WILLINGNESS TO RETURN TO DIGITAL LEARNING RESOURCES: INFORMATION ENVIRONMENTS OF STUDENTS FOLLOWING ONLINE COURSE COMPLETION

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

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INFORMATION ENVIRONMENTS OF STUDENTS

FOLLOWING ONLINE COURSE COMPLETION

presented by Tawnya Means,

a candidate for the degree of doctor of philosophy,

and hereby certify that, in their opinion, it is worthy of acceptance.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1: Introduction

Problem

Peter Drucker stated in his 1997 interview with Forbes Magazine that the university campus, as known at the time, would not survive another thirty years. Several authors (e.g. Needy & Claus, 1997; Sangster & Lymer, 1998) have since used Drucker's comment to suggest the need for universities to move from traditional brick-and-mortar institutions to "brick-and-click" institutions, or institutions offering distance education and providing learners the flexibility to learn anywhere, anything, and anytime. Little more than a decade after Peter Drucker's statement, the wealth of online and blended courses offered at most institutions has become an integral part of many educational experiences and offers learners the flexibility to "learn anywhere."

Drucker's assertion was more recently followed by a blog post from David Wiley, a leader in the field of open education, stating that "[if] universities can't find the will to innovate and adapt to changes in the world around them (what's happening in the economy, affordability, the impacts of technology and openness, etc.)… universities will be irrelevant by 2020" (Wiley, 2009b). Wiley and other colleagues are forwarding the concept of "open teaching" (Wiley, 2009a), making educational materials openly available to anyone with time and interest. As institutions such as the Massachusetts Institute of Technology (MIT), Carnegie Mellon, Tufts University, and Stanford move to providing open content, more learners have the flexibility to "learn anything."

These open courses, along with correspondence courses and other flexible learning options, allow learners the ability to take as much time as they need to learn the content, but even these courses restrict learners by a loss of access to the learning materials once the course is completed. The research presented here examines whether it is possible to provide learners with the flexibility to "learn anytime" through continued access to course materials following completion of courses. Many universities have moved considerably beyond the constraints of brick-and-mortar walls. Some are beginning to move beyond the constraints of enrollment in courses, and it is now suggested that they could move beyond the boundary of time associated with a traditional course.

In the traditional model of courses, learners enroll for a specific time period, participate in and complete the course, and then leave the course behind. However, today's technologies make it possible for learners to enroll in a course, participate in and complete the course, and then continue to maintain access to the resources in the course for as long as they need the information. There are at least three benefits for learners who maintain access to course content. First, course content evolves over time as instructors and information in the field change. This is especially true in fields where the content is based on ill-structured or complex domains. Second, the course structure provides context to support users in finding the information that they remember using while in the course. Finally, real life experiences of the learners may provide additional insights in the topics learned in the course. Giving ongoing access over time could provide those who have completed courses an opportunity to learn more about the

topic as new knowledge becomes available. They could also use it to find resources they have used in the past as they seek to solve current problems. This potential for lifelong learning becomes especially beneficial in topics where the knowledge in the field is young, or is continually changing. Additionally, it would be helpful in situations where there is potential for transferring learning from classroom-based, information concepts to work-based application needs.

Lifelong learning has long been a vague and 'extra-ordinarily elastic term' (Smith, 2000). It has also been a topic of much discussion, particularly since the early 1980s when authors such as Gelpi (1984) wrote about the lack of clarity in the term and called for a clear definition. While this study provides insight into possible solutions that support lifelong learning, it is not an attempt to define lifelong learning itself. In consensus with Aspin and Chapman (2000), this study takes the pragmatic approach that there are many different conceptions of the view of lifelong learning and that "there is … more sense to be gained by looking at the difficulties, issues and predicaments [that] the attempted solution … [has] been conceived to tackle (2000, p. 13)". However, a brief overview of the lifelong learning literature will highlight a few of the key difficulties and issues.

Online courses are increasingly becoming a common experience for students. According to the Sloan Consortium's 2008 report on online education in the United States (Allen & Seaman, 2008, p. 1),

> *"Online enrollments have continued to grow at rates far in excess of the total higher education student population, with the most recent data demonstrating no signs of slowing.*

- *Over 3.9 million students were taking at least one online course during the fall 2007 term; a 12 percent increase over the number reported the previous year.*
- *The 12.9 percent growth rate for online enrollments far exceeds the 1.2 percent growth of the overall higher education student population.*
- *Over twenty percent of all U.S. higher education students were taking at least one online course in the fall of 2007."*

However, there are significant differences between the traditional face-to-face course and online or web-enhanced courses. One difference is ongoing access to course content. Continuing access for many traditional face-to-face course resources such as the instructor's live lecture, group discussions or activities, and guest presentations is impossible since this is a synchronous event and requires learners to be present in the classroom. In addition, these are one-time events and are not retrievable or reviewable. Traditionally, the only way to return to access of these sessions would be through limited and often incomplete or inaccurate notes taken by those attending the lecture. Although recording lectures is becoming more common, these lecture recordings are typically used for online courses. Online courses also use digital capture of discussions and resources (such as documents) that make continued or returning access to activities possible.

Using today's online course resources as a starting point for supporting lifelong learning will not be easy. There are many issues to consider, a few of which include: 1) how to provide learners with continuing access to online courses as ongoing sources of information, 2) how to facilitate learners' return to trusted sources of information, and 3) how to ensure the ongoing quality of the information in course resources. The next section will examine these issues in more detail.

How to provide learners with continuing access to online courses as ongoing sources of information

In addition to the textbooks and other printed materials typically found in classroom-based, face-to-face courses, many online courses incorporate additional digital resources including digital documents, images, graphs, charts, links to external websites, videos, audio, tutorials, lecture notes, presentations, work samples, and other forms of supplemental material. Furthermore, most online courses include opportunities for interactions via chats and discussion boards captured in a digital format such as text, audio or video. While the value of these resources does not vanish when a course is completed, the act of completing an online course in a closed course management system usually means that learners no longer have access. The consequence is that the online resources cannot be used to support lifelong learning because they are no longer accessible.

While this dilemma is equally true of classroom-based courses, learners have developed practices for maintaining some level of access including keeping textbooks and filing class notes. Though limited in a face-to-face course, these practices are typically not practical for online courses. Printing course materials may even alter the format of the resource (e.g. printing an interactive chart). Areas experiencing rapid advances or changes in knowledge will soon be out-dated. Online course resources which are updated by the instructor on a regular basis for each new offering of the course could serve as vehicles for keeping learners abreast of the changes in a knowledgebase.

However, while online courses may be created for one facet of lifelong learners who are continuing their education later in life, the courses themselves are not created or managed with the concept of providing ongoing access to the content in mind. Instructors will need to begin to develop course content with the intention of facilitating lifelong learning in order for these resources to be used to support lifelong learning.

How to facilitate learners' return to trusted sources of information

The return to trusted sources of information has been studied in multiple fields, including business and marketing, library and information science, information behavior, and the military. When people face a problem, they tend to return to those trusted sources where they have found answers and help in the past. In the field of business and marketing, the terms "web revisitation" (Hackbarth, 2001) and "e-loyalty" (Reichheld & Schefter, 2002) refer to the tendency for people to return to a website that they trust will provide them with information they need about a product or service. In the field of library and information science, the term "willingness to return" (Durrance, 1989, 1995; Turner & Durrance, 2005) refers to a library patron's likeliness to return to a librarian who can provide help and answer the patron's reference questions. In the field of information behavior, research indicates that those seeking to solve problems prefer to return to people who have provided them with information in the past (Julien & Michels, 2000). In the military, the term "reachback" refers to providing deployed soldiers with access to help and information from trusted sources at the home base (Lackey, 2003; Neal, 2000). In all these fields, a recurring theme emerges: people return to sources of information that they trust. In order to facilitate learners' return to

resources from an online course, it is important to understand what features help develop and maintain trust in course resources as sources of information.

"Information overload," a term describing an over-abundance of information (Berghel, 1997; Bruce, Jones, & Dumais, 2004; Eppler & Mengis, 2004) impacts people's willingness to return to a trusted source. This overload leads to situations where people find and then lose resources, unless they have a method for "keeping" or remembering where to locate the resources again at a time when they need to use the information (Bruce et al., 2004; Jones, Bruce, & Dumais, 2001). Even with these methods, people can still lose the resources if they do not remember to use the information when they need it. Several *push* and *pull* technological tools are currently available to keep learners aware of the resources, including feeds, discussion boards, email, instant messaging, text messages, alerts, tag clouds, social bookmarking, "tweets," and more. By using these tools people can be more aware of the available resources from online courses.

An institution with an established practice of providing learners with access to completed courses while they are still in a degree program is one method for facilitating learners' future return. This may lead learners to be more willing and likely to continue to access the course materials after they have completed the program. In this situation, the reminder would be more natural to the context since the learner may remember a personal experience (finding information in the course resources) in light of new information (seeking to solve a current problem). The learner may then only need to be reminded periodically that access is available rather than needing reminders about

specific resources. Furthermore, continued association with the university in a learning mode may encourage learners to continue to participate in additional courses.

How to ensure the ongoing quality of the information in course resources

Ensuring the information quality of course resources includes consideration of issues such as whether learners can find what they need, whether the information answers the learners' questions, whether the information is applicable to the learner at the time of access, whether the resource saves the learners time and energy, and whether the information in the resource is up-to-date.

Taylor (1986) has discussed these categories of information quality in the Value-added model. As Taylor described, the "information use environment" will vary from person to person and from situation to situation, thus his model is considered contextual and useful for "disciplines and professions that study … systems for the provision of information" (Taylor, 1986, p. 49). Figure 1 reproduces the User Criteria and Values-added model from Taylor, with the user criteria presented in the first column, which separates the interface value-added elements in the middle column into broad categories that differ based on the user. The third column presents examples of processes or activities that the system could do to add value for users.

User Criteria of Choice	Interface (Values Added)	System (Value-added Processes: Examples)
Ease of Use	Browsing	Alphabetizing
	Formatting	Highlighting important terms
	Interfacing I (Mediation)	
	Interfacing II (Orientation)	
	Ordering	
	Physical Accessibility	
Noise Reduction	Access I (Item Identification)	Indexing
	Access II (Subject description)	Vocabulary control
	Access III (subject summary)	Filtering
	Linkage	
	Precision	
	Selectivity	
Quality	Accuracy	Quality Control
	Comprehensiveness	Editing
	Currency	Updating
	Reliability	Analyzing and comparing data
	Validity	
Adaptability	Closeness to the problem	Provision of data manipulation capabilities
	Flexibility	Ranking output for relevance
	Simplicity	
	Stimulatory	
Time-Saving	Response speed	Reduction of processing time
Cost-saving	Cost-saving	Lower connect-time price

Figure 1: User criteria and values-added (Taylor, 1986)

Studies based on Taylor's model include those in information seeking (Detlor, 2003; Kuhlthau, 1993; Lee, 2000; Rieh, 2002; Sutton, 1994), interface design (Bergman, Beyth-Marom, & Nachmias, 2003; Ju & Gluck, 2003), knowledge organizations (Pimentel, 2009), and information retrieval (Downs & Friedman, 1999; Vakkari, 1999; Yerbury & Parker, 1998). Recently, Eisenberg and Dirks (2008) have modified the Value-added model for entrepreneurship and innovation based on their experience in using Taylor's model. However, no studies were found that explore the use of elements from this

model in improving the quality of information for the purposes of lifelong learning and understanding learners' willingness to return to resources.

People make judgments about the quality and authority of a source in the course of their information seeking behavior (Olaisen, 1990; P. Wilson, 1983). Olaisen's work investigates the quality factors that influence perceptions of cognitive authority for electronic sources of information. As people develop trust in the quality of resources, they tend to turn to those sources when they need new information. Olaisen found that the more familiar people are with electronic resources, the more they will use them. He also found that if trustworthiness, relevance and form are improved, the majority of those interviewed in his study would use electronic resources over print for solving a concrete problem.

If students experience quality while they are enrolled in a course, it is reasonable to assume that they would develop trust in the resources and would be more likely to continue to return once they have left the course. Once they leave the course, even if they do not remember the resources available from an online course, if they are 1) reminded of the availability, 2) have a need, and 3) are provided access, it seems likely that they will return. Once they return, the information quality they experience will likely influence whether they continue to return.

The research presented here focuses on facilitating learners' return to online digital learning resources and exploring the influence of the information quality of those resources. While other factors may drive learners to return to course resources, the level of quality learners find in the resources may influence their willingness to return.

Attention to these details could assist universities in developing an institutional environment conducive to developing lifelong learners and in providing those learners with ongoing access to course resources that are organized and presented in a beneficial manner.

Purpose of the research

The purpose of this study was to identify factors that must be addressed for online course resources to be used as ongoing support for lifelong learning. The following questions have guided this research.

Research questions

1. What are the characteristics of learners' information environments, and how do these characteristics influence learners' willingness to return to digital resources from an online course?
2. How do learners' perceptions of quality of the course resources influence willingness to return to digital resources from an online course?
3. What is the influence of the institutional environment on the learners' willingness to return to digital resources from an online course?

Answering these questions has theoretical and practical implications that can influence universities' models of supporting learning, especially related to ongoing access to course resources for lifelong learning. An expanded understanding of learners' information environments serves to further develop theory in information behavior, specifically in the areas of information needs, seeking and use. Extending learning

beyond classroom walls means more than just providing current learners with access to learning inside and outside the physical classroom; it expands the concept to include providing learners with continuing access to learning outside the clock and calendar infrastructure of the traditional course itself.

Significance of research

This research has significance for the fields of information behavior and education, as it increases the knowledge available about the information environments of learners from online and web-enhanced courses. Understanding the factors that must be considered in order to use online course resources to support lifelong learning enhances universities' flexibility by providing opportunities for learners to return to digital learning resources from online courses. In addition, this knowledge expands universities' understanding of the quality of course resources that will encourage learners to continue to return, thus extending the life of online course materials and encouraging lifelong learning.

A review of the literature related to online courses calls for research into actual learning and instruction online (Tallent-Runnels et al., 2006). Since learning is a lifelong concept, this research need does not conclude when a learner leaves the walls of the classroom, whether those walls are physical or virtual. While there is significant research into student preferences, faculty satisfaction, and student motivation in regard to the use of online courses, currently no other research was found into offering those who complete online courses continued access to digital learning resources.

With nearly 4 million students participating in online courses, and with the number of online courses expanding at an exponential rate (Allen & Seaman, 2008), this research could have a significant impact on the way that universities use online resources to support lifelong learning. Understanding the growth and trends in online education leads to awareness of the affordances of online resources to extend the life of resources from online courses, and to facilitate lifelong learning. This study suggests that universities can offer their students continued access to resources from online courses. As universities make strides to accomplish this, they will take the next step in changing the paradigm of course structure, thus moving beyond the boundaries of place, content, and time associated with traditional courses in higher education.

Research plan

Although originally proposed as a single location study at a large Midwestern university (U_1), an opportunity arose early in the study to include a second location at large Southern university (U_2). For purposes of this study, U_1 is defined as an emerging environment for willingness to return (EWR) to resources because despite a long-standing history of distance education, no culture of return to resources has been established. On the other hand, U_2 is defined as an established EWR because its Internet MBA distance education program has an ongoing practice of supporting the return to resources after completion of an online course. The reasons for this consideration are further explained below.

The U_1 students were enrolled in the university's online educational technology program. These graduate level students had previously completed an online course on

using technology to enhance learning. Students in this course had never had access to return to any completed online courses. In fact, the concept of returning to course resources was completely unknown. Following completion of the course, these students received access to a newly created site in the course management system which contained resources from the completed course. These students were not initially informed of their participation in the study in order to maintain the natural context of a previous instructor communicating about course content. The students received regular email reminders from the instructor about resources in the course, along with emails when the site was updated.

The U_2 students were enrolled in the university's Internet MBA (IMBA) program. The program requires that these graduate level students complete a series of online courses over a span of either one or two years depending on their experience and educational background. Since the IMBA program culture has always provided these students ongoing access to return to completed courses until they left the program, this was considered an established EWR to resources. Each course in the program is archived following completion and there were no changes in the educational materials in the course, but students can return at any time. The students in this group did not receive any communication from instructors about the course content.

At U_1, data collection included course management system logs, which contained access information for the students over two months. The intent was for these logs to be used to measure the relationship between the use of reminders and updates about the resources and the participants' access of course resources. However, there were

numerous issues with the log data that made statistical analysis unreliable; therefore these data are used for informational purposes only.

Course management system access logs were also collected at U_2. These logs contained access information for students over a period of approximately four years. The logs are historical records of access to each course by the students and include the name of the student, along with the date and time of the access. These logs are used to define the frequency of return in an established EWR.

Because of the differences between institutions in providing access to return, the logs of access at U_1 are from a limited time-frame of two months (April to June 2007), while the logs of access at U_2 cover a more expanded time-frame of four years (2005 to 2009). Since the dates during which users access content are not relevant to this study, the date differential between the two institutions is not considered as a factor. Additionally, these two institutions are presented as a rich description of the two environments and are not used for a direct comparison. However, due to the natures of an emerging and an established environment, it is expected that there will be significant differences as a practice is recently implemented in one and has long been in place in the other.

Face-to-face, semi-structured interviews based on Sonnenwald's (1999) information horizon methodology were used with three students at U_1 and four students at U_2 to explore the characteristics of the information environment of participants. Additionally, a survey instrument was piloted with the three interviewees at U_1 to refine the survey prior to widespread distribution. The survey instrument was constructed based on

elements from Taylor's value-added processes in information systems (1986) and Olaisen's general model of information quality and cognitive authority (1990). The survey instrument was designed to identify perceptions of quality in general and to explore whether those perceptions influence willingness to return to digital learning resources from completed online courses. The survey further identifies whether or not participants returned to course resources and why they did or did not return. This online information quality survey was sent to 264 students at U_2.

Definition of terms

Throughout this research, people may be referred to as learners, students, or users. For the purposes of this study, the following definitions apply to those people:

Learners – may or may not be enrolled in a course, considered "lifelong learners" or "self-directed learners"

Students – currently enrolled in or participating in a course or program

Users – generic system users, not necessarily associated with a course

Additionally, the following commonly used terms can be found throughout the study:

Blended courses – courses that combine face-to-face and online components

Online courses – courses that are made available primarily over the Internet, with students participating either synchronously or asynchronously

Online course resources – digital course materials including, but not limited to: documents, images, graphs, charts, links to external websites, videos, audio, tutorials,

lecture notes, presentations, work samples and other forms of supplemental material provided to students in an online or blended course

Information environment – the sources (including print, digital and human) that provide information and help to people

In-service teachers – practicing teachers in public or private, pre-K through 12th grade classrooms

Internet MBA students – professional MBA students enrolled in a 1 to 2 year program that includes beginning and end term visits to campus, with the balance of course content presented online

Emerging environment for willingness to return – an environment where access to return to resources from completed courses is beginning to be provided

Established environment for willingness to return – an environment where access to return to resources from completed courses is established and expected

Chapter 2: Literature Review

This study of willingness to return to digital sources of information from online courses has been guided by literature related to lifelong learning, digital sources of information, information environments, information users, informing and productive knowledge, awareness of and returning to sources of information, and information quality.

Lifelong learning

Lifelong learning is the term used to describe the activities people perform throughout their lifetimes to improve their knowledge, skills, and competence in a given field (Aspin & Chapman, 2000). While this study does not focus on defining or exploring lifelong learning *per se*, it is important to examine the value of learning resources and the practice of continued learning outside of the typical time and place of the classroom. As such, this study relied on literature related to lifelong learning needs and issues.

Lifelong learning is now seen by educators and others as one of the most important competencies that people can possess (Collins, 2009). In today's society, a person who is educated is one who is willing and able to consider learning as a process that occurs across a lifespan (Fischer, 2001). This means that learners must be able to direct their own learning activities beyond formal educational experiences. Self-directed learning is learning that is pursued outside of formal schooling where learning is systematic but

does not rely on the instructor or classroom (Merriam, 2001). When we understand how and what people learn when they are seeking information to solve their own learning needs, this information provides us with insights into how the learning within a traditional course can be more relevant (Candy, 2009). According to Barrows, Burak, and Hancock (Barrows, 1985; Burak, 1993; Hancock, 1993 as cited in Dunlap & Grabinger, 2003, p. 7), the characteristics of lifelong learners include the ability to:

- identify and define a problem or learning need;
- establish goals and objectives for addressing the problem or learning need;
- develop action plans and timelines to guide learning activities;
- identify, find, use, and critique resources for solving the problem or meeting the learning requirement;
- capture and apply information from resources to the problem or learning need; and
- critique information, skills, and processes used to solve problems or meet learning requirements.

