Falvo, D. A. (2006). Reflections and perceptions of integrated learning tools in an online course. *International Journal of Technology in Teaching and Learning, 2*(1), 1-16.

Reflections and Perceptions of Integrated Learning Tools in an Online Course

David A. Falvo
University of Northern Colorado

Exploring perceptions about the use of online learning tools to complete a course about educational technology, participants completed online courses on current issues and trends in the field of educational technology, and how technology impacts teaching and learning. Findings highlight student experiences in the course, their reflections on the challenges and successes in a technology-oriented online classroom, and mostly their perceptions about the online tools and resources for learning that they used during the course. Students felt the research components of the course helped them understand the complexity of the field of instructional technology. The text and interactions contributed greatly to students' abilities to define the field and know current issues and trends. Additionally, this qualitative study shows that the course was effective because collaborative activities were integrated throughout the instruction and because the structure and sequence of the content of the course were appropriate for students with little background in this area.

Keywords: Online, Instructional Technology, Learning Tools

INTRODUCTION

Before the last decade, most colleges providing distance education used face-to-face sessions, live satellite, or closed-circuit television (Reiser, 2001a). Recently, broad use of the Internet for conducting instruction has become popular in academia (Falvo & Johnson, 2005; Fuller, Rena, Pearce, & Strand, 2000). These online courses are typically conducted in one of three environments: completely online without face-to-face interaction; as hybrid courses where the class meets face-to-face frequently, as well as online; and as face-to-face sessions with integrated web-based support materials and activities (Horton, 2000). Recently, much research has been published about the impacts and effects of online courses and the pioneering approaches of Web-based pedagogy. The

David Falvo is an Assistant Professor of Educational Technology at the University of Northern Colorado. Please contact Dr. Falvo at the University of Northern Colorado, Box 124, Greeley, CO 80639-0051, E-mail: david.falvo@unco.edu.

history and adaptation of the Web has been labeled a technological shift and has changed how we think about and use information (Burnett & Marshall, 2003). This seems especially evident in the development and use of online and web-based instructional tools and materials (Falvo & Solloway, 2003). Although the Web is an academic village where people learn and produce, a significant number of university administrators and faculty persist in focusing their vision on the physical campus- bricks and mortar (Leonard, 2001). Prior research defines online tools by features and components (Kahn, 1997). Because many teachers do not understand the complexity of using these features and components, they sometimes are disinterested in the Web as an academic village (Flowers, 2001). Research can help teachers understand the complex uses of online learning tools as well as best practices for effective online learning. This qualitative study explores the experiences of university students and their professor in a quest to explore their concerns and attitudes about integrated features and tools in web-based, interactive learning environments.

BACKGROUND

Online learning goes back far beyond the mid 1990s (Reiser, 2001a). Indeed, online education existed back in the 1970s long before the emergence of the Internet (Kearsley, 2005). Although using rather primitive technology compared to today's standards, pioneering online instructors sometimes based their courses upon sound pedagogy and unique resources. These teachers engaged in action research, so the rich and extensive body of research and practice spans well over two decades. However, today many more learners are eager to engage in online learning. Today, many children and young adults have a history of playing video and computer games, watching MTV, Instant Messaging, and using technology tools daily (Simpson, 2005). One study indicated that more K-12 students use their home computers for games and simulations than for school homework assignments (National Center for Educational Statistics, 2003). Clearly, computer and video games are a part of the daily lives of students at the K-12 level (Simpson, 2005). As these students move into high school and post-secondary environments, they will likely be eager to engage in online learning and they will seek highly interactive and compelling online learning tools. Some barriers to the acceptance of online learning are a lack of perception of need, a lack of awareness of online opportunities, a perception that online education is too impersonal, and a perception that online education is of inferior quality (Flowers, 2001).

ONLINE LEARNING TOOLS

No single media, method, or learning paradigm will address the wide-range of problems and issues for teachers and learners (Hannafin, 2001). As teachers consider using new technologies, they question long-held beliefs about the purpose and nature of both content areas and instruction (Sandholtz, Ringstaff, & Dwyer, 1997). Previous studies indicate that appropriate use of technology requires more time for teacher planning and skill development than traditional techniques (Schrum & Fitzgerald, 1996). In some cases, enhanced technical training programs combined with extensive technical support assists teachers in incorporating technology into their classrooms (Bradshaw, 2002).

Even though the World Wide Web contains many resources and various forms of information, learners are limited in how they can efficiently use these resources (Jungwirth & Bruce, 2002). However, much of the success of online can be attributed to the availability of Learning Management Systems (LMS), also know as Virtual Learning

Environments (VLE) or learning platforms (Paulsen, 2003). These systems help instructors provide materials and activities for learning to their students while tracking participation and progress through data systems and assessments. The LMS provides an online interface that automates the administration and facilitation of online interactions and distribution of learning materials and integrates online learning tools into instruction (Hall, 2004).

A more recent study of US colleges and universities showed that the most popular LMS used was Blackboard (Falvo & Johnson, 2005). The second most used system was WebCT. Recently, Blackboard acquired WebCT and both systems are now owned by one company. Of the 100 institutions in the study, 79 schools were apparently offering online courses in a formal manner. Of those schools in the study not using Blackboard or WebCT, there faculty were using various systems. Some of these systems were commercial and others were self-built. However, there was no substantial use of a particular system among these remaining schools.

