The Dissertation Committee for Valerie Kesner Greenberg Certifies that this is the approved version of the following dissertation:

ATTITUDINAL INFLUENCE ON TECHNLOGY USAGE BY FACULTY IN HIGHER EDUCATION

Committee:

Sherry Field, Supervisor

Elaine Fowler

Norvell Northcutt

Mary Lee Webeck

Frank Wicker

ATTITUDINAL INFLUENCE ON TECHNLOGY USAGE BY FACULTY IN HIGHER EDUCATION

by

Valerie K. Greenberg, B.A., M.A.

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

December, 2006

Dedication

To Dr. Oscar Mink

Acknowledgements

Just as it “takes a village to raise a child”, this work was supported by much collaborative effort in my behalf.
I would like to thank my mother, Bobbette Wells Kesner, who supported me in many ways, emotionally, materially and motherly, to make this work a reality a very long time. Thanks, Mom. I will always be eternally grateful to you. I truly could not have done this without you. I would also like to thank the chair of my issertation committee, Dr. Sherry Field for her support, guidance and wisdom. . Kudos as well to Dr. Wicker, whose class I began with—and whose wonderful teaching style led me to a deeper appreciation of my topic.
I owe a huge debt of gratitude to my daughter, Jennifer, who functioned in many roles for me: T.A., technical consultant, and good old fashioned hand- holder. She gave unselfishly of her time and talents, and again, her aid was beyond value to me. Thank you, Jennie, from the bottom of my heart. I would also like to thank my son, Kevin for his continued love, concern, and long distance encouragement. Kevin, you always make me smile. Thanks to my sister, Stevie Ricks for ‘being there’-- a comrade in arms and luckily for me, my own homeopathic expert. I also want to thank Thom Ricks for his encouragement and always-upbeat views on life and the pursuit of happiness. To Laurie Williams, my friend and mentor at UT Austin, you have been in so many ways invaluable with your time and friendship. Thanks to Guillermo Torres who spent countless generous hours editing my work, and to Maggie, who even helped to edit from Japan! And l wish to thank Barrett Pepper for working until dawn to help upload this work to ProQuest.
And finally, I want to express my tremendous gratitude to Dr. Patricia Lonchar, who is my dear friend and mentor. She set the standard for me to follow of a woman returning to University to earn her doctorate with great intelligence, grace and commitment. Beyond that, she has added her wisdom and counsel to almost every aspect of my academic life. Thank God for Pat Lonchar, a beacon of light for me! To all of you, my sincerest appreciation and love.
And finally, I would like to thank those pioneers in technology (old computer people) as well as the innovators in communication technologies such as Tim Burners Lee for revolutionizing the way we communicate, and thus teach, all future generations.
Here’s to change!

ATTITUDINAL INFLUENCE ON TECHNLOGY USAGE BY FACULTY IN HIGHER EDUCATION

Publication No._____

Valerie K. Greenberg, Ph. D

The University of Texas at Austin, 2006

Supervisor: Sherry Field

The rapid inclusion of new technologies into educational curriculum has left some educators feeling ill prepared and anxious towards changes in teaching styles and curriculum necessary to put these innovations to use in their classrooms. It is imperative that we address this reluctance in order to provide inclusion of both faculty and students in the information revolution that began with the Internet and that continues to sweep the globe. Existing research takes primarily an external perspective to lack of technology usage in education; few studies have considered the psychological barriers that may contribute to technological and digital inequality within a University community. Real progress can be made in motivating technology resistant faculty by teaching them to differentiate between the characteristics of experts and novices, by providing them with the tools necessary to improve their self-efficacy to utilize new teaching technologies, and by providing the infrastructural support necessary to succeed.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

> "The experts are startled that educational institutions have changed so little, despite widespread expectation a decade ago that schools would be quick to embrace change."
>
> *Pew Internet & American Life Project, 2005*

The Pew Internet and American Life Project issued surprising results in March of 2005. The Pew Research Center functions as a philanthropic think tank on societal issues and emerging trends in American culture, provides knowledge by gathering information, and advances policy solutions on a variety of issues, including the integration and use of the Internet in American life. In its Internet project, societal issues are examined through the prism of Internet adoption and the impact it continues to have on our culture. The recent findings in spring of 2005 suggest that educators are not embracing use of the Internet to the degree forecast in the mid-'90s by many experts. What might be behind the lag of adoption of technology usage in education? What are some of the attitudes of some University faculty toward integrating new technology into their teaching methods? This study proposes examining university faculty attitudes

toward new technologies, including the Internet and the attitudes toward the changes those new technologies bring to faculty classrooms and teaching.

BACKGROUND

The introduction of the World Wide Web opened a door to a new kind of technology never seen before 1992. Alongside the other great communication technologies: the printing press (1436), radio (1896) and television (1927), the Internet has had a colossal impact on most aspects of the very fabric of our societal constructs. Imagine all of the changes that the printing press wrought from 1438 until the mid-1990s. Now imagine that change taking place in under twenty years. You have just imagined the remarkable changes that have and continue to occur since the advent of the World Wide Web in 1992.

"Technology has now changed or altered how people access, gather, analyze, present, transmit, and simulate information. Today's technologies provide the tools, applications, and processes that empower individuals of our information society" (Pisipia 1994, 30). By 2005, the Pew Internet Project found that not everyone in society took advantage of new technologies. For example, it stated that "The Internet will be more deeply integrated in our physical environments and high-speed connections will proliferate – with mixed results" (Pew 2005). These mixed results can readily be seen today in most university settings in the United States. While some faculty members enjoyed and looked forward to the spreading use of computers and the Internet in their teaching, others trailed behind, unsure of this new milieu. Since the beginnings of

teaching with digital tools, adoption of new technologies by Universities and higher education settings have left some faculty members feeling ill-prepared and anxious toward change and its role in teaching styles and the curriculum necessary to put these innovations to use in their classrooms.

According to the National Survey of Information Technology in Higher Education, difficulties integrating technology into instruction continues to be the single-most important issue confronting institutional Information Technology (IT) efforts over the next few years. Nearly one third (approximately 31.5 percent) of respondents in 2001 identified "assisting faculty integrate technology into instruction" as being the top challenge for the IT department on their campuses. Comparatively, 29.6 percent of respondents in 1997, and 40.5 percent in 2000, identified the same thing as being the top priority (Green, Campus Computing, 2001). Difficulties supporting and developing technology for instruction continue to plague campuses worldwide. This view is reinforced by several recent studies of the faculty's use of technology in instruction, which indicate that many instructors do not use technology in any systematic or curricular way, if at all (Caffarella, 1999; Parker, 1997; Albright, 1997; Schwieso, 1993).

In 1984, Bloom asserted his negative assessment of traditional teaching with his claim that teachers' behaviors keep "80% of students from learning" (p. 12). That great teachers and great teaching may be necessary components of successful learning seems pretty obvious. Researchers in teaching effectiveness or process-product research have shown that positive teacher behaviors produce positive student outcomes (Evertson &

Green, 1986; see also Rodriguez, Plax, & Kearney, 1996; Ryan & Harrison, 1995; Teven & McCroskey, 1996). Yet little time or money is provided for our schoolteachers to receive teacher development. If teachers are the "at the very core of educational enterprise" as most experts agree, then the process of educating educators must be acknowledged as critical with subsequent actions by our societal institutions which affirm and provide concrete support to teachers in our nation's schools to achieve the goal of teacher digital learning and technology.

A New and Different Breed of Student

According to Donald Tapscott (1998, 2): "For the first time in history, children are more comfortable, knowledgeable, and literate than their parents about an innovation central to society" (italics mine). This means that some students also routinely feel more comfortable, knowledgeable and literate than many of their teachers about some aspects of their curriculum and its delivery causing discomfort to many faculty members. This astonishing statistic also means that for some younger students, their knowledge base and their understanding of it are routinely filtered through the lens of high-tech schema of which some of their teachers have little or no knowledge. This leaves little room for "shared meaning." Most have been raised on the Internet since they were in Pre-K through middle school and onto high school, and have not thought much about its gradual and increasing influence of it on their lives. For them, it is as routine as radio was for baby boomers. For some tech-conscious students it is easier to share and discuss their meaning of knowledge in a chat room originating in Hong Kong than it might be to share it with a teacher in their classroom. It is critical that those who teach

in higher education both understand and have the ability to relate to a new breed of student.

> "Today's students are no longer the people our
> educational system was designed to teach"
>
> *Marc Prensky (2001)*

Technology increasingly forms and shapes curriculum and policy in our institutions. Among young people there has been a dramatic increase in learning through use of personal computers and, more recently, the World Wide Web. As recently as 1990, personal computers were found in fewer than 10 percent of U.S. homes. By 1995, they were in 36 percent of all homes, and by 1997 this figure had increased to 46 percent (Pew). Now it is estimated that 63 percent of all Americans have Internet access and a personal computer in their homes (with varying degrees of usage) and that 75 percent of children between the ages of 12 and 17 years old log on to the Internet daily (Pew 2004). The latest figures are in: By 2014, 90% of all Americans will go online from home via high-speed networks that are dramatically faster than today's high-speed networks (Pew 2006). The students, who are products of this technology-immersed curriculum do not think or behave the way students before technological interventions in schools, did.

The office of Educational Technology studies reveals that computer use may promote cognitive development in both children and adults, specifically in the area of visual intelligence….(Greenfield et al. 1994a, 1994b; Subrahmanyam and Greenfield 1994; also see Weikart 1995; Thelen 1996; Healy 1999 as quoted in OET, 2006). A certain skill-set is involved in obtaining access to the Internet, which requires more

effort and probably more intelligence than simple reading/listening/viewing skills that media demanded in the past. Fourteen years ago, most media presented to us, whether television, film, radio or print, exhibited a passive quality. These media presented us with their information which we could absorb or not, but we could not actively manipulate the medium or interact with it. The media, until the introduction of the World Wide Web in 1992, had been carefully screened and sub-screened, and finally filtered by publishers, editors, producers, librarians or other gatekeepers. A hierarchical sifting process for screening knowledge acquisition still exists in media other than the Internet. These human screeners are not found in cyberspace; there are no filters in place on the Internet unless we purposely place them there. Without these information mediators triaging mass media, a surfeit of information exists which should be carefully weighed, considered. and accepted or rejected by its consumer before its acceptance. Even the level of trust found in information presented to the net savvy is not the same as it was for media consumers prior to 1992.

Current students' information base isn't the same from which the baby boomers drew in school, either. In 2004 the SCANS (Secretary's Commission on Achieving Necessary Skills) report, a study conducted by the U.S. government to examine the skills that jobs will need in the future and how best to teach those skills in our school systems, indicated the following information:

- "The amount of information doubles every 19 months.
- 90% of kindergarteners will work in jobs that do not currently exist

- 50% of what we learn today will be unusable in ten years."

The majority of faculties in higher education today are from the 'baby boomer' demographic, those persons born between 1948 and 1964. In what respects do students of today differ from their faculty members who fall in the baby boomer demographic? Rick Reis, editor of *Tomorrow's Professors Today* at Stanford University, includes a description written by Starret and Rogers, of a typical session of a student's use of technology in his latest installment of *Tomorrow's Professors Today*, published by The Stanford University Center for Teaching and Learning (2006):

> He sits at the computer with headphones piping music from an iPod to his ears. Ten different MSN chat windows blink and chime on the computer screen. An online role-playing game is minimized on the Windows taskbar. A music video blares from a TV in a corner of the room. A calculus book lies nonchalantly open by the cell phone, which itself sits next to the PC. He is doing his homework. He is real. He is a 21st Century Learner.
>
> (Starret & Rodgers as qtd in NTLF 2005)

The students entering universities and colleges today have used some form of interactive media through most of their school years. They rely on their cell phones as their primary means of communication and "continued connectedness": as a portal to

the Internet where they can chat online, stream video or pictures of themselves or interesting objects of their attention, or send and receive IMs (instant messages). As they concurrently perform these tasks, they do so routinely, never conceding their actions as multi- tasking, for to them, multi-tasking is their performance venue of choice.

Diana Oblinger, Vice President for EDUCAUSE, refers to youngsters born in 1982 or after as "Net-generation" learners. Other terms sometimes used are "Millennial Student," "Generation-Y," and "Digital-native"(Oblinger 2005). Rodger and Starret tell us that "they all refer to students who have grown up in a technology-enabled world, never knowing life without computers, the Internet, CDs, and cell phones (as quoted in Tomorrow's Professors, 2001). To these students, life without digital technologies seems "distant, alien, and quaint" (Rodgers and Starett, 2005). Teachers who do not make use of technology in teaching probably also seem quaint. The beginnings of a stream of generations of tech-savvy learners are now entering universities and colleges. The heralds of this stream of students graduated from college in 2005-2006. Following them are younger children and adolescents moving through our school system from kindergarten into the first grade followed by elementary and middle school and onward through the high school system. Following graduation, they enter colleges or universities, never having experienced schooling without technology available in some form. Their expectations, needs, and wants are formed from a childhood spent in a tech-enabled environment. (Starret and Rodgers,2005 as quoted in NTLF).

Who Are These Guys Anyway?

According to the US Department of Education: “The nearly 50 million students in our elementary, middle and high schools today represent the largest and most diverse student body in our history. Thirty percent are minorities, meaning that our school population is more diverse than this country's adult population.” Following are some recent statistics compiled by the US Department of Education that help to define this generation of students (as noted previously, sometimes referred to as the Millennial generation, or "The Millennials")

- 96 percent say that doing well is important to their lives
- 94 percent say they plan to continue their education after high school
- 88 percent say going to college is critical
- 74 percent say they get along with their parents extremely well or very well
- 76 percent want to learn more about the world
- 28 percent of high school students access foreign news sources via the Internet
- 90 percent of children between ages 5 and 17 use computers.
- Teens spend more time online using the Internet than watching television.
- 94 percent of online teens use the Internet for school-related research
- 24 percent have created their own web pages
- 16 percent of teens are shareholders in the stock market
- Teens and college students combined spend nearly $400 billion a year

According to Rogers and Starrett some of the learning characteristics of the net generation students include:

- A preference for visual modes of communication
- A need for instant gratification
- An ability to accomplish multi-tasking
- A strong desire for social connectedness (frequently met through the Internet on sites such as MySpace.com)

All of these characteristics partially define how the current generation learns. Net generation learners have been born into a digital habitat and raised in a technology-enhanced world that has impacted their development as individuals and as learners. Staffert and Rodgers make this startling assertion "many believe that the unprecedented interaction with technology has resulted in neural development markedly different from that of all previous generations" (italics added).

Vygotsky emphasized the importance of the use of tools in the development of human mental processes. "The tool is not simply added on to human activity; rather, it transforms it" (Vygotsky qtd in Tikhomirov, 1981: 270). Many have predicted that one of the seismic changes brought with the Net generation into formal educational will include more student-driven learning. Enabled by information technologies, the pace of learning in the next decade will increasingly be set by student choices. In ten years, most students will spend at least part of their "school days" in virtual classes, grouped online with others who share their interests, mastery, and skills—not by age group. Marc Prensky had dubbed the student who relates to learning since 1990, "digital

natives." What should we call these "new" students of today? Some refer to them as the N-[for Net]-gen or D-[for digital]-gen. But the most useful designation the researcher has found for them is digital natives. Our students today are all "native speakers" of the digital language of computers, video games and the Internet.

So what does that make everyone else? Prensky defines those who were not born into the digital world but have, at some later point in their lives, become fascinated by and adopted many or most aspects of the new technology are, and always will be compared to them, digital immigrants, strangers in a new strange land. Staffert and Rodgers use the term, "21st Century Learner", because it includes digital natives and older learners who are also influenced and impacted by technology in and out of the classroom. Furthermore, the students of today have not just demanded a new way of learning, they have created a new type of learner: the internet-savvy kid. Internet-savvy students are maintain a remarkably different mindset from those who came before them and their non-wired peers. When it comes to communicating with their classmates, peers, and teachers they exhibit both a different attitude towards the use of computers as well as the way they physically achieve and produce accomplishments. They interact with education in the outside world in technology- driven ways including the use of online libraries, online phone directories, online FAFSA applications.

Today's students are very technology-savvy, feel strongly about the positive value of technology and rely upon technology as an essential and preferred component of every part of their lives.

- Students approach tasks and daily activities differently because of the technology they use.
- As students get older, their use of technology becomes more sophisticated, and, comparatively, the younger students are on a faster track to becoming greater technology users and advocates.
- The access point for technology use, particularly for older students, is home-focused, not school-focused.
- Today's students are ultra-communicators.
- "Voices and Views of Today's Tech-Savvy Students", 2004

STATEMENT OF THE PROBLEM

Faculty members are faced with teaching a new generation of students who have lived and learned in a digital habitat—some students have been schooled in digital technology since kindergarten or before. Teaching in today's digital environment tests faculty skills as they are expected to engage students at a digital level in technologically rich learning environments. It seems that part of the difficulty with integrating a digital learning experience into teaching and research has been motivating faculty to "buy in" to the process of integrating new ways of thinking, teaching and doing while they convert familiar teaching activities into technology-rich ones in the digital classroom. For some faculty this process has been interesting and easily learned while for others it has involved a steep learning curve, or no learning at all. Most universities offer faculty workshops and seminars on technology and its uses in higher education, but not many

studies have been done on the underlying attitudes that promote the feelings of excitement or dismay at the idea of changing teaching methodologies to keep up with the latest technology tools and trends that these workshops purport. Some factors which seem to generate anxiety and surround their hesitancy of use of/lack of technology include a lack of self-efficacy, lack of social persuasion and modeling and the uncomfortable feelings of an expert within his/her own cognitive domain experiencing learning as a novice in a domain which is unknown to them.

THE STUDY

In this study the author will systematically examine attitudinal factors surrounding the hesitancy of use of technology by university faculty members including fear of change, negative perceptions about new technologies in the classroom, lack of self-efficacy in using technology and anxiety generated when a reversal of their role as an expert to a novice occurs within the technological domain.

Rationale and Purpose of the Study

Educators do not seem to be embracing technology as predicted since the early 1990s. While some faculty easily adapted to new technologies, others failed. Even with its limitless possibilities and promise, why have some technology initiatives in educational settings failed? According to Everett Rogers' diffusion of innovation theory, one reason why there is so much interest in the diffusion of innovations is because "getting a new idea adopted, even when it has obvious advantages, is very difficult" (Rogers, 1995, p. 1). This study investigates some of the factors surrounding hesitancy of

technology use by university faculty and how the diffusion of innovation theory applies to this phenomenon.

This study systematically investigates the attitudes of university faculty members toward the use of new technologies in their teaching and interprets and describes the attitudinal motivation which influences success or failure in adopting new technological methodologies. This work analyses the process and the social and other factors influencing the diffusion of Internet/World Wide Web technology for curriculum purposes among some university faculty members. Attributes of internet technology that differ from those of traditional instructional technologies and that modify the adoption and diffusion process are discussed, as are characteristics of the potential adopters and strategies that contribute to successful technology adoption and integration within an organization.

The transformation and saturation of higher education with technology will be examined through the prism of the Innovation of Technology. The process and the issues surrounding the adoption of new technologies by certain faculty into their classrooms will be framed in diffusion theory. The differences between traditional non digital, non-internet teaching and teaching with digital technologies and the differences they bring into a faculty member's educational setting will be discussed.
Emphasis will be placed on the characteristics of the potential adopters and strategies that contribute to successful technology adoption and integration within higher education classrooms.

RESEARCH QUESTION

In what ways can we come to understand University faculty attitudes regarding the utilization of new technologies in their classrooms, and how do those attitudes impact their beliefs and consequent motivation toward its use?

SIGNIFICANCE OF THE STUDY

Of societal institutions, (family, religious, social and educational) schools were expected above all others to spread the knowledge and subsequent use of technology throughout our society. This has not been the case, however (Pew 2005). The changing face of the world through globalization is no longer merely a promise; it has become a reality. In order to prepare our society for the rapid and accelerated adoption of new emergent technologies, we must ensure that our educational institutions and the educators who teach for them are ready to accept the challenge of teaching with and modeling technology use.

More practically, we need to discover what constitutes the attitudes behind the nature of faculty members' hesitancy about use of technology. What are the reasons behind this hesitancy? In order to motivate faculty members toward technology adoption we must come to understand the reasons behind faculty members' hesitancies so that negative attitudes and outlooks may be overcome with positive plans, and technology use can be assured. Bolstering a sense of confidence in computer use among anxious faculty members' sense of competency in computer use could help them engage and persist in undertaking the necessary change new learning promotes. Technology

use provides a new type of interface between students and their professors, and those who cannot communicate with these digital skills might find themselves not "connecting" to students in the same ways as before. If we want non-technology proficient faculty to change, we need to understand the barriers to that change. An examination of these topics, filtered through the prism of the Diffusion of Technology Theory hopes to reveal how the development of new ideas and practices surrounding technology adoption are accepted or resisted by faculty in higher education. This theory focuses on diffusion, the process by which an innovation is adopted and gains acceptance by individuals or members of a community.