The first three points from the authors are important for getting started with learning knowledge or skills, but this process can be stymied if it is not easy to identify, find, use, and critique resources. Furthermore, the ability to capture and apply information requires that the resources be relevant to the needs of the learner at the time that the learner is seeking the information. One method for increasing the opportunity for learners to identify, find, use, and critique resources could be to provide

a familiar location or person. This could be accomplished either through a course that learners have participated in or through an instructor considered an expert in the field.

Dunlap and Grabinger (2003) provided a review of instructional features and teaching methodologies educators can use to develop in students the "capacity for self-direction, metacognitive awareness, and disposition toward lifelong learning" (Dunlap & Grabinger, 2003, p. 7). Strategies included:

1) developing student autonomy, responsibility and intentionality;
2) providing intrinsically motivating learning activities;
3) enculturation into communities of practice;
4) encouraging discourse and collaboration; and
5) encouraging reflection.

While these strategies were initially discussed to develop characteristics of lifelong learners, they can also be used to further self-directed, lifelong learning itself. The strategies could offer guidance that would encourage institutions to provide ongoing access to course content so learners' can further develop autonomy, discussion, collaboration, and reflection using the digital sources of information following course completion.

Digital sources of information

A vast array of digital sources of information is available on the Internet, including resources for conducting commerce, seeking health information, participating in communication and collaboration, and learning knowledge and skills. This abundance of information, the ease with which it is published and accessed, and the breadth of its

content lead to issues related to information overload, difficulties with keeping found resources, and concerns about the credibility and authority of the source.

Information overload

The Internet provides access to a wealth information that is always available, anywhere, anytime, and on any topic or device. However, the Internet is overloaded with resources of varying levels of quality. Internet users have access to far more information than they can use at one time (Bruce et al., 2004). The ease with which incorrect, misleading, and even false information can be posted online requires users to continually assess the quality of individual resources. Many Internet users are coming to realize that "… the mere fact that a resource is available on the Internet does not provide any guarantee of importance, accuracy, utility or value" (Berghel, 1997, p. 20). Furthermore, it is difficult to obtain the right information at the right time if Internet users are required to comb through the vast amounts available (Edmunds & Morris, 2000). While there may not be a definitive solution for these issues (Eppler & Mengis, 2004), in a learning environment, instructors can act as a filtering mechanism. As they review content in their areas of specialization, they can create or adapt digital resources to use in online courses.

Keeping resources

As valuable resources are found, users must have a method of "keeping" or remembering where to locate the resource again when they need the information. Research into "Keeping Found Things Found" (sometimes referred to as KFTF) by Jones,

Bruce and Dumais (2001; 2003) and Capra and Pérez-Quiñones (2003) suggests that Internet users have trouble organizing and re-finding information resources that they have found and used. If Internet users try to preserve the resource locally, the functionality can be altered or lost if the keeping method includes printing or saving the resource. These resources may no longer be portable (i.e. saving a file on a home computer and needing it at the office), and may even be in a different format (i.e. printing an interactive chart).

Studies indicate that Internet users have various methods of "keeping" resources, such as emailing links to themselves or others, bookmarking links, and/or printing information they find (Jones et al., 2001). Each of these methods has drawbacks. Emailing links requires that users actively search their inbox the next time they need it. Bookmarks lack context (users must remember why the URL was important or which folder was used to store the bookmark) and are not easily portable from one computer to another. Printing alters the format of a digital resource. Other reasons for losing "found" resources include the resource not being where the user previously found it, or users not remembering to use the information when they need it. Jones, Bruce and Dumais (2003) found that important functions for KFTF included:

- portability of information (the ability for Internet users to take the information with them),
- number of access points (the ability for Internet users to access the resource from a number of locations),

- context of saved materials (the ability for Internet users to remember why a URL was saved), and
- reminding (prompts that help the Internet user to remember to use the information later in the right situation).

Jones, Bruce and Dumais (2001) also reported that there were additional functions for KFTF including:

- persistence of information (if the information is still where the Internet users remember it to be),
- preservation of information (if the resource still has the same functionality), and
- currency of information (if the information is up-to-date).

Additionally, they found that Internet users who are familiar with a resource location will not use a keeping method, but will instead go directly to the resource. The use of a familiar institutional course as a resource would provide users with a more portable, accessible, contextual, persistent, and current location that is familiar and easy to find.

While there are social bookmarking sites such as Delicious (http://delicious.com/) and Stumbleupon (http://www.stumbleupon.com/) gaining popularity and functionality, these tools still have the drawbacks associated with "folksonomy" or a lack of specified tags or associated keywords. These drawbacks include misspelled tags, unclear tags, no method of relating one tag to another, and tags that mean one thing to one user and

another thing to another user (for review of benefits and drawbacks, see Aharony, 2009).

Online resources available in a course management system (CMS) website have many of the functions discussed in the KFTF research. The information in a CMS is portable and has numerous access points (they can be accessed from anywhere with an Internet connection). Students from online courses are familiar with the location of the course management system. The structure of the course provides context and persistence and helps users remember the location of resources. However, one function that is not currently included in many course management systems is the ability to automate reminders to students. Blackboard is one company with a web-based course management system (CMS) that has made progress into iPhone applications using Really Simple Syndication (RSS) feeds for current students (NWCag, 2009). But, even in such advanced systems, the RSS feeds would not be available to those who have completed a course, due to the current paradigm of course structure where ongoing reminders to learners beyond course completion have not been considered. The benefit to learners is that reminders of the availability of the resources may help them remember the location of specific information within the course. If this reminder comes at a time that they need to use it, it would facilitate the return to the information. These reminders could take the form of an instant message, a text message, an email, a subscription to a RSS feed, alert, "tweet," or other form yet to be created.

Internet users who have participated in an online course have familiarity with the institution, the course structure, and the instructor. Resource reminders could not only

prompt users of the location of information from a familiar source, but it could help them be aware that the information is still available, has the same functionality (e.g. interactive charts are still interactive), or has been updated by the course instructors. The familiarity that they have developed in a course may additionally lead to reduction in concerns about the credibility of the information.

Credibility on the Web

Due to the nature of information on the Internet, many users have valid concerns about the credibility of its sources (Bell & Smith, 2008; Berghel, 1997). Learning materials available through the Internet vary in pedagogical structure and access levels. Due to Internet users' lack of critical evaluation skills, efforts are being made to educate and train users in developing these skills (see an extensive literature review by Metzger, 2007). However, several studies Metzger cited (2007) demonstrate that the intensive time and labor required by users in order to ensure the quality of Internet sources often results in few users who are diligently and rigorously evaluating the quality of the information they find. While arguments can be made for additional or different tactics in educating users, Meola (2004) and Metzger (2007) have both noted that evaluation of credibility of Internet resources should not be left to the user and that the time and effort invested in teaching users how to evaluate information on the Internet would be better spent teaching users which sources have value and how to use them. Metzger's literature review suggests a number of complex solutions, while noting that the solutions she presents "may be infeasible due to their high cost, low profitability, reliance on voluntary compliance, and tremendous implementation effort" (Metzger,

2007, p. 2086). She further noted that peer-review and collaborative rating systems can be biased and inaccurate reflections of a resource's quality (Metzger, 2007). For these reasons, it is important to investigate other methods of filtering and providing users with credible information.

Users who are already familiar with a source of information will be more likely to view that information as credible (Wathen & Burkell, 2002). Students who have successfully completed a course will be familiar with the course structure as well as the instructor from the course. A well qualified course instructor is usually considered an expert in the field he or she is teaching. Assuming that quality instructors regularly review and update their course materials for teaching, a secured subscription to ongoing access to completed course materials may be a relatively simple and effective method of providing learners with credible information on a concrete topic area until they have developed the expertise themselves to better judge the quality of a wider range of resources.

Trust in sources of information

In business and marketing, the terms "web revisitation" (Hackbarth, 2001) and "e-loyalty" (Reichheld & Schefter, 2002) are used to describe how people return to a website, thus indicating that they trust the company that offers the information. In information science literature, the term "willingness to return" (Durrance, 1989, 1995; Turner & Durrance, 2005) describes library patrons' likeliness to return to a librarian who can help them and answer their questions. While original studies of willingness to return were focused on reference service, recently the term has been extended to

include application to other situations (Turner & Durrance, 2005) such as digital reference (Nilsen, 2004). Likewise, the military uses the term “reachback” to describe the ability to virtually return to resources as needed in the field (Lackey, 2003; Neal, 2000). All of these terms in the various fields are describing essentially the same concept of returning to trusted sources of information based on first-hand experience or second-hand knowledge of a source with high credibility or cognitive authority (Rieh, 2002; Rieh & Belkin, 2000; P. Wilson, 1983). Similarly, it would seem reasonable to assume that in an online course environment, if students view the instructor and the resources as credible, they are likely to continue returning even after the course has been completed.

Cognitive authority

The operational definition of cognitive authority is the extent to which users can trust information (Rieh, 2002). In studies of information behavior, it has been suggested that people prefer to return to the people that they trust when they need solutions to problems that they encounter (Julien & Michels, 2000). This is typically due to the cognitive authority of the person being sought. Cognitive authority is the degree to which one person’s knowledge is trusted by another person (P. Wilson, 1983). Different from being considered an expert, this means that the person with a higher degree of cognitive authority has more influence on another person regarding a specific sphere of interest. The higher the cognitive authority of the source, the more credible the person considers the information (Olaisen, 1990).

Learners' judgment of an instructor's cognitive authority thus acts as a filtering mechanism, allowing for more effective management of information processing (Rieh, 2002; Rieh & Belkin, 2000). This filtering mechanism can be beneficial when dealing with the issues related to information overload as discussed above.

Cognitive authority can be related to individuals, but can also be recognized in books, organizations, institutions and other sources of information both electronic or otherwise (Rieh, 2002; P. Wilson, 1983). In a study on cognitive authority and the Internet, Rieh (2002) suggested that students conducting a search using library or institutional resources were not concerned about the authority of the source since they already had developed a trust in the source through their first-hand experience with the library or institution. They assumed that the librarian or other professionals had previously vetted the information. In addition, Rieh found that when students were asked to find information, they went to sites of which they had first-hand experience or second-hand knowledge. These results suggest that students who have gained experience with a course structure and instructor would be willing to trust the course resources if and when they needed to return to that information, provided that they were aware of the ability to return.

Information environment

Taylor (1982) describes the information environment of users as "the set of those variables (a) that affect the flow of information messages into, within, and out of any definable organization or group of clients, and (b) that determine the criteria by which the value of *information messages* will be judged in that context [emphasis in original]"

(p. 343). Exploring the information environments of learners will allow for a deeper understanding of how information flows and the value that learners place on the information that they receive. A learning environment that supports an ongoing flow of information will be different from an environment in which access to information is removed. While there were no studies found related to providing learners with ongoing access to digital learning resources, such a practice could potentially positively influence the information environment of learners. In studies where current courses provide enhancements to face-to-face courses using online access to information, there are clear benefits to learners.

Cooper (1999) provided students with a course website that included continuous access to links and other online course resources during face-to-face courses. Students in this study indicated that they valued the information that was available online. Codone's (2004) descriptive study of 73 students in four undergraduate courses found through surveys that providing online course resources to students who were currently enrolled in face-to-face or distance learning courses was a helpful method of providing continuous access to course information. Students enrolled in these courses reported that they quickly became dependent on course information provided on an external course website. In another similar study, Bee and Usip (1998) provided supplemental course resources, tutorials and course information online. They reported that students using these materials improved their course performance over those who did not use these resources.

Informing and productive knowledge

Knowledge can be both informing and productive (Olaisen, 1990; Taylor, 1982). Informing knowledge is described by Taylor as "contextual and nutritional" and can "add to or change one's picture of the world… [affecting] a person's decisions and actions" but is "not immediately useful" (Taylor, 1982, p. 342). One example of informing knowledge would be when a student is enrolled in a course and is presented with information to be used to complete course tasks. Learning in a course context is one way of gaining valuable and necessary informing knowledge. However, this knowledge only becomes useful following a judgment process, and the judgment process requires opportunity for action or decisions (Taylor, 1982). One example of productive knowledge would be when a student has learned something in the classroom and moves into the real world and is faced with a management decision that calls upon information that was learned in the class.

Unfortunately, since students in a class are not usually completely aware of what issues they will encounter on the job, they are not able to know what information will be important later. If they have continuing access to the informing knowledge and can use it to make decisions and solve problems they encounter on the job, they have the opportunity to develop productive knowledge. Use of information from the course will depend on the degree of "fit" that the resources have with users' needs. Fit determines the value of the information. As users have access to resources and gain more experience, they have more productive knowledge. This will continue until at some point they internalize the information and most likely do not need it anymore.

In a study conducted by Daugherty & Boser (1994), teachers reported their concern over a lack of follow-up after completion of university technology courses. The study found that follow-up did not always need to include additional classes, but rather could consist of continued access to the resources they received in the course. As learners have continued access to these course resources, including regularly updated information about the course content, along with local support, it is more likely that the course content will be applied successfully.

Awareness of available resources

Because people are busy and have access to many resources, it is hard to find useful and relevant "nuggets" of information (Edmunds & Morris, 2000). Due to the constant flow of information, they may forget about some resources that they have used in the past. Some of the methods used to help people keep found things found (Jones et al., 2001) include emailing and bookmarking links. However, direct links are not usually possible with resources from an online course in a closed course management system. Students completing an online course may not have access to or remember the resources that they used while in the course.

Technologies exist today that can help to eliminate these problems. There are both *push* and *pull* technologies that provide information without any effort by the actual user. These can include instant messaging, text messages, email, RSS feeds, news lists and other methods of providing information to users. It is common practice to send email reminders to survey participants in order to increase response rates. However, very few studies describe the use of email reminders to encourage participation in

online learning. In one study, Abdolrasulnia, et al. (2004) report on the effectiveness of using email reminders to encourage physicians to access ongoing course resources online. They found that with a sample of 445 physicians, each receiving up to 33 emails reminders over a period of 11 months (1.5 emails per week), participation in the online educational content increased to 47.2%. However, there was no description of the levels of participation prior to the emails. The authors also reported that the first three emails produced the largest response rate; that there was less participation for emails four through nine; and that response rates declined even more significantly after 10 emails. The researchers noted that there was a delay between the initial recruitment of participants and the email announcement providing access to the educational materials. This delay may have contributed to lower overall participation rates than may have been found if the course materials would have been ready immediately following recruitment.

Information quality

Once users initially return to the course resources, it is reasonable to expect that the quality of the resources in the information system will influence whether users continue to return to the resources. Taylor (1986) and Olaisen (1990) have provided models for information quality that inspired the development of a survey instrument used in this study.

Value-added model

The value-added model, which Taylor developed, describes value-added interface elements and activities or processes that information systems can offer users in order to improve the user experience and assist the users' information gathering. The value-added model is considered contextual and useful for "disciplines and professions that study or design systems for the provision of information" (Taylor, 1986, p. 49) because the model focuses on the user and provides keys to judge the quality from both the system's and the user's perspective. Taylor further stated that the "processes of storage and display on one side and choice and use on the other are based throughout on conscious and unconscious assumptions about the value of information" (Taylor, 1986, p. 49).

There are six broad categories of user criteria within Taylor's model of value-added processes, including: ease of use, noise reduction, quality, adaptability, time-saving and cost-saving. These categories contain 23 interface elements or values that an information system can add. Each category and the corresponding values are described below.

The "Ease of Use" category includes elements that help users find the information they need. It includes those elements that make the information easier to get to, either because of physical access or proximity. Elements within this category include: browsing, formatting, interfacing, ordering and physical accessibility.

Browsing allows users to "scan an information neighborhood" to see if it contains information they need. *Formatting* is the physical presentation and organization of the

information to allow users to more easily find what they are looking for. *Interfacing* (including orientation and mediation) is the capability of the system to interpret itself to users, including how easy it is for users to understand what they need to do to get around in the system and find the information they need. Users' needs change based on their current situation. *Ordering* is the dividing or organizing of the information in the system. *Physical accessibility* is how easy it is to physically access the information.

The "Noise Reduction" category eliminates unwanted or unneeded information. This concept is constantly changing since unneeded information may not always be unneeded; it depends of the context and the user at that particular point in time. As previously discussed, the same information that was not needed while a learner was enrolled in a course may be needed when that learner is a teacher is in the classroom or a business manager running a retail store.

In light of the issues related to information overload discussed above (cf. Berghel, 1997), it is important to give the users the right information they need at the right time. Noise reduction includes: exclusion or withholding information (restricting the amount of information without denying access); inclusion or making sure the right information is available (not leaving important information out); and precision or the focus of the information. Elements within this category include: item identification, subject description, subject summary, linkage, precision, and selectivity.

Item identification is the identification of a chunk of information (a name tag) that allows users to access the information directly. *Subject description* includes the use of index terms, descriptors, and names of information. *Subject summary* adds value to

accessibility, providing summaries or explanations of chunks of information. These summaries reduce the information that users have to read through to find what they need. *Linkage* is providing pointers and links to other helpful and often external information, including external sites and contact information for experts. *Precision* is helping users find exactly what they need. This is a complex issue. Users need to have a good idea of what they need, but "the better one can define the information required, the more one knows about it … the less it may be needed" (Taylor, 1986, p. 61). *Selectivity* is making good choices at the input side, which means that the least amount of information possible is put into the system, while still providing the information users need. Included in selectivity is making sure that the information in the system stays up-to-date and accurate and that old information is removed.

Quality as a value-added interface element is different from the broader concept of information quality. In Taylor's work, quality refers to the degree to which the information is valuable. Specifically, elements within the category of "Quality" include: accuracy, comprehensiveness, currency, reliability, and validity.

Accuracy is making sure that the system contains error-free information. High accuracy leads to user trust in the information in the system. *Comprehensiveness* is the completeness of coverage of the information, the converse of selectivity. *Currency* describes how recent the information was updated. The information must be up-to-date and clearly maintained. *Reliability* is "the trust a user has with consistency in quality" of the system and its outputs over time (Taylor, 1986, p. 64). In other words, the user can be sure that the system will meet his/her needs at this time and the user can reasonably

expect that the system will continue to do so in the future. *Validity* is whether the system indicates to users the soundness of the information.

The category of "Adaptability" describes the responsiveness of the system to the users' needs; this includes the "fit" of the information to the problem or situation that the user is experiencing at the time. In addition, adaptability refers to the flexibility of the system. This includes identifying if there is more than one way to access the information, and determining if the method of access fits with the users' needs and skills. Elements within this category include: closeness to the problem, flexibility, simplicity, and stimulatory.

Closeness to the problem means meeting the needs of a specific user at a specific time with a specific problem. *Flexibility* is the ability of the system to provide a variety of approaches for working with the information. *Simplicity* is making the information easier to understand. *Stimulatory* is the ability of the system to create feelings of familiarity, visibility and develop a sense of community.

The last two categories describe the reduction in time and effort for the users. *Time-saving* evaluates whether the system saves the user time. *Cost-saving* assesses whether the system saves the user costs, not only in terms of dollars, but in terms of effort needed to access the information.

Taylor's value-added model is well cited, with well over 300 authors referring to his 1986 work (Pimentel, 2009). These studies include the use of the value-added model in studying information seeking (e.g. Detlor, 2003; Kuhlthau, 1991; Lee, 2000; Rieh, 2002; Sutton, 1994), tasks in information science (Byström & Hansen, 2005; Vakkari, 1999),

interface design (e.g. Bergman et al., 2003; Ju & Gluck, 2003), knowledge organizations (Pimentel, 2009), and information retrieval (Downs & Friedman, 1999; Vakkari, 1999; Yerbury & Parker, 1998). However, there were no studies found exploring the use of the model in evaluating and improving the quality of information and information systems for the purposes of supporting lifelong learning and understanding willingness to return to digital learning resources from online courses.

General model of information quality

The theory of cognitive authority, developed by Wilson (1983) posits that people construct knowledge in two ways: from first-hand experiences and from what they hear from others. People make judgments on the quality and authority of an information source in the course of their information seeking behavior. Expanding on these concepts, Olaisen (1990) investigated the quality factors that influence perceptions of cognitive authority for electronic sources of information.

While there are many publicly available resources for Internet users (a Google search for technology integration for teachers returns more than 7 million hits), the quality of those sources is not always guaranteed due to the ability for anyone to publish on the web, nor are they easily accessible due to information overload. Information in closed systems such as online course management systems and digital repositories may have higher quality because of constraints on who can publish the information, but again the information in such a system is not always accessible. Most course management system accounts are closed after course completion. If users do

maintain ongoing access to the resources from an online course, this access is only useful if users perceive the information in the resources to be valuable.

Olaisen's study specifically relates to perceptions of information quality of electronic sources by business managers and proposes a general model for information quality. His study to determine users' perceptions of quality, cognitive authority, and electronic information used postal surveys with 327 usable survey responses and semi-structured, open-ended interviews with 50 business managers. Not surprisingly, results showed that the more familiarity that people have with electronic resources, the more they will use them. Results also showed that if trustworthiness, relevance and form were improved in a system, the majority of those interviewed reported that they would use electronic resources over printed resources for solving a concrete problem.