STUDENT CENTERED ONLINE LEARNING

Teachers who become classroom guides facilitate a cooperative learning environment, becoming partners with their students. Partnerships between teachers and learners are the foundation of learner-centered classrooms (Davies, 2000). In another study researchers found that online learning tools and expectations combined to generate an awareness of and sense of community in an online course (Falvo & Solloway, 2004). Additionally, increased instructional support or guidance that focuses on helping learners reflect on and articulate their ongoing understandings will allow students and faculty to achieve greater coherency and experience less frustration (Land & Greene, 2000).

Most of the time, teachers struggle with large classes of diverse learners who, in many cases, need individualized instruction (Hannafin, 2001). Teachers continue to express serious concerns about teaching with technology; when their concerns are addressed they can move on to help address the concerns of their students (Rakes & Casey, 2002). Worldwide, it is understood that computers, the Internet, or distance-learning cannot replicate the fine art of teaching. These tools can, of course, augment an already high-quality educational experience, but to rely on them as any sort of panacea would be a costly mistake (Flowers, 2001). Instructional designers remove barriers to individualized learning when they focus on information objects, building bridges from prior knowledge, and building interactive learning communities (Moller et al., 2002). The use of online learning tools must fit instructional goals (Strehle, Whatley, & Kurz, 2002) and fit the needs and learning styles of users (Leopold-Lusmann, 2000). Additionally, online learning provides an environment that is time and place independent (Deal, 2002). The investment goes beyond buying expensive equipment; school systems need to invest in educating teachers and students to properly use the learning management systems (Blair, 2002).

Conversations about technology enhanced, student-centered education have not been about technology but about learners (Falvo, 2003; Falvo & Solloway, 2004; Filipczak, 1995, Solloway & Harris, 1999). Conversations transition from discussions of instructor as technologist to discussions of online learners and their needs for reciprocal relationships (Wagner & McCombs, 1995; Wolcott, 1996). How the technology is used is more important than what is used (Falvo 2003; Hipp, 1997; Jones, 1996; Morgan, 1996). Establishing classroom and online relationships involves both moving from instructor control to empowerment of learners, exploring learner characteristics including learning styles, and recognizing that knowledge is a socially constructed project (Cowan, 1996; Dempsey, 1997; Falvo, 1999; McCaffery, 1997; McHenry & Bozik, 1995; Yucha,

1996). Knowledge is enhanced through collaborative learning (Burnham & Walden, 1997). Kolb (1999) defines learning styles as preferred methods for perceiving and processing information. Differences in styles result from heredity, past life experiences, and environmental demands. Situated learning uses interconnections of technology to serve the innerconnections of learners to open deeper understanding of a content area (Gardner, 1991: Herrington & Oliver, 1997; Jonassen & Grabowski, 1993; Thorpe, 1995). Additionally, instructional technology spans both processes for teaching and the development of resources and tools for learning (Reiser, 2001b).

Discussions about cooperative learning focus on the instructional use of small groups where students work together to maximize their own and each other's learning. Although sometimes described synonymously with cooperative learning, collaborative learning has historically been much less structured and more student-directed than more than cooperative learning (Johnson & Johnson, 2004). Technology-rich learning environments that promote collaboration effect learning styles and motivation (Cohen, 2001). Moving beyond cooperation, participants of collaborative groups most always express interdependence, synthesis, and independence (Hathorn & Ingram, 2002). Instructors use and promote interdependence, tracking, motivation, relevance, and shared goals to enhance collaborative learning (Gilbert & Driscoll, 2002; Wang, Hinn & Kanfer, 2001). Other studies have explored levels of interaction in relation to how learners engage in classroom and online collaborations (Falvo & Solloway, 2004; Rovai, & Barnum, 2003; Wang, Poole, Harris, & Wangemann, 2001).

Although team or group work is increasingly popular in both online and face-to-face classrooms, those teams are not always effective. The complex dynamics of a group involve interpersonal communication, conflict resolution, consensus building, and formative and summative feedback. Sometimes, people with different learning styles generate different perspectives on effective strategies for dynamic group interactivity. The evidence available suggests that further research is needed to identify which tools help online instructors support learners in collaborative, learner-centered communities. In this study, the research question was "what tools and processes were effective for students' learning in the online course and what perceptions did students have about the tools and activities in the course?"

METHODS

PARTICIPANTS

Participants of this qualitative study were two groups of students (30 total participants) who completed an online course that entailed specific online resources and activities. These two groups were in different sections of the same online course about the history and current trends and issues in educational technology. In this study, the participants entailed everyone taking the two courses. During these courses, graduate students examined the field of educational technology, and especially how technology impacts teaching and learning. The course content included historical and current perspectives, as well as trends and issues in the field. Students studied innovations in instructional technology and sought to develop a comprehensive understanding of integrating computer technology into instruction and learning. Most of these students are in an instructional technology masters or doctoral program while a few of these students are practicing teachers or adult learners who are interested in instructional design and technology.

DESIGN AND PROCEDURES

Participants of this study examined the field of educational technology, and especially how technology impacts teaching and learning during an online course.