Chapter Two

Review Of The Relevant Literature

Chapter Two: Review Of The Relevant Literature

The office of educational technology still sites the inclusion of technology in curriculum and instruction as the premiere issue in educational policy. The decade of the '90s saw access to technology in universities, colleges and schools increase from 35% in the mid '90s to 95% by the end of the decade, and from 3% to 65% in classrooms during that same time period (OET, 2003; NCES, 2000a; NCES, 2000b). The rapid speed of inclusion of new technologies by universities into educational settings and curriculum was embraced with excitement by many in higher education eager to sample brand new teaching techniques, but the introduction of technology has also left some educators feeling ill prepared and anxious towards the changes it brings and its role in their instruction. A brief review of the research literature related to technology and the attitudes of educators towards adoption of its use reveal several categories, including change and faculty attitudes, novice and expert domain, and self-efficacy.

FACULTY AND TECHNOLOGY

The face of change in the guise of technology adoption has entered almost all Universities and schools during the last thirteen years since the introduction of the World Wide Web in 1992. Some educators saw the uses of the new technology in the classroom as imperative to quality education. As the turn of a new century neared, Becker (1998) claimed that the Internet might become the most valued use of the

computer in schools--for both teachers and students--enhancing activities in the classroom and becoming an "integral part" of classroom instruction (Stuhlman & Taylor, 1998, p.91) and providing the "…connection to the global village" (Kurshan, 1990, p.51, Williams, 2003). The Department of Education's Office of Educational Technology (OET) stated in its November, 2000 report that "rapid advances in computer and telecommunications technologies are revolutionizing the way we work, gather information and connect to the world. As McKenzie (2001) described it, along with placing the technology in the classroom, Universities began encouraging their faculty members to use technology in their teaching and research. "We expect to see daily effective use of new technologies in standards-based curriculum . . ." (US Dept of Education 2000). Yet Greene (2000, p.1) tells us":in the Internet age, change is the only constant."

FACULTY AND CHANGE

How has faculty reacted to the transformation that technology brings? Change implementation is a given in education and occurs continuously as new information is taught. Learning itself promotes change. Attitudes about change vary individually from professor to professor. Some professors who are very comfortable with the way things are in their teaching practice are hesitant to embrace change (Anderson, 2002).

Change can be a source of stress (Honey & Culp 1996; Scheffler & Logan, 1999) or present an element of risk (Rogers, 1995; Williams 2003). Anxiety and fear are among the most common internal barriers to effective integration of telecommunications

projects (Brown, 1999; Dusick, 1998; Fabry & Higgs, 1997; Henson, 1987; McKenzie, 2001; Sherry, 2000. Unsettling feelings of uncertainty can afflict even the most competent of faculty as the cognitive change process invokes self doubt concerning new ways of thinking and task completions. Researchers have recently come to realize the need to employ a broad approach to research in the area of attitude towards computers and their use that relies on theories and models from multiple disciplines as a foundation (Goodhue, 1 988). Many researchers have hypothesized about the relationships between anxiety, attitudes and motivation that affected computer use. A study by Dyck (1998) explained that computer anxiety could be stated in terms of factors such as direct involvement. Other studies have shown that that relationships between computer anxiety and attitude toward computers remain largely unexplored. (Igbaria and Parasuaraman) while still more researchers have used the words computer anxiety and attitudes interchangeably (Convert & Goldseing 1980, Gilroy & Desai, 1086, Morrow, Prell & McElroy, 1986) as qtd in McVay, 2002.) Fewer studies have attempted to tie a link between attitudes towards computers and performance.

The lack of understanding regarding how attitudes towards computers and its resultant anxiety and consequences toward classroom teaching is scarce. More currently these attitudes have expanded beyond reaction to simple computers as our communications technology has developed and grown into a plethora of devices, gadgets and instruments made available to teachers by administrators, anxious themselves to increase teaching efficacy, and to keep abreast of the latest lures for new students.

Bandelos and Benson describe anxiety as "fear, dislike and lack of confidence towards computers."

Self-efficacy issues and feelings of incompetence also inhibit growth and change (Dusick, 1998; Fabry & Higgs, 1997; Henson, 1987; Marcinkiewicz; 1993; Sherry, 2000). The Pew Study on the Internet (2006) suggest that the hesitancy to utilize technology found in society as a whole is also seen in University faculty members: "The experts are startled that educational institutions have changed so little, despite widespread expectation a decade ago that schools would be quick to embrace change" (Pew 2006). Clearly, the administrations within institutions of higher learning have embraced the major change that technology could bring as demonstrated by the latest technological equipment housed within them and the hiring of support teams necessary to keep them humming. However, many faculty members in higher education have not taken the leap of faith by integrating technology, and the changes it brings, into their own classrooms. (Dirks, 1997; Fullan, 2002; Marcinkiewicz, 1993). Teachers who are planning to integrate technology driven projects in the classroom are facing more than one change. Not only do they need to learn how to use the technology; they often have to modify the way they teach–and often even the way they manage and organize the classroom (Scheffler & Logan, 1999)–to use that technology effectively (Berg, Benz, Lasley, & Raisch, 1998; Dirks, 1997; Fabry & Higgs, 1997).

Teachers facing use of telecommunications projects in the classroom will be facing changes (Becker, 1998). Change implementation is not new to education. Although educators often face change, "it is something that teachers who are

comfortable with the way things are often find frightening" (Henson, 1997). Change can also be a source of stress (Honey & Culp, 1996; Scheffler & Logan, 1999) or present an element of risk (Rogers, 1995), Mioduser, Nachmias, Lahav, & Oren, 2000; Rogers, 1995; Wells & Anderson, 1997; Zhao, 1998). Too often, administrators try to mandate change, expecting it to happen all at once, in "one giant step" (Dirks, 1997, p. 52). Robinson's 1995 study (as cited in Dusick, 1998) claims that teachers need an administrative mandate to compel them to change. As Bloome and Kinzer point out: Often in response to mandates. and orders from school administration, teachers use the strategy of closing their classroom doors and doing what they believe in their professional judgment is the best thing for students, giving only lip service to an administration's mandate. (Miller, 1998, p. 10)

Fabry & Higgs (1997) have found that teachers are more likely to adopt innovations from a grassroots level if they can receive administrative support, rather than having it mandated from top down. In this way, teachers feel ownership in the change and empowerment in growth decisions (Asayesh, 1993; Guskey & Sparks, 1996). "Students (faculty as students) who learned something in order to put it to use, showed more intrinsic motivation and showed greater conceptual understanding than did students who learned the material for testing purposes. (Deci 331)

For innovations to be diffused throughout an organization such as a school or university and to be adopted by individual professors, as education reformers hope, change agents must examine how the innovation fits in relationship to the different contexts within the organization. However, Fullan (2002) warns that "…those firmly

committed to their own ideas are not necessarily good change agents, because being a change agent involves getting commitment from others who might not like one's ideas" (p. 17).level (DuFour, 2001; Fullan, 2002; Guskey & Sparks, 1996; Waugh & Godfrey, 1995) and impact individual teachers and their effort.

NOVICE AND EXPERT DOMAIN

With the publication of **Social Foundations of Thought and Action: A Social Cognitive Theory**, Bandura (1986) expanded his theory of social learning to one he called social cognition. Bandura saw humans as self-functioning in a self-regulatory way that drew upon cognitive functions and self -reflective processes in human adaptation and change. This theory was advanced beyond earlier notions that humans were reactive organisms shaped and even driven by environmental factors. In this schema, persons are seen as proactive, self-directing and self-regulating constantly in a dynamic state of cognitive self-direction.

Pajares advanced a view of human functioning that accords a central role to cognitive, vicarious, self-regulatory, and self-reflective processes in human adaptation and change. Pajares asserted that "from this theoretical perspective, human functioning is viewed as the product of a dynamic interplay of personal, behavioral, and environmental influences. For example, how people interpret the results of their own behavior informs and alters their environments and the personal factors they possess which, in turn, inform and alter subsequent behavior" (Pajares 1997). This is the foundation of what is known as Bandura's (1986) conception of reciprocal determinism.

Pajares explains that in this view that "(a) personal factors in the form of cognition, affect, and biological events, (b) behavior, and (c) environmental influences create interactions that result in a triadic reciprocality [sic]." Bandura altered the label of his theory from social learning to social "cognitive" both to distance it from prevalent social learning theories of the day and to emphasize that cognition plays a critical role in people's capability to construct reality, self-regulate, encode information, and perform behaviors. (Pajares 213) Conflicting feelings may emerge in reluctant faculty due to actual cognitive processes which 'feel different' to them than the ones they experience as they teach as an expert within their own field and cognitive domain. Adding new technologies to this mix often causes unease as their familiar patterns of knowledge retrieval and understanding and learning mechanisms switch from that of an expert learner (within their own domain) to that of a novice (in the field of educational technologies). Sandholtz and Ringstaff assert that "Teaching presents ever-changing challenges. As the context changes, so do the demands. Experienced teachers quickly become novices when the classroom environment shifts dramatically, transforming tried-and-true strategies into ineffective approaches (Sandholtz & Ringstaff, 1996, p. 282).

Teachers finding themselves in a novice's position often doubt their own competence (Marcinkiewicz, 1993) and spend a lot of their initial learning time preoccupied with their feelings of inadequacy (Sandholtz & Ringstaff, 1996). Harris (1999) describes this initial learning as "stumbling" (p. 57), because teachers often encounter unexpected situations as they take their first steps. McKenzie (2001) warns change agents that rushing novices to move through stages of learning–not giving them

time to absorb and process information, and to explore and practice new learning–may result in a "great danger that anxiety, concern and latent resistance of many of the more reluctant learners will be aggravated" (p. 4). Some reluctant teachers' aversion to the change involved in integrating technology has been likened to avoiding a "disease" (Willis, 1992, p. 82). Many novices also hesitate to initiate actions based on new learning until others can confirm that the planned action is appropriate for the given situation (Daley, 1999).

A large portion of determining the differences between novice and expert cognitive domains is descriptive; that is, expert behavior is described and often compared to novice behavior. Glaser (1996) summarize characteristics of expertise that are robust and generalizable across a variety of domains. Most experts excel in their own area of expertise or domain for a variety of reasons. For example, they perceive they perceive large meaningful patterns within their domain. They also possess superior short-term and long-term memory beyond novices. In addition, they are faster than novices at performing skills within their domain, quickly solve problems with little error and spend a great deal of time analyzing a problem quantitatively. And last, experts utilize strong self-monitoring skills to see and represent a problem in their domain at a deeper (more principled) level than novices (Glaser 1996).

No wonder then, that a novice in the field of teaching with technology might experience overwhelming feelings of defeat when trying to incorporate the necessary skills to radically changes teaching habits. Novice technology users teaching in the classroom begin to experience a role reversal from expert to novice with its

accompanying doubts and fear.

Study of the functions and processes of the mind help us to understand what learners know and how they know. According to constructivist learning theory we learn through a continual process of constructing, interpreting, and modifying our own representations of reality based on our experience with reality (David Jonassen, cited in Harper and Hedberg, 1997). Harper and Hedberg also point out that studies consistently show that "higher order thinking skills are not acquired through didactic approaches, bur rather through learner's active involvement with information.

The constructivist view argues that knowledge and reality do not have an objective or absolute value or, at the least, that we have no way of knowing this reality. Von Glasersfeld (1995) indicates in relation to the concept of reality: "It is made up of the network of things and relationships that we rely on in our living, and on which, we believe, others rely on, too" (p.7). The knower interprets and constructs a reality based on his experiences and interactions with his environment. In contrast to von Glaserfled's position of radical constructivism, for many, social constructivism has emerged as a more palatable form of the philosophy. Constructivists also hold that individuals construct knowledge through interpreting their own experiences. Jean Piaget, one of the most influential proponents of constructivist theories, held the view that "children construct knowledge of the world through assimilation and accommodation" (Rice & Wilson, 1999), but he emphasized biological maturity as a necessary condition (Piaget 1954). Lev Vygotsky, a Russian philosopher and educational psychologist, agreed with many aspects of Piaget's work but emphasized cultural and social influences on

cognitive development (Vygotsky 1986).

Recent research on novice and expert thinking has consisted of identifying differences between novices and experts. For example, research has shown that experts have knowledge structures that are more detailed as well as more organized than those of novices (Chase, 1983; Chi, Glaser, & Rees, 1982; Larkin, 1979; Reif & Heller, 1982); tend to organize and perceive problems at a more concrete level whereas experts rely more on abstract concepts. Much of memory and skill acquisition revolves around the distinction between declarative knowledge and procedural knowledge which refers to the difference between knowledge that and knowledge how (Baxter 136).

Anderson (1983, 1987) asserts that expert cognition relies on the declarative-procedural distinction because … types of knowledge are manifested differentially in the three stages. (Anderson). In the first, (cognitive stage) learners primarily gather declarative knowledge from a variety of sources. When a person wants to perform a task, they must retrieve relevant sections of the declarative knowledge from long-term memory and operated on by what Anderson terms as "domain general procedural knowledge" (procedures that can be applied to declarative structures in any content area). An example of a domain general procedure would be, "If goal is to transform current state into goal state, then match current state to goal state to find the most important difference" (Anderson, 1985). In the early phases of this stage, decision-making and problem solving tend to be slow, tedious, and prone to error. As we become more competent in the domain, we gradually move into a second, associative, stage. Charness and Campbell tell us: "The repeated use of declarative knowledge in given

situations results in domain-specific procedures, that is, direct associations between specific conditions and the resultant action. The need for operating on declarative knowledge gradually becomes bypassed. The advantage to this process is that when conditions in the environment match the conditions of the procedural rule, the action is automatically invoked, circumventing the longer and more tedious process of retrieving declarative knowledge and applying general productions to it (Charness & Campbell, 1988). Finally, in the third, autonomous, stage, the procedures become highly automated. That is, the associations become strengthened and more highly specialized or tuned toward particular types of situations. Procedural knowledge at this stage operates in a very fast, automatic fashion (Anderson, 1983; Gagne, 1985; Charness & Campbell, 1988, Gordon 101).

Converting faculty from novice thinking patterns into experts with fast , automatic procedural knowledge is a challenge that must be faced for educators to be able to move into the habitat of a digital natives, the incoming wash of future students. Faculty resistant to the changes that new methodologies bring can ease self doubt by successful completion of small, easily accomplished tasks until they become expert at the knowledge how. While most faculty feel expert in their own knowledge areas and have a high sense of efficacy for their given field, undertaking new tasks in an emerging field can shake their sense of self-accomplishment. An exploration of self-esteem and self-efficacy concerning faculty perceptions of their ability to use technology provides insight into faculty reluctance to change.

SELF-EFFICACY

"Self-efficacy is the belief in one's capabilities to organize and execute the sources of action required to manage prospective situations". Self-efficacy contributes to student achievement. Students' beliefs in their efficacy to regulate their own learning and to master academic activities determine their aspirations, level of motivation, and academic accomplishments. Professors' beliefs in their personal efficacy to motivate and promote learning affect the types of learning environments they create and the level of academic progress their students achieve (Bandura, 1986).

Bandura also found that self-efficacy affects the choices we make, the effort we put forth and determines how long we persist when we confront obstacles and in the face of failure how we feel. Belief in one's personal efficacy spurs our actions. Self-efficacy issues and feelings of incompetence also inhibit growth and change (Dusick, 1998; Fabry & Higgs, 1997; Henson, 1987; Marcinkiewicz; 1993; Sherry, 2000). "Lack of self-efficacy could cause people to give up trying and to cease attempting to achieve their goals" (Zhang, et al., 1999, p. 372). Unless people believe that they can produce desired effects by their actions, they have little confidence that they will achieve their goal. Strong support systems, including organized technology workshops and informal support and mentoring, can help ease the internal barriers that educators may face. A strong sense of self-efficacy buffers the learner's disappointments with failure and provides an unshakable belief in their personal efficacy and a firm belief in the worth of what they are doing. (Eccles, 1983; Schunk, 1991; Weiner, 1986). Compared with learners who doubt their capabilities, efficacious learners are more likely to engage in

tasks, expend effort, persist to overcome difficulties, and perform at higher levels.(Bandura, 1997; Pajares, 1995; Schunk, 1996; Zimmerman,1994). Self-efficacy is different from self-esteem in that it is a context specific assessment of competence to perform a specific task or range of tasks in a given domain.

SELF-BELIEFS AND LEARNING

Albert Bandura tells us "What people think, believe, and feel affects how they behave. The natural and extrinsic effects of their actions, in turn, partly determine their thought patterns and affective reactions" (1986). Educators have always recognized that self-esteem is tied to learning in educational settings. Several studies have been conducted to measure whether student's beliefs about their capabilities influenced their performance. Since a child spends upwards of 15,000 hours in school during their mandated academic career, it behooves educators to study these areas to learn about motivational factors and their students' success. School also serves as a socializing experience that will impact the student's self-concept and their ability to contribute to society, and thus, the course of their lives.

There are two types of initiators to general motivation: extrinsic and intrinsic. These are also known as the locus of control. Extrinsic motivation is characterized by behaviors, which are performed because of either fear/reprisal or external reward systems. Thus a student who does his homework to avoid a negative punishment, or a student who only does an extra assignment to get further points on his grade demonstrates extrinsic motivation.

Intrinsic motivation is characterized by behaviors, which are initiated by the person's own sense of and desire for agreement with their own values and code of beliefs. The regulatory processes are integrated within the person and become an expression of the person's values and who the person is. Many faculty members in the study found that as they used technology they began to believe in its efficacy more and more. Consequently they integrated the use of technology more into their curriculum and what they saw as valuable, becoming less and less anxious while experiencing more and more success.

Sometimes the force of intrinsic motivation is so strong that it can alter a person's psychological status and cognitive pattern into an intensely focused state. In fact, Csikszentmihaly developed his theory of flow surrounding this idea. His theory, called "flow theory," holds that "the strength of intrinsic motivation is directly proportional to the extent to which the activity promotes a state of flow: a feeling of such total immersion in the task at hand that the individual becomes unaware of anything else." (Csikszentmihalyi 111). Most of us (more than 80%, according to Csikszentmihalyi) have experienced flow at one time or another- when a class session is going particularly well, for example, or when we become thoroughly engrossed in working on our computer or playing the piano or even in analyzing research data. The principal characteristic of flow is the perception of perfect congruence: that what one is doing is just challenging enough to give us a sense of accomplishment and growth. The feeling of congruence promotes a sense of accomplishment and growth. "At these times we're at the top of our game, and that feeling alone is enough to sustain us. Insufficient

challenge, on the other hand, leads to boredom and lack of energy; a challenge that is too far out of reach leads to anxiety and frustration."

For success, one must link challenge with support. If the goal is to encourage more faculty to use technology in their teaching and integrate it into their curriculum, for example, then the appropriate strategy would be not only to show faculty how technology might enrich their teaching, but also to provide opportunities to experiment with such technology in a low-risk, high-support environment which would motivate faculty to technology adoption. If the goal is to encourage more faculty to use technology in their teaching and integrate it into their curriculum, for example, then the appropriate strategy would be not only to show faculty how technology might enrich their teaching, but also to provide opportunities to experiment with such technology in a low-risk, high-support environment which would motivate faculty to technology adoption.

Deci defines motivation in education as "promoting in students an interest in learning, a valuing of education, and a confidence in their own capabilities and attributes"(Deci & Ryan 1985, 1991). Students are defined as motivated if they have a genuine interest in learning which they have internalized, showing volitional involvement in their learning projects. In other words, the highest kinds of learning seems to occur under the same types of conditions one would find where personal growth occurs. The person involved sincerely wants to learn certain knowledge to benefit themselves. Support is offered environmentally and psychologically by the teacher to the student to aid their success. If the person fails to succeed, whether from

outside conditions or internal beliefs, the failure acts as a negative feedback that effects the student's confidence and belief systems.

Wortman And Brehm (1975) suggested that responses to repeated failures need to be seen from a time course perspective. Individuals may fight back in the face of initial failures in a reactive attempt to reestablish control. It is only when failure experiences keep piling up that people are expected to give up and become helpless. Also, Ford and Brehm (1987) argued that prior failure may lead to perception of a subsequent task as comparatively more difficult. Because more difficult tasks commonly elicit more effort than easy tasks--at least up to a certain point (Wright and Brehm, 1989)--this may result in enhanced effort expenditure on the subsequent task (Motivation and Emotion class packet, 1999). All of these feelings can lead to a deterioration in the student's self-belief systems such as self -motivation, self-determinism and self-efficacy.

