a team design?
2.# How do they collaborate with each other during their design process?
3.# What collaboration skills should an instructional designer possess?

Participants

A total of eleven faculty and staff from a north central university participated in this study, including four instructional designers (faculty status), two subject matter experts/developers (faculty status), two librarians, one multimedia specialist, one IT manager, and one adjunct faculty (part-time instructor).

Data Collection and Analysis

Structured, semi-structured interviews and observations were conducted from March to November 2009. Artifacts were collected in the same time frame. Two investigators completed one-hour training on coding the interview transcripts. They agreed upon appropriate coding methods during the training and blind reviewed interview transcripts individually. The themes that emerged from the data were recorded in Word documents. Then they met and discussed the themes from their findings until an agreement to be reached.

By the time this proposal is completed, the researchers analyzed the transcripts of three interviews. Two are from instructional designers and one is from subject matter expert. The following themes were emerged from the data.

Roles and tasks of each member in the team

In this team approach, instructional designers play a central role, connecting all the team members. The instructional designer also serves as the project manager who leads the team and pushes course development forward. The developer provides the contents and work together with the instructional designer to create assignments, activities, research, and projects. The developer also facilitates the workflow of the adjunct faculty members and seeks their inputs through online retreats. The librarian supports the instructional designers to locate relevant journals and articles and have them approved by the subject matter expert. The instructional designers send out invitation to multimedia specialist and discuss details for creating proper multimedia pieces to enhance students' cyber learning. The adjunct faculty is responsible for delivering the course and providing students' feedback to the developer. The IT manager ensures the technical part of the team design process.

Communication channels and collaboration methods

Communication channels for this team design approach are classified as informal and formal communications. Informal communications include stopping by each other's office, emails, and phone calls. One designer creates designated folders in email accounts to save and track the communication occurred among the team members. Formal communication channels include a 2 to 6 hour block time for course development only, a Skype conference meeting, and Google Docs.

Collaboration skills for instructional designers

All the participants agreed on the importance of communication skills for an ID. Other important skills needed in team design include negation skills, problem solving skills, facilitating skills, decision-making skills, synthesizing skills, persuasive skills, conflicting solving skills, time management skills and leadership skills.

Conclusions

Although only the collected data have been partially analyzed by far, the results of the study are promising. The interdisciplinary team works best for the cyberlearning design. The ultimate collaboration could be achieved if every team member understands each other, develops good collaboration skills, and employs effective communication channels. A more in-depth understanding of improving collaborations in a team design will be reported once the data is fully analyzed.

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Web2Quests (Web 2.0 WebQuests)

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Abstract

This papers describes the process of creating Web 2.0 based WebQuests. It also discusses students' responses to it. The Web 2.0 WebQuest has three defining features (1) Web 2.0 design style (2) integration of Web 2 services and trends such as blogs, social networking sites and wikis (3) use of Really Simple Syndication (RSS). In one class, my students and I created regular WebQuests and Web 2.0 based WebQuests. In another class, my students and I used these WebQuests. Data were collected from both classes through interviews and observations. Results indicated that while students enjoyed the WebQuest activity, the responses from the Web 2.0 style groups were more positive.

Introduction

The Web has brought new possibilities for teaching and learning. WebQuests are among the most used methods by K-16 educators as a strategy for integrating the Web into classroom instruction. The WebQuest technique was created by Bernie Dodge in 1995 with early input from Tom March. A WebQuest can be defined as "an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet" (Dodge, 1997). This technique usually requires students to work in groups and heavily relies on information sources on the Web. Students are guided to visit appropriate web resources to look for information.

A WebQuest usually includes six steps: (a) the introduction; background information about a topic that learners will explore (b) the task; a general description of what learners are required to do (c) information sources; mostly web sites for students to investigate to complete the task (d) a description of the process; a step by step description for learners to follow (e) evaluation; includes evaluation criteria for students' works and (f) the conclusion; a summary of the experience. WebQuests can be a short term (one to three class periods) or a long term (one week to a month) activity and usually require group work. Furthermore, WebQuests can be designed within a single discipline or be interdisciplinary (Dodge, 1997).

The WebQuest method has been widely adopted in K-16 education (Zheng et al, 2008). One important point to mention is that while being applied to a wide variety of different educational settings, the WebQuest technique has changed little (Abbit & Ophus, 2008). Since the creation of WebQuests, however, the Web has changed a lot, shifting from Web 1.0 to Web 2.0. Web 1.0 was the first and Web 2.0 is the next phase of the Internet. Web 1.0 and Web 2.0 differ on how they present information. Although Web 1.0 was mostly about retrieving information, Web 2.0 represents a more collaborative, interactive, and user-focused approach.