The learning tools (see Table 1) for the two identical sections of this online course were configured into a learning managements system developed by Blackboard, Inc (www.blackboard.com). Students conducted web-quests, participated in textual discussion forums, collaborated through email, and attended several scheduled real-time sessions coordinated with online conferencing software developed by Centra, Inc (www.centra.com), which was recently purchased by SABA Software, Inc (www.saba.com). Students also learned how to develop and post a simple website using HTML editing software. The textbook for the course was titled. Trends and Issues in Instructional Design and Technology (Reiser & Dempsey, 2002), which provides a comprehensive overview of the history and current state of the field of educational technology. Students read the entire text and after reading assigned chapters they authored reflective statements about the readings and also participated in online discussions about the chapters with their peers. Additionally, students were required to search for, read, and abstract three recent research articles related to the field. They posted their abstracts on their web sites and they engaged in online discussions about those studies.

DATA ANALYSIS, METHODS, AND INSTRUMENTS

Data for this study were collected in the form of textual data files (e.g., discussion forums, email), two particular surveys, and document analysis of student projects and course materials (Merriam, 1998). The first survey was conducted online during the midterm week of the course. The second survey was conducted online during the final week of the course. Each of the two surveys entailed 10 questions addressing how student perceived the effectiveness of the specific course tools and course activities. Students were asked to identify things that were helpful for their learning and also things that acted as barriers to their learning in the course. The questions were designed to be open ended and to let students write about any issues they felt important in answering each question.

The word qualitative implies an emphasis on processes and meanings that are not rigorously examined or measured (if measured at all) in terms of quantity, amount, intensity, or frequency (Denzin & Lincoln, 1998). In this study, I searched for moments insights that would reflect the social context of teaching and learning online. Specifically, data for this paper include instructor notes, email transmissions, class records, reflective statements, student projects, and personal web-pages. The triangulation of data sources assisted in confirming the issues and themes relevant in the data. The data were coded by standard qualitative research to identify and confirm codes, methods, issues and emerging themes.

RESULTS

This descriptive, qualitative study highlights some of the unique issues and challenges that universities and teachers face when addressing issues in online and web-based course environments. I have arranged the data into three broad categories: 1) Reaction to the Online Tools; 2) Learning with Technology; and 3) Overall Reaction to the Course Content and Delivery. By reflecting upon many issues in the data, I write about how students and their teacher use the Internet tools for quality learning, showing the users' perspectives (Johnson, 1998). In this study, participants showed enthusiasm for the

convenience of learning online and the tools provided for learning and interaction, although there was a desire for technical assistance. Students also showed satisfaction with the information provided by the textbook. The learners showed much interest in developing a personal website to share their coursework, which they enjoyed structuring around topics of personal interest. Additionally, students showed satisfaction with integration of collaborative interactive online learning tools that helped to build relationships. The instructor was successful in developing both the sequence and structure of assignments.

Table 1. Online Tools for Learning

Tool	Description	Purpose
Blackboard (LMS)	Learning management system for posting materials and incorporates interactive systems such as chat and discussion forums.	primary course web-site that includes announcements, assignments, grade book, links to resources and links to student web sites
Threaded Discussion Forum	Asynchronist threaded textual forum where participants post messages and respond to messages	interaction, primarily to discuss readings and assignments, and to share ideas and insights
Centra (virtual classroom)	Real-time interactive classroom allowing voice and video communication, slideshows, application sharing, and participant feedback tools	one synchronistic live session (recorded), where students and instructor interacted live, and where an invited speaker made a presentation
Textbook	Reiser, R.A., and Dempsey, J. V. (Eds.) (2002). Trends and Issues in Instructional Design and Technology. Upper Saddle River, NJ: Pearson Education.	primary source of information about the course content, chapters were assigned weekly
Student Web Sites	Self-authored sites developed with Web-editing software and ftp software	students learned to construct and manage a web-site where they posted their assignments and biographical information
Grade-book	Itemized spreadsheet where each activity and assignment was graded on a point scale	source of feedback to students about the quality of their work, assignments and activities were graded weekly
Email	Primary communication tool for asynchronist interaction	regular communication between instructor and students and for peer interaction
Telephone	Secondary communication tool for synchronistic verbal interaction	Instructor called each student the first week to welcome them and answer questions, also used for web development tutorials

REACTION TO THE ONLINE ENVIRONMENT

The online environment has the potential to be relatively convenient for particular groups of students. One student stated:

> This course, and others like it, requires the learner to be highly self-motivated, flexible, and open-minded. These courses are not for

> everyone. But, I feel there are enough of us who would prefer them and succeed at them that they will be an expanding area of education.

Online courses are attractive to part-time and nontraditional students, which was the case for many participants in this study. Many were mostly practicing teachers or professionals in the field of education having little experience with online learning tools. A persistent problem that plagues adult distance learners' efforts in education pursuits is the lack of appropriate technical support (Grubb & Hines, 2000). If a learner cannot negotiate required technical skills or identify appropriate technical or content support when a problem arises, learning becomes impossible. Although some students indicated problems using the Centra conferencing software, many students indicated that tool as the most effective for their learning and building a connection between them and the other course participants. One student stated:

> What excited me most about the Centra software was the potential it could have for the course I've been developing. From past experiences teaching the full cataloging class face-to-face, I know that the group work on cataloging is one of the most helpful tasks the students do.