Deci goes on to discuss his examination of self-determination, which he argues is different than self-esteem. In several varying research projects, Deci concluded that "students who are intrinsically motivated for doing schoolwork and who have developed more autonomous regulatory styles are more likely to stay in school, to achieve, to evidence conceptual understanding, and to be well adjusted than are students with less self-determined types of motivation" (Deci, Valerian, Pelletier, Ryan 1991). When faculty changes roles from teacher to learner, similar constructs apply to them.

Bandura published "Self-efficacy: Toward a Unifying Theory of Behavioral Change" in 1977. This work contributed greatly to our understanding of motivation and

failure in academic settings. Bandura stated that "self-efficacy is the belief in one's capabilities to organize and execute the sources of action required to manage prospective situations". (Bandura 1977) He also stated that, “self-efficacy affects the choices we make, the effort we put forth and determines how long we persist when we confront obstacles and in the face of failure how we feel”. Much of our past dealings with learning culminate in our current level of self-efficacy. Self-efficacy closely relates to other motivational factors such as self-concept, self- determinism, and self esteem. Findings have consistently shown that academic domain-specific self-concept is related to academic achievement and to other motivation constructs across domains (Pajares, Emory University Lecture Notes).

Self-efficacy derives from what Bandura called mastery experience, vicarious experience and verbal persuasion, as well as physiological states. It is different from self-esteem in that it is a context specific assessment of competence to perform a specific task or range of tasks in a given domain. Thus, one might have high self-efficacy in regard to academic writing skills, and very low self-efficacy when faced with dealing with new technology.

Individuals constantly develop and create their own self- perceptions of capability that becomes instrumental to the goals they pursue and to the control they are able to exercise over their environments. (Pajares, Emory Website) Bandura called this self-agency. Therefore, it follows that many underachievers in school do not succeed not because they are not capable, but because they are incapable of believing they can succeed. They have come to hold perceptions of themselves as unable to do the

academic work or to see the work as irrelevant to their perceived world. Many students in remedial classes are there not because of an incapability to do the work, but because they hold the self-perception that they cannot read, master math, or think well, even when this is not true academically. Their self-perception of the ability to succeed has overwhelmed their natural abilities.

Thus, faculties who have high self-perceptions concerning their academic domain may find themselves foundering if their self-perception of their skills in the technology domain are less than to be desired; in fact, their perception of their abilities to acquire these skills might be a true barrier to their learning.

Bandura says these academic failures or crises "are crises of confidence." What people know, the skills they possess, or the attainments they have previously accomplished are often poor predictors of subsequent attainments because the beliefs that they hold about their abilities and about the outcomes of their efforts powerfully influence the ways in which they will behave (Bandura, 1977). Consequently, how people behave can often be better predicted by their beliefs about their capabilities than by what they are actually capable of accomplishing.

Bandura's Social Learning Theory emphasizes the importance of observing and modeling the behaviors and attitudes of others. Instruction can be made more efficient by modeling desired behaviors of functional value to learners and by providing situations, which allow learners to use or practice that behavior to improve retention. (Halford, iii).

Once the learner demonstrates a capability to use the skill or strategy independently

when performing related tasks, a shift occurs from attending workshops and presentations, to incorporation of these behaviors into their own classroom teaching, self-controlled use demonstrates the learning that has occurred.

One of the most powerful ways to raise self-efficacy and erase avoidance of technology occurs through mastering challenges. Carefully planned faculty workshops taught by instructors sensitive to self-esteem and self-efficacy issues could assist faculty in overcoming learning barriers in a friendly, relaxed atmosphere while providing an opportunity to master their newly acquired skills. The workshops could provide the gentle, social persuasion necessary to success. The incorporation of what they have seen modeled for them, together with a self-efficacy, which allows them to experiment and feel good about their outcomes, enables faculty to achieve a high degree of technical expertise within their own teaching strategies, and to become more eager to embrace the changes that it brings. Many faculty who early- on embraced technology in teaching help to spread or 'diffuse' the innovation through the use of modeling successful outcomes with technology to promote it's adoption by others. These role models accelerated the rate of adoption among other faculty by acting as change agents in a complex schema that Everett Rogers dubbed the Diffusion of Innovation Theory.

DIFFUSION OF INNOVATIONS THEORY

> "Diffusion research is emerging as a single, integrated body of concepts and generalizations, even though researchers in several scientific disciplines conduct the investigations."
>
> Everett Rogers with F. Floyd Shoemaker (1971)

What could corn farmers and college faculty possibly have in common?

Both are examples of the time proven theory formulated by Everett M Rogers more than sixty years ago, the Diffusion of Innovation Theory.

Current research in the area of change looks at the way innovations are diffused throughout systems and how individuals adopt innovations and adapt to change (e.g., Dirks, 1997; Durrington, Beichner, Titus, & Valente, 2000). One of the most important facts to consider in discussing diffusion theory is that it is not one, definitive, cohesive, and comprehensive theory, but rather a large number of theories, from a wide variety of disciplines, each focusing on a different element of the innovation process, combine to create a meta-theory of diffusion. (Surry, 1997).

According to Surry, the researcher who has done the most to synthesize most of the significant findings and compelling theories related to diffusion is Everett M. Rogers. Rogers' book, Diffusion of Innovations, first published in 1960, and now in its fifth edition (Rogers, 2004) is the closest any researcher has come to presenting a unified theory of diffusion (Surry, 1997). Beginning with studies on farming and corn technology in the 1940's, and continuing to currently studying the diffusion effect in the AIDS epidemic, Rogers has amassed information concerning the diffusion of innovations more than any other author/researcher.

The study of diffusion of innovation is a fairly recent field. Rogers (1995) points out that a 1943 study by Ryan and Gross at Iowa State University provided the genesis of modern diffusion research. Hybrid seed was made available to Iowa farmers in 1928. The hybrid vigor of the new seed increased corn yields on Iowa farms, hybrid corn

varieties withstood drought better than the open-pollinated seed they replaced, and hybrid corn was better suited to harvesting by mechanical corn pickers. By 1941, about thirteen years after its first release, the innovation was adopted by almost 100 percent of Iowa farmers. Ryan and Gross studied the rapid diffusion of hybrid corn in order to obtain lessons learned that might be applied to the diffusion of other farm innovations. However, the intellectual influence of the hybrid corn study reached far beyond the study of agricultural innovations and outside of the rural sociology tradition of diffusion research. The Ryan and Gross (1943) study, from the field of rural sociology, used interviews with adopters of an innovation to examine a number of factors related to adoption. The interview-based methodology used in the Ryan and Gross study has remained the predominant diffusion research methodology ever since (Rogers, 1995). The adoption of a technology is a complex process; more than simply exhibiting the technical superiority of a product (Abrahamson & Rosenkopf, 1997; Rogers 1995; Ryan & Gross, 1943, Valente, 1995). Ryan & Gross discovered that diffusion was "a social process through which subjective evaluations of an innovation spread from earlier to later adopters rather than one of rational economic decision making. Additionally, Ryan and Gross (1941) developed a new lexicon to classify the adopters of a new innovation. They listed five adopter categories: innovators, early adopters, early majority, late majority and laggards. Additional theorists since (Abraharnson & Rosenkopf, 1997;Gladwell, 2000; Midgely & Dowling, 1978; Rogers, 1995) have used and modified these basic categories to build upon the work of Ryan and Gross.

Innovators are the first 2.5 percent of the individuals in a system to adopt an

innovation. Venturesomeness is almost an obsession with innovators. This interest in new ideas leads them out of a local circle of peer networks and into more cosmopolite social relationships. While an innovator may not be respected by the other members of a social system, the innovator plays an important role in the diffusion process: That of launching the new idea in the system by importing the innovation from outside of the system's boundaries. Thus, the innovator plays a gate-keeping role in the flow of new ideas into a system.

Early adopters are the next 13.5 percent of the individuals in a system to adopt an innovation. Early adopters are a more integrated part of the local system than are innovators. Whereas innovators are cosmopolites, early adopters are localites. This adopter category, more than any other, has the greatest degree of opinion leadership in most systems. Potential adopters look to early adopters for advice and information about the innovation. This adopter category is generally sought by change agents as a local missionary for speeding the diffusion process. Because early adopters are not too far ahead of the average individual in innovativeness, they serve as a role model for many other members of a social system. The early adopter is respected by his or her peers, and is the embodiment of successful, discrete use of new ideas. The early adopter knows that to continue to earn this esteem of colleagues and to maintain a central position in the communication networks of the system, he or she must make judicious innovation-decisions. The early adopter decreases uncertainty about a new idea by adopting it, and then conveying a subjective evaluation of the innovation to near-peers through interpersonal networks.

Early majority is the next 34 percent of the individuals in a system to adopt an innovation. The early majority adopts new ideas just before the average member of a system. The early majority interacts frequently with their peers, but seldom hold positions of opinion leadership in a system. The early majority's unique position between the very early and the relatively late to adopt makes them an important link in the diffusion process. They provide interconnectedness in the system's interpersonal networks. The early majority are one of the two most numerous adopter categories, making up one-third of the members of a system. The early majority may deliberate for some time before completely adopting a new idea. "Be not the first by which the new is tried, nor the last to lay the old aside," fits the thinking of the early majority. They follow with deliberate willingness in adopting innovations, but seldom lead.

Late Adopter is the next 34 percent of the individuals in a system to adopt an innovation. The late majority adopts new ideas just after the average member of a system. Like the early majority, the late majority makes up one-third of the members of a system. Adoption may be the result of increasing network pressures from peers. Innovations are approached with a skeptical and cautious

air, and the late majority do not adopt until most others in their system have done so. The weight of system norms must definitely favor an innovation before the late majority is convinced. The pressure of peers is necessary to motivate adoption. Their relatively scarce resources mean that most of the uncertainty about a new idea must be removed before the late majority feels that it is safe to adopt.

Laggards are the last 16 percent of the individuals in a system to adopt an innovation. They possess almost no opinion leadership. Laggards are the most localite in their outlook of all adopter categories; many are near isolates in the social networks of their system. The point of reference for the laggard is the past. Decisions are often made in terms of what has been done previously. Laggards tend to be suspicious of innovations and change agents. Resistance to innovations on the part of laggards may be entirely rational from the laggard's viewpoint, as their resources are limited and they must be certain that a new idea will not fail before they can adopt.

Diffusion research, in its simplest form, investigates how these major factors, and a multitude of other factors, interact to facilitate or impede the adoption of a specific product or practice among members of a particular adopter group. (Surry 1997). Rogers also developed a theory innovation-adoption process. (Rogers 2004). Given that decisions are not authoritative or collective, each member of the social system faces his/her own innovation-decision that follows a 5-step process (Orr, 2003):

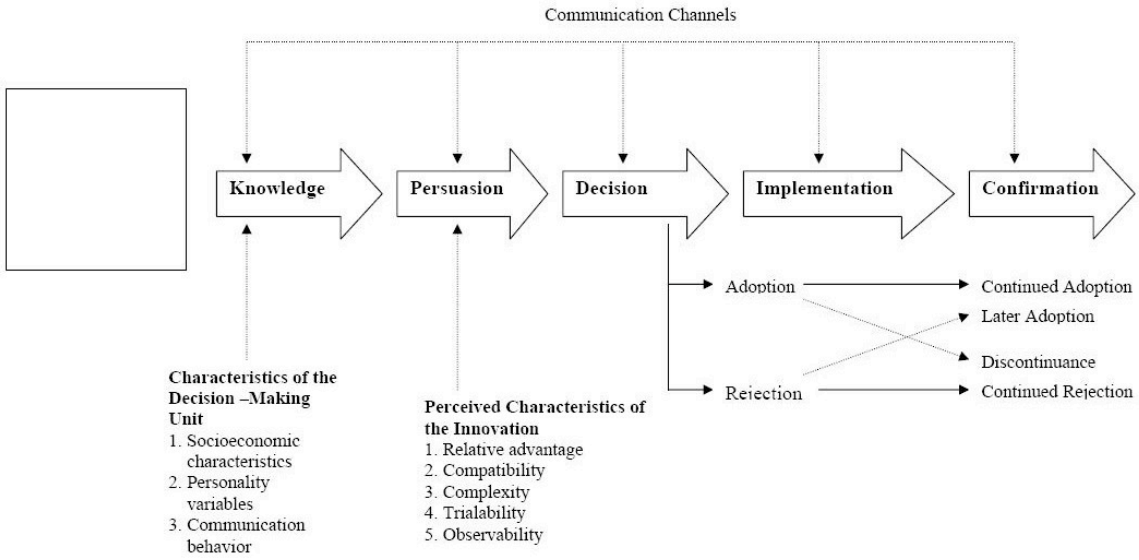


Figure 1 Rogers & Shoemaker (1973): Stages in the Innovation Decision Process

1. *Knowledge* – person becomes aware of an innovation and has some idea of how it functions
2. *Persuasion* – person forms a favorable or unfavorable attitude toward the innovation
3. *Decision* – person engages in activities that lead to a choice to adopt or reject the innovation
4. *Implementation* – person puts an innovation into use
5. *Confirmation* – person evaluates the results of an innovation-decision already made

The four major factors that influence the diffusion process are the innovation itself, how information about the innovation is communicated, time, and the nature of the social system into which the innovation is being introduced (Rogers, 1995).

In fact, empirically the successful spread of an innovation follows an S-shaped curve proven for over 60 years, first by Ryan and Gross who were interested in corn seed diffusion and later by Educators in the disciplines of sociology, anthropology, and marketing and communications. Rogers theorized that innovations would spread through society in an "s" curve, as the early adopters select the technology first, followed by the majority, until a technology or innovation is common. The "S curve" is an accepted theoretical framework which proves that, after about 10-25% of system members adopt an innovation, relatively rapid adoption by the remaining members and then a period in which the holdouts finally adopt (Rogers, 1995). Developed for analyzing technology adaptation by farmers, it is now used in all the social sciences.

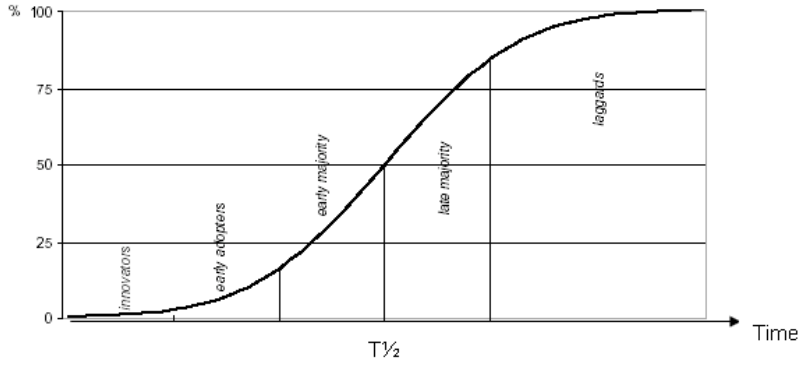


Figure 2. S Curve depicting Innovation Adoption vs. Time

Rogers theorized that innovations would spread through society in an “s” curve, as the early adopters select the technology first, followed by the majority, until a technology or innovation is common.

DIFFUSION IN SOCIAL SYSTEMS

The most striking feature of diffusion theory is that, for most members of a social system, the innovation-decision depends heavily on the innovation-decisions of the other members of the system. In educational settings, the motivation for the adoption generally spreads from individual users of the technology, "and as their communication and influence moves laterally through their contacts, a body of support can grow and exert "pressure" on… the system to commit to adoption of the technology." (Carr) One's practical influence on members of the system and what type of adopter you are creates the influence level that you exert. Rogers calls the level of influence and characterization of adopters "ideal types", concepts based on observations of reality that are designed to make comparison possible. Naturally exceptions can be found for ideal types in every category. Recently, Rogers studied the effects of interpersonal networking on diffusion. Rogers says, "the heart of the diffusion process is the modeling and imitation by potential adopters of their near peers' experiences new idea." The decision of whether to adopt a new innovation is mainly decided on the communications one exchanges with others much like themselves who have already adopted it. Opinion leaders are those members of the society who receive the greatest number of sociometric choices and who are the most sought after by others in the society for their advice and opinion concerning a diffusion. A highly important role in the spread of innovation in a system, organization or network is the Change Agent. Change agents usually possess a high degree of expertise regarding the innovations that are being diffused. They act as

a creative force in adoption by others by creating an intent to change and establishing a line of communications clarifying concepts for new adopters concerning the innovation.

> "A network can be used, rather than ignored, when creating (diffusion programs)."
>
> (Valente and Davis as quoted in Rogers 2004 p321.

The four major factors that influence the diffusion process are the innovation itself, how information about the innovation is communicated, time, and the nature of the social system into which the innovation is being introduced (Rogers, 1995). Diffusion research, investigates how certain factors interact to facilitate or impede the adoption of a specific product or practice among members of a particular adopter group (Rogers, 2004).

In earlier times, past adoptions in some way solved a dilemma for the faculty or Institution. With the Internet and World Wide Web technology, however it may be that the World Wide Web will provide a means of creating totally new learning environments, and it may be to that end that adoption is initiated. (Carr). Despite the promise of greater teaching support for professors, easier learning methods for students and the bonding that collaboration in innovation might bring, the use of technology integrated into teaching has not diffused and been adopted at near the rate formerly predicted by sociologists who expected that of all societal institutions, Education would advance the acceptance of the Internet.

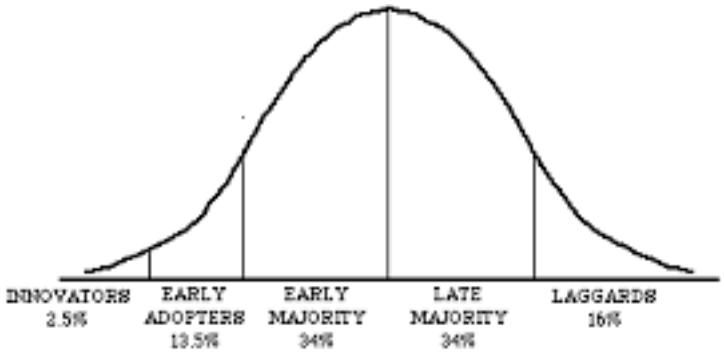


Figure 3. Stages in the Innovation Decision Process (Rogers & Shoemaker,1973)

DIFFUSION ADOPTER CATEGORIES IN AN ACADEMIC SETTING

In an academic or university setting, an academic filter on innovators might look something like this:

- Innovators tend to be experimentalists and "techies" interested in technology itself
- Early adopters who may be technically sophisticated and interested in technology for solving professional and academic problems
- Early majority who are pragmatists and constitute the first part of the mainstream—use technology for teaching, practical applications
- Late majority who are less comfortable with technology and are the skeptical, second half of the mainstream, avoid technology use

- Laggards who may never feel comfortable using new ways or new technologies, like to maintain previous methods of teaching

Chapter 3

Research Methodology

Chapter 3: Research Methodology

In this dissertation, the research is devoted to developing an understanding of human systems, be they small, such as a technology-using teacher and his or her students and classroom, or large, such as a cultural system. Systems theory has been well used by educational technologists for a long time (Heinich, 1970; Pask, 1975, 1984; Scott, 2001; Winn, 1975). It offers a way to describe learning that is more focused on cognition while avoiding some of the problems confronting those who use more quantitative methodology.

A qualitative gathering of data/opinions concerning faculty use of technology from the faculty point of view will be explored in order to understand faculty avoidance of the use of the latest learning technologies. Lincoln and Guba (1985) and Denzin and Lincoln (1994) contend that the history of inquiry can be divided into eras based on the cultural beliefs during the time when the research occurred. They argue that scientific inquiry is defined by the positivist paradigm, which has prevailed until recently. They call the earliest era the prepositivist era, which included human scientific endeavor at about the time of Aristotle to the middle of the 1700s and mostly consisted of passive observation followed by recorded observation. Many think that the modern era, known as the positivist era, began in the 1700s and continue to the present. Positivism can be

identified by scientific research that involves hypotheses, manipulation, active observation of occurrences, and, thus, testing of hypotheses. Now positivism is challenged by the post positivistic which others term qualitative research.