Olaisen describes two categories of quality factors: cognitive authority factors and technical user-friendliness factors. Institutional quality of electronic information is based on the relationship between these factors. High institutional quality leads to higher judgment of cognitive authority, which in turn leads to more credible information (Wathen & Burkell, 2002).

Cognitive authority is one way in which we have influence on others and others have influence on us. People that we know and are familiar with will have more influence on us than people that we do not know. Olaisen includes credibility, influence, reliability, relevance, meaning over time, validity, and perceived value in his category of cognitive authority factors that affect user perception of quality.

Credibility includes two factors, competence and trustworthiness. Furthermore, credibility describes whether users think that a source is worthy of belief and if they can trust the judgment of the source. Learners who have experienced competence from and developed trust in an instructor will perceive the information that the instructor provides as credible. Olaisen includes the description of influence within credibility. It appears that he considers influence and credibility to be overlapping concepts.

Reliability describes whether the information in the source is correct. *Relevance* describes whether the information in the source relates to the problem at hand. *Validity* describes whether the information is related to the user's goal. These three factors are critical for instructional materials, whether they are for learners currently enrolled or for those who have completed the course. *Meaning over time* describes whether the information retains its value over time and was not found in Olaisen's study to be important to the participants. When well-qualified instructors periodically review and refresh course materials, learners should not need to be concerned about the longevity of the resources.

Olaisen does not specifically define *perceived value* beyond using the term. However, he does discuss perceived quality as the result of the other factors within cognitive authority quality. Further, his study indicates that credibility, reliability and relevance are the important cognitive authority factors.

Olaisen's elements of technical user-friendliness include: form, actual value, accessibility, timeliness, desired speed, flexibility, completeness, intrinsic plausibility,

selectivity, browsing, and features. These are the elements that make a system easier to use.

Accessibility is defined as encompassing timeliness and desired speed, having the right information accessible at the right time. Olaisen's study found accessibility to be the most important factor. *Form* describes the way in which the information is presented. In Olaisen's study, users preferred to have both a long and a short form of the information, and to be able to search for information using natural language. *Flexibility* is described by Olaisen as being able to combine internal and external sources.

Olaisen describes *actual value* as the currency of the information. This may not be the best way to define actual value as information can be up-to-date and still not have value. He further adds that *selectivity* (the ability to browse through the information) and *completeness* of the information are not seen as important factors for technical user-friendliness. He concludes his discussion with a further break-down of information quality into the following groupings:

- Cognitive quality (credibility, relevance, reliability, validity, meaning over time);
- Design quality (form, flexibility, selectivity);
- Product quality (actual value, completeness); and
- Delivery quality (accessibility).

The total perceived quality of information is the relationship between all these factors, which Olaisen defines as process quality. There are some inconsistencies in this last set of groups as Olaisen seems to be eliminating some of the factors from his first

model as they were not found to be important in his study. Further investigation could determine whether his results are due to the population surveyed or if other users agree that the missing factors are not important.

Olaisen's model has been cited by more than 30 authors in the areas of judging the quality of information (Wathen & Burkell, 2002), cognitive authority (Rieh, 2002; Rieh & Belkin, 2000; Wathen & Burkell, 2002), credibility (Rieh & Danielson, 2007), trust in electronic environments (Chopra & Wallace, 2003), and misinformation on the web (Calvert, 2001). However, there were no current studies found using the model to establish ongoing access to quality course resources for supporting lifelong learning.

There appear to be some overlapping elements between the two models. For example, in each model, there is a factor called "browsing". Additionally, there is a factor in Taylor's model called "currency" that seems to overlap with Olaisen's model factor called "timeliness." Neither model addresses all elements, thus justifying the use of elements from both models in developing a survey of perceptions of quality. Additionally, both authors discuss the issue of context (time and situation specificity), stating that users will certainly view resources differently based on where they are and what information they need at the time. Information quality is judged based on the situational context and varies from person to person and context to context. As people move from one social location in time and space to another, they will have different needs and will vary in the quality factors that are important.

The literature described in the areas of lifelong learning, digital sources of information, information environments, information users, informing and productive

knowledge, awareness of and returning to sources of information, and information quality demonstrates a need for study into willingness to return to digital sources of information from online courses. The following chapter describes the research study methodology.

Chapter 3: Methods

Purpose

The purpose of this study was to develop an understanding of the influences on willingness to return to digital learning resources following completion of online courses. While there are multiple factors that influence willingness to return, this study was designed specifically to investigate two of those factors: information environments and resource quality. Toward this goal, the following research questions guided this research:

1. What are the characteristics of learners' information environments, and how do these characteristics influence learners' willingness to return to digital resources from an online course?
2. How do learners' perceptions of quality of the course resources influence willingness to return to digital resources from an online course?
3. What is the influence of the institutional environment on the learners' willingness to return to digital resources from an online course?

This chapter discusses the research design, including context, sampling, data collection methods and instruments, data analysis procedures, validity, and reliability of the study.

Research Design

This study used a mixed-methods research design that combined qualitative (in-depth interviews) and quantitative (survey; access log analysis) methods in order to inductively develop an understanding of the characteristics of the information environment and the influence of the institutional environment and information quality in learners' willingness to return to digital learning resources upon completion of an online course.

Question	**Data Collection Method(s)**
What are the characteristics of learners' information environments, and how do these characteristics influence learners' willingness to return to digital resources from an online course?	Survey Interview
How do learners' perceptions of quality of the course resources influence willingness to return to digital resources from an online course?	Survey Interview
What is the influence of the institutional environment on the learners' willingness to return to digital resources from an online course?	Access logs Survey

Table 1: Research questions and data collection methods applied

In-depth interviews were used to answer the first research question about the characteristics of learners' information environment. These data were used to explore the number and types of resources available for solving information needs. These interviews along with a survey were used to answer the second research question about perceptions of quality of the course resources. Both interview and survey methods explored the level of importance for various elements of the system, whether or not learners returned to course resources and their reasons for or against returning. Finally, the third research question about the influence of the institutional environment was

explored through examination of the practices of the two universities, the data from the survey, and analysis of access log data.

Research context

Although originally proposed as a single location study at a large Midwestern university (U_1), an opportunity arose early in the study to include a second location at large Southern university (U_2). Prior to the study, U_1 was identified a possible emerging environment for EWR to resources because no access had been provided to return to resources. Once the study was underway, U_2 was identified as an established EWR due to its Internet MBA distance education program which has an ongoing practice of supporting the return to resources after completion of an online course. Further details about each location are provided below.

The first location is a large Midwestern university (U_1). The university's College of Education offers a master's level program in educational technology. The program attracts students who are teachers interested in increasing their level of competency in the use of technology in the classroom. The program offers a course on using technology to enhance learning, whose objective is to:

> *"…engage [students] in integrating technology into lessons in order to support meaningful learning by [their] students. The activities in this course are but a representative sampling of the many ways that technology can be used to support learning. Because there is too little time in the school year to waste it on having [classroom] students memorize large quantities of material, it is important [for teachers] to teach them how to think rather than what to think.*

The emphasis in this course is on using technologies to engage and support student thinking, especially higher order thinking and problem solving with the use of technologies."

-- Course Syllabus

The course is designed for new and experienced teachers, with the emphasis on in-service teachers. Teachers have ongoing needs for education and training in order to learn how to deal with ill-structured or complex problems in the classroom. They have regular need for information on planning lessons, meeting the various needs of their students, and keeping up with changes in their subject areas. Teachers use many methods to meet their information needs. These can include searching the Internet, sharing discussions and experiences with colleagues, and in-service education. The course is offered completely online in the Blackboard CMS and requires a secure login. The students are generally distributed, meaning that they are not located on-campus. The main mode of communication for the course outside of the CMS is email.

The second location is a large Southern university (U_2). The university's College of Business offers two Internet-based MBA (IMBA) programs. One program spans twenty-seven months and is designed for professionals who have an undergraduate degree in a field other than business. The second IMBA program spans sixteen months and is designed for professionals with an undergraduate degree in business. The students in both IMBA programs are working professionals with an admission requirement of at least two years experience in business, with the average experience being six years in banking, insurance, retail, energy, communications, transportation, manufacturing,

investment, military or other business related field. With such a range of experiences and backgrounds, these students have wide exposure to complex and ill-structured problems where a need for ongoing information is important to stay current in the field. The IMBA courses are offered online in iNet[1], a customized web-based CMS requiring secure login. The practice of providing access was begun through a lack of an explicit decision to deny access. When the Internet MBA program first began, the iNet system was designed by database programmers and for each new cohort, new instances of course sites were built into the design of the system. Students have access to return to the courses that they have completed throughout their program and for one term following completion of the entire program. Courses in both programs cover the topics of accounting and finance, economics, professional writing, management, legal, real estate, marketing, and leadership. The students are generally distributed and come to campus for eight or five weekend visits depending on the length of their program. The main methods of communication outside of the CMS are email and Elluminate[2].

Both in-service teachers and MBA professionals have an ongoing need for knowledge that is applicable and useful and extends beyond the classroom experience. As teachers continue to learn and participate in continuing education and professional development, one of the topics that they struggle with is integrating technology into their teaching practices (Bitner & Bitner, 2002). While they may participate in local and university sponsored learning, they need extensive time in order to fully implement

[1] iNet is a Lotus Notes application custom-built by the college for their course management system for the IMBA program. It is hosted locally within the college.

[2] Elluminate is the college provided application for web, video, and audio online collaboration between students and faculty.

what they are learning. Training does not provide enough hands-on time to allow students to fully apply what they are learning in a real-world application. Furthermore, as business professionals obtain their MBA degrees, they will move into more complex activities in the business world. Some of the information they encounter in a course may not be relevant or helpful until they have the opportunity to apply what they have learned. Both groups of users need different types of knowledge while they are enrolled in courses and once they have completed them.

In this study, the students at U_1 received access to a newly created course site in the CMS containing resources from a completed course. This group of students had never received access to return to a course and there was no way for them to organically know that they could return. While it would have been possible to use some other method for alerting the students of the access such as RSS feeds, email was selected since this was the commonly used method for the instructor to communicate with the students. Students received regular reminders and updates about the information in the site. The students at U_2 have always had access to return to courses they have completed until they leave the program. The logs demonstrated that they have historically been returning to the courses and for this reason, they did not need to receive any reminders.

Data collected at U_1 included the course management system access logs, interviews, and pilot survey feedback. Data collected at U_2 included course management system access logs, interviews, and surveys.

Sampling

This study used a purposeful, convenience sample based on the students available to the researcher. Institutional Review Board (IRB) approval was obtained from both universities. Log analysis was undertaken to identify activity of students in the following groups: 1) all 84 students from two semesters of U_1's technology in learning online course, and 2) 264 students from five cohorts in U_2's Internet MBA program. All students in both groups were solicited to participate in the interviews. Participants self-selected for face-to-face or online interviews at both universities. All students at U_2 were sent an invitation to participate in the survey. Students at U_1 were not asked to participate in the survey since they were not responding to requests for other participation in interviews or debriefing of the course access portion of the study.

Data collection

Due to the previously described nature of the emerging EWR, email reminders were regularly sent to participants at U_1. These emails provided information about the availability of resources and how to access the resources in the course management system. All students received an initial email from the course instructor inviting them to visit the new course resources website, located within Blackboard. The URL and login information were included in the email. They then received weekly emails from the instructor to remind them of the course resources site. Included in the email was a short description of one of the course resources, along with the URL and login information to access the site.

Log data from the course management systems at U_1 and U_2 were collected. The logs at U_1 were collected from the Blackboard system over a period of nine weeks between April and June 2007. The logs at U_2 were collected from the iNet system in January 2009 and covered a time span of four years. Due to the differences described earlier between institutions in the culture of return, and since the dates during which users access content are not relevant to this study, the date differential between the two institutions is not considered as a factor.

Qualitative and "less formally structured interviewing procedures" (T. D. Wilson, 2006) were used in the form of "information horizon interviews" (Sonnenwald, Wildemuth, & Harmon, 2001) to create a natural context for participants to discuss their information environment and to explore the reasons why they may or may not have returned to the course resources to solve a problem. Participants were selected based on their willingness to participate in a one-on-one, in-depth interview. As designed, this study was set up to include a moderate number of interviews. Students were recruited for interviews through repeated email requests from the researcher, the U_1 instructor and the IMBA program staff. However, only three individuals from U_1 and four individuals from U_2 agreed to participate. As a result, the interview data in this study is used in a purely descriptive and anecdotal manner. However, this information does help to explore this developing concept and provide insight which could be used in designing further studies.

The interview instrument was based on the information horizon methodology introduced by Sonnenwald et al. (2001). A person's information horizon describes the

resources that a person uses to conduct an information seeking task. The information horizon includes a variety of resources such as "social networks, including colleagues, subject matter experts, reference librarians, information brokers, etc; documents, including broadcast media, web pages, books, etc.; information retrieval tools, including computer-based information retrieval systems, bibliographies, etc.; and experimentation and observation in the world" (Sonnenwald, 1999, p. 8). Interviews were conducted face-to-face or virtually using Elluminate, based on the needs of the participants.

Prior experience by this researcher in applying the methodology was gained in a doctoral level research seminar course in information behavior and an associated study of life science researchers' use of information sources (Erdelez & Means, 2005). In the information horizon interview, each participant was asked to recall a specific and recent incident in which he or she needed information. In order to provide accurate accounts of the previous experiences of the participants, similar to the research conducted by Sonnenwald (2001), this study used critical incident methods (cf. Flanagan, 1954; Urquhart et al., 2003), and probing questions, to gather complete information about the situation. Participants were asked about the information that they needed, where they went to find the information (what resources they used), whether they were satisfied with the outcome, how they used the information and whether they would follow the same process the next time they needed similar information.

In order to reduce bias in the interview, participants were not at first directly asked about returning to course resources, but were more generically asked about any

situation when they needed information to solve a problem. Participants who did not specifically mention using the course resources after the first round of the interview were asked if they had ever used the resources from the course, and if so, how they used them. Participants who did not volunteer information about the course resources were then asked to describe any situation where they had used the course resources.

Following completion of the verbal description of the incident, each participant was directed to create an information horizon map indicating him- or herself and the information resources used during the incident (see Figure 2 for a sample map). The participant drew lines to indicate the relationships between the resources. The iterative process within the interview of recalling a situation and creating a map continued until enough information was collected to create a clear understanding of the information environments of these individuals. Participants who described more than one situation were asked to create more than one map, as suggested by Sonnenwald, et al. (2001).

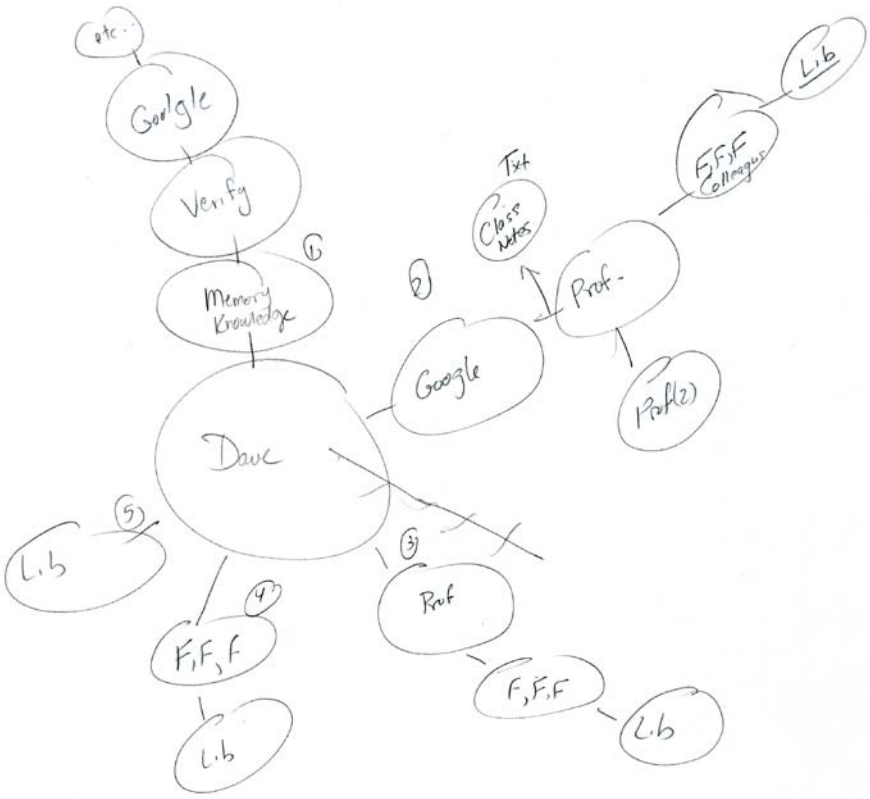


Figure 2: Sample information horizon map

In this study, data about the influence of the perceived quality of resources on participants' willingness to return to information resources were collected through the interview and through the use of a survey. In order to prepare for the online survey, a face-to-face pilot test of the survey questions was conducted as part of the interview process with three students at U_1. The initial design of the survey was to provide a list of options to the participants with the ability to place a rank number in front of each item in order of importance. This was confusing to the participants and as a result, the structure of the online survey was altered to allow participants to drag and drop options into boxes, based on the "card sort" methodology, a common technique for eliciting users' categories for non-scalar groups (Rugg & McGeorge, 2005). While this is a

commonly used technique (Faiks & Hyland, 2000), there is "surprisingly little guidance on this in the literature" (Rugg & McGeorge, 2005, p. 350) and no literature could be found that provides guidance on using this technique in a digital format. Due to the distributed nature of the students in this study, it was important to utilize a survey instrument that could be accessed anytime and anywhere. Further study into the use of digital card sorts would provide more insight into this technique.

The pilot study was conducted following the information horizon interviews at U_1. Three participants were asked questions about the importance of each of the elements of information quality. To determine the level of importance for each item, the interviewees were asked to organize the items in each category in order of importance. After completion, they were asked about the structure and length of the survey and whether any of the items were confusing. Participants were asked to point out confusing or irrelevant sections of the survey and assist in focusing the survey. Refinements were made to the survey based on the results of the pilot. Following this survey refinement, students in five cohorts from U_2 received an email announcement about the survey. Included in the email was information about accessing the survey. An email reminder was sent after one week and a final email reminder was sent one week later.

The survey instrument contained a total of 17 questions, a mixture of short answer and yes or no response questions. Additionally, a consent item was listed first which explained the survey and minimal risks, including that the survey was voluntary and the expected length, and asked whether they consented to their data being used for the

study. All respondents received 11 of the 17 questions regardless of their responses. Then there was one branching question, with one branch receiving a total of 13 questions, and the other branch receiving a total of 16 questions. Specifically, the survey included:

- 8 questions with drag and drop items to sort into groups and then prioritize the items within the groups (Q1-Q8)
- 3 yes-no response questions (Q9-Q11)
- 1 open-ended question on one branch (Q12 branching from a no response to Q11)
- 2 open-ended and 2 multiple-choice questions on the second branch (Q13-16 branching from a yes response to Q11)
- 1 question with multiple options including one open-ended response "other" option (Q17)

This survey was available online and email invitations were sent to students requesting their participation.

Data analysis

The survey data analysis used descriptive statistics (mean and standard deviation) and t-tests to investigate whether the students' perceptions of quality, as indicated by the level of importance they chose for elements identified by the literature, influenced whether or not they returned to completed course resources.

Access log data were reported using simple descriptive statistics about the date and time of return at both U_1 and U_2, which provides the frequency of student return for

each university and whether the email reminders at U_1 influenced the frequency of return in an emerging EWR. The context of this discussion is set through descriptions of the institutional environments at both locations.

The original design of the study included the use of content analysis of information horizon interview data in order to analyze participants' information environment and the reasons why participants may or may not have returned to the course resources to solve a problem. Due to an insufficient number of participants, the information presented from the interviews is descriptive and anecdotal.

There is a well-documented methodology for analyzing information horizon interviews. With a larger pool of participants, it would be possible to use this method. Based on the transcribed information horizon interviews and the information horizon maps, the graphical representation of the interviewee's information seeking task is transferred to a matrix where each row represents the information resources described and each column represents a participant (for a sample matrix see Figure 3). Each cell contains a number that represents the participants' ranking of the resources. This would provide more concrete data for discussing the information resources available to participants and determining whether the digital learning resources are being used to solve problems or find information.

	FF	LF	GG	RH	MC	DB	# participants	Total times mentioned
Internet	5	4	3	3	1	2	6	18
Faculty					1	3	2	4
Friends	2	3	1	2		3	5	11
Library						2	1	2
Course Site					1		1	1
Other	2		1	1	1		4	5

Figure 3: Sample information horizon matrix

While content analysis is not used for this study, a thorough review of the content from the interviews was conducted with the researcher looking for common themes. Though not statistically significant, the data provide exploratory information that could be used to design further research studies.