Another student stated:

> This was the first time I have used Voice-Over-Internet. It was obvious what a difference that could make in creating a sense of place and community for a class. For example, although I see some of our classmates weekly, I had never heard Dr. Falvo speak before and had never met many of our other classmates in person. Hearing their voices gave me a sense of cohesiveness about this class experience that I had not had before.

Another student stated:

> People have communicated with voice for much longer than writing, and are able to convey nuances through voice that will never be captured in writing. I believe hearing is a much more efficient method of communication; however, we need to recognize there are also natural benefits to writing, such as an efficient record of what has been written.

Another student stated:

> Because of what I do at work, I am constantly in audio teleconferences with groups of people in various parts of the world. We come very close to simulating the Centra environment just by using a multi-person telephone call and using our internet-connected computers to share applications via NetMeeting (a free utility that comes with Windows).

In this study, the problem with using Centra centered on not having a system to help students who had technical issues during actual live sessions. Seldom considered affordable by administrators, trained technicians monitoring toll free, 24-hour help lines assisting teachers and students during online courses provides the ideal support for online learning. Because technicians are rarely provided to instructors, a number of techniques can afford teachers and students support in lieu of face-to-face interaction. Alternatives are online glossaries, problem-solving databases, and help wizards that address the special technical concerns of online participants.

Students were surprised by the high amount of interaction in the course. Most of these interactions were conducted in online discussions and in real-time, audio-visual conferences using the Centra software. One student stated:

> When I first became familiar with distance learning as an option, I felt that it could not compare classroom learning. I thought people would cheat and there wouldn't be as much peer interaction or learning taking place. Now I believe that these ideas aren't true and online learning can

> be as beneficial or more if taught correctly and if the instructor is familiar with research in online learning.

LEARNING WITH TECHNOLOGY

In this study, course-work generally attempts to familiarize students with various innovations in instructional technology and to develop a comprehensive understanding of the history and evolution of the field of educational technology. Student projects included self-authored web sites, mini research papers that required interviewing professionals in the field, and a term paper for the course. Students shared these projects with each other and the instructor by making them available through self-authored web sites.

The primary learning management system in this course was Blackboard. Virtual and resources were constructed to offer extensive examples and explanations of the required material and a variety of tools for learning were integrated into the systems. The LMS allowed students access at any time, but sometimes required some synchronistic (real-time) presentations and interactions. Tools used by participants included chat, discussion forums, virtual conferences and classrooms, web searches, and links to online resources. One student stated: "The Internet tools were used very effectively during this course. I like that we were in constant contact with other students. Their assistance in solving problems and answering questions was invaluable." Another student stated:

> I have always liked the concept of synchronous learning options in an online class, but as a student, I have often found the regular chat interface to be a little too chaotic. For those that are used to following multiple strings of a conversation, it is suitable, but it can be a little confusing when three or five or more messages are sent in between a question and a reply. It adds to the confusion when the message composer does not preface each comment with the person to whom they are speaking.

Another student stated:

> The most obvious benefit is the integrated Voice over Internet Protocol (VoIP) technology. The ability to have voice conversations in real time provided an added sense of community with the other students. The video streaming is still a bit shaky, but adds a nice touch of humanity to an online setting.

Although students were given some freedom to pace themselves accordingly as they approached upcoming lessons, they were also required to attend several online sessions. The course included online threaded discussions, reflective papers posted on student web-sites, asynchronistic discussion in small groups, and synchronist audio-visual conferences using Centra. The interactive experiences and projects covered research on learning and instructional design, human performance technology, examples of integrated technology, and current trends in the instructional technology field.

Follow-up online activities frequently accompanied the lessons. The activities were used to encourage students to actively participate in the learning process. All activities were geared toward providing visual representations of specific course material. The activities sometime required collaborative efforts among group members, especially peer feedback sessions where formative evaluation was used to improve the quality of projects. Each student was required to develop and post a personal web site where he or she posted reflections, personal information to share with peers, and course projects. Developing the site was a challenge for several students. However, in retrospect these same students felt that they learned much from the experience. One student who retook the course after dropping the class the previous semester stated:

> The development of a web-site (using Dreamweaver) helped me because I struggled with that last semester, and it was a good review… Before I took this course for the first time, I was computer illiterate. I would say now I am at least at a level of knowledge that I can use the computer as a versatile tool.

Another student sated:

> Personally, I believe that the personal web site assignment has been one of the most helpful course activities to date. I found this assignment to be somewhat challenging, but I am certain that I will retain the learning associated with the assignment for quite some time.

OVERALL REACTION TO THE COURSE CONTENT AND DELIVERY

The industrial age paradigm and factory model of education contrasts with digital learning environments (Leonard, 2001). While online, both teachers and students have to be willing to change their approach to interaction and involvement in the learning environment. The learning community in this study viewed the purpose of the course to not only introduce new ideas and concepts, but also provide a digital experience where each member of the learning community sought to expand their experience with interactive, collaborative, online learning. Various forms of technology served as tools to help expand perceptions and ideas of how technology can be used to enhance teaching and learning. Although the course goal, objectives, and content provided copious amounts of information that need to be covered, the experience of working and learning online gave students a chance to engage in the actual content of the course.