Qualitative research finds itself described with varying meanings in educational research, For example, Borg and Gall (1989) suggest that the term is often used interchangeably with terms such as naturalistic, ethnographic, subjective, and post positivistic. Qualitative research methods typically include interviews and observations but may also include case studies, surveys, and historical and document analyses. Prior to, and even well into the 1980s, it was still common for qualitative researchers to think of their own studies as being 'non-scientific' (Farrell 1987: 123). Jensen recounts that non-quantitative researchers during this period were trying to "secure a relatively under-defined niche" for something other than social 'science' a discipline where non-quantitative research thrived (Jenson 111). While the distinction between 'hard' science and 'soft' scholarship may still be debated in the new millennium (Rosengren 2000), the past two decades have witnessed a shift from "passive tolerance to active dialogue" (Jensen 11) between self-defined qualitative and quantitative researchers. At the same time, researchers during the same time period were trying to identify and categorize the features that make up qualitative research. Generally, qualitative research offers an information rich environment in which to gather and assess data and permits the researcher more freedom to experience opportunistic research, that is to say, research which allows for the flexible application of theoretical concepts and analytical procedures as it unfolds.

Qualitative research has several hallmarks. It is conducted in a natural setting, without intentionally disturbing or manipulating the environment. Qualitative research involves highly detailed rich descriptions of human behaviors and opinions. Wolcott explains that "one of the opportunities and challenges---posed by qualitative approaches is to treat fellow humans as people rather than objects of study, to regard ourselves as humans who conduct research among rather than on them" (Wolcott, 23). The prevailing perspective is that humans construct their own reality, and an understanding of what they do may be based on why they believe they do it. By researching among rather than on the research subjects, the researcher tries not to disturb their reality or impose their own reality on their subjects.

There is allowance for the "multiple realities" individuals thus might construct in an environment. The research questions often evolve as the study does, because the researcher wants to know "what is happening" and may not want to bias the study by limiting or narrowly focusing on their research questions. The researcher becomes a part of the study by interacting closely with the subjects who are being researched . The researcher attempts to be open to the subjects' perceptions of "what is"; there is a concern for the uniqueness of a particular setting and participants. Typically qualitative researchers seek answers in highly detailed rich descriptions of human behaviors and opinions, whether they be found in case studies, surveys, field observation or other qualitative methods.

Qualitative methods support the idea that an individual's world is socially constructed, amazingly complicated and ever changing. These ideas are supported by an

interpretivist (also referred to as a constructivist) paradigm “that humans construct their own reality, and an understanding of what they do may be based on why they believe they do it. There is allowance for the multiple realities individuals thus might construct in an environment” (Babbie, 2004). Qualitative researchers can help interpret and make sense of these multiple realities. Finally, qualitative data analysis is a tool that offers a non-numerical way to assess observations made through in-depth interviews, participant observation, and other naturalistic methods. There are several outstanding examples of qualitative researchers including Harry Wolcott's studies of a Kwakiutl village and school (1967) and of one year in the life of a school principal (1973); John Ogbu's (1974) ethnography of urban education.

Qualitative research methodologies will be utilized during this study. In this proposal, qualitative research may be thought of as research devoted to developing an understanding of human systems, whether they are vast---such as cultural, or very small—such as educational classroom research. A qualitative gathering of data/opinions concerning faculty use of technology will be explored in order to understand faculty avoidance of the use of latest technology. Generally, qualitative research offers an information rich environment in which to gather and assess data and permits the researcher more freedom to experience opportunistic research, that is to say, research which allows for the flexible application of theoretical concepts and analytical procedures as it unfolds.

Qualitative research has several qualifiers. Generally, it is conducted in a natural setting, and the researcher takes care not to deliberately disturb its environment;

however, the researcher may become a participant to the research undertaken and even interact within it. Typically qualitative researchers seek answers in highly detailed rich descriptions of human behaviors and opinions, whether they be found in case studies, surveys, field observation or other qualitative methods. Qualitative methods support the idea that an individual's world is socially constructed, amazingly complicated and ever changing. These ideas are supported by an interpretivist (also referred to as a constructivist) paradigm "that humans construct their own reality, and an understanding of what they do may be based on why they believe they do it. There is allowance for the multiple realities individuals thus might construct in an environment (Babbie 2004). Qualitative researchers can help interpret and make sense of these multiple realities. Finally, qualitative data analysis is a tool that offers a non-numerical way to assess observations made through in-depth interviews, participant observation, and other naturalistic methods.

Background to the Study

I began to notice a divide occurring between those teachers who used and embraced technology, and those who did not, in the mid 1990's. I began to wonder why some in higher education were intrigued (even if not expert) by the introduction of the Internet and other technological wizardry, and why others regarded the increasing call to computing as more of a hindrance than a challenge. Of course, there were also those like myself, who fit into both camps. Having been an admitted technophobe since 1986 when I began my Master's Work, I was no stranger to change. Completing assignments in my master's level education began with using the typewriter, which was totally

eclipsed by use of the PC mid-masters. By the time of my graduation, some 30 months later, word processing and use of computers had become the expected norm, Experienced with finicky technology and having come from working in a field which depended on the latest technological gizmo (media production) I knew the fear and panic that can set in when one doesn't feel in control of their production tools, no matter the method of production: filming, video taping, audio announcing, website authoring or writing. I considered the panic I felt back then about the belief that the computer would 'eat' the assignments I wrote and its nasty machinations to end my Master's career, just another step in the continuum of technophobia I had already experienced with other methods of production.

Years later, during my Doctoral schooling, I felt I completely understood the reluctance and ambivalence that some faculty felt towards integrating the fickle element of technology into their classroom curriculum, and I observed that some of my graduate classes at the doctoral level were tech-heavy while others were taught by professors who did not use the Internet, even for e-mail, on a regular basis.

I came to believe more and more the attitudes that faculty in higher education held about technology and the emotions connected to those beliefs, separated those who struggled, yet integrated technology into their teaching methods, and those who resisted and faltered. I began to develop a hunch about what was going on, and I found it interesting to explore the topic in several class assignments. I also presented research findings on this topic at several conferences. Eventually, some seven years later, I began to integrate what I had learned on this topic with my dissertation research on the same

topic.

The method I chose, Interactive Qualitative Analysis, is a rather new one, but a method, which lent itself remarkably well to my study as it allowed for analysis of real people's stories with constructivist methods. Encouraged by my faculty committee members who found value in the topic, I began the research necessary to conduct my study.

Most of the faculty I planned to study fell into the demographic category of baby boomer, those born between 1946 and 1964, whose high school and college experiences are notably different in many ways from that of the students whom they teach. As I continued with my research, I came to realize just how different the attitudes towards technology were from faculty aged from 45-80+, and the mainstream students they currently teach. I also noticed that for older students reentering college, with little or no previous computing/technology experience, the exasperation they felt for being inexperienced widened as they observed the younger, more tech savvy classmates achieving what they could not in the computer labs. I wondered if the attitudes (what seemed to me as fear, confusion and fear of loss of control) might also be what faculty felt when they prepared to introduce technology into their curriculum, or class objectives.

METHODOLOGY: INTERACTIVE QUALITATIVE ANALYSIS

Albert Einstein observed that, "Problems cannot be solved at the same level of awareness that created them." Interactive Qualitative Analysis (IQA) seeks to create

such levels of awareness by studying the ways in which certain individuals perceive the problem. Given that a naturalistic approach to research helps the inquirer to tease out, interpret and analyze individual realities of subjects within the study, I selected this specific qualitative method, Interactive Qualitative Analysis. In the field of higher education, new systems of research are developing. Recent developments include interactive multimedia, information technologies such as hypertext databases and the Internet, virtual reality systems, interactive learning environments, new distance-learning systems, and micro worlds. A spectrum of those in higher education including professors, administrators and institutional leaders contend that the evolution of new technologies will continue to change the nature of teaching, training, instruction, and learning (Ambron & Hooper, 1990, 1988; Lambert & Sallis, 1987; Schwartz, 1987; Schwier, 1987; U. S. Congress, OTA, 1988).

New methods of research reflect the need to find new ways of understanding. Interactive Qualitative Analysis (IQA) is a systems approach to qualitative research developed by Northcutt and McCoy at The University of Texas at Austin. Interactive Qualitative Analysis has its theoretical underpinnings derived from phenomenology, constructivism and grounded theory. "IQA reconciles quantitative TQM rigor to a qualitative design of data collection and analysis"(McCoy lecture notes 2005). IQA seeks to capture the lived reality of people, actively involving participants in the "mapping of their stories" while identifying relationships among self-identified components of an issue. IQA integrates the identification of the nature of the problem with solutions, even when uncertainty exists as to the exact nature of the problem. IQA

builds consensus among the focus group participants. IQA builds strategies around the nature of the problem". (Northcutt, McCoy 2004). (Significant portions of this chapter and subsequent descriptions of methodology in later chapters are used with the permission of Northcutt and McCoy. Other portions are products of class materials generated during the author's attendance in the IQA research class).

IQA falls within the naturalistic method. Naturalistic inquiry represents "a domain of inquiry aimed at understanding actualities, social realities, and human perceptions that exist untainted by the obtrusiveness of formal measurement or preconceived questions. It is a process geared to the uncovering of many idiosyncratic but nonetheless important stories told by real people, about real events, in real and natural ways" (Guba and Lincoln,1981).

Reality as it is perceived and held in consciousness is the primary object of study in IQA. While qualitative methods usually operate under the principle of that analysis and data collection are two completely separate processes. These methods also insist that only the researcher can analyze and interpret the data. IQA, on the other hand, achieves its insightful results by recognizing and allowing for the interdependent relationship between those being observed and the observer.

IQA is especially relevant to this study as it teases out the attitudes and beliefs of those researched through a systematic approach while supporting the ideas that humans construct their own reality, and an understanding of what they do may be based on why they believe they do it (Lincoln and Guba). It further upholds the ideas of Denzin and Lincoln who compare qualitative research to that of bricoluer--a quilt maker who

patches together parts to form a whole based on varying interpretations. (Denzin and Lincoln in Northcutt and McCoy 2004). IQA allows for a constructivist approach while supporting the belief that researchers deal with multiple, socially constructed realities that are complex and varied, while allowing that the observer and the observed are interdependent.

A major construct of Interactive Qualitative Analysis is grounded theory. The researcher collects extensive data with an open mind. As the study progresses, he or she continually examines the data for patterns, and the patterns lead the researcher to build the theory. Further data collection leads to further refinement of the questions. The researcher continues collecting and examining data until the patterns continue to repeat, sorting and refining until new patterns emerge. The researcher builds the theory from the phenomena, from the data, and the theory is thus built on, or "grounded" in, the phenomena. As Borg and Gall (1989) note, even quantitative researchers see the value of grounded theory and might use qualitative techniques in a pilot study without completely using *a priori* notions of theory to develop a more grounded theory on which to base later experiments.

System theory, also an integral part of IQA, has been well used by educational technologists for many years (Heinich, 1970; Pask, 1975, 1984; Scott, 2001; Winn, 1975). It offers a way to describe learning that is more focused on cognition while avoiding some of the problems confronting those who use more quantitative methodology. Furthermore, IQA recognizes the validity of the Japanese system known as TQM which holds as one of its basic tenets that the ideas of those closest to the

problem should name and fix the problem). All of these qualities lend themselves to and seems a good match for the proposed study and its sample.

In this instance, IQA will be used to determine the perceived state of reality in both focus groups while basing the analysis on the participants' own descriptions of that reality. Similarities and differences in both groups' experiences with the integration of technology into their teaching pedagogy will be identified. Later, through group sessions and individual interviews, symbolic depictions of the groups' mental schema (or mind map in IQA parlance) will be used to represent both groups' realities concerning integration of technology into teaching pedagogy

Purpose

The purpose of this study is to develop a systematic description of faculty experience using new technologies in their teaching from the faculty's point of view and to relate this description to faculty attitudes, motivation and adoption of technology into teaching pedagogy. Furthermore, the IQA faculty attitudes adoption impact study will allow a representation of the UIW faculty to create its own interpretive "map" and then to similarly construct individual "maps" of meaning: together, the two levels of meanings are used by the researcher as the foundation for interpretation. The "map" is represented as a system of states (affinities) held together by roadways (relationships among affinities). An IQA study prompts the faculty participants to examine the issues of technology adoption for their own teaching use: its good news along with its bad, with respect to the importance of technology adoption to them:

- What does technology in your teaching mean to you?
- What led to these feelings?
- What are the results?

Research Question:

In what ways can we come to understand University faculty' attitudes regarding the utilization of new technologies in their classrooms, and how do those attitudes impact their beliefs and consequent motivation towards its use?

What are the differences between faculty experiences and their subsequent attitudes of those who like and use technology in their pedagogy and those who do not?

In this study, involving two faculty constituencies, the first, those who early on embraced and used technology in their teaching and the second, faculty who avoid or resisted the use of technology in teaching the researcher's investigation will be guided by the following research questions:

- What factors comprise faculty members' understanding of their experience of integration of technology and attitudes toward the use of new technology in their teaching?
- How do influences in the pro-technology faculty group compare to that of the technology –resistant- faculty group?
- How does the individual's experience compare to that of the group as a whole, and how do the factors comprising the faculty member's experience with technology and teaching influence attitudes both positive and negative

with use of technology in the classroom?

The Sample

Sampling in qualitative research is usually purposive. The primary goal in qualitative research is to select information rich cases that will be useful in one's study. For example, a subset of University professors was questioned because interviewing all university professors who teach at the researched University would be an impossible task.

The purposive sample in this study is drawn from representative faculty members in a small, Catholic, private, liberal arts University in Central Texas founded one hundred and twenty five years ago. The student population is numbered at 4,442 (2004 census) with 45 degree plans offered at this University including but not limited to Education, Psychology, English, Nursing, Communication Arts, Math, Environmental Sciences, Pre-Pharmacy, Religious Studies**,** Dance, Music, Interior Design, Fashion Design, Computer Information Science, Instructional Technology, Biology, Earth Science, Chemistry, Engineering, Nutrition and Political Science. The faculty at this institution range in teaching experience from one year to more than 40 years and total number of faculty equals 379, including both full time and adjunct faculty teaching both undergraduate and graduate students. Almost all fulltime faculty members hold a PhD or terminal degree in the field in which they teach. Of 134 full time faculty, 76 are female and 62 are male. Some have adopted and used emergent technologies in their

teaching while others have avoided it. Because of the nature of a liberal arts education, the faculty members teach in a wide range of colleges or schools from the Humanities, Arts, and Social Sciences, Math, and Interactive Media and Technology to Education and Nursing. The University offers 45 undergraduate majors, four minors, 24 graduate degree programs, and a Ph.D. program with four specializations.

The sample will consist of two groups of University faculty members with a minimum of 15 members each. Group A will consist of faculty members who easily and early on adopted technology into their curriculum and classroom teaching. This group will be labeled "early adopters". Group B will consist of faculty members reluctant to practice teaching with methods that integrate newer technologies, hardware, software and the Internet. This group, for obvious reasons, will be labeled 'technology resistant' as a synonym for the term Rogers labels "laggards". The labels for the two groups follow the vocabulary and reasoning of the diffusion of innovation theory as delineated by Everett Rogers.

Sample Selection

The sample will be a purposive one selected by the University's Chief of Instructional Technology who will identify and submit to the researcher 60 names of possible faculty members whom they feel could roughly fall into one of the two groups (early adopters or technology resisters, called laggards by Rogers). Because of the nature of the chief of instructional technology's job, she is in a position to identify and categorize possible participants for the study. After the possible participants are

identified, letters will be sent to the identified Faculty members asking for their participation in the study. Sixty faculty members will be identified in the hope that thirty will respond affirmatively to the call for participants.

IQA Research Design

IQA design begins with a generalized idea of a problem or issue that is interesting or needs help in its resolution. In order to clarify the true nature of the issue, IQA assumes that at the beginning of the research process, the issue will probably be vague or ambiguously defined. As the steps in the research design are followed, more and more definition occurs to clarify the issue. Furthermore, IQA uses the same rationale as TMQ—those closest to the problem should be the ones to come up with a solution. For this reason, IQA participants are hopefully those experiencing the problem. In which case the researcher must ask, "How much control do they have over the problem?"

In this instance, IQA will be used to interpret the reality of both focus groups while grounding the interpretation in the participants' reality. Similarities and differences in both groups lived experience will be compared emphasizing their experiences with integrating technology into their teaching pedagogy. Later, through group sessions and individual interviews, symbolic depictions of the groups' mental schema (or mind map in IQA parlance,) will be used to represent both groups' realities concerning integration of technology into teaching pedagogy.

OVERVIEW OF THE IQA RESEARCH FLOW

IQA research flow has four distinct phases: research design, focus group, interview, and report. Research design provides a series of tools to help articulate problems of interest, to identify constituencies that have an interest in the problem, and to state research questions that are implied by the problem statement. IQA then uses focus groups to identify the "map pieces" (affinities) of a system or systems that will ultimately represent the group's experience with the phenomenon. The group next identifies the relationships between each of the affinities. A system is drawn that represents a "mind map" of the group's reality. Affinities defined by the group are then used to develop a protocol for interviews, which are invaluable in to further explore the meanings of the affinities and their systemic relationships. A comprehensive system diagram is developed from the interviews to explain the phenomenon. The final report allows the researcher to describe the affinities and their relationships, to make comparisons among systems and individuals, to make inferences (predictions) based on the properties of the system(s). Following is a summary of each of the stages in the research flow. (McCoy and Northcutt, 2004)

Below is a diagram of the flow of a typical IQA project:

(used with permission, Northcutt & McCoy 2004)

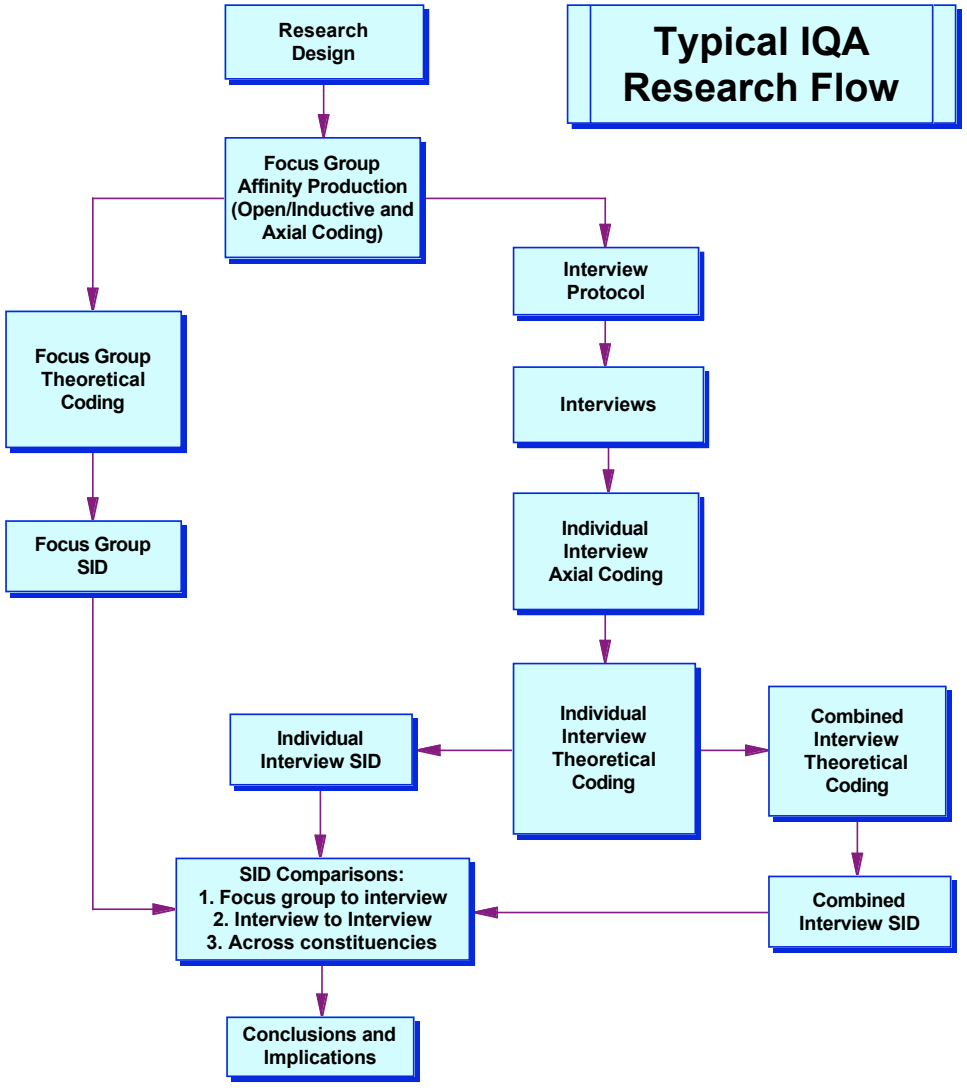


Figure 4 Group Realities: IQA Focus Groups

Focus Groups

During this study period, two focus groups of University Faculty members will be formed. Due to the nature of interactive qualitative analysis, the focus groups were formed and identified within each group according to faculty members' similar attitudes

about technology use and their personal teaching habits. IQA focus groups typically share a critical reality that is an integral part of the research process.