Coombs (2007) states that Web 2.0 is 'transforming the Web into a space that allows anyone to create and share information online-a space for collaboration, conversation, and interaction; a space that is highly dynamic, flexible, and adaptable' (p. 17). Web users are now easily building pages, sharing photos and videos, and interacting with each other. These users are generating most of the content by uploading videos, pictures and other media, participating in discussions (for instance leaving comments on others' writings, videos, pictures), and writing (blogging, wikis etc). This is why many call Web 2.0 a more user-powered and democratic approach than Web 1.0.

With Web 2.0, a new design style was also introduced. This style is a more simplistic approach. In this style, special attention is given to usability; making web site designs easy to browse for Internet users. This includes presenting information in a clear way and not causing confusion for the users. Presenting content is very straightforward. Users do not spend time trying to find what they are looking for from complicated web site layouts. Usually, in this layout, there is content centered in 1 or 2 columns, large texts, plenty of white space to direct attention to the content, fewer graphics but more small icons and solid areas of different content sections.

Research studies indicate that a large portion of the young population (under 20 years old) use Web 2.0 sites such as social networking (e.g. facebook.com, myspace.com etc.) or video/photo sharing sites (e.g. youtube.com, flickr.com etc.) (Balci & Ayhan, 2007; BECTA, 2008; Pew Internet, 2007). Kurt (2009, p. 36) argued that:

> Most of the WebQuests, if not all, could be found to carry very basic characteristics of Web 1.0 in terms of functionality and design. These WebQuests do not interact with the learners. One of the major weaknesses of the WebQuests is that the design structure of this method is not interactive with learners. Interactivity here means the extent to which learners can actively participate in the process and collaborate with other learners. That means this technique heavily relies on written content. It does not fully take advantage of current Web technologies which may increase interactivity and learners' engagement dramatically. WebQuests should embrace the benefits of Web 2.0 in order to engage today's learners with the information we introduce through this method.

Thus if we created a WebQuest based on Web 2.0, would that be more effective than using a traditional WebQuest as a teaching method?

Methods

To create Web 2.0 WebQuests, we employed Blog and Wiki software and services to create our Web 2.0 Web Quests. Blogs and Wikis were used to accomplish many things such as increasing collaborations and discussions among students, adding many dynamic features such as polls, video and picture galleries, discussion boards etc. and monitoring students' activities by employing history features. Another advantage of using blogs and wikis as a basis for our WebQuests was that they simplified the design aspects of this technique by making use of templates, which are pre-developed web site page layouts. Furthermore, we used Really Simple Syndication (RSS) to increase the effectiveness of the WebQuests we created. Via RSS, we syndicated content from other such sites as Youtube.com. RSS also enabled us to create automatically updating WebQuests.

I teach two educational technology courses and one of the important topics in these courses is the WebQuest technique. One class is called Computer Literacy and the other one is called Educational Technology and Material Design. In computer literacy, I teach WebQuests as a technique. In the other class, my students and I try to create different educational technology materials from PowerPoint to web sites. We also create WebQuests. In this class, we tried to create Web 2.0 based WebQuests. We tried to create a more dynamic and user-focused WebQuest with the help of the Web 2.0 tools and services described in this paper. Our Web 2.0 WebQuest has three distinctive features different from the traditional WebQuests: (a) Web 2.0 WebQuests carry the characteristics of Web 2.0 design styles (Scratchmedia Limited, 2009; Chang, 2006) (b) Web 2.0 WebQuests include many such dynamic features as searching, commenting, discussion boards etc. (c) Using RSS to syndicate content from related Web sites.

Creation of Web 2.0 WebQuests

I randomly divided my students into five groups. Each group consisted of 7-8 students. Each group was required to create two versions of a short term WebQuest; (a) a Web 2.0 WebQuest (b) and a traditional style WebQuest. For the Web 2.0 WebQuest, each group used WordPress blogging software to create their WebQuest. WordPress is the most popular blogging system today (W3techs, 2010). One distinctive feature of WordPress is that WordPress can run multiple blogs from one installation of WordPress. This feature let us easily create multiple blogs for each group. Each group was also required to create the same WebQuest using the original WebQuest templates found at http://webquest.org/index-create.php. Since I taught these students Computer literacy previously, they knew how to design simple Web sites.