Data quality

In order to maintain the quality of the data collected, a number of precautions were taken. First, during the U_1 access log data collection period, participants were not informed that their access to the online course resources was part of a study. The instructor communicated through email with the students following course completion and did not inform them of the study until the end of the data collection period. This provided as much of a natural context for the student access to the course site as is possible in an emerging EWR.

Additionally, the interviews based on the information horizon methodology created a natural context for participants to describe their information environment and helped prevent the interviewer from influencing participants' response, which would have occurred by asking interviewees directly about their use of the course resources. The survey pilot study evaluated the questions and helped to assure that participants understood the questions. The use of the in-depth interviews about the survey and expert review of the survey helped to assure instrument validity. Finally, consultation with statistical experts assisted in defining the analysis methods.

Limitations

One limitation of this study was a lack of prior contact with participants. This was done in order to prevent influencing participants' return to the course resources prior to the use of email reminders. There was no way of knowing prior to or during the study the exact information needs of the individual participants or whether prior inclination to

return to online resources might affect the patterns identified in this research. Another limitation was the small number of willing participants for the interview phase of the study. Future studies could recruit additional interview participants in order to conduct a more complete analysis.

Another limitation for this study was that the environments at the two locations were observed and not controlled. There were significant differences between the practices at the two institutions in providing access for return. At U_1, it was not logistically possible to recruit enough instructors to match the number of courses with return access provided at U_2. Additionally, it was not possible to extend the study long enough to match the time of access for the two institutions. Due to the nature of an emerging EWR, it is assumed that there will be less of a full implementation of a practice. For this reason, rich descriptions of the environments will be used to answer the research questions and no direct comparisons will be made between the two locations. A future study should do a more complete exploration of the differences between the two types of environments for willingness to return.

Further limitations include low response rates, and issues with survey completion including no response or partially completed surveys. There was the possibility for participants to answer the survey questions as they thought the researcher would want them to answer. These limitations were partially overcome through email reminders to complete the survey, careful consideration of partial survey responses, and the fact that participants were self-reporting in an online survey and had little incentive to change their answers to please the researcher.

Chapter 4: Results

Introduction

Three methods of data collection were employed in this study: online survey, in-depth interviews, and access log collection. The online survey was used to investigate perceptions of quality of course resources. In-depth interviews were used to explore the number and types of resources that participants had available for solving information needs. These two methods were also used to explore the level of importance for various elements of the system, whether or not participants returned to course resources and their reasons for or against returning. Furthermore, examining the practices of the two universities allowed for discussion of issues related to the research focus including determining whether email reminders were an effective method for increasing return to course resources in an emerging EWR, whether participants returned and their reasons for or not returning, along with suggested reasons for future plans to return.

The following description of data collection and analysis from the online survey, information horizon interviews, along with sent emails and logs of course management system access help to answer the following questions:

1. What are the characteristics of learners' information environments, and how do these characteristics influence learners' willingness to return to digital resources from an online course?

2. How do learners' perceptions of quality of the course resources influence willingness to return to digital resources from an online course?
3. What is the influence of the institutional environment on the learners' willingness to return to digital resources from an online course?

Since two locations and multiple methods are used in this study to answer each research question, a more clear presentation of the results is facilitated by discussing each location, with a description of the data from each research method used at that location.

U_1: Emerging environment for willingness to return

For the purposes of this study, U_1 is considered an emerging EWR to course resources. The methods at this location included access log collection and in-depth interviews. Emails were sent to notify students about the available resources. Comparing the access logs to the dates that email reminders were sent allows for exploration on whether email reminders were an effective method for increasing return to course resources in an emerging EWR. In-depth interviews were used to explore the number and types of resources that participants had available for solving information needs. Additionally, this method was used to explore the level of importance for various elements of a system, whether or not participants returned to course resources and their reasons for or against returning, as well as their reasons why they might return in the future.

Following the in-depth interviews, a pilot study was conducted of the survey protocol. It was intended that the survey would be conducted with the full 84 students

at this location, however since the data source there was exhausted and students did not respond to repeated email requests for other purposes, no attempt was made to offer the survey.

Email reminders

Prior to this study, students at U_1 had not had access to return to any completed courses. As an method to inform students about the opportunity to return following course completion, students received eight emails over a period of nine weeks; roughly one per week. The weekly emails were sent from the course instructor and included information about the availability of the resources, along with specific references to new or updated resources on the site. On the day of the email and the day after the email, the number of users accessing the course site increased. Figure 4 provides information about the dates emails were sent and the number of accesses to the course management system. The highlighted boxes indicate dates that emails were sent. The line indicates the number of students accessing the course site each day. The gray box indicates a period of time that the course management system was upgraded and data was lost.

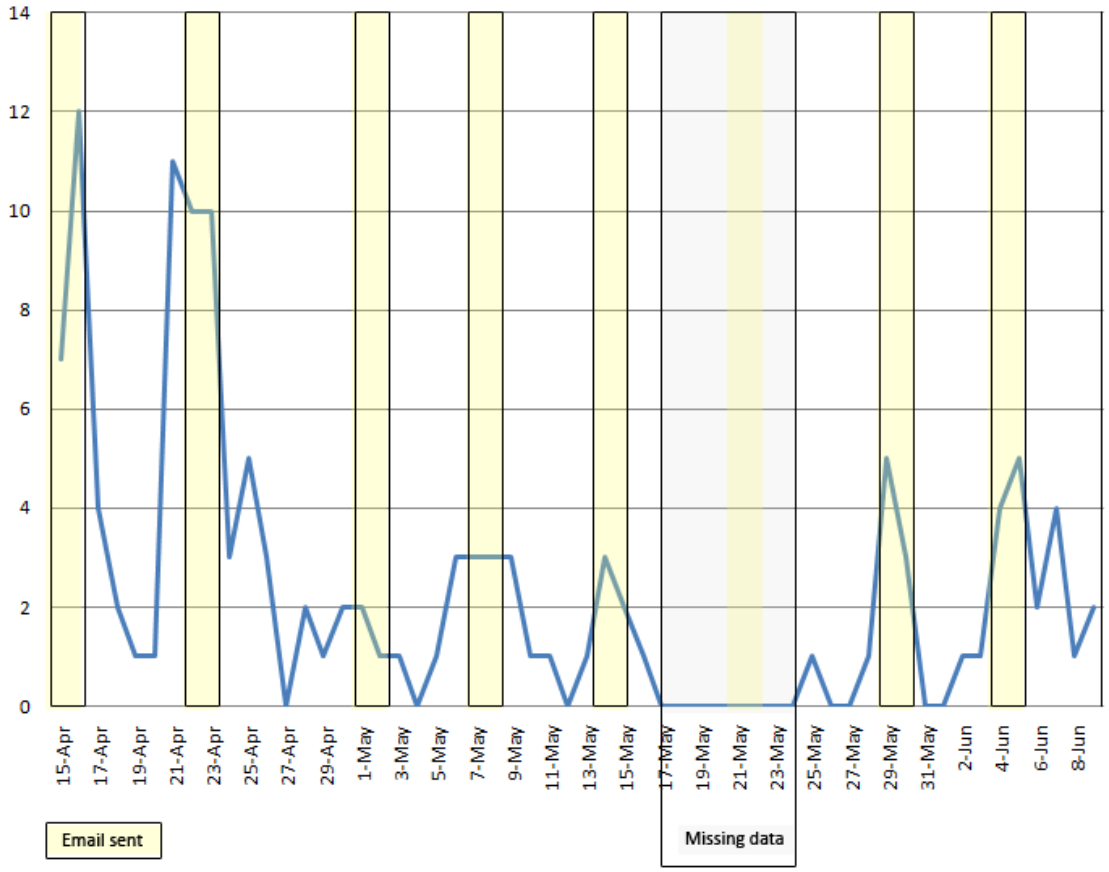


Figure 4: U_1 emails sent and corresponding student access log data

A total of 84 students at U_1 were sent email invitations by the course instructor following course completion.

Log Access

There were 58 students (69%) who accessed the course site at least once during the data collection period. Only 17% of all students accessed the site on a moderate (4-9 visits) to high (more than 10 visits) frequency. Table 2 details the number of visits per student for those who returned (n=58).

Number of visits per student	Number of students returning	%
1-3	48	83
4-9	8	14
>10	2	3

Table 2: U_1 log data of student visits

Figure 5 provides frequency of return in a pie chart, with the majority of visitors to the course site accessing the site only one to three times, a low rate of return (83%), and very few visitors returning more than 10 times (3%).

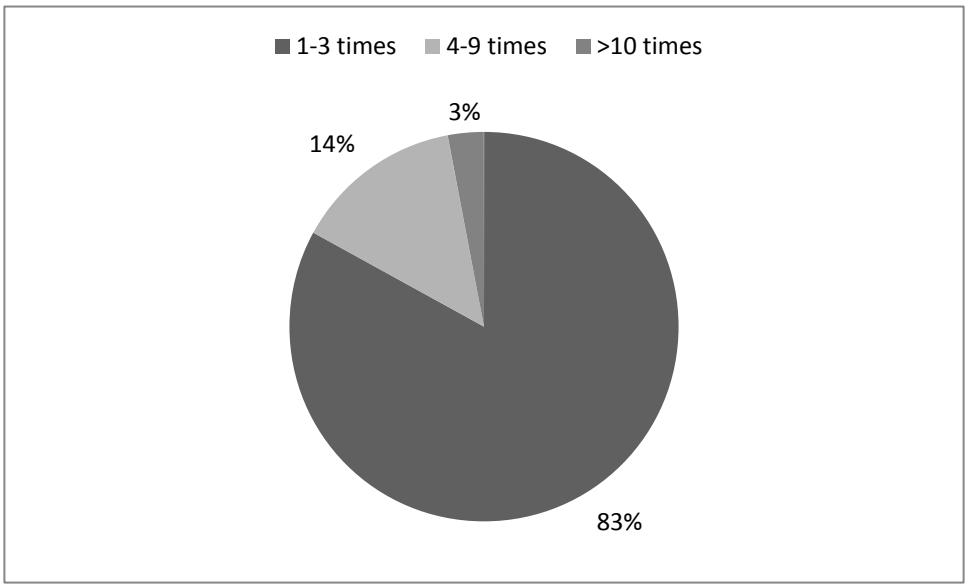


Figure 5: U_1 frequency of student visits

A review of the email text was conducted to further explore the response rates for the various emails in this study. Table 3 provides the date the email was sent, relevant segments of the text from the emails and the number of students visiting the site either on the day of the email or the following day. Due to system upgrade, there is no access data available that corresponds to the sixth email.

Date	Content	Student Visits
4/15/07	This is a really exciting opportunity that I am able to make available for students from my 9467 course to continue to have access to all the course resources from our course website. I want to make these available to you as ongoing resources to support your professional, lifelong teaching and learning. So, we have developed the XXXXX Course Resources Site that is available at [URL] … check out the resources that are available there including resources such as webcasts, resource links, unit notes, and discussion board postings. Additionally, some new information has been added to the course resources including additional links to Wikipedias, blogs, and webquests; a discussion forum for sharing resources; and … whatever you want to share. Remember, the point is to give you ongoing resources to enhance your teaching and learning! I hope to see you online – again!	19
4/22/07	Some of you have emailed me about your excitement to have access to our course resources and I wanted to thank you for your feedback! I am very glad to know that you have found this beneficial to you and your teaching. I wanted to remind everyone again to please take advantage of a really exciting opportunity just for students from my 9467 course. We have been able to continue to allow you to have access to all the course resources from our course website. These resources are available to you as ongoing resources to support your professional, lifelong teaching, and learning. The XXXXX Course Resources Site is available to you at [URL].	20
5/1/07	…let you know that we have added even more new links related to webquests. You can find the links by clicking on the "Other Resources" tab and then clicking on the "Webquests" folder. Several of the additions we are making to the website come from your suggestions and ideas, so keep them coming!	3
5/7/07	I just wanted to let you know that there are some new links in the "Learning Environments" folder under Other Resources. One of the new links I added is to the iEARN website. This is the website that allows teachers to get their students involved in global networking projects. Several of you have asked about how you can get involved in global learning communities, so here you go! Have fun!!	6

5/14/07	We have added something really cool to the course site! When everyone was participating in the course itself, I found that some of the best resources were found when people shared a link or a technology that they use in their own teaching. People are often our best resources. Even sharing a story about an experience using technology to teach can help others. So, I created a new discussion board forum called "Post Your Resources" where you can go to share resources that you use to integrate technology into their teaching and see what others are doing!	5
5/21/07	New this week is folder inside "Other Resources" called "Videos". It has links to Edutopia Videos, eMINTS videos, InTime videos, the ShowMe the World video conference, and Teacher Tube. These are fantastic resources for your teaching and sharing with other educators!	No data
5/29/07	I think you are going to love this! There is now a new folder inside "Other Resources" called "Resources from Class Members". This contains some great resource links taken from the Discussion Boards. Check them out - I hope you will enjoy these and find them very useful!!	8
6/4/07	Remember the eThemes Resources we worked with in class? You even requested new eThemes topics as one of the assignments. We have gone through and pulled the "Top 25 eThemes" for the past year and put them in the "Other Resources". Check them out and see which are the most popular eThemes!	9

Table 3: U_1 Email invitations and corresponding visits

In these email messages, the instructor was relying on the past good relationship with the students to encourage them to return. Some students responded to her by email with appreciation and excitement for the resources. The first two emails were general in nature and encouraged students to return without discussing specific resources. There were 19 students (23%) who accessed the course site within the first two days of receiving the first email and 20 students (24%) after receiving the second email. The rest of the emails highlighted specific resources that were available in the

site, including new information that built on resources that were available during the class. These emails resulted in lower return rates with only three to nine students returning (4% to 10%) within two days of each email.

Interviews

Three participants were interviewed at U_1, with all of them reporting that they did not return to the course resources because they did not need the information. Many attempts were made to interview participants who had returned to the course resources, but these were unsuccessful. The comments from these interviews should not be taken as representative of all students in the course.

In each of the interviews, interviewees created information horizon maps that included very few specifics in terms of the actual websites they visited. While they were encouraged to add more to the maps, many did not include many specifics that they turned to when looking for information. The nature of the information horizon interview is to focus participants on a specific situation or need for information. It is not clear if the limited number of resources described were due to the concise information need at the time described or if these students in general actually have limited information horizons. The following sections provide key themes that were raised in the interviews.

Keeping resources. Two interviewees provided details about their practice of keeping resources. They listed a number of ways that they saved resources, even if the course was not useful and they did not see a need to use it again.

> *Interviewee: "I've bookmarked them in past courses, I've taken lots of files and saved them to my hard drive, just saved the html files or copied them into a Word doc… I got a lot of that stuff saved to my flash drive now."*

Interviewer: "And you go back and use those?"
Interviewee: "Sometimes… not very often… like I said… I feel kind of bad but this was probably the most forgettable class that I've taken in my program."

Need for information. While all the U_1 interviewees reported that they did not return, they did say that they would if they had a need. The lack of return was generally described as being due to not needing the information.

Interviewee: "The concept of it sounds great and for some other courses I might have been more likely to do that… certainly as long as I'm using the skills, I'll be interested in the information whether [or not] I'm still a student."

Interviewee: "I really don't recall any time when I would have needed to [return]."

Interviewee: "I would say I rarely go back when the course is done, unless there's a crossover [from one course to another]."

One student reported returning, but not finding anything of use.

Interviewee: "I really don't recall any time when I would have needed to [return]. Yeah, I did go look at them, but I didn't really feel like there was much in there for me."

The pilot of the survey instrument was conducted following the information horizon interview. Each participant was asked questions about the importance of each of the elements of information quality. To determine the level of importance for each item, the interviewees were asked to organize the items in each category in order of importance. After completion, they were asked about the structure and length of the survey and whether any of the items were confusing. Participants were asked to point out confusing or irrelevant sections of the survey and assist in focusing the survey. This process provided feedback used to create an online survey to allow participants to drag and drop options into boxes, based on the card sort methodology.

U_2: Established environment for willingness to return

For the purposes of this study, U_2 is considered an established EWR to course resources. The methods at this location included survey, in-depth interviews, and access log collection. The description of the survey data helps to answer the research question about learner perceptions of quality and the impact on willingness to return. Additionally, this method was used to explore the level of importance for various elements of a system, whether or not participants returned to course resources and their reasons for or against returning, as well as their reasons why they might return in the future. In-depth interviews were used to explore the number and types of resources that participants had available for solving information needs. A discussion of the institutional practices along with access log data provides the structure for an examination of the logs to identify the number and frequency of students returning to courses following course completion. These data help explore the research question about the influence of the institutional environment on the students' willingness to return.

Survey

The description of the survey data from U_2 identifies characteristics of learners' environments and helps make inferences about how the environment influences their return to courses following course completion. These data descriptions also help to answer the research question about learner perceptions of quality and the impact on willingness to return.

Survey results, in conjunction with information collected from interviews, provide data to investigate perceptions of quality of course resources and their influence on students' willingness to return to course resources. This information further defines the effect of the U_2 institutional environment, whether or not students returned and their reasons for doing so, and reasons for future plans to return.

The survey was conducted in June 2008. There were 354 students across seven cohorts who had graduated from or were currently enrolled in the IMBA programs. Two cohorts of students (n=90) from 2007 were unable to participate in the survey as they had completed the program in 2007 and could no longer receive U_2 email. Table 4 details the number of students in each cohort and the number who were sent the invitation to participate in the survey. This email was sent by the researcher and a follow-up email was sent by staff from the MBA program, encouraging the students to participate. Two follow-up emails were sent over the next two weeks.

Cohort	**Students in each cohort**
I1MBA07	49
I2MBA07	41
I1MBA08	51
I2MBA08	53
I1MBA09	55
I2MBA09	56
I2MBA10	49
Total across all cohorts	354
Students not surveyed (I1MBA07/I2MBA07)	90
Students surveyed	264

Table 4: U_2 students per cohort

A total of 264 students were sent the email invitation to participate in the survey. There were 85 survey submissions received for a response rate of 32%. Of the 85

submissions, 18 respondents consented to the survey but did not answer any survey questions. These respondents have been removed from the analysis, leaving a usable response rate of 26%. There were 50 survey submissions that were completed in full. There were 17 surveys that were partially completed. This group of respondents completed only some of the eight questions with drag and drop items to sort into groups and then prioritize the items within the groups (Q1-Q8).

- 7 answered only Q1
- 1 answered Q1 and Q2
- 2 answered Q1-Q3
- 6 answered Q1-Q7
- 1 answered Q1, Q7, Q8

Because each of these 17 respondents completed at least one of the drag and drop perception of quality question types (the most technologically difficult type of question to answer), the dropout rate is not considered to be based on their inability to technically complete the survey. Rather this suggests that respondents perceived the survey as being too long or did not like this format for some reason and chose not to continue the survey. The number of respondents who did not complete many of the questions may indicate that they did not like the format since they did not continue through the survey. The respondents who answered through the sixth question seem to have given it a good faith try but may have thought that the survey was too long or that the question items were repeated. Further study into this type of survey is

recommended. None of the 17 partial survey responses included answers to the following questions:

- 3 multiple-choice yes-no response questions (Q9-Q11)
- 1 open-ended question on one branch (Q12 branching from a no response to Q11)
- 2 open-ended and 2 multiple-choice questions on the second branch (Q13-16 branching from a yes response to Q11)
- 1 question with multiple options including one open-ended response "other" option (Q17)

The analysis of these questions (Q9-Q17) will only include responses from the 50 complete surveys. All data from the survey was analyzed by question, including the number of responses for each. Each question was analyzed with every response to that question included.

There were eight questions about perceptions of quality presented as drag and drop items to be sorted into levels of importance and then ranked within groups. Each question provided a randomly ordered set of options and four boxes with the options listed as "very important," "important," "somewhat important," and "not important". Each item could be dragged into any of the four boxes, and then items within the boxes could be moved and ranked in any order (see Figure 6).