Once convened at the data gathering session, the focus group(s) {in perspective order and on different days/times} will be led in a silent, self reflective session about their feelings concerning the topic to encourage participants to relax, center themselves, and increase thought flow. Following this, the group will be asked to participate in a group brainstorming session. First, they will be asked to write their experiences about technology use and teaching on note cards, one thought per card. The participants will be encouraged (through silence and passing of time) to fill out as many cards as possible until their ideas are exhausted.

After this, the group will be asked to tape their cards to the wall. The researcher will read the cards aloud and invite discussion about each card, thus subtly involving participants in constructing a shared reality within the focus group. This activity is known as inductive coding. The focus group will be asked to silently classify themes that emerge on the cards into groups, which later form terms that are called affinities. Next the cards will be discussed and rearranged by the group members until clear themes or affinities emerge. Group members will be encouraged to come to consensus in order to tighten the affinity process by eliminating some card groupings or collapsing others into a new, more encompassing group.

While performing this activity, some relationships and causal relationships between affinities will begin to be identified by the group. The identification and collection and naming of data permit the members of the focus group to describe and

label their experiences which produces a conceptual map, a systematic representation of the perceptions that comprise the focus group members' reality as its exists within consciousness.

This visual depiction is known as a mind-map, or in IQA the SID and is a direct result of naming the affinities involved in the research. The first step in creating a mind map is to assist the focus group members in organizing their thoughts into a manageable number of categories or affinities, sets of textual references that have an underlying common meaning or theme, synonymous to *factors* or *topics*. The group collectively names the affinities and helps the researcher create a detailed written description or definition of each affinity. The goal is to produce the smallest number of affinities with the greatest amount of detail or "richness." Axial coding refines and completes the naming of the affinities, again through discussion and consensus.

Interviews

Interviews will be conducted with individuals in each group to further elaborate the richness of detail of the data and to support and further delineate the affinities. The interview information leads to the completion of the Affinity Relationship Table (ART). Similarly, the Theoretical Coding interview is used to describe and analyze transcripts for relationships, with a resultant TCT or theoretical code table being completed.

Axial coding seeks to name, reorganize, clarify, and refine the affinities. Major categories of affinities are reviewed and then may be combined or divided into hierarchical systems of sub-affinities. Once again, this process is achieved through group

discussion and consensus. The descriptions are refined and narrowed by the group until each participant agrees that the definition accurately reflects the meaning of the affinity.

Identifying Relationships among Factors.

After the affinities have been clearly defines, the group is then asked to analyze the nature of the relationships shared between each of the affinities. They are then asked to analyze all possible pairs and determine if a relationship exists. If a relationship does exist participants are supposed to determine which affinity possesses greater influence over the other. Group members are then asked to record their responses in a table containing these pairs, which are referred to as an *Affinity Relationship Table (ART)*. With this information IQA uses several protocols for developing the group *Interrelational Diagram* or *IRD*, which contains all of the necessary information to produce a group (or individual) *mind map*, as depicted upon the following page.

Affinity Name
1. Negative Aspects
2. Ambivalence
3. Trepidation
4. Technological Advantages
5. Positive Feelings

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Affinity Relationship Table

Affinity Pair Relationship		
1	→	2
1	→	3
1	←	4
1	←	5
2	←	3
2	←	4
2	←	5
3	←	4
3	←	5
4	→	5

Table 1 Affinity Pair Relationship

DATA COLLECTON AND ANALYSIS

Data will be obtained from the described sample of university professors during specific data gathering sessions. These include focus groups and follow up interviews.

RESEARCH PROTOCOL

In order to discover group thoughts and feelings concerning the research questions, the focus groups will participate in a group brainstorming session, which also includes coding of shared information. The process by which the group brainstorms to find relevant, shared and deeply rich experiences is termed inductive coding.

Axial coding, the shared information of the group that forms itself into similar organizational patterns, results in the naming of affinities or themes as the group dialogues and brainstorming develops; and theoretical coding reveals relationships between the affinities which serve as a basis for further research.

IQA data collection/analysis techniques originated from Total Quality Management (TQM) processes designed to capture knowledge from organizational members to solve problems and improve processes because A major TQM assumption those who are closest to the 'problem" best understand what is wrong and how to fix it. Similarly, IQA data collection techniques assist members of a group close to a phenomenon of interest in describing and labeling their experiences, and in articulating perceived relationships among these experiences to produce a theory in perception or a conceptual map, which is a systems representation of how a person or a group understands a particular phenomenon.

The ultimate purpose of IQA is to produce a depiction of the system known as the *Systems Influence Diagram* (*SID*), as Northcutt and McCoy state (2003). The *SID* represents the perceptual terrain or *mind map* of the group regarding a certain issue. It is a visual depiction of a rationalized summary of the theoretical codes derived from the

IRD. *Theoretical coding* refers to the process of ascertaining and recording all of the possible perceived relationships between affinities in the system. Within the setting of the focus group this is done by facilitating a systematic process of building various hypotheses that link each possible pair of affinities. The group *Interrelationship Diagram* (*IRD*) provides a summary of this process. Hypotheses are then developed based on this data. IQA provides focus group members with a formal protocol to help them determine whether a direct influence exists between each pair of affinities. This process is used to identify the underlying (and often hidden) structure of the group's mind map concerning . This information is expressed in a SID.

Focus Groups

During this study period, two focus groups of University Faculty members will be formed. Due to the nature of interactive qualitative analysis, the focus groups will be formed and identified within each group according to faculty members' similar attitudes about technology use and their personal teaching habits. IQA focus groups typically share a critical reality that is an integral part of the research process.

Once convened at the data gathering session, the focus group(s) {in perspective order and on different days/times} will be led in a silent, self reflective session about their feelings concerning the topic to encourage participants to relax, center themselves, and increase thought flow. Following this, the group will be asked to participate in a group brainstorming session. First, they will be asked to write their experiences about technology use and teaching on note cards, one thought per card. The participants will

be encouraged (through silence and passing of time) to fill out as many cards as possible until their ideas are exhausted. After this, the group will be asked to tape their cards to the wall. The researcher will read the cards aloud and invite discussion about each card, thus subtly involving participants in constructing a shared reality within the focus group. This activity is known as inductive coding. The focus group will be asked to silently classify themes that emerge on the cards into groups that later form what is called affinities. Next the cards will be discussed and rearranged by the group members until clear themes or affinities emerge. Group members will be encouraged to come to consensus in order to tighten the affinity process by eliminating some card groupings or collapsing others into a new, more encompassing group. While performing this activity, some relationships and causal relationships between affinities will begin to be identified by the group. The identification and collection and naming of data permit the members of the focus group to describe and label their experiences which produces a conceptual map, which is a systems representation of how the focus group has come to understand its 'issue' or phenomenon. The conceptual map is known as a mind-map and directly results in naming the affinities involved in the research. Axial coding refines and completes the naming of the affinities, again through discussion and consensus.

Individual Realities Interviews

Interviews will be conducted with eleven individuals in each group, for a total of 22 individual interviews for Group A and Group B) to further elaborate the richness of detail of the data and to support and further delineate the affinities. The interview

information leads to the completion of the Affinity Relationship Table (ART). Similarly, the Theoretical Coding interview is used to describe and analyze transcripts for relationships, with a resultant TCT or theoretical code table being completed.

Data Analysis

The purpose of IQA is to produce a systems influence design or SID using a relationship assessment table for the affinities known as an ART (affinity relationship table). The ART reveals the perceived relationships between all the affinities. Also analyzed in the formation of the system influence design is the content of the IRD (Interrelationship Diagram), which is a summary of theoretical coding that the group produces. These analytical relationship tables lead to the production of the SID, or Systems Influence Design, which allows one to see the relationship and influence between the phenomenon, and the group whose data produced it.

The "map" is represented as a system of states (affinities) held together by roadways (relationships among affinities). An IQA study prompts the participants to examine these issues with respect to a phenomenon important to them: how the introduction of technology into their teaching environments has affected their attitudes towards teaching with technology.

Chapter Four

Results And Interpretations

Chapter Four: Results And Interpretations

Group Reality: System Relationships

PROBLEM STATEMENT

The purpose of this qualitative study was to develop a systematic description of faculty experience using new technologies in their teaching from the faculty's point of view and to relate this description to faculty attitudes, motivation and adoption of technology into teaching pedagogy.

RESEARCH QUESTION

In what ways can we come to understand University faculty attitudes about the utilization of new technologies in their classrooms, and how do those attitudes impact their beliefs and consequent motivation towards its use?

In this study, the researcher's investigation will be guided by the following research questions:

1. What factors comprise faculty members' understanding of their experience of integration of technology and attitudes toward the use of new technology in their teaching?
2. How do these factors relate to each other in a perceived system of influence or cause and effect?

3. How do influences in the pro-technology faculty group compare to that of the technology -resistant faculty group?

4. How does the individual's experience compare to that of the group as a whole, and how do the factors comprising the faculty member's experience with technology and teaching influence attitudes both positive and negative with use of technology in the classroom?

The Interactive Qualitative Analysis (IQA) Process

In this study, two groups of University Professors yielded 8 affinities (for Group A) and 5 affinities (for Group B) successively. The sections that follow the processes of this IQA study in affinity- naming and in interviewing confirm the quality and the thorough examination of that data. The study progressed in directed steps, which culminated with a systems model, which explains how the study participants thought about the use of technology in their classroom, and its subsequent influence on their attitudes and motivation. The IQA model establishes the framework of language and discourse that explains how mental models both shape, and are shaped by, the individual and collective thought necessary for the qualitative grounding of the study. (Bakhtin,1986; Gee,1989 as qtd in Harrell, 2004). The steps taken to gather, analyze and interpret the data resultant to the production of the final mind- map required planning efforts to collect data from two focus groups whose separate collaboration within their individual groups produced valuable initial affinities. Following the group exchanges, intense one-on-one interviews were conducted with 11 members of each

focus group respectively. These interviews confirmed relational information regarding the influence and direction of each of the themes or factors that emerged.

FOCUS GROUPS

Sample Selection

The sampling process was purposive in order to study a small group in an in-depth fashion. This type of sampling generally yields thick, information- rich studies, which are integral to the purpose of the study.

Call To Attend

A call for participants was sent out to both Group A and Group B on the same day, April 10, 2006. Group A's session was scheduled for April 25, 2006, and was chosen because it was the UIW official advising day-- when faculty was required to be on campus. The second date, May 2 was chosen because of its close proximity to April 25th. Once the weekends and holidays were factored out, it was only one day from the first group meeting to the second group meeting, a time frame I desired in order to prevent discussion between participants from the different groups. After the call to attend was sent out, I began to canvas the campus to find rooms that would fit the particular needs of an IQA focus group. Others might think that the most important characteristic, of course, is size; but, in my mind, more important than that was that the room possess a large blank wall, one which ran the length of one side of the room undisturbed, with plenty of space for writing, and a finish to the wall that lent itself to allow taping of the cards which would later become affinities. Ability for the focus

group members to move the cards to different groupings and to rearrange cards easily meant that the wall space needed a certain texture that permitted taping and un-taping of the cards with ease.

I was searching for a room that was more rectangular in shape than square, for the key ingredient had to be a space in which to assort our cards, undisturbed by a physical distraction such as a blackboard, white board, window, or any other break in the line of thought that would flow from the minds of the group without spatial distraction.

Location of Group A

There are not so many rooms on a 125-year old campus that met the needs of my study since the older rooms have windows placed for ventilation and the newer buildings have glass windows and blackboards on most walls. The first room I could find that filled these requirements was located in the nursing building, room 223. The physical characteristics were almost perfect with a long blank wall along one side of the room, a blackboard in the front, and windows all along the opposite wall.

I realized that the room had to be a room which was available during the time that I wanted to have the focus groups, late afternoon to early evening from 4-6pm to catch the faculty as they left the campus to go home, arrived to teach a night class, or took a break between a day class and a night class they might teach, another criteria that had to be met. The next day I checked the room's potential for both the date I needed and the time period I needed. Both were available! I was good to go!

Having determined the timeframe for this focus group as late afternoon to early evening, I decided I would serve food that could be suitable for that time and to keep the

faculty member's mind on thinking about affinities and not the distraction of how hungry they were! I offered a sort of British tea fare: Breads, Cheeses, Wine Coffee and Water, Fruit Tray and Cookies.

The first date that I chose I can see now in hindsight was an imperfect choice for many reasons. I chose Advising Day, when most all of our faculty is required to be on campus and which is over in most situations easily by 4pm. However, I did not count on the activities of the day to cause a gap between the end of final duties-- in some fortunate cases, way too soon, or, in others, playing catch up at the end of the day. However, I still had a very substantial response to this date.

Each focus group was compiled from the entire list of full time faculty. Invitees for focus group A self-selected themselves by virtue of its member's attendance at the focus group meeting, from a group compiled and identified by the former head of Instructional Technology, Cheryl Anderson. Dr. Anderson taught many faculty workshops on technology and had a very good grasp of the level of interest and acumen held by each faculty on most of my list. I asked her to sort the group as follows: Faculty who early on embraced the notion of learning about and possibly incorporating technology into their teaching methodologies, Early Adopters. The second group I asked to be sorted by their indifference or reluctance to embrace teaching with technology, technology resistant faculty (known in Diffusion Theory/ Roger's parlance, as "laggards") . For obvious reasons, the term "laggard" was changed to technology resistant to avoid its negative connotations. Sixty- seven faculty names were identified from the list as early adopters or as tech-resistant. Due to the availability and qualifying

factors from those, a total of sixty calls to participate were mailed on the same day and at the same time.

The people in the first group, early adopters, were titled Group A. The room that was chosen for this focus group was room 223 in the Nursing Building.

Focus Group A Proceedings

The day, April 25, was clear, sunny, and rather hot. Because it was later in the afternoon when I arrived to set up my research, the room was cold and quiet, and rather dark. It felt good to me, like a good place to think. As the first of group A participants arrived, many offered their help in solving little logistical problems that occurred. There were not enough cups, and cutlery for everyone who might show up. I offered wine to drink, but no water. One person walked back the entire length of the campus to bring her "ready supply" for social meetings/gatherings: plates, napkins, cutleries and cups; another went back to her office to bring more bottled water to share. Others helped out with different types of challenges, offering to tape the session, writing consensus votes on a white board as we came to the affinity naming session. Most did these activities without being asked; one could see they were experienced 'facilitators to learning' who naturally wanted to enhance the learning experience for all.

Even though this was the end of a tiring day of advising, most everyone seemed very engaged at the beginning of the session. The faculty in the first group totaled 22: fifteen females and seven males. They belonged to varied disciplines campus-wide: science, math, business, education, nursing, humanities, design & technology—the entire curricular spectrum of our university! As faculty came into the room, they sat near

friends or acquaintances, many from their college and nearby disciplines and commenced with small talk . The room filled with subjects. Eventually, as their advising duties wound down, more came; finally, there were not enough desks to hold the occupants and some stood against the wall in the back. In this group were also some very distinguished members of our faculty: Three who had received the campus' highest award for scholarship and community recognition, called our "Moody Professorship" award, one Piper Professor, two "CCVI Spirit Award" recipients, one "Zlotkowski Faculty Service-Learning Award" recipient. Many were either officers or members of the Faculty Senate and University Planning Commission.

One of the members of Focus Group A ,who has been an inspiration and mentor to me for nearly 15 years, looked at her watch which gently reminded me it was time to start. These were all busy professional people, and it was only good etiquette to keep the time frame I promised them. I distributed the permission sheets and had the faculty sign them. Next, I began the first part of the method, asking the group to meditate. The meditation part of the focus group exercise was one of the reasons I chose Interactive Qualitative Analysis for my research method. I know the power of visualization and I was delighted to find it being sanctioned as a PhD caliber activity in IQA.

I asked the group to come to quiet, to breathe in and out; for at least two minutes I counted the in and out breaths, as I have done in my yoga and meditation practice with a basic breath. Next, I began quietly asking the group members to visualize the first time they had ever used technology in their teaching methods, and to think back to that moment-- to see themselves again beginning to use the technology in their teaching day.

I asked the questions: “What are the feelings that are you are experiencing? How does this feel to you? Are you happy, perplexed, neutral? Think back to the activities surrounding the use of the technology in your teaching, how do they seem to you”?

After 5 minutes of contemplation, more and more of the group began to stir from their reveries, I asked the group, “Now think to yourself—What does the use of technology and teaching mean to you”? Another thirty seconds passed until I quietly asked the group to begin coming back to the present time and the present place.

Once everyone was ‘back on board” I passed out the 3x5 cards, magic markers, and masking tape. I explained what an affinity was, and requested that they fill out their cards with a short phrase or word that they connected to the meaning (for them) to the meaning of technology in teaching. This was quickly accomplished with many cards generated. Next, I advised the group members to go over to the clean, empty wall and tape their cards to it. A quiet buzz of murmurs rippled throughout the group at this strange request. I explained that as the cards were taped, categories or themes would begin to emerge. As the themes began to sort themselves out, they could move, rearrange cards or sections of cards to form what would eventually become the focus group affinities.

The activities of the group were very focused and a “game playing, knowledge exploration” atmosphere was immediately generated. People were talking together in small groups and discussing what card should go where as they taped up their own store of affinities. This focus group seemed committed to participating within the group and, more than that, giving of themselves to assist others. They worked very well together

and were able to collaborate. Small group discussions broke out in clusters of the faculty as they moved around rearranging cards and forming new categories. Not many in Focus Group A seemed to tire or showed displays of disinterest by talking to another person on another subject. This group was persistent, asking for input, refining the affinity cards, as they formed small clusters to decide which card went with the categories that were emerging on the wall. They engaged in active discussion about emerging affinities, even going so far as to ask for definitions on some minor issues. As the activity continued beyond the 15 -minute mark, a few group members hung back from the wall, grew tired, or became diverted and withdrew from participating.

Once their cards were placed, most members scrutinized the wall, and began to change the order of the cards to other categories, or they began creating subcategories which became a new affinity group. There was discussion, but no real dissention. Finally, the group came to peace and returned to their chairs; although some members, once returned to their seat could see the entire wall from a fuller perspective and left their seat to rearrange a few more cards. Finally, it seemed as if everyone was satisfied and all were seated. The card taping session ended in laughter as one faculty member stood up, walked to the wall and moved one card with a show of finality and a 'so there' affect, and then returned to her chair as the focus group laughed in delight.

Next, I explained that now we were going to name the themes that had emerged from the card shifting exercise, and that each category would be a part of the research and was called an "affinity". There was an easy flow of conversation as the first ideas emerged, and then the room became quieter. The group easily saw merit in each

category, and named the affinities.

Affinity Names Chosen by Focus Group A

1. Learning
2. Frustration
3. Time
4. Pedagogy
5. Communication
6. Organization
7. Pleasure of Technology
8. Infrastructure

Figure 5 Group A Affinity Names

Chapter Four: Results And Interpretations

I thought the session had gone extremely well, especially with the help of all concerned and who manifested a wonderful spirit of genuine learning and group collaboration while relating to the task at hand.

The affinities and their respective relationships that they group expressed were recorded in the following Affinity Relationship Table.

Affinity Name		Possible Relationships
1. Learning		A → B
2. Frustration		A ← B
3. Time		A <> B (No Relationship)
4. Pedagogy		
5. Communication		
6. Organization		
7. Pleasure of Technology		
8. Infrastructure		

AFFINITY RELATIONSHIP TABLE

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 ← 6
1 ← 3		3 ← 7
1 ← 4		3 ← 8
1 ← 5		4 ← 5
1 ← 6		4 ← 6
1 ← 7		4 → 7
1 ← 8		4 ← 8
2 ← 3		5 ← 6
2 → 4		5 ← 7
2 ← 5		5 ← 8
2 ← 6		6 ← 7
2 → 7		6 ← 8
2 ← 8		7 ← 8
3 → 4		
3 → 5		

Table 2 Affinity Relationship Table

I thought the session had gone extremely well, especially with the help of all concerned and who manifested a wonderful spirit of genuine learning and group collaboration while relating to the task at hand.