During the initial weeks of each session, numerous postings in the welcome technical support discussion forums showed that students needed support and guidance in using the online course tools. Students were satisfied by the quality of support that they received from their peers when they requested help. The instructor and students transcended what would be traditional classroom roles. In this digital classroom, the course content fell into a secondary focus for both the teachers and the students. One quote sums up the general reaction to the structure of the online learning environment. The student stated: "What I like most about this course is the online interactions between my classmates and the convenience of being able to look at and do the assignments when I get a chance." Another student stated: "I enjoy the asynchronous nature of this course; completing course work according to my own schedule is very convenient… I value the opportunity to structure assignments around topics of personal interest."

Although several students indicated that this online course format was convenient for them, the course exceeded expectations in terms of how the participants felt about the tools used for online collaboration and interaction during the course. Such feedback is integral in a view that users of technology, in particular here students and instructors, should be considered in the design and adaptation of technologies for online learning (Johnson, 1998). However, to bring online learning into a user-centered perspective, we must understand the tasks being performed online by both students and instructors. One student stated: "Using the technology provides actual experience for the online classroom and the interactions between classmates and the instructors."

Once we understand how the users define and represent these tasks, support mechanisms and system modifications can support effective and user-friendly online environments. Complex classroom interrelationships and peer support help students feel a part of a collective striving to reach higher levels of knowledge and understandings (Barab, MaKinster, Moore, & Cunningham, 2001).

The textbook for the course was also an important tool for student learning. Many students indicated that the text provided details about the course content and a foundation for quality online interaction about the concepts and topics of the course. One student stated:

> The text readings provide a solid overview of the history, development and issues of the field. Since my background is more technology and business than education, I used the text as a "jumping point" to access other resources for more in depth learning about certain topics. For example, the chapter on history referred to the military initiatives in education. That triggered some side research on my own about military education, where I found some very interesting material on current programs supported by the U.S. Navy.

Another student stated: "The web resources and text readings helped me gain and understanding of a field that I didn't know much about."

Many students responded that exploring current research issues and trends helped them know what interests educational technology scholars. Students were required to search for, read, and abstract three recent research articles related to the field. They posted their abstracts on their web sites and they engaged in online discussions about those studies. One student stated: "Reading professional journal articles in the field and writing abstracts for them have contributed to my understanding of more of the current trends in the field."

The abstracts assignment worked well in this course because students could use the web to search for articles as an alternative to visiting a library in person. Online resources were provided so students could search some of the major journals identified by both the instructor and the authors of the text.

Specific discussion forums were assigned weekly, where students posted short reflections about an assignments or readings. Guidelines were posted so students engaged in dialog about these issues rather than just posting their own thoughts. Students were graded not only in terms of the quality of their postings, but also the quality of their interactions with their peers. One student stated: "I think the discussions have been the most helpful for me. Seeing things through others' points of view helps me expand my thoughts…" Another student stated: "I definitely feel that I can learn more by hearing other people's opinions on what they learned from the readings, including the text, my web page, and feedback on the abstracts."Another student stated:

> My peers have been very helpful in this course. I have been exposed to many new ideas and resources. They have made me think about other points of view not only in what I have read, but have offered insight and questions about the things I have written. When I began the course (my first online), I was afraid I would miss out on class interaction. I feel I have gotten to know each of the students a bit, and even know what they like to do outside of class. For many of them, their sense of humor comes out just fine in print, and they have been a great educational resource as well.

Two factors helped to establish effectiveness in this course. First, the integration of collaborative interactive online learning tools helped to build relationships between students (Solloway and Harris, 1999). The absence of well-known rituals that bond students as a cohesive group often hinders the development of the cultural commodities in the online environment (Grubb & Hines, 2000). One student stated:

> The quality of interaction and feedback is greater (here online) than that of a classroom course. Students are allowed to post a comment/question and … have necessary time to address the posting… we avoid a lot

> confrontation by eliminating the tone of our response and physical reaction…Thereby, creating a more conducive atmosphere for learning.

Another student stated: "I liked the peer forum, but it can be hard when students find it hard to give constructive criticism. Sometimes I think that people want to be really nice and then they may not reveal things that you should really work on."

Having student post their work, publicly, encouraged them to take writing assignment seriously. Most students took pride in having their personal web site where they could share information about themselves and where they could post their assignments and projects for the course. One student stated: "By assigning reflections and having me post those on a web page as well as respond to other students' reflections, it has forced me to read the chapters and focus on the material I am responsible to respond to."Another student stated: "I like the "hands-on" aspect…Even though I have had some challenges, I have derived satisfaction from the creation of a tangible website."

Consequently, online course designers need to help students bond as a cohesive group of learners. To do so, instructors must implement computer-mediated communication strategies within Web-based instruction to address interaction. For example, threaded email discussion can play a major role in successful collaborations. These interactions are essential when courses are being offered and taken to address professional development in the field of education (Dempsey, 1997).