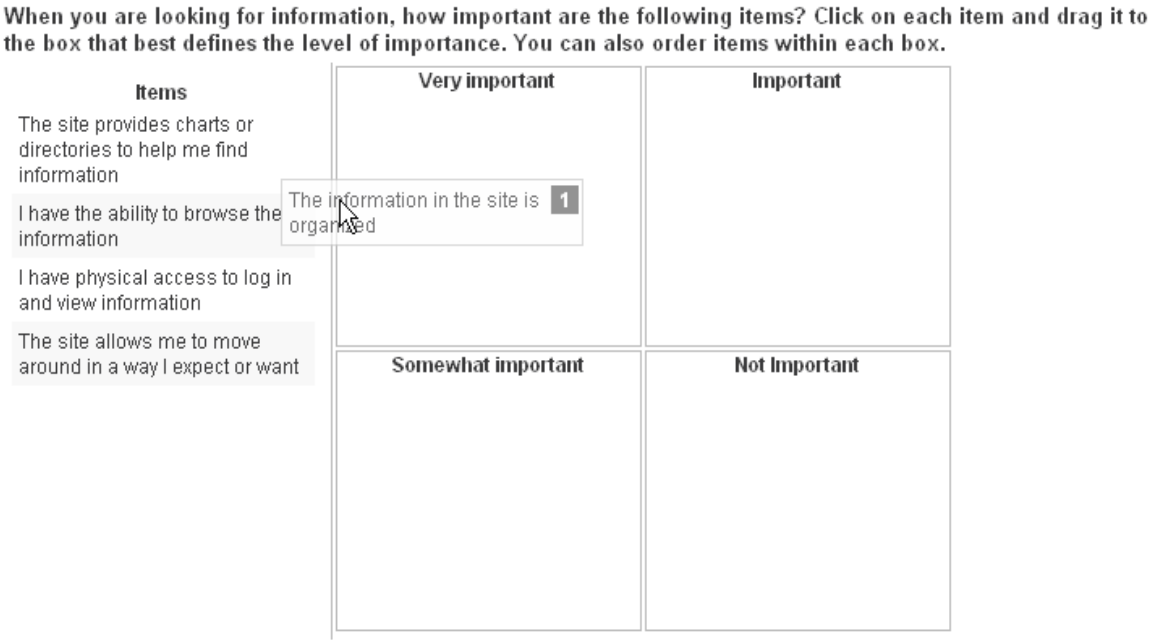


Figure 6: Example drag and drop survey item

The following survey options were related to "Ease of use":

- I have the ability to browse the information (Browse)
- The site provides charts or directories to help me find information (Formatting)
- The site allows me to move around in a way I expect or want (Interfacing)
- The information in the site is organized (Ordering)
- I have access to log in and view information (Physical Access)

The digital card sort technique was used by respondents to prioritize options within categories based on their perception of the levels of importance for each option. Table 5 presents how respondents sorted options by importance. Figure 7 presents the same information by mean and standard deviation (σ). The option for *formatting* or charts or directories to find information was selected as the least important element (9% not

important) [see Table 5] within this category, but this also was the element with the most variability between user response (σ=.93) [see Figure 7]. The most important option (86.6% very important) [see Table 5] was *ordering* or the organization of the site is very important. This was also the most homogeneous response (σ=.45) [see Figure 7].

	Browse	%	Formatting	%	Interfacing	%	Ordering	%	Physical Access	%
Ease of use										
Very Important	33	49.3	17	25.4	38	56.7	58	86.6	37	55.2
Important	29	43.3	26	38.8	20	29.9	7	10.4	20	29.9
Somewhat Important	5	7.5	18	26.9	9	13.4	2	3	6	9
Not Important	0		6	9	0		0		4	6
(n=67)										

Table 5: *Ease of use* levels of importance

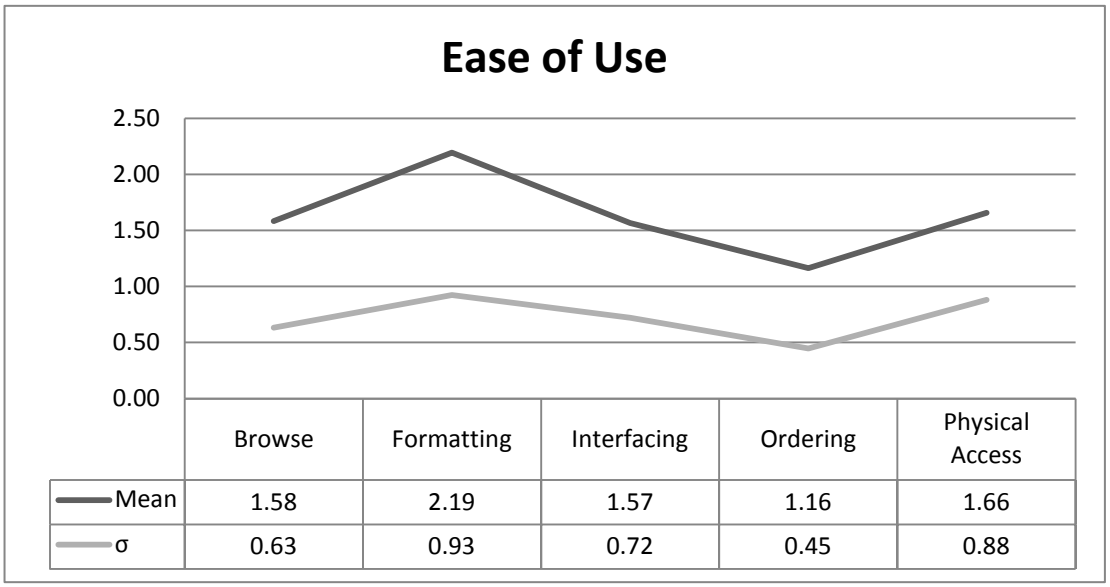


Figure 7: *Ease of use* mean and standard deviation

Using a two sample t-test assuming unequal variables to compare student responses to a later survey question on whether or not students returned to course resources (Q11), the aggregate score for the category for all students who completed the entire

survey (n=50) [see Table 6], it appears that *ease of use* had no statistically significant influence on whether or not students returned.

	yes	*no*
Mean	8.368421053	8
Variance	4.076813656	3.454545455
Observations	38	12
Hypothesized Mean Difference	0	
df	20	

Table 6: *Ease of use* t-Test: Two-Sample Assuming Unequal Variances

The following survey options were related to "Noise reduction":

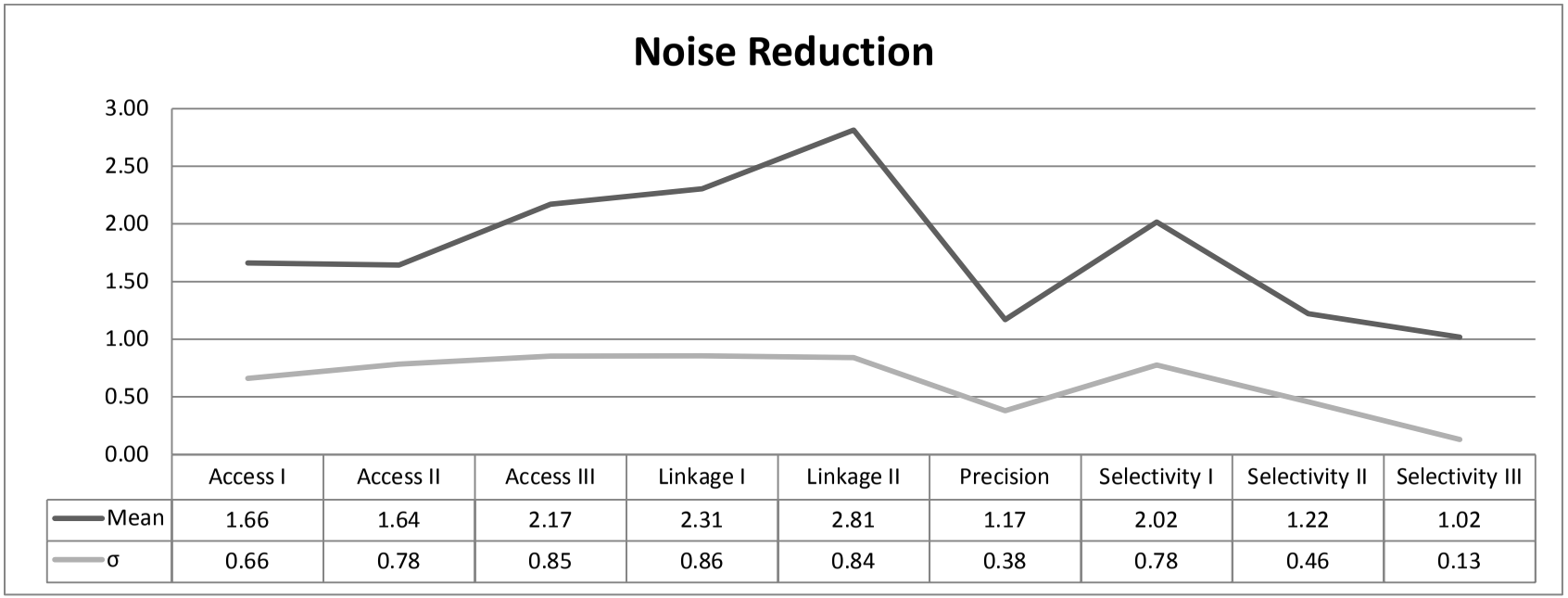
- It is easy to tell what items in the site are (Access I)
- The subjects of items are identified (Access II)
- There is a summary of items in the site (Access III)
- There are links between items in the site (Linkage I)
- There are links to other information outside the site (Linkage II)
- I can find exactly what I need (Precision)
- There is the right amount of information (Selectivity I)
- The information is up-to-date (Selectivity II)
- The information is accurate (Selectivity III)

Table 7 presents how the respondents prioritized the options for *noise reduction*, while Figure 8 presents the mean and standard deviation for these options. The most important option as perceived by participants was the portion of *selectivity* describing the accuracy of the information (98% very important) [see Table 7], which was also the most homogeneous response (σ=.13) [see Figure 8]. The option *linkage II* or outside links was selected as the least important element (18.6% not important) [see Table 7],

with the options for *access III* or summaries of site information (σ=.85), *linkage I* or internal links (σ=.86) and *linkage II* or external links (σ=.84) being the most variable [see Figure 8].

	Access I	%	Access II	%	Access III	%	Linkage I	%	Linkage II	%	Precision	%	Selectivity I	%	Selectivity II	%	Selectivity III	%
Noise Reduction																		
Very Important	25	42.4	30	50.8	13	22	11	18.6	5	8.5	49	83.1	15	25.4	47	79.7	58	98.3
Important	30	50.8	22	37.3	27	45.8	23	39	12	20.3	10	16.9	30	50.8	11	18.6	1	1.7
Somewhat Important	3	5.1	5	8.5	15	25.4	21	35.6	31	52.5	0		12	20.3	1	1.7	0	
Not Important	1	1.7	2	3.4	4	6.8	4	6.8	11	18.6	0		2	3.4	0		0	
(n=59)																		

Table 7: *Noise reduction* levels of importance



	Access I	Access II	Access III	Linkage I	Linkage II	Precision	Selectivity I	Selectivity II	Selectivity III
Mean	1.66	1.64	2.17	2.31	2.81	1.17	2.02	1.22	1.02
σ	0.66	0.78	0.85	0.86	0.84	0.38	0.78	0.46	0.13

Figure 8: *Noise reduction* mean and standard deviation

Using a two sample t-test assuming unequal variables to compare student responses to a later survey question on whether or not students returned to course resources (Q11), the aggregate score for the category for all students who completed the entire survey (n=50) [see Table 8] indicates that *noise reduction* had no statistically significant influence on whether or not students returned.

	Yes	*No*
Mean	16.5	15.58333333
Variance	7.662162162	7.174242424
Observations	38	12
Hypothesized Mean Difference	0	
df	19	

Table 8: *Noise reduction* t-Test: Two-Sample Assuming Unequal Variances

The following survey options were related to "Quality":

- The information is error-free (Accuracy)
- There is enough information (Comprehensiveness)
- The information is recent (Currency)
- The site fits my needs now and I think it will continue to fit my needs in the future (Reliability)
- The site indicates how I can tell if the information is valid (Validity)

The most important option in this category was *accuracy* or that the information be error-free (84.5% very important) [see Table 9]. Accuracy was also the option with the lowest variability (σ=.48) [see Figure 9]. While the option for accuracy (*selectivity III*) in the previous category was chosen as the most important (98% very important) [see Table 7], the *accuracy* option in this category was not given as much importance (84.5% very important) [see Table 9]. The least important option in this category was *validity* or

that the site indicates how the user can tell if the information is valid (10.3% not important) [see Table 9]. This was also the most variable answer (σ=.9) [see Figure 9].

	Accuracy	%	Comprehensiveness	%	Currency	%	Reliability	%	Validity	%
Quality										
Very Important	49	84.5	26	44.8	39	67.2	30	51.7	12	20.7
Important	7	12.1	30	51.7	16	27.6	19	32.8	27	46.6
Somewhat Important	2	3.4	2	3.4	2	3.4	9	15.5	13	22.4
Not Important	0		0		1	1.7	0		6	10.3
(n=58)										

Table 9: *Quality* levels of importance

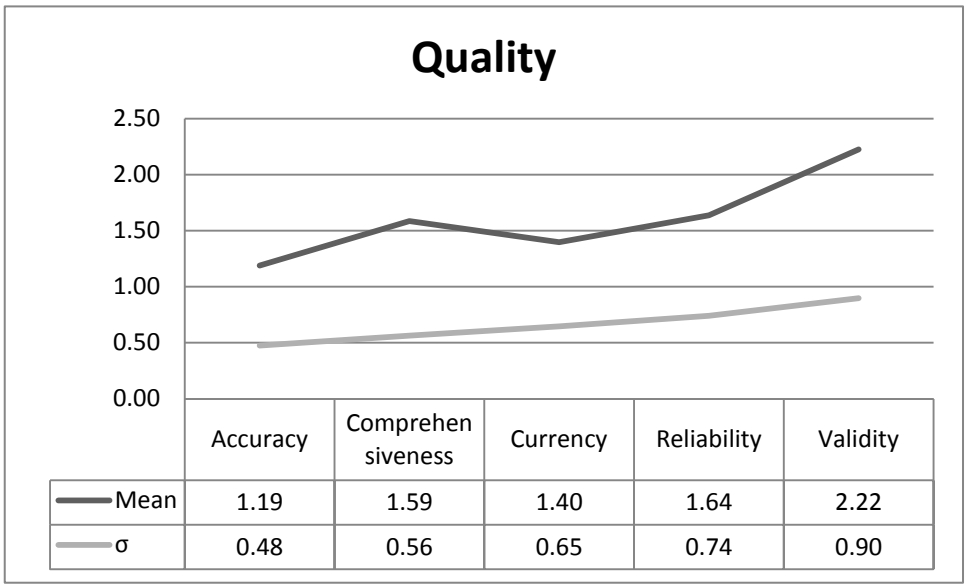


Figure 9: *Quality* mean and standard deviation

Using a two sample t-test assuming unequal variables to compare student responses to a later survey question on whether or not students returned to course resources (Q11) and the aggregate score for this category for all students who completed the

entire survey (n=50) [see Table 10], it appears that *quality* had no statistically significant influence on whether or not students returned.

	Yes	*No*
Mean	8.342105	7.583333
Variance	2.393314	6.810606
Observations	38	12
Hypothesized Mean Difference	0	
df	14	

Table 10: *Quality* t-Test: Two-Sample Assuming Unequal Variances

The following survey options were related to "Adaptability":

- The information in the site fits my needs (Closeness to the problem)
- The site allows me flexible ways of getting information (Flexibility)
- The information is easy to understand (Simplicity)
- The site is familiar to me (Stimulatory I)
- The site is easy for me to find (Stimulatory II)
- The site provides me with a sense of being part of a community (Stimulatory III)

The most important option in this category was *closeness to the problem* or that the information in the site fits the needs of the user (71.4% very important), while the least important option was *Stimulatory II* or that the site is easy to find (26.8% not important) [see Table 11]. The most variability was found in the same option (σ=.94) [see Figure 10].

	Closeness to the problem	%	Flexibility	%	Simplicity	%	Stimulatory I	%	Stimulatory II	%	Stimulatory II	%
Adaptability												
Very Important	40	71.4	21	37.5	37	66.1	10	17.9	30	53.6	6	10.7
Important	12	21.4	24	42.9	15	26.8	26	46.4	23	41.1	11	19.6
Somewhat Important	4	7.1	8	14.3	4	7.1	15	26.8	2	3.6	24	42.9
Not Important	0		3	5.4	0		5	8.9	1	1.8	15	26.8
(n=56)												

Table 11: *Adaptability* levels of importance

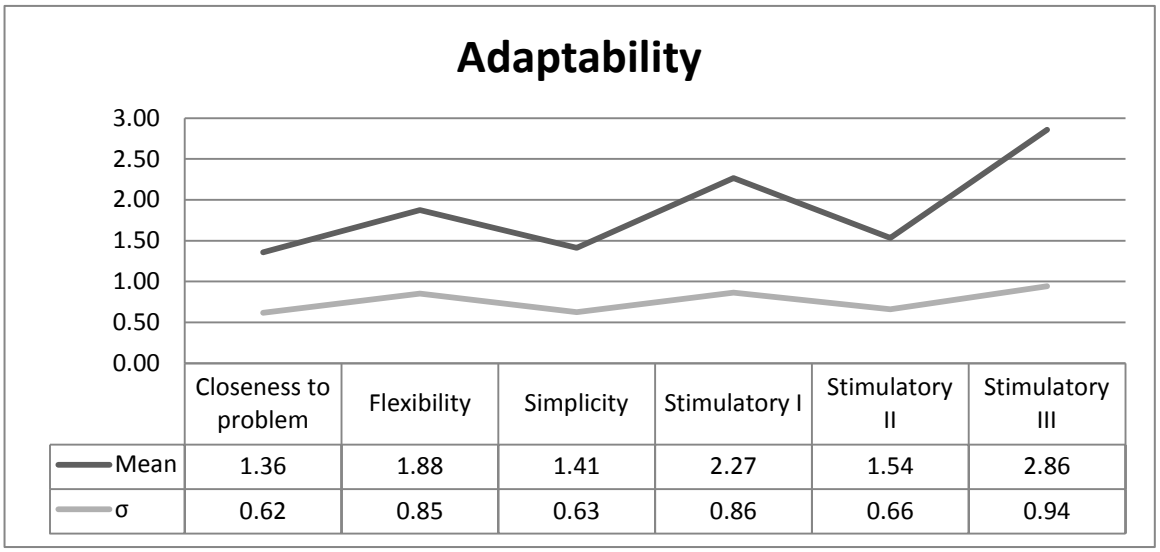


Figure 10: *Adaptability* mean and standard deviation

Using a two sample t-test assuming unequal variables to compare student responses to a later survey question on whether or not students returned to course resources (Q11) and the aggregate score for this category for all students who completed the entire survey (n=50) [see Table 12], it appears that *adaptability* had no statistically significant influence on whether or not students returned.

	Yes	*No*
Mean	11.55263158	11
Variance	7.875533428	3.272727273
Observations	38	12
Hypothesized Mean Difference	0	
df	29	

Table 12: *Adaptability* t-Test: Two-Sample Assuming Unequal Variances

While the original model defined time- and cost-saving as separate categories and the survey design offered them as separate categories, the data results were almost identical across the two categories. The following survey options were related to "Time-saving" and "Cost-saving":

- The site saves me time
- The site saves me effort

While there was variability between the responses within the *time*- and *cost-saving* categories (σ=.59, σ=.63) [see Figure 11], across categories they were prioritized in an almost identical manner (respectively 67.9% and 66.1% very important) [see Table 13].

	Time-saving	**%**	**Cost-saving**	**%**
Time- and cost-saving				
Very Important	38	67.9	37	66.1
Important	15	26.8	15	26.8
Somewhat Important	3	5.4	4	7.1
Not Important	0		0	
(n=56)				

Table 13: *Time*- and *cost-saving* levels of importance

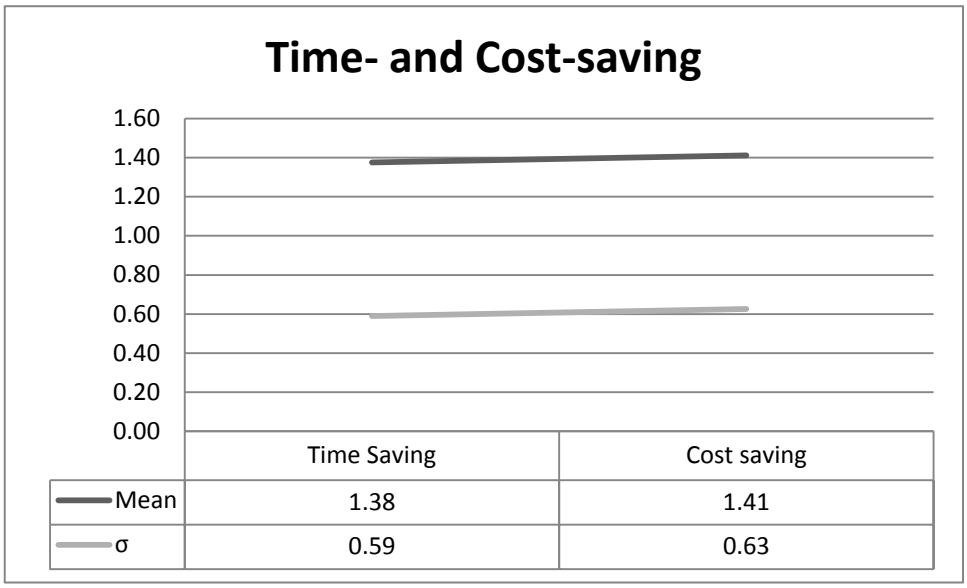


Figure 11: *Time*- and *cost-saving* mean and standard deviation

Using a two sample t-test assuming unequal variables to compare student responses to a later survey question on whether or not students returned to course resources (Q11) and the aggregate score for this category for all students who completed the entire survey (n=50) [see Table 14], it appears that neither *time*- or *cost-saving* had statistically significant influence on whether or not students returned.