The following protocol was derived from the reconciled affinity list. A very brief definition was used to describe the affinity so as not to influence the responses given during the interview. A copy of the protocol was handed to each person being interviewed as a point of reference. The interview protocol consisted of two parts: 1) the open-end *axial interview* designed to provide rich description of affinities by the respondents; and 2) the structured *theoretical interview* designed to identify relationships between affinities. The axial interview is addressed later in this section.

Transcripts and Theoretical Code Tables

All interviews were transcribed verbatim. Once the transcripts had been prepared, the researcher analyzed the text for *theoretical codes*, which are *specific examples of discourse that illustrate or allude to an affinity.* The researcher next examined all quotes for each separate affinity. The quotes for a particular affinity were organized into sub-groups. These subgroups contained quotes that addressed a common theme describing that affinity. Multiple quotes were then woven together to develop a composite quote. The following section is a composite description of the affinities based on quotes obtained from all the interviews.

Coding demands both induction and deduction. This is followed by analytical or axial coding which is primarily deductive in nature. Analysis of data actually begins when the group participants (A or B) are asked to identify themes and similarities among

their various responses grouped along the wall. Inductive coding occurs as participants identify and name the affinity. Axial coding refines, reorganizes and describes the range of meaning of each affinity within the context of the others. (McCoy, class lecture, 2005).

Also developed from the focus group was a group *mind map or SID*; the group SID was used by the researcher to produce the interview protocol. The SID also assists the researcher in addressing any ambiguities that may have occurred in the affinities. Such ambiguities might include two affinities that are dialectic. They may represent a pendulum swing of the same category of meaning and would better be represented under one affinity.

Focus Group B

This group met on May 2, 2006, at the same time as Group A, 4:00-6:00 pm. I arrived half an hour early, and liked the feel of this room; although I was troubled by its size and amount of free space since a large boardroom style table filled the room almost from end to end. I began arranging the permission slips, markers and tape. Next, I unpacked food items. This time, I had remembered almost everything! Today, as well as water and wine , I offered a large container of freshly brewed Starbucks coffee to help energize those participants who thought that they might need it. I also offered fruit, cheese, and cookies.

Location of Group B

The choice of a room for this focus group was difficult to make. Most of this group worked in the College of Humanities, which is far from the Nursing building, so I

chose to use a building much closer to the Humanities area. The Joyce building was chosen because it houses a special conference room known as the Tilton room. The Tilton room is rectangularly shaped with windows on two sides, a fireplace, and finally a long paneled wall. Since Group B had fewer responses to the call than Group A, I was not expecting as many group B faculty to attend, so I reasoned that this room would be large enough to accommodate the group. Additionally, since this room was used as a conference room there were no desks, chairs and schoolroom trappings such as a blackboard or podium found in the traditional classroom; instead, there was a long "boardroom -style" table running the length of the room with only about five feet between the window on one side, and a fireplace at the other end, just enough room to create a passage around the table, perhaps four feet between the end walls and the table. Even though the Tilton room was not a classroom as was Room 223 used for Focus Group A, the difference between these two rooms became striking as the exercise unfolded. The physical layout emerged as a significant factor in the interpersonal dynamics of Focus Group B. The around-the –table seating created a different social exchange system for the members of Focus Group B who faced each other and could easily talk to those they could see in dinner-style fashion, but members who sat at the end of the table or near the end of it, were not as easily communicated with by members of the group sitting at the center of the table as those close to the end. Recall that Focus Group A was in a typical classroom with central vision for anyone who turned in their chair to see the speaker. In hindsight, I wish I had chosen a larger room. Because of its size, the cramped room made it difficult for the focus group members to easily move

about rearranging and redistributing cards.

Several members of the discipline who were housed in this small building on campus were the first to arrive. This happened to be the newly created School of Interactive Media and Design (SIMD) in which the communications department (and therefore, I) belonged. One of our senior SIMD faculty members came by to state that he had forgotten he was scheduled to teach a class on this night, and couldn't come. I was disappointed, since I was worried about the numbers who would comprise this group, and I tried to convince him to come to the focus group and meet up with his class later by enticing him with an offer of wine. In true professional fashion he declined and left to meet his students.

This day, May 2, was a teaching day, and people came to the group as classes and related business were over. As the first participants arrived, a social atmosphere ensued with gathering food, getting a drink, and relaxing at the table. As the clock ticked by, I became tense thinking that if I only had 6 or 8 members, I could not complete my IQA research validly. I needed at least 11 in each focus group.

As we waited for more participants to show up, my tension continued as one person asked, "can we go ahead?" and I said, "well let's wait for a minute more; it would be nice if we had at least 10 people here to makes a sufficiently large number of group members". After a minute, the door opened and two faculty members, BB, our charming music professor, and RR, our dean of the library for 35 years came through the portal entering the room. Spontaneously, the group at the table burst into applause, and cheers. At last we could get on with it! The two newcomers responded with smiles but

asked, “what’s up with the cheers”? Someone said, “now we have enough to begin”! At that point, the group numbered 10 and it was 20 minutes since the starting time listed on the call to attend. I began to pass out the cards and the markers, which elicited lots of ‘oh what’s this” remarks, and shows of interest.

I began to prepare the permission slips and pass them out. Soon we were joined by another faculty, PP, the Chair of the philosophy department, who apologized for being late. This member was “key” in my mind because although he had attended some workshops focusing on technology use in faculty teaching, I knew from his students’ conversations with me, that there was little use of technology in his classes. He notoriously did not partake in most faculty events, so I had little hope he would attend my research group. Delighted, I stepped forward to profusely thank him, and dropped a batch of cards on the floor. I knew I was more rattled than I realized. I really wanted this group to be large enough for a good study. I was not disappointed.

Although it took at least twenty-five minutes for the group to ‘trickle in’, the final total on the group was 19 people! By this time a ‘party atmosphere’ had ensued, and there was lots of laughter and talk, so my clumsiness was not an awkward silent moment, but passed over by the group as they went back to socializing. More and more members came in as we were signing permission slips, and the newcomers hurried to fill out the paperwork to keep up. By now, the group totaled 18 and room at the table was beginning to become scarce. The group totaled 18 participants, 11 males and 7 females. One participant had held the Moody Professorship while another was a Piper nominee. Several others were senators or on the University Planning Commission. I was urged to

begin as waiting would alter the equal amounts of time each group had. PL was acting as the "Jiminy Cricket" on my shoulder, helping me organize myself and stay on task. I had not thought of things from this aspect, and realized I best begin! At least half of the participants in the B group arrived late or seriously late.

Focus Group B Proceedings

I briefly described the IQA method and explained to Focus Group B why I was interested in that research method and described its benefits . I joked that any research method that combined meditation practices with intellectual pursuits was the one for me!

As the group quieted down, I began my pre- meditation relaxation exercises consisting of deep breathing, and relaxation. Next I asked the participants to close their eyes and think back to a time when they didn't use technology, to a time when they first became aware of it. Next I asked them to think back to the early days of technology use in their classroom, and to think back to how that felt for them, how and what the feelings were. I told the group "now you will have some time to contemplate these memories" I noticed a difference between this group and the other. This group didn't seems as ready to participate in this quiet time, and I felt an intuitive energy that asked me to shorten the length of reflection time as members seemed not to possess the stillness quotient as the other group. Soon, some even fidgeted in their seats, so I cut that part shorter than planned, and said "Now take the cards that are placed in front of you, and with one word or phrase that comes to mind for each thought, write words that answer this question: "what does technology use in your teaching mean to you?"

At first slowly, but later more quickly, people scribbled their thoughts on the cards. Most finished about the same time, but one persistent gentleman went on long after the others had stopped. Around this time, the door burst open and one of the senior faculty members came in, rushing to join the group. I was amazed by this as well, because this senior faculty person very rarely attended any university events, preferring to spend her time on her own writing and projects. There was a flurry of activity to try to 'catch up' this faculty member, who hurriedly signed permission slips and found a place along the wall behind, not at, the table. At this point I told the group to begin taping their cards to the wall along the room. The group members seemed amused by this idea, and began to move forward. Once they were near the wall, I explained that the cards would begin to emerge into themes and they could rearrange or move the cards to other themes as they saw fit.

There was a rush towards the paneled wall and people talked to themselves and to others nearby to clarify what was going on, and how to do this. Several of the members seemed to grasp this well, and began to lay out their cards. As others saw how this worked, they joined in. After the cards were on the wall, some people began to rearrange the cards into sub groups or expand card groupings already present. PM called out to me in an outraged voice,, "HEY! He moved my card!" I replied that anyone was allowed to move anyone else's cards, but that after it was moved, he could move it right back! Now the group was assembled around the wall, adding and removing cards. Some seemed to grow weary of the pursuit rather rapidly and they went to sit back down at the table and "watch" the others, more as observers than participants.

More and more did this until only a few participants remained, altering patterns and rearranging cards. Where I had remained silent in the other group, I encouraged this group to continue to make subgroups, as the groupings at this point only reflected two main groups: positive and negative!

One of our senior interior design faculty, MW, engaged in conversation with other interested faculty--probably about 8 or 10 who still worked the board. The person who had produced the most cards, continued to rapidly move things . MW spoke to people in clusters around the group; I could see she was facilitating the grouping of cards into more "affinities". Finally, the group came to peace and returned to the table.

I explained that now we were going to name the themes that had emerged from the card shifting exercise; each category would be a part of the research and was called an "affinity". There was an easy flow of conversation as the first two ideas emerged, and then things became quieter. The group seemed happy enough to let these topics stand as "negative ' and positive'. I said, "oh, come on --let's try to think of more than the basic black and white", but the group continued in their line of reasoning.

The group continued the discussion, but began to argue about what ideas should make up a theme, and what the theme should be called. MW argued for a greater list of themes, but the group was rather stubborn and continued to argue. Finally, one of our smallest but most intense faculty members, an artist, MG, pulled herself to her full height, stood up and shouted over the fray, "I don't think that this is what we want those cards to represent"—this isn't right!" Startled, others considered her ideas, then acquiesced. The argumentatively -toned academic uproar continued. Finally, however,

the group settled on 5 affinities: negative aspects, ambivalence, trepidations, technological advantages and positive feelings.

Finally, the group settled on 5 affinities and named them:

Table 3 Affinity Names Group A

Learning 2. Frustration 3. Time 4. Pedagogy 5. Communication 6. Organization 7. Pleasure of Technology 8. Infrastructure

Next, we began what I thought would be the orderly process of naming the affinities and deciding which had the greatest influence. I decided to do a group consensus vote, both because of lack of time and brain drain happening to tired minds after a grueling day. Here the group was not like Focus Group A, who seemed to grasp what was happening and quickly went through the exercise. Instead, this group argued over almost each point. They asked for clarification about how they should consider this syllogism and an argumentative discussion broke out between our two philosophers, PL and PM over how this worked. PM also said this was meaningless unless this point for philosophical syllogism was satisfied, and I teased "Oh, these philosophers, always philosophizing" to which he angrily applied "WELL YOU invited ME. The group even argued over what the number of the affinity point we were covering was; I would say

"now does *trepidation* have a greater influence over *anxiety* or does *anxiety* have…" someone in the group called out "Four? Are we on number four? I thought we were on number three? What are you on??" Throughout the exercise, these types of clarifications continued from other group members as well who seemed to have difficulty attending to the task at hand: determining the relationships amongst the affinities. Once identified they were recorded in the following table.

Table 4 Group B Affinity Relationship Table

Affinity Name
1.Negative Aspects
2.Ambivalence
3.Trepidations
4.Technological Advantages
5.Positive Feelings

Possible Relationships
A → B
A ← B
A <> B (No relationship)

Group B Affinity Relationship Table	
Affinity Pair	**Relationship**
1	← 2
1	← 3
1	→ 4
1	← 5
2	→ 3
2	← 4
2	→ 5
3	<> 4
3	← 5
4	<> 5

Table 3 Affinity Relationship for Group B

The group was boisterous, and loud. Just as we were beginning to conclude the session, we could hear loud clashes of thunder and cracks of lightening. A large thunderstorm was approaching.

Several persons stood up, walked over to the windows to look at the approaching storm and commented on how difficult it would be to get home in a downpour such as this. The group was still loud, but the disorderliness had disappeared. We quickly finished our axial coding. Many focus group participants became anxious as we saw the fierce winds bending the tree limbs amidst the cacophony of thunder and lightening. Group members began gathering their belongings while preparing to leave the building before the storm began in earnest. Most of the group stood huddled in the hallway outside its large double- door entrance, deciding when to sprint across to the larger building on campus. I watched as small groups formed and dashed away.

The next day we learned from news sources that this had, indeed, been a major storm of this spring, and I wondered if atmospheric pressure could have altered the groups' behavior from that of well-mannered faculty to confused, indecisive, and argumentative participants.

From the ART that the group decided upon a group *mind map or SID* was generated. The group SID was used by the researcher to produce the interview protocol. The SID also assists the researcher in addressing any ambiguities that may have occurred in the affinities. Such ambiguities might include two affinities that are dialectic. They

may represent a pendulum swing of the same category of meaning and would better be represented under one affinity. The following simple SID was the result of the second group's focus group session.

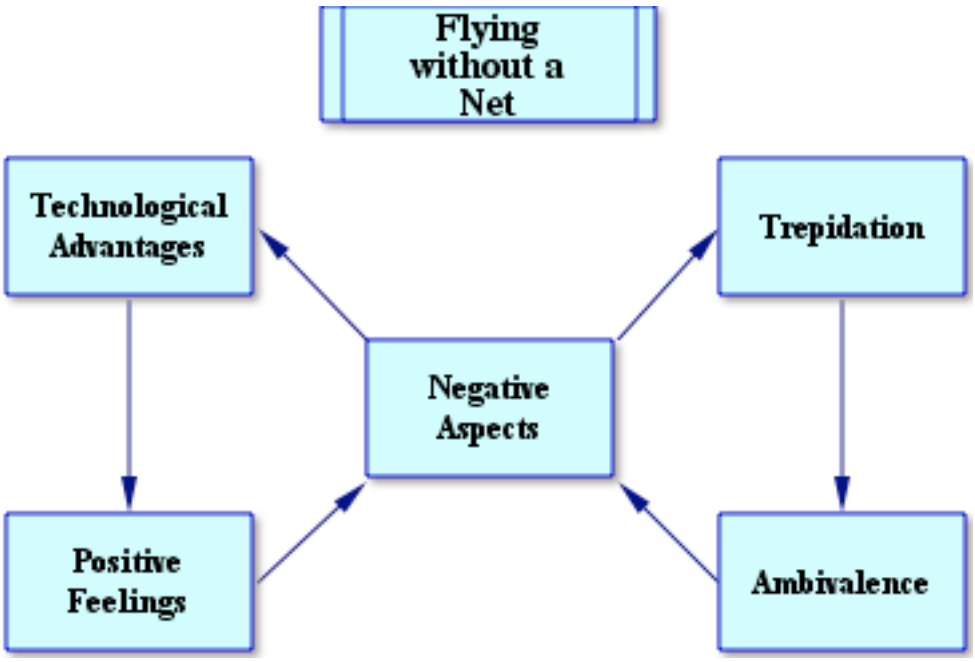


Figure 6 Group B SID: Flying Without a Net Mindmap

ANALYSIS

IQA provides a set of data collection and analysis protocols that are designed to minimize researcher involvement. Participants have a large degree of freedom within a framework provided by the researcher (which itself is typically developed in consultation with knowledgeable participants); participants themselves perform the first steps of analysis by organizing their discourse into categories of meaning called *affinities*; and participants themselves take the analysis even further by

articulating their own perceived relationships of influence among the affinities. The first responsibility of the researcher is to create a process that will invite the group members to produce the most data while minimizing the influence of the process on the content. The researcher's role then moves from designer to facilitator, teaching the group members the process and guiding them to generate and analyze their own data with minimal external influence. Perhaps the location and trappings of the rooms that the respective focus groups were conducted made a difference in the results between groups.

This created a different social exchange system for the members of Focus Group B who faced each other and could easily talk to those they could see in dinner-style fashion, but those members who sat at the end of the table or near the end of it, were not as easily communicated with by members of the group sitting at the center of the table as those close to the end. Recall that Focus Group A was in a typical classroom with central vision for anyone who turned in their chair to see the speaker." Could the ability to see all the members of the group and hear their exchanges have made a difference in the atmosphere in the room and the attitudes of the focus group members?

I think this could have affected the communication's flow between group members and might have changed other physical patterns as well. The next day we learned from news sources that this had, indeed, been a major storm of this spring, and I wondered if atmospheric pressure could have altered the groups' behavior from that of well-mannered faculty to confused, indecisive, and argumentative participants.

Reconciling Affinities

The purpose of the focus group session was to generate categories of meaning or affinities to later be used in an interview protocol. Through a series of interviews, respondents were asked to discuss what each affinity meant to them. Later, in a more comprehensive write up, the affinities were described based upon the interviews. Also developed from the focus group was a group *mind map or SID*; the group SID was used by the researcher to address any ambiguities that may have occurred in the affinities. Such ambiguities might include two affinities, which are dialectic. They may represent a pendulum swing of the same category of meaning and would better be represented under one affinity.

Individual Interviews

Following the focus groups, 11 participants from each group were solely interviewed by the researcher in locations most convenient for the interviewees. The summer hiatus most participants were enjoying precluded 'office-hopping' on the central University campus to conduct all the interviews. A total of 22 interviews were conducted in wide ranging locations from coffee shops to people's homes to University offices.

The following protocol was developed using the reconciled affinity list. A very brief definition was used to describe the affinity so as not to influence the responses given during the interview. A copy of the protocol was handed to each person being interviewed as a point of reference. The interview protocol consisted of two parts:

1) the open-end *axial interview* designed to provide rich description of affinities by the respondents; and 2) the structured *theoretical interview* designed to identify relationships between affinities. The axial interview is addressed in this section.

Interview Protocol

The following protocol was derived from the reconciled affinity list. A very brief definition was used to describe the affinity so as not to influence the responses given during the interview. A copy of the protocol was handed to each person being interviewed as a point of reference. The interview protocol consisted of two parts: 1) the open-end *axial interview* designed to provide rich description of affinities by the respondents; and 2) the structured *theoretical interview* designed to identify relationships between affinities.

Figure 7 Group A Interview Protocol

Group A
Interview Protocol

Axial Coding
The focus groups identified several common themes or affinities that describe their experience with technology. Let's look at these experiences one at a time and you can tell me about your experiences with each.

1. Learning
This affinity describes the acquisition of knowledge or skill through experience, practice or study. Please, tell me about your this.

2. Frustration

This affinity describes the feeling of being upset or annoyed, particularly because of inability to change or achieve something. Please, tell me about your frustration regarding technology.

3. Time
This affinity describes how much time is consumed learning new technology, time which could otherwise be spent with family and friends or in pursuit of other knowledge. Please, tell me about the relationship between technology, the other affinities and time.

4. Pedagogy
Pedagogy is the method and practice of teaching, especially as a theoretical concept or academic discipline. Please, tell me about this.

5. Communication
This affinity describes the imparting or exchanging of information or news. Please, elaborate on this affinity.

6. Organization
This affinity describes the action of organizing something or an efficient and orderly approach to tasks. Please, tell me about this.

7. Pleasure of Technology
This affinity describes experiencing technology when it is at its best, and performing to its peak levels. Please, tell me about this.

8. Infrastructure
This affinity describes the basic physical and organizational structures facilities that must be implemented for technology to function properly. Please, tell me about this.

Figure 8 Group B Interview Protocol

Group B
Interview Protocol

Axial Coding

Focus Groups have identified several common themes or affinities that describe their experiences using technology in teaching. Let's look at each of these themes one at a time and tell me about your experiences with these.

1. Negative Aspects

This affinity describes the negative factors surrounding the use of technology in teaching methodologies. Please tell me what this affinity means to you, and what affects or influences it.

2. Ambivalence

Ambivalence is the coexistence within an individual of positive and negative feelings toward the same idea or situation. Please, tell me about ambivalence.

3. Trepidation

This affinity describes a state of alarm or dread; an apprehension of teaching with technology. What are your feelings regarding trepidation?

4. Technological Advantages

This affinity describes all the .circumstance, opportunity, or means especially favorable to success in using technology in your teaching methods. Please tell me about the technological advantages you've experienced. Describe your feelings about the advantages of using technology to teach.

5. Positive Feelings

This affinity describes all the circumstance, opportunity, or means especially favorable to success in using technology in your teaching methods. Please tell me about the technological advantages you've experienced. Please elaborate on this statement. What do you think the advantages of using technology to teach are?