I also established a separate Wiki page for students' discussions for each WebQuest. Each student was required to write what he/she was doing and respond or comment about others' Wiki entries. More specifically, Wiki was used to help students to manage and organize information, share resources and discuss their work during the creation of the WebQuest activities. I closely followed the Wiki pages to monitor students' activities. Wikis have a history feature, this means that whenever there is a change, Wiki saves the before and after version of the change. This was a useful feature to follow students' progress.

WordPress has numerous themes; pre-designed web site layouts. A majority of them are designed by professionals and their licenses are suitable for educational use. These themes can be found at /wordpress.org/extend/themes/. This means that students were easily able to change the look of their WebQuests. Furthermore, the features of WordPress can drastically be increased by using their plugins found at http://wordpress.org/extend/plugins/. Students were free to use whatever themes or plugins they like to achieve what they want in their WebQuests.

Data Collection

Data were collected from my Computer Literacy class students and Educational Technology and Material Design class students. As I stated above, the WebQuests were created in my Educational Technology and Material Design class. Then, I used these new Web 2.0 WebQuests and the original style WebQuests to teach the WebQuest technique in my other class, Computer Literacy. Data collection included unstructured observations and interviews. I conducted unstructured interviews with 10 students (5 students from the Computer Literacy group and 5 students from the Educational Technology and Material Design group). These students were randomly selected. All the interviews took place in a private room. Each interview lasted around 15 minutes, and a tape recorder was used to record the interviews. Thereafter, the data was transcribed and analyzed. Each interview was independently examined. This examination included coding then, determining subcategories, and finding emerging themes and issues. In general, I wanted to learn about the students overall perceptions about the WebQuest technique and experiences using or creating WebQuests.

Results

In general, the interviews suggested that although students' from both classes enjoyed the WebQuest activities, students' responses to the Web 2.0 style WebQuest were more positive. Here are some responses:

> Student from Computer Literacy Class: I liked both versions of the WebQuests, but I think the Web 2.0 WebQuests offered more interactivity. I enjoyed that we were able to do many things on Web 2.0 WebQuests like adding our comments and participating in polls.

> Student from Educational Technology and Material Design class: During the creation of these WebQuests, Web 2.0 style WebQuests offered more flexibility. We could add any functionality we wanted. The difficult part was that we created this Web 2.0 WebQuest, and then were required to create the same WebQuest using basic HTML [referring to traditional WebQuest]. That was impossible to do. We only did it partly because Web 2.0 WebQuests have so many features that we could not accomplish in our traditional style WebQuest.

> Student from Educational Technology and Material Design class: We were able to finish our Web 2.0 WebQuests much faster than the traditional WebQuests. Our Web 2.0 WebQuests look more professional than our traditional WebQuests.

Many of them stated that they liked how it looked and they liked the features available more than the other, traditional, WebQuest. I also observed that students using this new WebQuest were more focused, created more discussions, and produced more groups' thoughts in the WebQuest activities than the traditional WebQuest. Furthermore, in the Web 2.0 WebQuest's Wiki pages, there were a lot more activity than in the traditional style WebQuest Wiki pages.

Discussion and Conclusion

This paper describes how my students and I created Web 2.0 based WebQuests. There are numerous studies examining the impact of WebQuests on students' learning (for a review of studies, see Abbit & Ophus, 2008). Yet, there is little knowledge of the factors affecting a WebQuest's success or failure. However, it seems that Web 2.0 style may have an influence on a WebQuest's effectiveness. There are many reasons that Web 2.0 styles WebQuests are potentially more effective. More comprehensive studies for all grade levels are required in order to conclude that Web 2.0 WebQuests are more effective.

WebQuest is a Web based technique. This means that special attention should be given to Web accessibility. Current WebQuests are known to have substandard design elements (Kurt, 2009).This means that they lack many accessibility standards. From this experience, we learned Web 2.0 WebQuests were more accessible than traditional WebQuests because students employed WordPress themes. These themes are designed by professional web designers and thus are consistent with accessibility standards.

One important point to mention is the importance of security when designing Web 2.0 WebQuests. As I stated we used WordPress software to build our Web 2.0 WebQuests. Since WordPress is a very popular tool, millions of Web sites are using this software. This popularity means that individuals who want to make trouble try to find ways to crack into accounts or sites to cause damage. To prevent any damage, keeping your WordPress installation, including the plugins up-to-date is essential.

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