The second factor that helped to make this course effective was the sequence and structure of assignments. Students were introduced to a definition, history, and an overview of the educational technology field early in the course. As the course progressed, specific examples of jobs and careers in the field were provided. Later in the course students had to explore current trends and research, and they each interviewed a few professionals working in the field. One student stated: "These assignments and activities have helped me better understand the evolution of IDT. A lot of what we take for granted today, PCs, calculators, even overhead projectors and videos, were the brainchild of someone in the field." Another student stated: "As I see it, the current issues are very similar to what has occurred in the past, foreseeing the future needs and trying to develop the right thing for the right time." Another student stated:

> This course has spared my interest in just how much online learning is available… (the assignments) informed me about the different educational positions people have and how they use technology. This information has led to many conversations (with family and associates)… it is amazing how widely used online instruction is in all areas.

Another student stated:

> Prior to this course, I knew little or nothing about these things. I was overwhelmed and intimidated when trying to create a simple website. The activity of creating the website was the most beneficial for me because it forced me to overcome my lack of knowledge (or"technology gap"). Once I was successful, I realized how naive and foolish I had been to be so anxious and reactive over the assignment. It was a slice of "humble pie" for me.

Although many scholars describe online learning tools as a means of delivering content or course information, this study explored how participants used these tools to interact and engage in the collective learning environment. The data in this study show that both delivering information and engaging students in collaborative interactions may be essential in designing quality online learning environments.

DISCUSSION

Overall, students were extremely satisfied with the course and the learning environment. Initially, there were concerns about using the technological tools and about the nature of the assignments. However, as the course unfolded student found the online learning tools to be very helpful for their learning and collaboration. Students responded positively to the Centra virtual classroom sessions and several indicated that such software would enhance other online courses. Students described the interaction as providing a new dimension to working with each other and the instructor. This dimension brought cohesion to the course. In cases of the absence of software and resources like Centra, teachers could use multi-person telephone conferencing as an option to bring learners together. Although students like the ability to work at their pace and times that fit their schedule, having several real-time sessions can enhance an online course. Additionally, those whom are unable to attend the live sessions can be afforded the ability to listen to a recording of the session.

Clearly, students felt the research components of the course helped them understand the complexity of the field of instructional design and technology. Additionally, the quality of the text and online resources contributed greatly to students' abilities to define the field and know current issues and trends. The discussion forums were most helpful for many students because they could both express their ideas and also read other students' perceptions about specific topics. Teaching a course about innovative instructional technology and design theories works well in an online format, especially a format that includes a variety of multidimensional learning tools. Having a learning management system that integrates the tools provides a structure and format that helps users best use all of the resources for learning. The course was effective because collaborative activities were integrated throughout the instruction and because the structure and sequence of the content of the course was appropriate for students with little background in this area. The instructor and the text often provided specific, real-world examples of the concepts and theories being taught in the course.

The predictions for technology infused classrooms and online teaching environments are that by the end of this decade, more than half of all university students will take courses online and all students will use technology daily in their studies (Horton, 2000). The social construction of knowledge demands the necessity of community in online classrooms and technology rich learning environments. More research is needed to help us explore critical questions about both the form and structure of web-based teaching and learning. Course designers need to address the interactive and collaborative context of the online learning environment as well as the content or subject matter addressed in their courses.

Although there are many opinions about technology in learning, online instruction provides valuable resources for K-12 and post-secondary education. This integrated technology sometimes builds bridges between knowledge and learners and helps these learners construct meaningful understandings. Despite some inherent challenges, technology will help to build redesigned schools for the future. Technology is alluring. It can be beautiful, helpful, and even lifesaving (Johnson, 1998). Although there are many opinions about Internet technology in learning, the Internet provides valuable resources for the classroom. Connections, relationships, and caring are essential components of building effective classrooms (Dempsey, 1994). If we move to online teaching and learning at the expense of these relationships, we stumble back to outdated ideas about improving schools. In the absence of teachers and students who care, the most expensive and innovative technology in schools will be useless. We must build technological

schools and virtual learning environments in ways that we can continue to develop quality interaction among the members of these learning communities.

LIMITATIONS AND FUTURE RESEARCH

Because this study addressed the perceptions of a small group of graduate students taking an online course, the findings and implications may not apply to every online learning setting. In the spirit of good qualitative research, readers of this study have to make decisions about how the findings apply to their particular circumstances. Indeed, much more research about the use of integrated tools for teaching and learning in online environments is needed. Much research comparing online environments to classroom environments has been published. However, as new learning technologies are integrated into online courses we must explore how those technologies support quality teaching and learning and how those technologies might impose new barriers to effective teaching. Future research might also address the use of interactive games, simulations, and animations in online courses. Personally, this researcher is very much interested in the collaborative, interactive use of the Internet to foster effective and efficient learning situations.

SUMMARY

The integration of collaborative interactive online learning tools helped to build effective learning relationships in this online course. Another factor that helped to make this course effective was the sequence and structure of assignments. Students used technology tools as they explored issues and trends in educational technology. Early assignments were quite simple and entailed posting statements in Blackboard. Later in the course students used web editing software to create their own personal websites. At the same time, these students explored their perceptions about the online tools and resources for learning that they used during the course. Students felt the research components of the course helped them understand the complexity of the field of instructional technology. The text and interactions contributed greatly to students' abilities to define the field and know current issues and trends. Additionally, this qualitative study shows that the course was effective because collaborative activities were integrated throughout the instruction and because the structure and sequence of the content of the course were appropriate for students with little background in this area.