Transcripts and Axial Code Tables

All of interviews were transcribed word for word. Once the transcripts had been prepared, the researcher analyzed the text for *axial codes*, which are *specific examples of discourse that illustrate or allude to an affinity.* The researcher next examined all quotes for each separate affinity. The quotes for a particular affinity were organized into sub-groups. These subgroups contained quotes that addressed a common theme describing that affinity. Multiple quotes were then woven together to develop a composite quote. The following section is a composite description of the affinities based on quotes obtained from all the interviews.

Coding demands both induction and deduction. This is followed by analytical or axial coding which is primarily deductive in nature. Analysis of data actually begins when the group participants (A or B) are asked to identify themes and similarities among their various responses grouped along the wall. Inductive coding occurs as participants identify and name the affinity. Interview axial coding refines and provides a much more detailed or "in depth" description of the what the individual participants believe the meaning of each affinity to be. Quotes from these interviews are then combined to form the composite descriptions of each affinity (McCoy, class lecture, 2005). In the following two sections are composite descriptions of each affinity from both groups.

Negative Aspects

"Even with your best efforts it doesn't work."

*"I'm always wondering if the technology will work**, that's the main thing***. It's negative but it is also OK, is it really going to be there? … will it work and, when it doesn't work, *what did I do wrong?* Or, am I doing it right, or is something else is going wrong?"

"There is always that anxiety of 'am I going to be able to do what I think I'm going to be able to do with this technology for this class, this period, this session, this hour?"

"Yeah, especially here at UIW. The machines won't work at all. So, when that happens, *I really get panicked. So, I never feel very comfortable with technology at all.*"

"***I'm still using old technology for the most part***. I am just now getting, this coming semester, to the part where I'm going to have a work-study start putting everything from slides, scanning everything from slides onto CD and into my computer."

"But, it turns out the technology, at least, because the MAC lab belongs to the department, so somebody's maintaining it. The machines are always working."

"You've got to have backup in the classroom "

"Technology is not perfect. So, unless you have some kind of backup, that's what I've noticed in my classroom, if I've counted on that power point, and then I can't, , than I'm kind of messed up. You've got to have a plan B with technology."

*"Usually when you are getting ready to use an **assignment you have a backup**, but I didn't have a **backup** for this. We went into the lab three different class periods. So, that is a* week and a half of work, so if the computers are not going to be working, that would throw everything off,"

"I wanted to do an overhead through the system. I had problems, when I finally did get it up, there was a lapse between what I was presenting in the classroom and going back to using the overhear, computer generated overhead, and the system had shut down on me. I couldn't get back into it. Those are technological problems that really put a hindrance on the classroom activity. Ultimately what you have to do, of course the show has to keep running, you know, is dance around it, which is what I did. What it does is it inhibits me to want to use it again. : *Yes, if it's not going to work**, it's either that or have to step into the class with a backup plan**."*

*"It takes a lot of **time**."*

"The administration----They are supposed to be supporting what we're doing, it can't be our urgency, it has to be their urgency."

"If it's not working, somebody else can help us. But, in the classroom, when something really happens, you cannot call the Media Center because they won't come right away, right?"

"Where, you know, I always felt that it was much easier to avoid that in a traditional classroom setting."

"I guess I always felt like I was shorting, doing that online class. It was tough to make sure that they weren't only going to do just enough to get by. : It's not as rich of an environment."

"I find a lot of students are using technology to tune out. "

"I think that in a lot of ways the dark side of technology separates and isolates people from each other.…the negative aspects that I see have to do with some sort of distancing effect where I feel as though my communications with students is being effaced and eclipsed by the technology but I would say that is only about certain kinds of technologies…"

"It still works, it still works. It's just that they're not making projectors anymore. Yes, we are killing ourselves, shooting ourselves in the feet all the time. I'm going to guard our projectors like crazy because there are some slides, like Native-American slides, that we don't use that often, so we're not going to convert them into CDs right away. But they're very valuable, so I'm going to keep the projectors just in case we need them. Not only that, but CD-ROMs degrade, computers go out of use. My computer could crash tomorrow, never to awaken again--I mean, I had to get an external drive for my disks because I had all my budgets on disks."

*"OK, negative two, the technology keeps changing. As we progress to the next level of technology, my bequest is what's this going to be replaced by****? And how long is it going to take me to create the information again****."*

"And should I even bother to do this step, because if I skip this step, I'm already in the next step, yes, I thought about that, too."

"I've skipped this one, you know, floppies, and I'm going to CD-ROM. I have no zip-drives, thank goodness, because now zip drives are useless. And there are no zip drives… nobody is using zip-drives anymore. …*The other negative aspects have to do with, just on a personal level, some of the complications in learning the new technology and how to employ it. I still get apprehensive about relying too much on it* ***because I'm afraid it's going to minimize human contact."***

"What I have found, instinctually, with the students is *that they find PowerPoint as an opportunity to not engage*. *They disengage and remove themselves from inquisitive inquiry*. Like, if I don't use it everyday, then I forget how to turn it on, not to turn it on, but you know what I mean? Like in power point, go through the windows and do all that. The other interesting thing that I've found is that using power points and that using the handouts, *you know of your power point, well then, students just seem to tune out*. I rarely use power point at all anymore because I just discovered that by myself. I would do it and my class, the classroom experience was totally different. People would zone out. *There wasn't any interaction*."

"Will I even find my Power Point even if it does work, you know? Those kinds of things are negative."

Ambivalence

"The ambivalence tends to dominate"

"In a way I do feel ambivalence because I have that lingering sense *that there is something depersonalizing about certain types of technology*. *And to me, to the extent the sense that it disrupts a kind of interpersonal communication, I think it can be ineffective as a* ***teaching*** *tool*. So, that's why I say technology is not all bad. Let me say it this way:"

"If I don't need to use it, I won't use it. Because, as I said, *many of my students already expose themselves to technology too much*."

"*If I'm ambivalent, meaning, if I'm not sure that this is going to have an advantage,* I'm not going to stick my neck out. *It's like, you're not sure. So, why are you bothering?* When is it going to go out of date? How much time am I going to invest and how long am I going to be able to keep this technology before I have to re-invest the same amount of time or more.. Yes, they I would put to arrows because *some of my ambivalence towards technology has to do with some of the negative things I associate with it* as opposed to the positive thing, because there is no one on one interaction. There was certainly ambivalence over the effectiveness that the computer tutorials had That and like long distance learning, I really have negative attitudes towards that."

"On the one hand, we need it; on the other hand, it has MORE control in our life, in our teaching life. ***I have a lot of complaints about using technology here, but it is a necessary evil now.*** Because now, for example, when I teach, especially when I teach Impact of Media, I have to show different media to the students to see how they have great impact on, for example social psychology, etc. etc.. So, you need to use the DVD player, the Internet, etc. etc. So, we need to rely upon technology."

"However, you know I'm a philosopher, I teach Impact of Media….*I always think* ***technology is "The Other****". And, unfortunately, "the Other" is becoming more and more dominating in our life. So, I feel more and more ambivalent towards the technology*."

"Since I teach languages, I often think about listening and speaking. So when we did that bulletin board thing. Is that helping their listening skills? No, not really. Is it helping them to speak? No not really. I think that some of the students might not have cared about the assignment; actually, I know that they didn't because I passed out a questionnaire afterwards. Some said: "I wasn't interested in this at all". I can see how the students and some of the instructors would be ambivalent about using technology in the language Classroom."

"I don't know how to fix it and I don't have someone right there who does know how to fix it."

"I was scared …I am not very computer savvy myself so I was wondering, "What if this doesn't work or what if something happens to the computer I haven't used a lot of technology, but I would like to. I would like to use it outside of the classroom to continue the learning. *The anxiety is a big factor for me.*"

"If you accumulate this kind of ambivalent feeling you will be, ***sometimes you become fearful because you cannot control over the technology*** *You can't fix it. We don't have the ability to fix it, or, ordinary people don't have the ability to fix it*."

Trepidations

"I think a lot of students have grown up using the computer and feeling very comfortable, unlike some of their teachers. We are the ones who fear it a lot of the times, not the students."

"The presence, the physical presence, and the physical interaction, face-to-face, is incredibly important. Any of us who have been in the classroom know that, we know that."

"Yeah. If you have more and more bad experiences with using the technology, then you become afraid of it. Like me, I always say I'm a computer-idiot, *I'm a computer-phobic. I only use the Internet and email, but something happens to my computer—I get panicked—yeah."*

"…That's the issue here. An institution can't just shove the technology down the instructor's throat*. I think the institution needs to engage in technology seminars so we*

can learn the technology and then leave it up to us to see how and if we're going to incorporate the technology into what we're doing. You really have to be inspired."

"*I'm glad that, at my age, that I can, that technology doesn't scare me. Because I see people that won't even learn how to email*."

"Yeah, because I think I have more control about my human life, I mean about human relationships with other people than my relationship with the technology. Yeah. That's why in the beginning, I said sometimes computers are very emotional."

"*See, I have trepidation there, OK. It's a removal and it generates the opportunity for the instructors to remove themselves as much as they can from their own agenda*, maybe their own scholarships and what have you. I think it generates problems in regard to communication and technological breakdowns because I saw that with (Inaudible). With Phoenix, as great as Phoenix is, there were still problems. ***It opens up greater opportunities for misinformation and lack of communication***. *The presence, the physical presence, and the physical interaction, face-to-face, is incredibly important. Any of us who have been in the classroom know that, we know that*."

"I have trepidation that *whatever I have put together as a kind of technologically mediated presentation will simply, there will be a glitch. I worry about it will get all jumbled or the electricity will go out or something like that. This summer at Harvard… it wouldn't work. And it disrupted everything and we struggled*."

"*The trepidation is, I'm going to open the book and what am I going to do? That's wrong. How many ways am I going to find to make a mistake? How frustrated am I going to get and, again, the time. How long is it going to take me until I feel confident, until I feel that I really have got this down? Figuring out how it all works*. Speaking of somebody who pretty much has to teach myself Photoshop, OK?"

"*The thing is they do have…a class in Photoshop here… I took a lovely Photoshop workshop here. But it was two hours, one afternoon. You can't learn Photoshop in two hours one afternoon*. I learned how to make marching ants and move something, that was it. That was good but that was all the time there was."

Technological Advantages

"*Actually, for me, the technological advantages outweigh the negative*. This is where the thing begins to shift. This is literally what happened to me. When I saw that the advantages were far outweighing any negativity or any ambivalence or trepidation, I'm like, OK, we're going full steam ahead. *Technological advantages win every time. Definitely* when I have worked extensively with technology in my classes…. "

"They have to go to the actual experience in order to experience the advantages, in order for you to be able to assimilate what you're doing and then cognitively take a step back and see the advantages of the technology and how you can incorporate it."

"*I think it's the technology advantages allow for the creation of the positive feelings.* … Yeah, I have an iPod and the students used to laugh at me bringing my gigantic boom box, but now I can …it has been more streamlined, I don't have to lug stuff up and down stairs, I feel like that is kind of the flipside *when you master it or feel comfortable with a form of technology like that they rather than kind of disrupting you're your contact with the students it actually facilitates contact with the students.* ***I can kind of talk on their wavelength***, and I can get them to help me create their own play lists and we can share things, it has actually enhanced that course a lot, and I am very positive about that. getting into some special forms of technology that the advantages are outweighing the negatives for me."

",.. especially for foreigners like me, I take a lot of advantages with technologies. For example, in the past, *Thirty years ago or forty years ago, if I want to show students some different cultural stuff, where could I get that material? Now, I can get it in one second—through the Internet.* Yeah. It's a Global Village, like Marshall McLuhan said. I think that is the biggest advantage we are enjoying. . In the past, if you don't bring, for example, the transparencies, you could not show them, or slides, or whatever, or pictures or photos. But, now, whenever you think about something, as long as you know where you can find it , you can show that right away. I think that is the biggest contribution of computer technology to the teacher."

"… if you have to answer it immediately and spontaneously that is the most anxiety provoking thing that can happen in the language classroom. Some research has shown that you can avoid that anxiety by working online. So that is one of the advantages."

Positive Feelings

"*I think that* ***the advantages overwhelm the negative*** *aspects but only if you get involved*."

"I love it. I loved to introduce the Paint Shop Pro into Portfolio, because then they can take pictures of their work, edit their work, and build a portfolio, so they have an electronic portfolio."

"*Negativity can outweigh the advantages, especially if you are aware of the negative aspects*."

"I love e-mail; I check it every two hours!"

"Negative feelings influence the positive aspects because *more people are not aware of the positive aspects*. I think positive feelings influence negative aspects because I think you gotta feel positive before you can overcome the negative,"

"I'll say this. *I think that when you have an entire campus that is involved in technology and interested and committed to it, and that you have people who are willing to help you, and a COMPUTER ARTS program where the students know everything, it makes it a lot easier. I don't think I would have gotten this far technologically if I was somewhere where it's like, OK, you can have a computer if you want to*…I wouldn't have lagged as much, if they weren't saying, you know, there is wiring everywhere on campus and you can sit out there, when the day is nice, and you can do what you need to do, and pick up your email. I think if that wasn't there, I wouldn't have gotten to evolve as I have."

"*And the students do it. It's like, it's embarrassing if the teachers can't do it and the students are so good at it.* ***So, it almost pushes you into the 21st century that way***. What do you mean you don't know how to, whatever."

"I can use the Internet, to go to different countries, web-sites, etc. etc. to show (the students) them that different countries actually have different ways of thinking, we all have different ways of behavior, etc. etc. I think that is probably the most positive cases. *See, now, that is great, for one thing: storage*. We have tons of slides. Tons of slides are now, you know 5 or 6 CDs. So storage is one thing. And then, of course, the whole thing of having things come much more quickly. It used to take forever to make a slide. You'd have to find the image, get somebody to photo, and set the lights, get somebody to photograph it, take it to be developed, processed, get it back. Get somebody to put it in the little carrier that is going to make it permanent. Now, you take the digital camera, or you take the scanner, and it's zoom, and you see it. There's no middle man."

"I mean, I think I have positive feelings when things work, when I show what I want to show, do what I want to do. . . make the points with power that I want to make."

Table 5 Group B Tabular IRD

Tabular IRD								
	1	**2**	**3**	**4**	**5**	**OUT**	**IN**	**Δ**
1		↑	↑	←	←	2	2	0
2	←		←	←	←	0	4	-4
3	←	↑		←	←	1	3	-2
4	↑	↑	↑		↑	4	0	4
5	↑	↑	↑	←		3	1	2

Count the number of up arrows (↑) or *Outs*
Count the number of left arrows (←) or *Ins*
Subtract the number of *Ins* from the *Outs* to determine the (Δ) *Deltas*
Δ = Out- In

Table 6 Group B Affinity Names

Affinity Name
1. Negative Aspects
2. Ambivalence
3. Trepidation
4. Technological Advantages
5. Positive Feelings

Examine each individual Interview Theoretical Code Table and tally the frequency of each relationship in the table below.

COMBINED INTERVIEW

THEORETICAL CODE

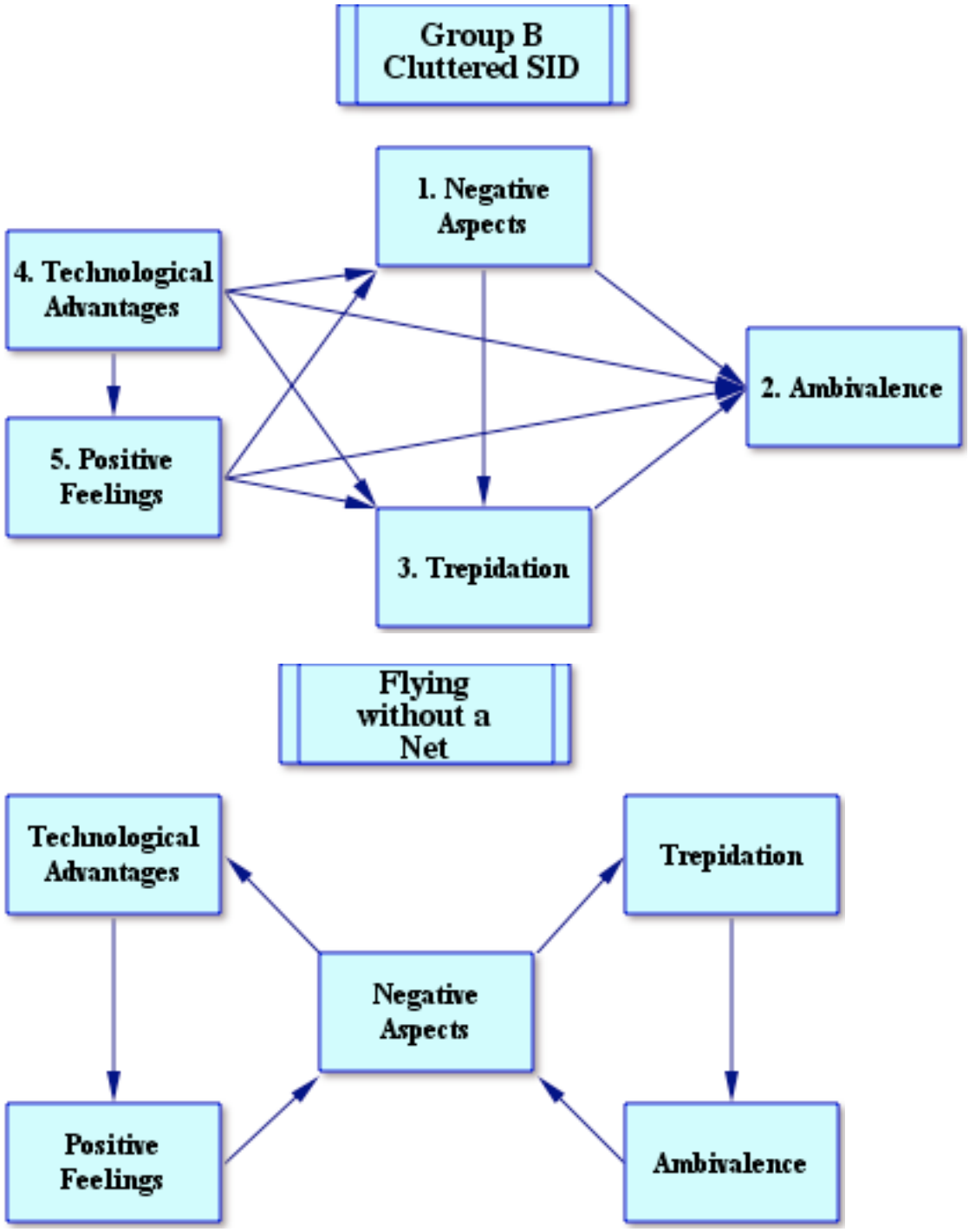
Frequency Table

Affinity Pair Relationship	Frequency		Affinity Pair Relationship	Frequency
1 → 2	6		2 → 4	2
1 ← 2	3		2 ← 4	9
1 → 3	5		2 → 5	2
1 ← 3	4		2 ← 5	9
1 → 4	4		3 → 4	2
1 ← 4	6		3 ← 4	9
1 → 5	3		3 → 5	2
1 ← 5	7		3 ← 5	9
2 → 3	4		4 → 5	8
2 ← 3	7		4 ← 5	1

Table 7 Tabular IRD Group B

Tabular IRD – Sorted in Descending Order of Δ								
	1	**2**	**3**	**4**	**5**	**OUT**	**IN**	**Δ**
4	↑	↑	↑		↑	4	0	4
5	↑	↑	↑	←		3	1	2
1		↑	↑	←	←	2	2	0
3	←	↑		←	←	1	3	-2
2	←		←	←	←	0	4	-4

Tentative SID Assignments	
4	Primary Driver
5	Secondary Driver
1	Circulator / Pivot / ?
3	Secondary Outcome
2	Primary Outcome



The circulator (point of recursion) is the first affinity, Negative Aspects.

This traps the group in two negative feedback loops, with no way out.

Every time ideal is felt or a positive idea is tried, it is drowned out by the negative chatter of bad experiences. Failed attempts caused Group B to obsess over their lack of knowledge, and how poorly they looked to their students if they do not look technologically savvy. *Most feel that they must have "back up" in the classroom, they are flying without a net, on the edge of a fatal crash —trepidations at best.*

Ambivalence is the primary outcome but every time it loops back to the point of recursion, negative aspects it reinforces their fears, making them more ambivalent, trapped in a spiral of negative aspects several group member claimed that these affinities drove their mental state, the negative aspect affinity always 'trumped' any good feelings they night experience.

Learning

"I learned how to do something else that I was shocked that I never thought I could do, but it comes in odd moments, and it's not in the formal classes, it's very informal, like Leslie the librarian showed me. I had to go over there three times. Every time I did it, there was a kink. Gives you real patient, that's the key. Explained what I was doing wrong. But, on the other hand, it's frustrating."