	Yes	*No*
Mean	2.868421053	2.75
Variance	1.144381223	0.931818182
Observations	38	12
Hypothesized Mean Difference	0	
df	20	

Table 14: *Time*- and *cost-saving* t-Test: Two-Sample Assuming Unequal Variances

The following survey options were related to "Cognitive authority":

- The information is credible (Credible)
- The information is trustworthy (Influence)
- The information is reliable (Reliability)

- The information has meaning over time (Meaning over time)
- The information is valid (Validity)
- The information has value (Perceived value)

This category had the most homogeneous responses across the category with respondents reporting that *influence*, *reliability*, and *perceived value* all rated as the same level of importance (100% very important) [see Table 15]. While still relatively important (82.5% very important), the least important option was *meaning over time* (1.8% not important, 15.8% somewhat important) [see Table 15]. This option was also the one with the most variable responses (σ=.82) [see Figure 12]. In these results, influence, reliability and perceived value all share the same level of importance across respondents (100%). However, credibility (98.2%), meaning over time (82.5%) and validity (96.5%) vary across respondents [see Table 15].

	Credibility	**%**	**Influence**	**%**	**Reliability**	**%**	**Meaning over time**	**%**	**Validity**	**%**	**Perceived value**	**%**
Adaptability												
Very Important	56	98.2	57	100	57	100	47	82.5	55	96.5	57	100
Important	0		0		0		0		0		0	
Somewhat Important	0		0		0		9	15.8	1	1.8	0	
Not Important	1	1.8	0		0		1	1.8	1	1.8	0	
(n=57)												

Table 15: *Cognitive authority* levels of importance

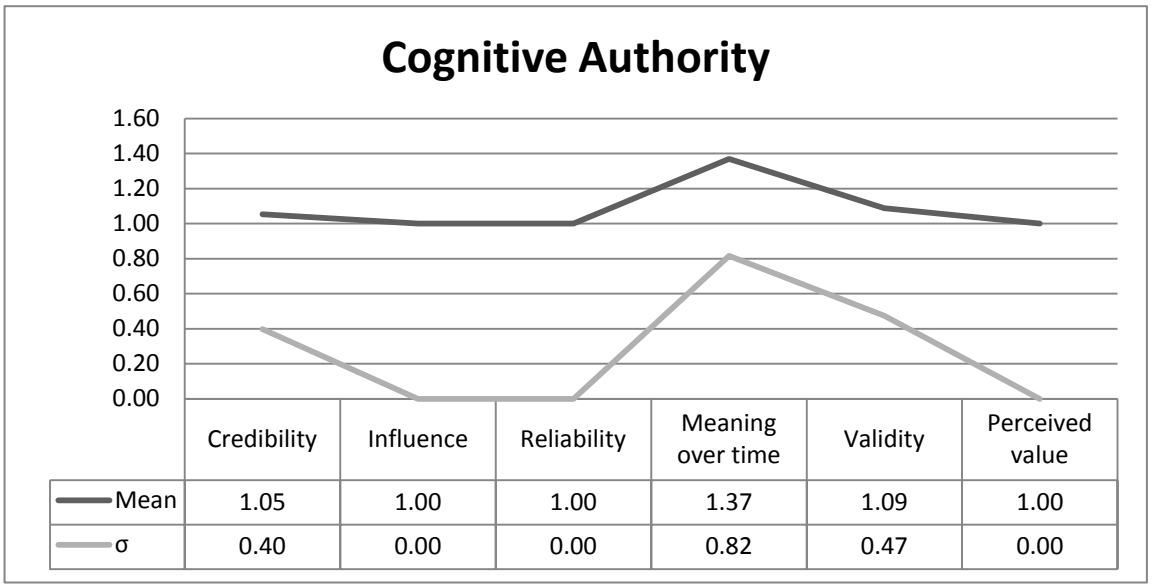


Figure 12: *Cognitive authority* mean and standard deviation

Using a two sample t-test assuming unequal variables to compare student responses to whether or not students returned to course resources (Q11) and the aggregate score for this category for all students who completed the entire survey (n=50) [see Table 16], it appears that *cognitive authority* had no statistically significant influence on whether or not students returned.

	Yes	*No*
Mean	7.763157895	8.083333333
Variance	1.969416785	3.71969697
Observations	38	12
Hypothesized Mean Difference	0	
df	15	

Table 16: *Cognitive authority* t-Test: Two-Sample Assuming Unequal Variances

The following survey options were related to "Technical user-friendliness":

- The information is accessible (Accessibility)
- The information is timely (Timeliness)
- The information is available at the speed I want (Desired speed)

- The information is provided in a flexible manner (Flexibility)
- The information is complete (Completeness)
- The information seems plausible (Intrinsic plausibility)
- There is not too much information (Selectivity)
- I can browse the information (Browsing)
- The site has features that make it easy to use (Features)
- The information is presented and packaged in a way that I can use (Form)
- The information has value to me (Actual value)

This most important option to participants in this category was *completeness* (70.6% very important, 27.5% important) [see Table 18], and the least important option was *selectivity* or not too much information (35.3% somewhat important, 29.4% not important) [see Table 18]. However, *selectivity* also had the most variability in responses (σ=.94) [see Figure 13].

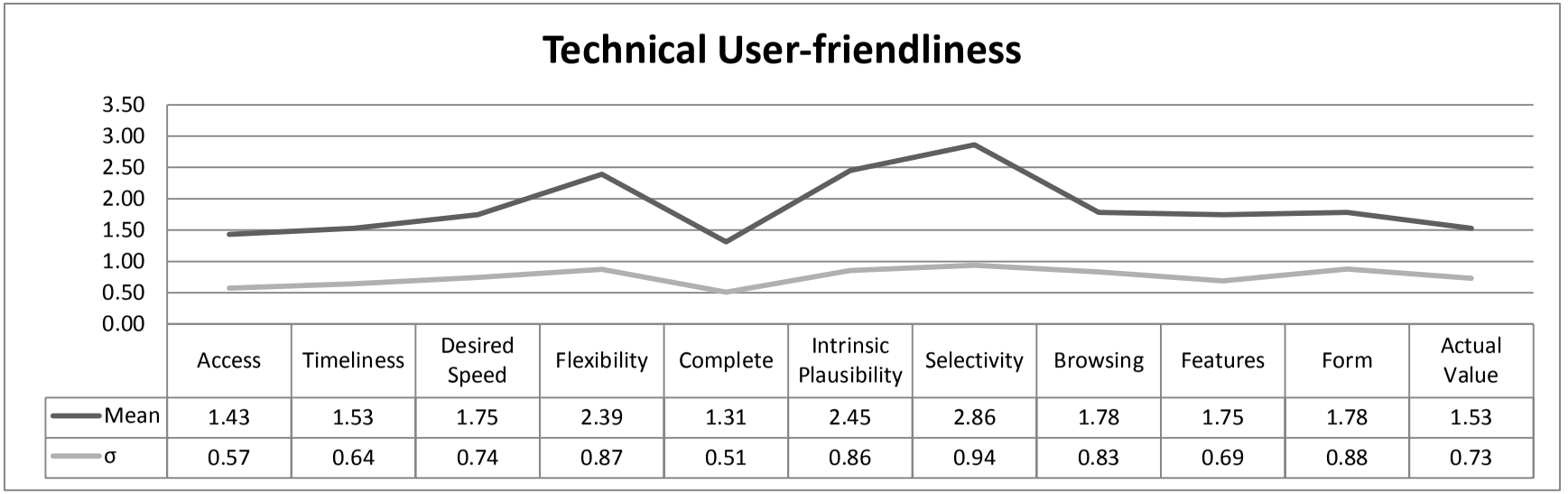
Using a two sample t-test assuming unequal variables to compare student responses to whether or not students returned to course resources (Q11) and the aggregate score for this category for all students who completed the entire survey (n=50) [see Table 17], it appears that *technical user-friendliness* had no statistically significant influence on whether or not students returned.

	Yes	*No*
Mean	20.73684211	19.41666667
Variance	11.71266003	9.356060606
Observations	38	12
Hypothesized Mean Difference	0	
df	20	

Table 17: *Technical User-friendliness* t-Test: Two-Sample Assuming Unequal Variances

	Accessibility	%	Timeliness	%	Desired Speed	%	Flexibility	%	Completeness	%	Intrinsic Plausibility	%	Selectivity	%	Browsing	%	Features	%	Form	%	Actual Value	%
Adaptability																						
Very Important	31	60.8	28	54.9	22	43.1	8	15.7	36	70.6	7	13.7	4	7.8	22	43.1	20	39.2	23	45.1	30	58.8
Important	18	35.3	19	37.3	20	39.2	20	39.2	14	27.5	19	37.3	14	27.5	20	39.2	24	47.1	19	37.3	16	31.4
Somewhat Important	2	3.9	4	7.8	9	17.6	18	35.3	1	2	20	39.2	18	35.3	7	13.7	7	13.7	6	11.8	4	7.8
Not Important	0		0		0		5	9.8	0		5	9.8	15	29.4	2	3.9	0		3	5.9	1	2
(n=51)																						

Table 18: *Technical user-friendliness* levels of importance



	Access	Timeliness	Desired Speed	Flexibility	Complete	Intrinsic Plausibility	Selectivity	Browsing	Features	Form	Actual Value
Mean	1.43	1.53	1.75	2.39	1.31	2.45	2.86	1.78	1.75	1.78	1.53
σ	0.57	0.64	0.74	0.87	0.51	0.86	0.94	0.83	0.69	0.88	0.73

Figure 13: *Technical user-friendliness* mean and standard deviation

The next section of the survey included three close-ended, yes-no response questions. These questions asked respondents if they were aware that they could return to courses themselves, if they were aware that they could return to resources from courses, and if they had ever done so. Table 19 provides the responses, with 88% of students reporting that they were aware they could return to courses, 82% reporting that they could return to resources including lectures, assignments, references and documents, and 76% reporting that they had returned.

Question	**n**	**Yes**	**%**	**No**	**%**
Did you know you that you can go back to courses you have finished?	50	44	88	6	12
Did you know that you can go back to resources (lectures, assignments, references, documents, etc) from courses you have finished by returning to the course site?	49	40	82	9	18
Have you ever gone back to view resources from courses you have finished?	50	38	76	12	24

Table 19: U_2 survey awareness of ability to return

Twelve respondents (24%) reported that they did not return to courses. These respondents received a branched open-ended question that asked why they did not return. There were three general reasons that respondents gave for not returning: time, awareness and need. Figure 14 contains the responses, with two reporting issues related to time, three reporting a lack of awareness, and the rest reporting that they had not needed the resources. Those reporting a lack of awareness may have been from cohorts in their first term who were not aware of the ability to return.

Time	Awareness	Need
• No Time. • Not enough time to remember where the information is located.	• I didn't know that I could. • Didn't know I could since I just finished my first courses 1 wk ago. • Did not know that this was possible.	• I have only finished one term and have not had to look back at the information yet. I do intend to use this feature in the future. • There hasn't been a need so far. • I haven't found it necessary. • I have not needed that data. • Haven't needed to, either for my job or for a class. I have referred back to foundations review notes. • Files were either saved on my laptop or have not been needed to-date. • I have had no reason to. Maybe in the future I will. • I just finished the first term last week.

Figure 14: U_2 survey responses categorized by reasons for not returning

The 38 participants who responded affirmatively that they had returned to courses or resources were provided a follow-up question about the frequency of their return. Table 20 describes the number of participants and the frequency of their return, along with percentages of return[3].

[3] Due to rounding, percentages do not add up to 100%.

Number of visits per student	Number of students returning	%
1-3	23	61
4-9	9	24
>10	6	16

Table 20: U_2 survey student self-report of visits

The survey participants' self-report of the frequency of their return (see Figure 15) to the course sites is very similar to the access log frequency of return (see Figure 16), with 61% of students reporting that they had a low frequency of return (compared to U_2 access log data of 50% low frequency), 24% of students reporting that they had a medium frequency of return (compared to U_2 access log data of 29%) and 16% reporting that they had a high frequency of return (compared to U_2 access log data of 16% high frequency).

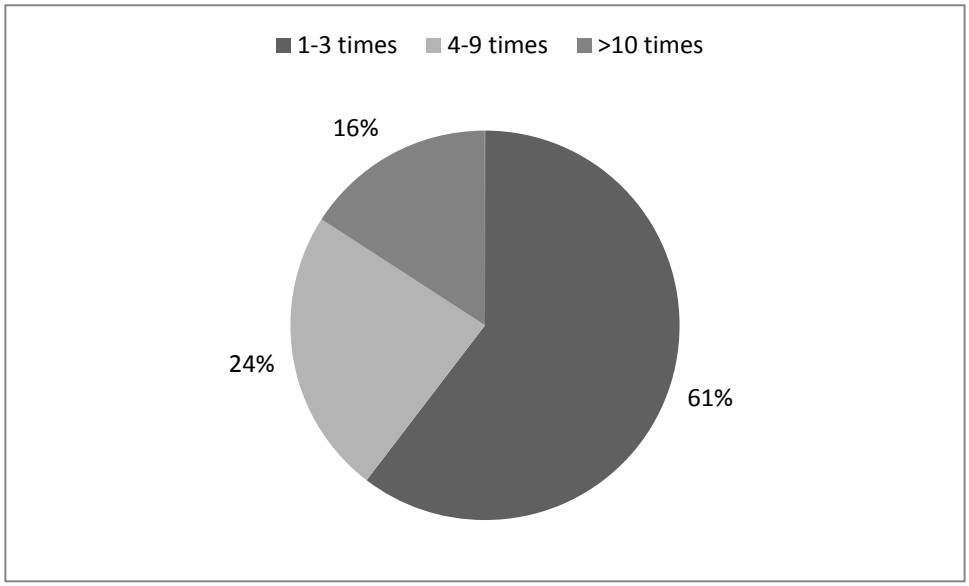


Figure 15: U_2 self-report of frequency of student visits

The respondents reporting that they had returned received a branched open-ended question that asked about what they were looking to find. All responses were related to needing information to refresh their memory or find associated material for work or

another course. Figure 16 includes representative statements broken down into the types of information needed:

General Content	Content Related to Another Course/Work	Other
• I was refreshing my memory on principles of professional writing. • Review information: accounting & finance • I was looking to strengthen my understanding of Marketing concepts. I also looked at Personal Finance and Leadership information. • Topics that applied to current events. • Previous lectures, previous readings, and previous discussions.	• Resource Information - reviewed old lectures that were relevant to current issues • reference to something that was in current class, but just forgot the actual context of the original presentation • Refreshment of previous topics important to current classes • Review/refresh material related to a topic that I am engaging in at work	• information from NET 1000 for using the technological resources I was given • basic finance tools • don't remember

Figure 16: UF survey representative reasons for return to course resources

When asked if they found what they were looking for, all of these respondents reported affirmatively (n=50). The following quotes provide representative explanations from the open-ended question.

> *"The new finance class I was taking did not give the formulas for the more basic stuff we learned earlier. I couldn't remember all those formulas off the top of my head, so went back to our intro finance class to find them, and I could."*

> *"I was looking to see how the information was organized to help me figure out how to best manipulate the next course and access the information in a way that would assist me."*

"The teacher took some of what I was looking for down as I was studying, it was frustrating. I think he did that because he tends to repeat exam questions. However we should all have equal access to posted information."

"I am conducting a job search and wanted to stay abreast of the material."

"I had to search through some lectures to find the right slides, but I was ultimately able to find them."

When asked what would encourage users to return to course materials in the future, respondents chose from the following options (see Table 21). Multiple responses were allowed.

Reasons that would encourage users to go back	**N**	**%**
You are told that the resources on the site have been updated or are new.	11	22
You are looking for resources that you remember using or seeing.	49	98
You need information for a different class you are currently taking.	40	80
You need information for your job.	39	78
You are just curious.	18	36

Table 21: U_2 survey reasons for future return

Remembering resources is one of the main reasons (98%) that users would return to a course site following completion of the course. They would also return because they needed information for a job (78%) or another class (80%). Additionally, 3 respondents (6%) chose "other" and provided the following text:

"Job Search information for a given field"

"To remember how to do something (i.e. like referenceing [sic] old notes)."

"Take home exam"

The survey results provide data to investigate how the learners' perceptions of quality influence their willingness to return to course resources. Additionally, this information further defines the effect of the U_2 institutional environment, whether students returned and their reasons for or against returning, along with reasons for future plans to return.

Access Logs

The practice of providing students with access to completed courses has been ongoing since the program started in 1999 and the custom course management system was implemented. Since the IMBA program has always provided student access to resources following course completion, the students expect that they can return. For this reason, there was no need to send email reminders to students. Access logs were collected from the database supporting the custom course management system for 71 courses across seven cohorts with access provided for 354 students. For this study, courses were considered as completed seven days after the last day of class in order to allow late students to resolve incomplete work and to eliminate students who accessed the site just to check grades, thereby mitigating contamination of the data.

While return access at U_2 has been available since 1999, the access logs only contain data beginning in June 2005 through the log download date of January 2009. This is due to the technical nature of the system (similar to other systems that retain data access logs) such that:

1) the logs contain a finite amount of space,
2) the system accesses and writes to the logs three times per day, and

3) older data drops off the logs over time.

The log captures information each time a user accesses any course page. Since each "page" of the course site is built using frames, there are three to five hits, or document "reads", recorded in the log each time a user accesses any part of the course site. Entries in the log that are seconds or a few minutes apart are likely to indicate movement around in the course site, but while the log records each time that a user accesses any part of the course site, it does not indicate where the user is in the site or the length of the visit. To avoid misrepresentation of the data, visits that were within 30 minutes of each other by the same user were considered a single visit.

Data from the logs demonstrate that across all cohorts 257 students (out of 354) accessed at least one completed course site during the data collection period. Table 22 details the number of students per cohort that returned and totals the number of unique visitors, along with the total students in each cohort and the percentage of return. Since it is possible for students starting in one cohort to finish in another, there were some students who returned to course resources in more than one cohort.

Cohort	Unique Student Visitors	Students per cohort	% returning
I1MBA07	7	49	14
I2MBA07	29	41	70
I1MBA08	43	51	84
I2MBA08	42	53	79
I1MBA09	46	55	84
I2MBA09	49	56	88
I2MBA10	43	49	88
Total across all cohorts	259	354	73
Total without I1MBA07/I2MBA07	223	264	84

Table 22: U_2 unique student return visits by cohort

Across all cohorts, 73% of students accessed at least one completed course site at least one time during the data collection period. However, this number is slightly misleading when the access log issues discussed above are taken into consideration. A more accurate reflection of the actual rate of return would be found by considering the data from cohorts more recent than the I1MBA07 and I2MBA07 cohorts where 223 out of 264, or 84% of students returned and will be used for the rest of the U_2 log analysis. Table 23 details the number of students and the number of visits per student, along with the percentage of students at the various rates of return (n=223). There were 52% of students returning at a low frequency (1-3 times), 32% returning at a moderate frequency (4-9 times), and 16% returning at a high frequency (more than 10 times).

Number of visits per student	Number of students returning	%
1-3	116	52
4-9	71	32
>10	36	16

Table 23: U_2 log data of student visits

Figure 17 provides a graphic representation of the frequency of return for the U_2 users.