REFERENCES

Barab, S., MaKinster, J. G., Moore, J., & Cunningham, D. (2001). Designing and building an online community: The struggle to support sociability in the Inquiry Learning Forum. *Educational Technology Research and Development, 49*(4), 71-96.

Blair, J. (2002). The virtual teaching life. *Education Week, 21*(35), 31.

Bradshaw, K. L. (2002). Technology for teaching and learning: Strategies for staff development and follow-up support, *Journal of Technology and Teacher Education 10*(1), 131-150.

Burnett, R., & Marshall, D. P. (2003). *Web theory: An introduction.* New York: Routledge Press.

Burnham, B. R., & Walden, B. (1997). Interactions in online education: A report from the other side. In T. Mulder & T. C. Reeves (Eds.) *Educational multimedia/hypermedia and telecommunications*, (pp. 49-54.). Charlottesville, VA: Association for the Advancement of Computing in Education.

Cohen, V. L. (2001). Learning styles and technology in a ninth-grade high school population. *Journal of Research on Computing in Education. 33*(4), 355-367.

Cowan, R. (1996). Technology is to science as female is to male: Musing on the history and character of our discipline. *Technology and Culture 37*, 572-582.

Davies, T. (2000), Confidence! Its role in the creative teaching and learning of design and technology. *Journal of Technology Education, 12*(1).

Deal, W. F. (2002). Distance learning: Teaching technology online. *Technology Teacher, 61*(8), 21-27.

Dempsey, V. (1994). Context, relationships, and shared experiences: The construction of teachers' knowledge. In A. R. Prillaman, D. J. Eaker, & D. M. Kendrick, (Eds.), *The tapestry of caring: Education as nurturance*, Norwood, NJ: Ablex Publishing.

Dempsey, V. (1997). The nature of professionalism in the context of school reform. In N. E. Hoffman, W. M Reed, & G. S Rosenbluth, (Eds.), *Lessons from restructuring experiences: Stories of change in professional development schools*. Albany, NY: State University of New York Press.

Denzin, N. K., & Lincoln, Y. S. (1998). *Strategies of qualitative inquiry.* Thousand Oaks, CA: Sage Publications.

Falvo, D. A. (1999). A qualitative study of five West Virginia k-12 RuralNet project teachers merging the internet into their instruction and how the internet affects professional practice. Unpublished doctoral dissertation, West Virginia University, Morgantown.

Falvo, D. A. (2003). Professionalism in teaching through technology skills development. *Tech Trends: Journal of the Association for Educational Communications and Technology*. *47*(3)21-25.

Falvo, D. A., & Johnson, B. F. (2005). The use and implementation of learning management systems in the United States of America. Conference proceedings of the Annual Meeting of the *Society for Information Technology in Teacher Education*, Phoenix, AZ.

Falvo, D. A., & Solloway S. G. (2004). Constructing community in an online course. *Tech Trends: Journal of the Association for Educational Communications and Technology 48*(6), 56-65.

Filipczak, B. (1995). You're on your own. *Training. 32*(1) 29-36.

Flowers, J. (2001). Online learning needs in technology education. *Journal of Technology Education, 13*(1), 17-30.

Fuller, D., Rena, F. N., Pearce, K., & Strand, S., (2000). Internet teaching by style: Profiling the online professor. *Educational Technology & Society, 3*(2), 71-85.

Gardner, H. (1991). *The unschooled mind: How children think and how schools should teach*. New York: Basic Books.

Gilbert, N. J., & Driscoll, M. P. (2002). Collaborative knowledge building: A case study. *Educational Technology Research and Design, 50*(1), 59-79.

Grubb, A., & Hines, M. (2000). Tearing down barriers and building communities: Pedagogical strategies for the web-based environment. In R. A. Cole (Ed.), *Issues in web-based pedagogy* (pp. 365–380). Westport, CT: Greenwood Press.

Hall, B. (2004). New technology definitions, retrieved December 18, 2004 from http://www.brandonhall.com/public/glossary/index.htm

Hathorn, L. G., & Ingram, A. L. (2002). Online collaboration: Making it work. *Educational Technology, 42*(1), 33-40.

Hannafin, M. (2001). Better learning with multimedia? Concepts and results from psycology and education. http://1psl.coe.uga.edu?Hannafin?papers/Issing.html January, 2001.

Herrington, J., & Oliver R. (1997). Avenues to understanding: A aualitative study into how students learn from multimedia. In T. Mulder & T. C. Reeves (Eds.) *Educational multimedia/hypermedia and telecommunications*, (pp. 473-478.). Charlottesvill, VA: Association for the Advancement of Computing in Education.

Hipp, H. (1997). Women studying at a distance: what do they need to succeed? *Open Learning*. *12*(2), 41-19.

Horton, W. (2000). *Designing web-based training: How to teach anyone anything anywhere anytime*. New York: Wiley & Sons.

Jonassen, D. H., & Grabowski, B. L., (1993). *Handbook of individual differences, learning, and instruction*. Hillsdale, NJ: Erlbaum.

Johnson, R. R. (1998). *User centered technology*. New York: State University of New York Press.

Johnson, D. W., & Johnson, R. (2004). *Assessing students in groups: Promoting group responsibility and individual accountability*. Thousand Oaks, CA: Corwin Press.