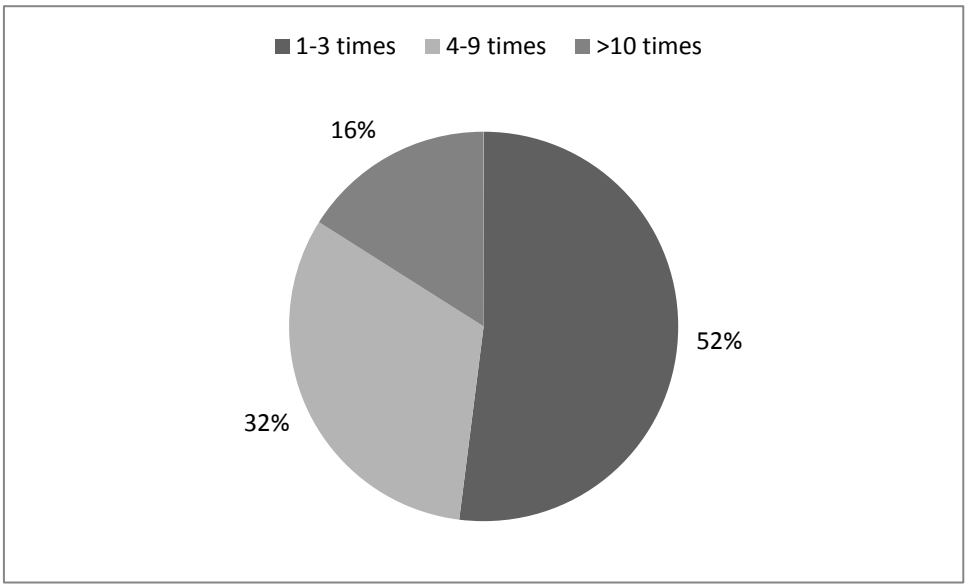


Figure 17: U_2 frequency of student visits

Access log data provides insight into institutional practices related to access for an established EWR. The log data and the email information contribute to an understanding of the number and frequency of students returning to courses following course completion. The data indicate the influence of the institutional environment on students' willingness to return and whether email reminders are useful in an emerging environment.

Interviews

Interview data provided in-depth information related to the research question about the characteristics of the students' information environments. Additionally, the interview data explores perceptions of quality and whether students chose to return and their reasons either for or against the return.

Four interviews were conducted at U_2. One of the four U_2 interviews had technical difficulties with recording and that data will not be included in these results. The study

was originally designed to include more interviews. Emails were sent out to 264 students from five cohorts at U_2. Every effort was made to accommodate the schedule and availability of the students; however there were not enough volunteers for content analysis of interview data. For this reason, this interview data is used in a purely descriptive and anecdotal manner. Despite this limitation, the interview data suggest useful information about users and their information environments. The text of the interviews was reviewed multiple times looking for common themes. There were three usable interviews from U_2, with all three reporting that they did return to resources. The following sections provide key themes that were raised in the interviews.

Information environments. Interviewees at U_2 shared details about their information environments, describing resources of people, websites, documents and files, as well as the usefulness of those resources. After describing a situation where she was looking for information to include in training materials for new employees, one interviewee described a couple websites that she had visited and people she had talked with.

> *Interviewer: "How did you know to go to these different websites and to these other people?"*
> *Interviewee: "A lot of it was from experience from being in the industry for several years, and I just asked the different people in my network that have also worked in the industry longer. A good friend of mine has been in it for about ten years, so I kind of racked her brain about that."*

When asked about the results of the information search, the interviewee indicated that it was not as easy as it could have been and that she hoped to improve in her ability to find the information she needed.

> *Interviewer: "Were you satisfied with the information that you found?"*
> *Interviewee: "Yes, for the most part; it took a little longer than I wanted it to… probably because I'm just now getting into this type of position… there's a lot of*

database websites that just aren't there for the information I need for the industry."
Interviewer: "Do you think it's not out there, or do you think it's just hard to find?"
Interviewee: "It's probably hard to find or my company probably needs to pay to have access to that information and we just can't afford it at this point."
Interviewee: "[Next time], I would probably try to access my network more because I've been in the industry five years, so I know there's probably other people out there that can better direct me instead of me spending so Much time searching for it, being a little smarter about finding ways to access it quicker."

Another interviewee provided similar interest in improving her information search skills.

Interviewee: "This is like the first time anybody had asked me to do research like that. Normally I'm coming up with numbers, not researching other companies. Hopefully I'll get better next time."

In two of the interviews, interviewees created information horizon maps that included very few specifics in terms of the actual websites they visited. While they were encouraged to add more to the maps, many did not include many specifics that they turned to when looking for information. The nature of the information horizon interview is to focus participants on a specific situation or need for information. It is not clear if the limited number of resources described were due to the concise information need at the time described or if these students in general actually have limited information horizons. One interviewee who described more resources was also employed by U_2. He seemed to have a more rich information environment.

Interviewee: "We talk about primary and secondary sources in education a lot, and some of the primary sources, we've flip flopped a little bit on how we do our primary sources. I think for most people like me who are very technologically savvy with Google, I pop it in, it gives me a response, and if I like it, cool, I've got the information I need. Now, a lot of that stuff is very general. You can dig deeper if you feel you have the time, but I have resources available to me, working in this environment, where I can just go upstairs and talk to a finance professor, and

they can just give me the breakdown of the real specific knowledge. So I think we've turned primary on its head. My primary is Google, Investipedia, maybe course lectures, where I can refer back. My secondary, where I go second, is probably my dad, my brother, professors; are probably secondary. The library is probably third, fourth fifth, sixth, way back there. I have yet to step into the library to look any of this stuff up. My time is too valuable, and all this stuff is available to me."

This interviewee did more to provide details about the process of finding the information, including in his map his thought processes as well as the resources that he used. For example, on his map, he referred to "F,F,F" or "friends, family, fools" several times when referring to Multiple people that provide him with information. Additionally, he included details about his process of verifying the information given through Google searches, his memory, or the library.

Keeping resources. Two interviewees provided details about their practice of keeping resources. They listed a number of ways that they saved resources, even if the course was not useful and they did not see a need to use it again.

Interviewee: "I have kept everything just in case, because I'm sure in the future again that I'll need it as I expand in my role and grow in my career… I accessed a personal reference binder I've built for myself over the years and I also accessed some of our company websites… I have kept all the CDs and DVDs that were provided to us... I retained my printouts and textbooks in addition…"

Interviewee: "I use Outlook for almost everything. So if it was something I knew I needed in the immediate future, then I would maybe create a task and maybe copy it into a word document and connect it to that task, or I would put it in my notes under Outlook also because those are really easy for me to recall and pull back up. Either how to get there or, because you can't attach an item, I might put how to get to a website or where it is in a book, and also… put my notes in straight from there."

Trust in sources. The interviewee who was more detailed in his information horizon map seemed to have a more extensive information environment and shared more details about his thoughts related to trust in sources.

> *Interviewer: "One of the things you mentioned was being able to look at was course lectures. Do you think there's a higher level of trust there, because it's associated with the institution?"*
> *Interviewee: "I think so, you have to have a little bit of trust in your instructors, that they know, and they've done their background research. The only fault I see with a lot of the instruction, and a lot of the instructors' notes and the class notes, is that they're very focused sometimes in a specific area. So, if Dr. so and so was very interested in derivatives, his course would focus on derivatives; so it doesn't give you the full breadth of maybe what you're looking at specifically. So you have to go find that person, or go talk to that person, and they'll say go talk to professor so and so, he knows more about that particular area. If the course notes are there; yeah I would trust them. I think a professor's job is to be accurate; as accurate as possible, using the most relevant sources as possible to display the, whatever they do, teach the class. So yeah, I would trust it Much more than just hopping online."*

> *Interviewee: "I feel more comfortable now that I have this knowledge [from the course]. I know that I've studied it, I understand something about it, now I can go back, and it makes me feel good; it makes me feel like I actually learned something in the course."*

Willingness to return. In general, interviewees reported that if they had a current need for the information, they would return to course resources. This next statement illustrates more detail into the issue of willingness to return.

> *Interviewee: "I've bookmarked them in past courses, I've taken lots of files and saved them to my hard drive, just saved the html files or copied them into a Word doc… I got a lot of that stuff saved to my flash drive now."*
> *Interviewer: "And you go back and use those?"*
> *Interviewee: "Sometimes… not very often… like I said… I feel kind of bad but this was probably the most forgettable class that I've taken in my program."*

This comment raises an interesting issue related to the value of the resources while students are enrolled in the course and their resulting willingness to return to the

course when it is completed. In this situation, the course was not relevant to the student so the student did not see a need to return even when the opportunity was presented. The two that did return reported that they had a specific need and remembered something valuable from the course.

> *Interviewee: "The writing courses I look at a lot, whenever I'm writing an email. As far as the other courses, because of the specific nature of the stuff that I do, you know, calculate reports, and stuff like that, I haven't, unfortunately, had a need for any specifics."*

> *Interviewee: "… he had a good summary of information in topics. I liked how he had it broken out so I went back and reviewed that information."*
> *Interviewer: "Were you looking for something specific?"*
> *Interviewee: "I was looking specifically at how he explained some of the insurance portions and those sections of his lectures because we have a lot of new hires that are not familiar with the industry…"*

This concludes the data results section. The following chapters will delve more deeply into a discussion of the data results, how they relate to the research questions, and the implications for future research.

Chapter 5: Discussion

The goal of this study was to explore the influences on participants' willingness to return to digital resources following completion of an online course, based on the characteristics of their information environments, perceptions of quality in information systems, and the influence of the institutional environment. Specifically, the study sought to answer the following questions:

1. What are the characteristics of learners' information environments, and how do these characteristics influence learners' willingness to return to digital resources from an online course?
2. How do learners' perceptions of quality of the course resources influence willingness to return to digital resources from an online course?
3. What is the influence of the institutional environment on the learners' willingness to return to digital resources from an online course?

This study used an online survey and information horizon interviews to identify the characteristics of learners' information environments and how these characteristics influence their willingness to return. These methods also assisted in identifying learner perceptions of quality of the resources and how the quality influences their willingness to return. Finally, the access log data collected helps to clarify understanding on the influence of the institutional environment on learners' willingness to return.

RQ1: Characteristics of learners' information environments

While limited by the response rates of the survey and the interviews, this study sheds light onto characteristics of learners' information environments and how these characteristics influence their willingness to return to digital resources from an online course through defining practices and resources that learners use. It seems that learners employ various methods of keeping digital and printed resources and because of the uncertainty of future need for information (or not knowing what they will need to know), they tend to save everything. Further research into the usefulness of this practice of keeping everything is warranted. Additionally, further research could explore the information overload that may be created by keeping resources that are not useful.

Based on survey responses and further discussed in interviews, remembering course information and returning to a familiar location does seem to be a factor in the learners' return access of a course site where there is a specific need. In general, this indicates that learners first have to recognize a need for information, then know, remember, or be reminded that the resource is available, then return to the resource, and be able to find what they need.

It is possible that having more resources available and familiar sources to access may lead to better awareness and better judgment of the quality of the information found but paradoxically having many resources may lead to a need for better strategies for finding information. Further research on this issue is warranted.

RQ2: Perceptions of quality

This study does not definitively answer the question about learners' perceptions of quality of the course resources and the influence of those perceptions on their willingness to return to digital resources from an online course. There was no statistically significant difference in perceptions of quality between students who did and did not return. It is not clear from this research whether this is due to the low number of responses or some other factor. This study suggests that there are learners who do return and that return behavior occurs at a higher frequency in an environment with an established EWR. However, reasons for return are not clear from the results of this study nor is it clear how perceptions of quality influence that return.

While this study did not attempt to test the models offered by Taylor and Olaisen, it is interesting to note that the survey respondents provided different perceptions of quality from those in the literature, thus inspiring additional questions. First, it is not clear whether the elements identified as components of Olaisen's perceived value all contribute to that construct. Responses to the survey suggest that influence, reliability and perceived value all share the same level of importance. However, perceptions on the importance of the factors for credibility, meaning over time, and validity vary widely across respondents. This could be due to the respondents' interpretations of the meaning of the option phrases, fatigue due to the length of the survey, or the possibility that they have seen similar options in other categories. Qualitative interviews probing learners' understanding of the terminology and their reasons for their perceptions could explore this issue in more detail.

Second, it was thought prior to the survey that there were some overlapping terms used between the two models and the results of this study seem to indicate that while there are options that are overlapping between the two models, there are also options that participants perceived as being different, even though the literature describes them in similar terms. Some of the survey responses match up almost exactly when examined between the two models. For other options, the survey results seem counter-intuitive. The option for *meaning over time* was surprisingly rated relatively low (32% very important). However, it would seem that having resources that retain their meaning would be a vital component to encourage learners to return. It is possible that in the context of the category and due to competing importance from the other options in the category, it was ranked as lower in importance. Additionally, it is possible that the participants did not understand the phrase used for the option ("The information has meaning over time"). The phrase used for a similar concept of *reliability* ("The site meets my needs now and I think it will continue to meet my needs in the future") was rated as more important (52% very important), and a similar phrase for *closeness to the problem* ("The information in the site fits my needs") was rated highly as well (71% very important).

There are some other results from the survey that provide interesting information for future study in understanding learners' perceptions. For example, the results for the option of "*completeness*" (71% very important, 27% important) would seem to indicate that the learners thought that more information is better than not enough information. However, learners in this study also stated in interviews that they kept all information

from courses even if they did not think it was useful. Comprehensive information on a particular topic could create issues with information overload. More research into this issue could provide guidance into "how much is enough" information which would guide instructors as they create content for their courses.

RQ3: Influence of institutional environment

Wilson discusses whether or not the "climate" of the organization impacts the way that people seek information (T. D. Wilson, 2006). This study does seem to confirm that the institutional environment or the practices of the institution has an influence on willingness to return to course resources.

Given the novel phenomenon being studied, it is not surprising that the majority of returning students at U_1 visit at a low frequency (83% return one to three times). This is to be expected in an emerging EWR. While this multiple location study does not allow for comparing the two institutional environments, there are some reasonable assumptions that can be made. Based on the frequency of return for U_2, it seems probable that with further exposure at U_1 to this culture of return (more courses offering access to return and more time for access to be needed), the users who returned infrequently would have more inclination to return and the rate of return would increase. This study does illustrate that with an established EWR, while the majority (52%) of U_2 visitors to the course sites still return less frequently, the percentage is lower (compared to U_1's 83%) and there are a higher percentage of U_2 visitors (16%) who return with high frequency compared to U_1's visitors (3%).

At U_2, the survey participants' self-report of the frequency of their return (see Figure 14) to the course sites is very similar to the access log frequency of return (see Figure 16). There were 61% of survey respondents reporting that they had a low frequency of return (compared to U_2 access log data of 52% low frequency), 24% of students reporting that they had a medium frequency of return (compared to access log data of 32%) and 16% reporting that they had a high frequency of return (compared to access log data of 16% high frequency). This serves to generally validate the survey responses for return.

Email reminders

The small population of students who received the email reminders limits the generalizability of these data. But there are still indications that support the findings of Abdolrasulnia et al. (2004); that email reminders encouraged users to visit the course site, and email reminders appeared to lose effectiveness after the first two sent. In that study, the first three emails produced the highest response, but they did not provide details about the text of their email reminders. Additionally there was no discussion about the baseline response rate prior to the email reminders. Despite this lack of detail, they reported that frequent email reminders increased response rates, and that the first three email reminders produced the highest response rates.

As outlined in the design of this study, each email highlighted a specific feature of the site, starting with the third email. However, it would seem that the first two emails may have been more effective due to their general nature. It is also possible that the emails that listed specific resources may have reduced the incentive for some visitors if

the participants were not looking for that particular type of resource. Furthermore, it is possible that repeatedly receiving emails may have resulted in diminished results over time. But it would seem that changing the content of the email may not have had an impact since the Abdolrasulnia, et al. study and this study had similar user behaviors in response to email reminders. It may be instead a factor that familiarity with the emails may make them easier to ignore unless there is a specific need that would be filled by acting at the time the email is received. Further research into the text of reminders related to the needs of the users would help to investigate this in more detail.

Willingness to return

The findings of this study suggest that in an established EWR, learners do have the willingness and even an expectation to return to digital learning resources following course completion. This study also seems to indicate that in an emerging EWR, even if learners do not remember the resources available from an online course, if they are provided access to return, if they are reminded of the availability of resources, and if they have a need, they will return. However, it is not clear how the characteristics of the information environment or perceptions of quality influence willingness to return. Further study is needed to better define perceptions of information quality, understand the influence of the information environment, and discover whether the information quality learners' experience has an impact on their continued return.

Practical Implications

While it is difficult to know the best way to implement a practice of providing ongoing access in an emerging EWR, the method that was used at the established EWR has been successful and could be used to guide future implementations. Essentially, the practice was begun through a lack of an explicit decision to deny access. It could be that in an emerging EWR, all that is needed in the beginning is to let it happen and to observe whether there are benefits to the students. Once the practice is begun and students develop an expectation of being able to return, additional considerations could include the following:

- If multiple instructors teach a course, which instructor's content would be provided to which learners? Should content from multiple instructors be combined in a resource repository? This removes content from the context of the course, but would provide additional resources.
- Should materials in the system be updated as the instructor updates content for other courses or should it remain as archived, historical content? Providing access to archived content is similar in nature to the handwritten notes that could be saved from a traditional course, but does not take advantage of the affordances of digital content for keeping information up-to-date.
- How should learners be granted access? Many course management systems require the use of a student username, but once students have completed the program, they no longer have the same student username.

- How should the system track courses to which a particular user should have access? The system and system administrators would need methods of identifying the previous courses that the learner had been enrolled in and if learners are to have access to the original content, there would need to be a system in place to manage access.
- How will the institution benefit from ongoing interactions with learners? How will learners benefit from ongoing interactions with the institution? Institutions are continually attempting to find ways to retain connections with alumni. Ongoing access to digital learning resources may be another positive point of contact between the institution and its alumni.

These issues are just a few to be considered when making a decision to implement provision of ongoing access to course content. Decision-makers within an institution would need to weigh the proposed benefits for learners against the issues to determine the best outcomes for the learners and the institution.

Conclusions

The information environment as described by Taylor (1982) is "the set of those variables (a) that affect the flow of information messages into, within, and out of any definable organization or group of clients, and (b) that determine the criteria by which the value of information messages will be judged in that context" (p. 343). The information horizon described by Sonnenwald (1999) is the set of resources that a person uses to conduct an information seeking task, including a variety of resources

such as “social networks, including colleagues, subject matter experts, reference librarians, information brokers, etc; documents, including broadcast media, web pages, books, etc.; information retrieval tools, including computer-based information retrieval systems, bibliographies, etc.; and experimentation and observation in the world” (Sonnenwald, 1999, p. 8). This study was a starting point for exploring the information environment and the resources available to learners. But as a starting point, it really serves to identify more questions and areas for future research. Specific issues could be defined through developing a broader understanding of the perceptions of quality using an in-depth qualitative study, exploring the factors that inspire learners to return to online resources following course completion, and recruiting more participants for information horizon interviews.

One of the limitations of this study was the small number of participants for the interview phase. A wider range of participants would likely identify more learners who were actually returning to the system and could explore the reasons that they return. It could also show how the quality of the information and of the system does or does not enhance their experience and influence their continued return. This qualitative study would serve to investigate in more depth the information needs of this population as well as the perceptions of quality and influences on willingness to return.

Wilson (2006) described categories of user studies, including studies that explore whether it is possible to make systems more efficient and effective through developing a better understanding of how users seek information independent of the system in which they seek the information. He proposed that the “availability of information may

bring about the recognition of a previously unrecognized cognitive need" (T. D. Wilson, 2006, p. 664). The results of this study seem to suggest that this is the case, but additional study can determine the applicability of the results to other populations.

This study began by suggesting that extending the flexibility to learn anywhere, anything, and anytime could include moving beyond the boundary of time associated with a traditional course. Collis and Moonen are two of the authors beginning to consider the implications of "flexible learning in a digital world" (Collis & Moonen, 2002). They describe flexibility in location, course programs, in study materials, types of interactions, and forms of communication within a course. If open learning includes lifelong learning, this flexibility framework could be adapted to include flexibility in pace of learning both in terms of the time to complete the course and the time learners are able to access the resources from the course. Future research could explore the various flexibility framework elements and their costs and benefits to learners and institutions.

While not the focus of this study, the results do seem to suggest that learners return to trusted sources of information from courses, that information overload is still a factor, and that users already familiar with a source of information may be more likely to view that information as credible (Wathen & Burkell, 2002). In future studies, it would be valuable to explore whether the filtering mechanism of instructors' cognitive authority provides learners with more effective management of information processing (Rieh, 2002; Rieh & Belkin, 2000). And while this study was not focused on issues such as "Keeping Found Things Found" (Bruce et al., 2004; Capra & Perez-Quinones, 2003; Jones et al., 2001) it does seem to have implications that are relevant for the broader issue of

the impact of information overload and keeping the right amount of resources for further learning.

Furthermore, although the Taylor and Olaisen models are frequently cited in literature (e.g. Pimentel, 2009; Rieh, 2002; Rieh & Belkin, 2000; Rieh & Danielson, 2007; Wathen & Burkell, 2002), this study seems to suggest that those models may be descriptive rather than operative. Taylor described quality from the input and interface of the information system and what values the system can add for the users. Olaisen described the information quality from the user side and what users want and need to trust the information and the system. As valuable as those models are for conceptualizing issues related to digital learning resources, more study is needed to understand the actual motives that influence learners' willingness to return following course completion.