Jones, T. C. (1996). Communicating skills necessary for success in a online environment. Paper presented at the Annual Meeting of the Southern States Communication Association (Memphis, TN, March 27-31, 1996) (ERIC Document Reproduction Service No. ED 399 577)

Jungwirth, B., & Bruce, B. (2002) Information overload: Threat or opportunity. *Journal of Adolescent and Adult Literacy, 45*(5) 400-406.

Kearsley, G., (Ed.). (2005). *Online learning: Personal reflections on the transformation of education.* Englewood Cliffs, NJ: Educational Technology Publications.

Kahn, B. H. (1997). *Web-based instruction.* Englewood Cliffs, NJ: Educational Technology Publications.

Kolb, D. A. (1999).*The Kolb learning style inventory.* Boston: Hay Resources Direct.

Land, S. M., & Greene, B. A., (2000). Project based learning with the world wide web: A qualitative study of resource integration. *Educational Technology Research and Development, 48*(1), 45-68.

Leonard, D. C. (2001). The web, the millennium, and the digital evolution of distance education. In Cole, R. A. (2000). *Issues in web-based pedagogy*. Westport: CT: Greenwood Press.

Leopold-Lusmann, B. D., (2000). Virtual learning environments and student learning dtyles. *International online seminar: Teaching and Studying in Virtual Learning Environments,* Retrieved January 8, 2002 from the World Wide Web: http://seminar.jura.unisb.de/publ/ss00/seminar/ss2000/int/individualwork/uploads/238/IndividualAssignmentHeatherWilliams.htm

McCaffery, F. (1997). Enhancing student learning through the use of a multimedia interface. In T. Mulder & T. C. Reeves (Eds.) *Educational multimedia/hypermedia and telecommunications*, (pp. 717-722). Charlottesville, VA: Association for the Advancement of Computing in Education.

McHenry, L. & Bozik, M. (1995). Communicating at a online: A study of interaction in a online education classroom. *Communication Education, 44*(4), 362-371.

Merriam, S. B. (1998). *Qualitative Research and Case Study Applications in Education.* San Francisco, CA: Jossey-Bass.

Moller, L., Prestera, G., Harvey, D., Downs-Keller, M., & McCausland, J. (2002). Creating an organic knowledge building environment with an asynchronous distributed learning vontext. *The Quarterly Review of Distance Education, 3*(1), 47-58.

Morgan, T. (1996). Using technology to enhance learning: Changing the chunks. *Learning and Leading with Technology, 23*(5), 49-51.

National Center for Education Statistics. (2003) from http://nces.ed.gov/

Paulsen, M. F. (2003). Experiences with learning management systems in 113 European institutions. *Educational Technology & Society, 6*(4), 134-148.

Rakes, G. C., & Casey, H. B. (2002). An analysis of teacher concerns toward instructional technology. *International Journal of Educational Technology, 3*(1), 124-132.

Reiser, R. A. (2001a). A history of instructional design and technology: Part 1 - A history of instructional media. *Educational Technology Research and Development, 49*(1), 53-64.

Reiser, R. A. (2001b). A history of instructional design and technology: Part 2 - A history of instructional design. *Educational Technology Research and Development, 49*(2), 57-67.

Reiser, R. A., & Dempsey, J. V. (Eds.) (2002). *Trends and Issues in Instructional Design and Technology*. Upper Saddle River, NJ: Pearson Education.

Rovai, A., & Barnum, K. (2003). Online course effectiveness: An analysis of student interactions and perceptions of learning. *Journal of Distance Education, 18*(1), 57-73.

Sandholtz, J., Ringstaff, C., & Dwyer, D. C. (1997). *Teaching with technology: Creating student centered classrooms.* New York: Teachers College Press.

Schrum, L., & Fitzgerald, M. (1996). A challenge for the information age: Educators and the Internet. *International Journal of Educational Telecommunications, 2*(2/3), 107-120.

Simpson, E. S. (2005). What teachers need to know about the video game generations. *Tech Trends: Journal of the Association for Educational Communications and Technology*. *49*(5)17-22.

Solloway, S. G., & Harris, E. L. (1999). Creating community online, *Educom Review, 34*(2), 8-13.

Strehle, E., Whatley, A., & Kurz, K. (2002). Narratives of Collaboration: Inquiring into technology integration in teacher education. *Journal of Technology and Teacher Education, 10*(1), 27-47.

Thorpe, M. (1995). Reflective learning in online education. *European Journal of Psychology of Education, 10*(2), 153-167.

Wagner, E. D., & McCombs, B. L. (1995). Learner-centered psychological principles in practice: Designs for distance education. *Educational Technology, 35* (2), 32-35.

Wang, X. C., Hinn, D. M., & Kanfer, A. (2001). The effect of learning styles with regard to computer supported collaborative learning. *Journal of Research on Technology in Education, 34*(1), 65-80.

Wang, M., Poole, M., Harris, B., & Wangemann, P. (2001) *Promoting online collaborative learning experiences for teenagers*. San Diego, CA: International Council for Education Media.

Wolcott, L. L. (1996). Distant, but not onlined: A learner-centered approach to online education. *Techtrends, 41*(5), 23-27.

Yucha, C. B. (1996). Interactive online education: Improvisation helps bridge the gap. *The Journal of Biocommunication, 23*(1), 2-7.