The proposed benefits for learners with access to evolving course content include the ability to keep current in the developing knowledge of a field and an increase in the applicability of the classroom content as learners move from informing knowledge to productive knowledge in the workplace. These benefits will be realized as there continues to be a change in the paradigm of higher education with a shift toward lifelong learning and as concepts of open teaching (Wiley, 2009a; Wiley & Hilton, 2009) become more of a reality. Continued access to online resources following course completion is one of the ways that universities can adapt to the changing needs of learners to support lifelong and flexible learning.

Appendix A:

U_2 Interview Consent Form

Research Study Informed Consent Statement – Interview Participant

The purpose of this interview is to discuss the resources you use to find information to solve problems you encounter. The data from this interview is part of a study to identify factors that must be addressed so that online course resources can be used to support lifelong learning. We request your participation in an individual open-ended interview. The interview will take approximately one hour of your time.

While the interview involves minimal risk to you, the following procedures will be taken to protect you against all risks:

1. Your participation in this interview is completely **voluntary**. There are no anticipated risks or discomforts related to your participation.
2. You have **the right to withdraw** from the study any time with no question asked and **no repercussions**. Your decision to withdraw from this interview **will not affect you in any way**.
3. You have the right to refuse to answer any questions uncomfortable to you during the interview.
4. All participant responses will be **completely confidential**. Your responses made during the interview will be available only to the researcher. Your name and identifying information will not be used in reports based on this research study. Participants will not be identified in any presentation or publication resulting from this research. Data will be stored in secure project files and password-secured computer analysis files by the researcher. Audio interviews will be transcribed and the original tapes and/or audio digital files saved on CDs will be stored in secure project files. Any personal comments of yours that the researcher wishes to share in reports, manuscripts, or presentations will be assigned to a pseudonym to protect your identity. All records will be destroyed three years following the close of the research.
5. Your permission is requested to allow the interview results to be used in presentations at professional conferences and printed professional publications.

If you have any questions about this research or your participation, now or at any time, please feel free to contact:

For additional information **about your rights as a research participant in the study**, please feel free to contact the

If you understand the request and:

- voluntarily agree to participate in this study;
- allow these results to be used for the research purposes stated in this consent;

Complete the following section:

I, _____, have read and fully understand the extent of the study and any risks involved. All of my questions, if any, have been answered to my satisfaction. My signature below acknowledges my understanding of the information provided in this form and indicates my willingness to participate in this interview session. I have been given a blank copy of this consent form for my records.

Signature:_____ _____ Date:_____

Appendix B

U_2 Interview Protocol

Interviewer Name:_____ Date: ____ Start Time: ____ End Time: _____
Interviewee Name:_____ Cohort: _____

Interview Part 1: Demographic Data and Incident Recall

1. Collect demographic data (Ask name, gender, occupation, years experience in occupation, educational background, technology skills, technology available, and technology use).

2. Ask interviewee to remember a recent, specific time when he/she needed information about business administration.

   Could you tell me about a time in the past two months when you needed information about business administration?

3. Ask probing questions to reveal details about the incident.

   Follow-up questions to elicit additional details about this situation:
   - What information did you need?
   - Where did you go to find the information? What help or resources did you use?
   - What did you do next? [Try to determine the information seeking process]
   - Where you satisfied with the outcome? Did you find information you could use?
   - How did you use the information?
   - Would you do it this way next time? If not, what would you do differently?

4. Move immediately to Interview Part 2

   Note: If more than one incident is discussed, complete Part 2 for the first incident prior to completing Part 1 for the second incident.

Interview Part 2: Information Horizons Map

5. Explain the information horizons map to the interviewee and show the example map.

   In this study, we are also asking people to draw a diagram or map of what we refer to as an information horizon related to the situation you just described. Put simply, this will be a map representing you and where you found information to

help you solve a problem in business management. So, to start the map, remember this specific time we just talked about.

6. Have interviewee create a personal information horizon map.

   Draw a circle on the map for yourself and then draw circles and label them for the people and other resources you used to find information to solve your problem.

7. Probe interviewee for further elaboration of the drawing on this incident.

   Do you remember using any other resources? (Let them respond. If yes, add those to map, otherwise, continue.)

   If interviewee does not mention the Internet MBA course resources, probe for additional details:

   You are enrolled in courses in the Internet MBA program. Have you used any of the resources from the courses in that program to solve this problem? How did you access those resources? (Printed, downloaded or accessed through the course resources website)

8. Probe for both opportunistic and purposive information seeking behavior beyond this incident.

   Have you used the resources from the Internet MBA program to solve any other problems? If so, please tell me about the problem and how you used the resources to solve that problem. How did you access those resources? (If another situation is described, create another map of the new situation)

9. Have interviewee review map and add if needed.

   Take a minute and look over your map. Is there anything else you would like to add? (Let them respond. If yes, add those to map, otherwise, continue) Thank you for your participation in this exercise. For the rest of the interview, I would like to ask you some questions about the quality of the course resources from the Internet MBA program.

Interview Part 3: Information Quality of Course Resources

1. Determine how the interviewee used the course resources while in the course.

   Tell me about your experiences using the resources and learning materials from courses in the Internet MBA program. Did these resources help you to solve

problems that you had with business management in your work/classroom while you were in the course? Did you think that you might want to use these resources again after leaving the program? Did you print or download any of the course resources to save for later reference?

2. Determine whether interviewee has accessed the course resources since completing the course.

   Did you access course resources (either locally by reading printed or accessing downloaded resources or using the course resources website) from courses you have completed in the Internet MBA program?

   a. If yes, what influenced you to return to the course resources? Did you have a problem that you needed to solve with business management?

   b. If no, why not? How could the resources be changed to be an ongoing resource for you to solve problems in your work/classes?

3. If interviewee has accessed the resources, determine his/her perceptions of the resources.

   Tell me about when you accessed the course resources. Were you able to find what you were looking for? Can you think of anything that might improve the resources to help you in the future?

Appendix C

U_1 Interview Consent Form

Site Study

Informed Consent Statement – Interview Participant

The purpose of this interview is to discuss your use of technology and the resources you use to solve technology integration problems you encounter in your teaching. This interview is the second phase in a study to identify factors that must be addressed so that online courses and their digital resources can be used to support lifelong learning. For this phase of the study, we request your participation in an individual open-ended interview. The interview will take approximately one hour of your time.

While the interview involves minimal risk to you, the following procedures will be taken to protect you against all risks:

1. Your participation in this interview is completely **voluntary**. There are no anticipated risks or discomforts related to your participation.
2. You have **the right to withdraw** from the study any time with no question asked and **no repercussions**. Your decision to withdraw from this interview **will not affect you in any way**.
3. You have the right to refuse to answer any questions uncomfortable to you during the interview.
4. All participant responses will be **completely confidential**. Your responses made during the interview will be available only to the researcher. Your name and identifying information will not be used in reports based on this research study. Participants will not be identified in any presentation or publication resulting from this research. Data will be stored in secure project files and password-secured computer analysis files by the researcher. Audio interviews will be transcribed and the original tapes and/or audio digital files saved on CDs will be stored in secure project files. Any personal comments of yours that the researchers wish to share in reports, manuscripts, or presentations will be assigned to a pseudonym to protect your identity. All records will be destroyed three years following the close of the research.
5. Your permission is requested to allow the interview results to be used in presentations at professional conferences and printed professional publications.

If you have any questions about this research or your participation, now or at any time, please feel free to contact:

For additional information regarding human participation in research, please feel free to contact

If you understand the request and:

- voluntarily agree to participate in this study;
- allow these results to be used for the research purposes stated in this consent;

Complete the following section:

I, _____, have read and fully understand the extent of the study and any risks involved. All of my questions, if any, have been answered to my satisfaction. My signature below acknowledges my understanding of the information provided in this form and indicates my willingness to participate in this interview session. I have been given a blank copy of this consent form for my records.

Signature:_____ Date:_____

Appendix D

U_1 Interview Protocol

Interviewer Name: _____ Date: ____ Start Time: ____ End Time: _____
Interviewee Name: _____ Cohort: _____

Interview Part 1: Demographic Data and Incident Recall

10. Collect demographic data (name, gender, occupation, years experience in occupation, educational background, technology skills, technology available, technology use).

11. Ask interviewee to remember a recent, specific time when he/she needed information about technology integration.

    Could you tell me about a time in the past two months when you needed information about technology integration?

12. Ask probing questions to reveal details about the incident.

    Follow-up questions to illicit additional details about this situation:
    - What information did you need?
    - Where did you go to find the information? What help or resources did you use?
    - What did you do next? [Try to determine the information seeking process]
    - Were you satisfied with the outcome? Did you find information you could use?
    - How did you use the information?
    - Would you do it this way next time? If not, what would you do differently?

13. Move to Interview Part 2.

    Note: If more than one incident is discussed, complete Part 2 for the first incident prior to completing Part 1 for the second incident.

Interview Part 2: Information Horizons Map

1. Explain the information horizons map to the interviewee and show the example map.

   In this study, we are also asking people to draw a diagram or map of what we refer to as an information horizon related to the situation you just described. Put simply, this will be a map representing you and where you found information to

help you integrate technology into your teaching. So, to start the map, remember this specific time we just talked about.

2. Have interviewee create a personal information horizon map.

   Draw a circle on the map for yourself and then draw circles and label them for the people and other resources you used to find information to solve your problem with integrating technology into your teaching.

3. Probe interviewee for further elaboration of the drawing on this incident.

   Do you remember using any other resources? (Let them respond. If yes, add those to map, otherwise, continue.)

   If interviewee does not mention the XXXXX course resources, probe for additional details:

   Recently, you were enrolled in the XXXXX course. Did you use any of the resources from that course to solve this problem? How did you access those resources? (Printed, downloaded or accessed through the course resources website)

4. Probe for both opportunistic and purposive information seeking behavior beyond this incident.

   Have you used the resources from the XXX course to solve any other problems since the time you left the course? If so, please tell me about the problem and how you used the resources to solve that problem. How did you access those resources? (If another situation is described, create another map of the new situation)

5. Have interviewee review map and add if needed.

   Take a minute and look over your map. Is there anything else you would like to add? (Let them respond. If yes, add those to map, otherwise, continue) Thank you for your participation in this exercise. For the rest of the interview, I would like to ask you some questions about the quality of the course resources from the XXXXX course.

Interview Part 3: Information Quality of Course Resources

4. Determine how the interviewee used the course resources while *in* the course.

Tell me about your experiences using the course resources or learning materials while you were enrolled in the XXXXX course. Did these resources help you to solve problems that you had with integrating technology in your work/classroom while you were in the course? Did you think that you might want to use these resources again after leaving the course? Did you print or download any of the course resources to save for later reference?

5. Determine whether interviewee has accessed the course resources *since completing* the course.

   Did you access the course resources (either locally by reading printed or accessing downloaded resources or using the course resources website) from the XXXXX course since you completed the course?

   a. If yes, what influenced you to return to the course resources? Did you have a problem that you needed to solve with integrating technology?

   b. If no, why not? How could the resources be changed to be an ongoing resource for you to solve problems in your work/classroom?

6. If interviewee has accessed the resources, determine his/her perceptions of the resources.

   Tell me about one time you accessed the course resources. Were you able to find what you were looking for? Can you think of anything that might improve the resources to help you in the future?

Interview Part 4: Information Quality of Course Resources Survey Pilot

1. Show interviewee list with elements of information quality from Taylor and Olaisen criteria.

   Use the following script:

   a. When you are looking for information about technology integration, which of these items on the list in this category are the most important to you?
   b. When you used the XXXXX Course Resources site, which of these items on the list in this category helped you?
   c. When you used the XXXXX Course Resources site, which of these items on the list in this category would have made your search for information better or different?
   d. Can you give me an example? (Tell me about a time when…)
   e. Looking at the order you have given to the list in this category as they relate to seeking information for technology integration, would you organize them differently for seeking information about another topic?

f. If so, how?

(Repeat for each category)

2. Conclude interview.

Is there anything else that you would like to tell me about? Thank you for your time.

Appendix E

U_1 Recruitment Letter from Instructor

Dear Students,

I hope that this email finds you busy and happy! For some of you, it has been a while since we had
together, but I wanted to take this opportunity to continue some of the great conversations and resource sharing that was started during our course.

This is a really exciting opportunity that I am able to make available for students from my course to continue to have access to all the course resources from our course website. I want to make these available to you as ongoing resources to support your professional, lifelong teaching and learning. So, we have developed the
Course Resources Site that is available at
and where you can login using your same MU Pawprint username and password that you used for the course. **NOTE:** There are NO assignments and NO costs associated with use of this Course Resources Site. It is there just for you to have continued access to the course resources and sharing communities.

I want to encourage each of you to go to the website
and check out the resources that are available there including resources such as webcasts, resource links, unit notes, and discussion board postings. Additionally, some new information has been added to the course resources including additional links to Wikipedias, blogs, and webquests; a discussion forum for sharing resources; and … whatever you want to share. Remember, the point is to give you ongoing resources to enhance your teaching and learning!

I hope to see you online – again!

Sincerely,

Laura

Appendix F

U_1 Consent Form

Site Study

Debriefing and Informed Consent Statement

For the last several weeks, you have had access to digital resources located on the Course Resources Site. These resources have been available to you for use in furthering your experiences beyond your past enrollment in . Providing you with this access has been phase 1 of a three phase study to identify factors that must be addressed so that online courses and their digital resources can be used to support lifelong learning. We have been interested in observing (in a natural context) if people have a need for and a desire to use digital resources from online courses they have completed, if email is an appropriate method of notifying people of the resources, and if they follow through on that need or desire for digital resources by accessing the Course Resources Site. Data about your access of digital resources from the Course Resources Site will provide information about people's interest in and use of digital resources from online courses. For this phase of the study, we request that your access data and participation in the Course Resources Site be used to study people's access to digital resources following email reminders about the resources.

While this activity involves minimal risk to you, the following procedures will be taken to protect you against all risks:

1. Your participation in this study is completely **voluntary**. There are no anticipated risks or discomforts related to your participation.
2. You have **the right to withdraw** from the study any time with no question asked and **no repercussions**. Your decision to withdraw from this study **will not affect you in any way**. If you decide that you do not want your data to be a part of the study, there will be **no affect to you in any way**. If you choose not to participate, your data will be excluded from the study.
3. All participant data will be **completely confidential**. Your access data made during this study is available only to the researcher. Your name and identifying information will not be used in reports based on this research study. Participants will not be identified in any presentation or publication resulting from this research. Data will be stored in password-secured computer analysis files by the researcher. All records will be destroyed three years following the close of the research.
4. Your permission is requested to allow your access data to be used in this study as well as in presentations at professional conferences and printed professional publications.

If you have any questions about this research or your participation, now or at any time, please feel free to contact:

For additional information regarding human participation in research, please feel free to contact

If you understand the request and:

- voluntarily agree to participate in this study;
- allow these results to be used for the research purposes stated in this consent;

then write the following and submit the statement. your name; _____; date _____

Appendix G

Survey Instrument

Consent

The purpose of this study is to identify factors that must be addressed so that online courses and their digital resources can be used to support lifelong learning. We are interested in determining if people have a need for and a desire to use digital resources from online courses they have completed, and if they follow through on that need or desire by accessing the resources. In addition, we are interested in understanding issues of information quality as it relates to online courses. For this study, we request that you carefully consider the following survey questions.

While this activity involves minimal risk to you, the following procedures will be taken to protect you against all risks:

- This survey will take approximately 15 minutes. You will not be compensated for participation.
- Your participation in this study is completely voluntary. There are no anticipated risks or discomforts related to your participation.
- You have the right to withdraw from the study any time with no question asked and no repercussions. Your decision to withdraw from this study will not affect you in any way.
- All participant data will be completely confidential. Your survey data collected during this study will be available only to the researcher. No identifying information will be collected. Participants will not be identified in any presentation or publication resulting from this research. Your responses will be identified with a randomly generated number and your name will not be collected for this survey. Data will be stored in password-secured computer analysis files by the researcher. All records will be destroyed three years following the close of the research. If you choose not to participate, your data will be excluded from the study.
- Your permission is requested to allow your survey data to be used in this study as well as in presentations at professional conferences and printed professional publications.

If you have any questions about this research or your participation, now or at any time, please feel free to contact:

For additional information regarding human participation in research, please feel free to contact:

If you understand the request and voluntarily agree to participate in this study and allow these results to be used for the research purposes stated in this consent, please check yes.

○ Yes ○ No

When you are looking for information, how important are the following items? Click on each item and drag it to the box that best defines the level of importance. You can also order items within each box.

Items
The site allows me to move around in a way I expect or want
The site provides charts or directories to help me find information
I have physical access to log in and view information
The information in the site is organized
I have the ability to browse the information

Very important	Important
Somewhat important	Not Important

Click and drag all items before going to the next page. *Please do not use the browser back button*.

When you are looking for information, how important are the following items? Click on each item and drag it to the box that best defines the level of importance. You can also order items within each box.

Items
There is the right amount of information
There are links between items in the site
The subjects of items are identified
I can find exactly what I need
The information is up-to-date
There are enough links to other information outside the site
There is a summary of items in the site
The information is accurate
It is easy to tell what items in the site are

Very important	Important
Somewhat important	Not Important

Click and drag all items before going to the next page. *Please do not use the browser back button*.

When you are looking for information, how important are the following items? Click on each item and drag it to the box that best defines the level of importance. You can also order items within each box.

Items	Very important	Important
The site indicates how I can tell if the information is valid		
There is enough information		
The information is error free		
The information is recent		
The site meets my needs now and I think it will continue to meet my needs in the future		
	Somewhat important	Not Important

Click and drag all items before going to the next page. *Please do not use the browser back button*.

When you are looking for information, how important are the following items? Click on each item and drag it to the box that best defines the level of importance. You can also order items within each box.

Items	Very important	Important
The site allows me flexible ways of getting information		
The information is easy to understand		
The site provides me with a sense of being part of a community		
The site is familiar to me		
The information in the site fits my needs		
The site is esay for me to find		
	Somewhat important	Not Important

Click and drag all items before going to the next page. *Please do not use the browser back button*.

When you are looking for information, how important is the following item? Click on it and drag it to the box that best defines the level of importance.

Items	Very important	Important
The site saves me time		
	Somewhat important	Not Important

Click and drag all items before going to the next page. *Please do not use the browser back button*.

When you are looking for information, how important is the following item? Click on it and drag it to the box that best defines the level of importance.

Items	Very important	Important
The site saves me effort		
	Somewhat important	Not Important

Click and drag all items before going to the next page. *Please do not use the browser back button*.

When you are looking for information, how important are the following items? Click on each item and drag it to the box that best defines the level of importance. You can also order items within each box.

Items	Very important	Important
The information is valid		
The information is credible		
The information has meaning over time		
The information is reliable		
The information is trustworthy		
The information has value		
	Somewhat important	Not Important

Click and drag all items before going to the next page. *Please do not use the browser back button*.

When you are looking for information, how important are the following items? Click on each item and drag it to the box that best defines the level of importance. You can also order items within each box.

Items	Very important	Important
The site has features that make it easy to use		
The information is available at the speed I want		
The information is complete		
The information seems plausible		
The information has value to me		
The information is accessible		
The information is timely		
I can browse the information		
The information is presented and packaged in a way that I can use		
The information is provided in a flexible manner		
There is not too much information		
	Somewhat important	Not Important

Click and drag all items before going to the next page. *Please do not use the browser back button*.

Open Questions

Did you know that you can go back to courses you have finished?

- ☐ Yes
- ☐ No

Did you know that you can go back to resources (lectures, assignments, references, documents, etc) from courses you have finished by returning to the course site?

- ☐ Yes
- ☐ No

Have you ever gone back to view resources from courses you have finished?

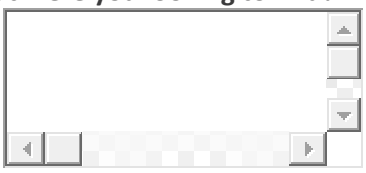
- ☐ Yes
- ☐ No

Why not?

Approximately how frequently have you gone back to the resources from a previous course after leaving that course?

- ☐ One to Three times
- ☐ Four to Nine times
- ☐ More than Ten times

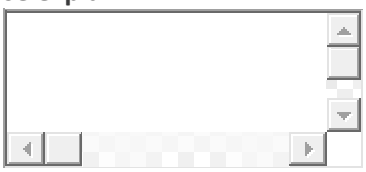
What were you looking to find?



Did you find what you were looking to find?

- ☐ Yes
- ☐ No

Please explain:



What reason(s) would encourage you to go back to the resources from a course?

- ☐ You are told that the resources on the site have been updated or are new.
- ☐ You are looking for resources that you remember using or seeing.
- ☐ You need information for a different class you are currently taking.
- ☐ You need information for your job.
- ☐ You are just curious.
- ☐ Other:

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VITA

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