"On the other hand, one reason that I might technology frustrating is this probably has to do with my learning style. Some people are very logical, very methodical, very rational, and they learn by reading, and I learn by observing and listening, and manually touching things. When your preference is to learn that way, and not by opening the book and understanding what the text says, then I think you have a problem."

"No learning at that point, its just panic."

"You're going to have difficulty learning because learning is absorbing and making those ideas internal."

"I could see how very well it could bolster learning, helped the learning of my students. It also leaves a trail of what I have done in class, because I post everything that I've handed out, every power point that I used, all of those kinds of things. They're posted there for the students to be able to go back and look at. That's terribly important and helpful, particularly for the international students who have heard all of the words but they need to go back and take longer to look again at what were the ideas and so forth, because they're having to translate them, too. I find that the use of technology, of some technologies, to be very, very helpful in teaching."

"The other side of it is that, in using technology, there is a learning curve that must be gotten over, both by myself, in learning to use the technology, and by the student, in being able to use it on the other end, too. Certainly learning is a piece of it, from both directions, in the use of technology and teaching."

"Learning influences pedagogy."

"Learning influences communication."

"Learning influences pleasures of technology, if you can learn how to do it better, you enjoy it better."

Frustration

"All the time, it is so freaking frustrating."

". There will often be at least an initial frustration that goes along with the learning curve. Some of the frustrations will be almost insurmountable for a few returning students and those who have poor telephone connections or with not much ease with computers at all. If they survive the first semester around here, our students end up being pretty computer savvy. Those things change, but those frustrations go away."

"I would say most people are easier, at least not scared of it, within a month. Some take a whole semester before they do, but once they get to the point where they accept, yes, I'm going to use this as a tool in my learning, then they're able to cope with it."

"Because if you can't get the equipment to work, or you don't understand the software that's there, and then you get—for myself? I get packed because I feel that I can't, I'm not learning, and I think students feel the same way. And I think they know a whole lot less than they tell us they know."

"Frustration affects learning, and partly because anytime frustration is the key, then there's no, the stress level goes up and I'm not clam. And I think learning, to be successful, has to be in a calm space."

"If you're frustrated you're not going to learn, you just give up and move on to something else."

"I have to have someone SHOW ME (emphasis on the phrase) ON (stronger emphasis) the thing, how to use it. I couldn't read a book and get it. They had to show me, and then I could do it. So I think some people are like that. Some people are aural learners, some are kinesthetic, some people are visual learners."

"In fact, the biggest frustration, going back to frustration, is when everything is down, or whatever, you can't do, because you have such expectations."

"But they do get over it, if you put them in a situation where it's reasonably supportive, a little bit of hand holder."

"…if it is going to be too frustrating, I don't bother with it, I don't put it within my repertoire of things I do."

Time

"Time affects learning."

"I think students have poor time management skills. And I think, for myself, it's a time issue that affects—that if I am pressured I can't—I don't learn as much. I can't. I think students are the same way."

"Students and teachers alike that are under pressure—I like to work until the last minute."

"The main issue with time and technology is that we have to extend our time with learning styles that extends the technology."

"It definitely takes time to communicate."

"Actually it's made me extremely aware of time in a couple of ways. When I teach graduate classes, I'll teach at night, so I've got that big three-hour, four-hour block of time. So of course, I'm looking to break that up into manageable chunks, so that they are not all sleeping by eight o'clock. One way technology is kind of my friend there, because I can use it to break things up and have different kinds of activities and so on. The other thing though, is that whole issue of, if it doesn't work, that's always, you know, I feel like I'm standing there dancing if front of the classroom. It could be 30 seconds, but if feels like 10 minutes to me."

"The other thing about time is that, because I typically will use, I'll typically have lots of different activities in a class period. That's real marked in the night classes, but even in an ordinary day class that's 90 minutes long, I'll have 2 or 3 activities. So that means if I'm moving from one piece of technology to another, kind of an ongoing frustration is how time consuming that is. It's not seamless, it's not easy. You know, there is too much downtime is when you're going from this thing to that thing. It's not click-click and you move one to something else."

"The infrastructure constantly causes me time, costs me time, has to make me think about time, has to make me fiddle with time-related issues."

"There are times when it takes more time, because of the preparation in the (inaudible), and other times when it's a great saver. Often it's not as much a time saver as it is a clarifier. I may need to spend as much time on a particular task but the history of it is there, then. If I messed up something, I can see that I messed it up. If it needs to go back and get fixed, or whatever, it secures what's happened in class."

"On one hand, it saves time; on the other hand it can soak up every moment of time that you have. Because I think the more you use technology, the more you become a perfectionist about things. I find myself constantly re-doing things and probably should leave some things alone and work on other things. The expectation is so much higher now that I think it takes some in return."

"I think pedagogy, for me, pedagogy influences how much time. Because I'm a stickler for, I want all the ducks in a row, and whatever. Because I want to embrace a better kind of pedagogy I think it ends up taking more time."

"you put enough time in and you can learn anything. "

"I've been teaching too long to ask my self to do things that is just too punishing. If it's just going to take too long it's not going to go into my repertoire of things to do. On the other hand, if it is something that is really worth while, if it is really serving a big meaning…"

Pedagogy

"The pedagogy often can enhance or can disrupt…when the pedagogy is ineffective and that will have some negative impact on the learning. But, I also know that whatever the learning outcome is does tell me the kind of pedagogy I should use."

"There was a few faculty members that resisted that, unfortunately paid the price and are no longer here… Because of that, I had to put everything on power point because

(Inaudible), and that was the wave, the coming wave and I did, and that changed my pedagogy. Now, when I go back and look at my old lecture notes, like I did last week, I found some small group activities. Well, God, I haven't done those. Now, I'm resurrecting them."

"I also think of learning outcomes. Those outcomes determine the pedagogy I'm going to use as a teacher."

"When you have different learning styles, you have to have different approaches…I also have different learning styles for different things. Like learning Word Perfect. I remember, I couldn't. That's how far back it goes. You come into the computer lab one day, sat down, and showed me three things on Word Perfect, and I learned."

"There are times when it takes more time, because of the preparation in the (inaudible), and other times when it's a great saver. Often it's not as much a time saver as it is a clarifier. I may need to spend as much time on a particular task but the history of it is there, then. If I messed up something, I can see that I messed it up. If it needs to go back and get fixed, or whatever, it secures what's happened in class."

"Well, it's changed mathematics period. Before the graphing calculator, and other kinds of technologies that support it, very much of mathematics had to be have them get the answer, please God that it will match the back of the book. And that's not what mathematics was to be about then, and it's not what mathematics is about now. It's about what patterns do you see, what are the things that happen under these conditions and how will those things change, if you change the conditions. That's mathematics… so you can get to the core of real mathematics so much faster now than you could without the technologies."

"…pedagogy influences learning."

"I think it's incredibly important for our students in education. I think we have to recognize that the computers have become such an important part of their daily lives. These are young people, although we do have non-traditional students who have not as much affinity for the computer, or technology, as their younger counterparts. For future teachers, they've got to be at home with technology, and they have to see us model it, because research indicates that their going to teach like the last people they've seen teach, and that's their professors."

"Pedagogy will affect how I teach. The pedagogy I use to teach will affect how I organize."

"For me the most important thing is that technology allows me to de-center the classroom, so that the instructor is less likely to be the center of attention. With

technology I can have lots of things going on in different centers in the room, I can give students things to do in groups and then have them come back and report. I can have them bring in things that they have gotten of the internet and have them work with them together."

"Clearly that's a part of technology. I don't have a lot of patience with things that don't work. I'll give it three minutes. And if it doesn't work after three minutes, we move on to plan B. I figured that three minutes that is [wasted]. Yes, that is, you know, 5% of the class time. And I've already wasted 5%, I'm not wasting more."

"I think that one thing that it's helped me do is put students in positions of expertise more. Because on any given piece of technology, there is likely to be a real big bell curve of ability in the classroom and I'm probably going to be sort of at the high average, but not the most expert user in the room. So if I run into trouble, I know, I'll put a student in charge. Now, I don't even wait to run into trouble. I will say: so and so, get this started while I take care of this, that, or the other. That has changed. Another thing that's changed is that it has just made it for me a whole lot easier to meet some of the ADA accommodations. The most typical accommodation I'm asked for is a copy of professor's lecture's notes."

Communication

"For instance, we're doing maybe an author or something, and I'm able to scan just one page, because I'm not going to scan the whole book, but I can scan it and show as a prompt to them and communicate to them in a class, expectations. Sometimes it may be kind of a focused thought for the beginning of our class, or to get them excited about something we're going to do with it all. "

"I think communication affects their learning."

"I find that to be very, very useful for communications of all kinds. From the mathematics point of view, one that I don't really hardly get to use anymore, except just in occasional courses, is my graphic calculator, those kinds of technologies, where communication is instant. I can instantly show you the difference between 5 different graphs and, within 5 minutes, you've seen them all and you understand them all. Where as in the bad old days, that would have taken me probably 50 minutes to graph it and then show them, and then graph the next one and then show them and then graph the next one and then show you, the difference is just phenomenal. And the student has the power to be able to do that, too. They take their equation and they can graph their equation, then they can tweak it a little bit and see the difference that it made, then tweak a little more and see what the difference is."

"Technology has taken that away from me, and it's taken away, to some degree, but not a lot, the dialogue, the back and forth." "My communication with students has improved because they email me and I make it a point to respond right away. I'm really an introvert at heart. I would prefer communicating by email than picking up a phone and calling. But sometimes it is faster to pick up a phone, because you know, if somebody has a 75 messages, they're not going to get on the machine."

"My theory is that if a student is not able to communicate the new idea, the theory, that student hasn't learned it.

Nobody thinks of the reverse? If the teacher doesn't communicate well, they can't learn?"

"It makes it so much easier to communicate with a great big group of students at a time. I have a blackboard site specifically for doctoral students and I have about five different email lists, distribution lists, on there. If I want to talk just to the org leadership students, I can do that. If I want to talk just to the faculty that serves on dissertations, I can send out emails to those, and so forth. That sort of thing is just invaluable."

"Yes, I think probably what communication means for me is the email communication and like the website. We have a doctoral website that we keep very alive and updated and what is happening now, with lots of pictures, and newsy little stuff on the website that is out of the main doc of the UIW website, so it's to the general public."

"I find that to be very, very useful for communications of all kinds. From the mathematics point of view, one that I don't really hardly get to use anymore, except just in occasional courses, is my graphic calculator, those kinds of technologies, where communication is instant. I can instantly show you the difference between 5 different graphs and, within 5 minutes, you've seen them all and you understand them all. Where as in the bad old days, that would have taken me probably 50 minutes to graph it and then show them, and then graph the next one and then show them and then graph the next one and then show you, the difference is just phenomenal. And the student has the power to be able to do that, too. They take their equation and they can graph their equation, then they can tweak it a little bit and see the difference that it made, then tweak a little more and see what the difference is."

"I'm just astonished at the degree to which communication with students has gone a degree more. My daily routine is different. I come in, usually I come in with my gym clothes on and my coffee and I'll do my emails first. Typically I'll have six or seven emails from students that will have come in since maybe midday the day before. And at 7:30, 7:45 am I'll have written them emails. It takes me ten minutes to go through and say, no, that's not due tomorrow, it's due next week, or, here's another copy of that handout, attach and send it. That kind of stuff makes it really easy to be a nice cop. That

has changed. Of course, professional list-serves, those are part of my everyday life now. I have a problem that I don't know how to solve it, I put a question on my list-serve and see what other people have done. A couple that I just work on but that's useful, too. All my students turn in almost all of their work electronically."

"The other thing is, you know, students are much more likely to shoot me the draft of a paper. Saying, would you look this over? When it was a paper copy and I can't find it, write it, blah…But I open it up, and I read it, give it a quick read, I'll write an email back that says, first of all you need to edit this thing or you're going to be in big trouble. You did a really nice job in the introduction. Hey, you said all kinds of unsupported stuff in paragraph three, take a look. I've invested 10 minutes, they do a better job, we're all happy. Before technology, they tended not to turn in their draft and I hated when they did because it was such an ordeal. So I think that makes a difference."

"Of course, communication with colleagues, scholarship, I did an article recently for Encyclopedia of Early Childhood on, and everything was electronically. From the invitation to do it, to the every step of the back and forth, it's all done electronically."

Organization

"I have always been one who's prepared very carefully for every class. In a lot ways, the things that I used to put on transparencies are now on power points instead. In some of the handouts that I used to have to crank to get copies up and burn down trees to distribute are digital copies instead that are posted, and those kinds of things. As far as the pace of the class, and that sort of thing, I think there has not been a whole lot of change because I was always that kind of teacher anyway."

"So that has worked out really, very, very well. I have learned not to just put everything under My Documents, right there on the top. I do get them, at least to some extent, sorted into directories, so I can know where something goes. As a result, I use the search function very often",

"I think that organization definitely affect learning, I because I like to be organized."

"I think tat organization definitely affects learning. And my reason for thinking that is that, although we all think in disorganized ways, the only way we can get to the end result of that thinking is through logic. And that's organized."

"I would like to be more organized. My directories are better on some days than they are other days. My directories look about like my desk here, you have a pile here for doctoral studies, you have a pile here for math Ed, then you have a pile here that's my calendar, and so forth. I have, particularly on this machine and with this job, I have tried

to departmentalize even more the pieces of my life. Every course has its own directory file on every machine that I own and use."

"Certainly organization influences communication. If you've got a distribution list, you're going to be able to contact them all, if you don't, you don't. "

"if it's organized well I can enjoy it better, I think that's what I was trying to say."

"I think organization is my own, dealing with and how I work with whatever infrastructure I have, is organization."

"Actually I find that technology helps me stay organized. I am a pack-rack on the kids, I throw things in my office, things are in stacks, they're a horrible mess, but electronically I can stay organized. I have a folder for every course. And when I do the hand out, and the quiz and the review sheet, I save them electronically and it's in the right place."

"I will create a folder, within my document. You've thought math and I don't know, so on the C drive area that is called my documents I save it there and I have folders for every class. So, let's say, my literacy assessment class. It will have a big folder and when I open it up, I'll have folders inside. I'll have the lecture notes, I can just dump those in there, but I will put a test in a separate folder, and I'll put student papers in there. Because students turn in their papers to me electronically, and pull them off of the digital drop box."

"That organization influences learning and that's partially because I'm organizationally challenged. I'm always focused on keeping it organized, getting it organized. And also, the little that I know about learning theory suggests that we learn things in groups in concepts and organized bungles, not random facts."

Pleasure of Technology

"The research. I love it, I love it, I love it."

"You know, it even affects my shopping."

"I think that pleasure affects the learning."

"That's a pleasure for me, to see them really learning."

"I think the pleasure of technology affects the learning because we always perform more positively and more happily in delight."

"I think that access to multiple resources that we could not even have in the library is a pleasure"

"I've been able to access sound recording of all of these British Music Hall obscure song, and I just sit there and listen to them and, you know, I'm dancing and happy and thinking, "Okay, how am I going to change the lyrics or whatever." It would have taken me years before."

"The more I learn about technology, the more pleasurable that is."

"I'll do things at first because they are cool and they're fun. And then I'll be looking and thinking, how can I make some learning come out of this? But often I'll lead with the fun."

Infrastructure

"When you have a student oriented culture in that department and I think things will improve for faculty and the students and the administrators."

"I think they have a yeoman's job to do and very often do a really good job with it. It aggravates me very badly to call the helpdesk and nobody answers. When that happens, I leave a message that says, a helpdesk is not helpful if nobody answers the phone. I do it every single time I ever get a not answer on helpdesk, I think that needs to be ran, as far as I'm concerned, 24/7."

"If the infrastructure is good, and supportive, then you're able to use the technology better with less frustration and with more pleasure and with more excitement."

"I think we, for a small university, we have had a lot of support for technology. I've seen, I think, a decline. I don't see the emphasis on it as much."

"Probably I'm a classic early adapter, so I'm willing to put up with a little more non-sense than some people. But there's something where I just won't go there, because I know that's not going to work."

"I've had trouble with, moving from VCR to blackboard and back and now I just make sure that, if I'm going to do that kind of thing, we'll do our home video clip and then I know that we'll have a nice long time where they sit at their desk and talk to each other, or write something so that I can fiddle. I don't try to make anything move quickly or seamless because I know it won't work. I am very cautious with the online testing. I do one application of that at one class where I used to do an in-class test and I do that online now. But other than that I don't try. I've heard of people who tried to do it in-class online and it just goes down and it's a mess, and it's horrible. Even at that, when I do it

outside of class, online testing, I know I'll have, out of a class of 20, I'll have two people who got turned off the network and I'll have to make other, you know. The other thing, it just makes me crazy when they change things and don't tell us. You walk in a room and all of a sudden stuff is different. I don't know that it's different, I just know it's not working so I figure it's broken or I've done something wrong."

": The other thing, I find that the, I mean, some of the infrastructure is nice. I love that we've got all this wireless hotspots. I love that there is a data projector in my classroom and I don't have to mess with it. There are some really nice things. But also, whoever set up those computer carts has never taught. There are these carts where you can only get to them if you sit down, on a chair, with your back to the students."

"Because they can never help. It seems to me the only thing they know to ask is: Is your computer plugged in? Did you try shutting down and starting up again? I do those things before I call the help desk. Half the time, I think it's telling that it is really even hard to find their phone number in this directory. I have my annotated directory so I know what it is, but it is kind of buried in there. They're often rude, they're rarely helpful. To be honest now, in the area of technology, I have two people that I know they know things and regardless of the issue, I'll call them. I either call Adel (Inaudible) or Veronica Garza, and that's it. They're my helpdesk. And I feel sorry, and I kind of apologize, and I'll say, Adel, I don't know this is exactly your deal but I'm trying to make happen. She will typically be able to help me right there on the sun or, if not, get me help quickly and often comes in my office and makes things work. Veronica is just the goddess of blackboard. But the helpdesk, they're stupid and they're rude. "

". I know my Dean certainly wants us to use technology after the fact is support of it, but I don't think she has a real sense of what is involved in the trenches. We've got a new smart board, which I understand is a really cool tool, but we didn't get any adequate training. Some guy came out for half a day and then (Inaudible) said you can go to the website and finish up, well, except that the website never worked. There is this big (Inaudible) smart board sitting on the corner of my room and it doesn't work. It just gets in the way of everything and I know how many thousands of dollars it cost and I think, this isn't so cool. I don't know whether she didn't have enough money to provide more training…"

". I sound like a troglodyte here. I'm just outraged when they pulled all the overheads out of our building, because we train teachers. They've got to learn how to put a transparency on an overhead and come up with something that kids can see in the back row. That's a survival skill for a beginning teacher. I finally and went and did an order for an overhead for my class every single day of the semester. They trucked it over every single day. I was not going to think about what day some student might in her presentation. Because I've got little five-minute presentation going on all the time. I

can't think that far. Things happen, something happened in the school where I have to re-schedule a kid, so they're trucking this over every single day and I don't give a dam."

Theoretical Coding

The interview process allowed the researcher to theoretically code the meaning of each affinity. These results were recorded in a Combined Theoretical Code Tables, which were used to produce composite SIDs and IRDs for each group. These are depicted below.

Affinity Name
1. Learning
2. Frustration
3. Time
4. Pedagogy
5. Communication
6. Organization
7. Pleasure of Technology
8. Infrastructure

COMBINED INTERVIEW THEORETICAL CODE FREQUENCY TABLE

Affinity Pair Relationship	Frequency	Affinity Pair Relationship	Frequency	Affinity Pair Relationship	Frequency
1 → 2	1	2 → 6	3	4 → 7	4
1 ← 2	10	2 ← 6	8	4 ← 7	3
1 → 3	1	2 → 7	8	4 → 8	0
1 ← 3	10	2 ← 7	2	4 ← 8	11
1 → 4	0	2 → 8	0	5 → 6	0
1 ← 4	7	2 ← 8	11	5 ← 6	11
1 → 5	0	3 → 4	7	5 → 7	0
1 ← 5	11	3 ← 4	3	5 ← 7	7
1 → 6	0	3 → 5	6	5 → 8	0
1 ← 6	8	3 ← 5	4	5 ← 8	11
1 → 7	2	3 → 6	2	6 → 7	4
1 ← 7	6	3 ← 6	8	6 ← 7	5
1 → 8	0	3 → 7	4	6 → 8	0
1 ← 8	11	3 ← 7	5	6 ← 8	10
2 → 3	2	3 → 8	0	7 → 8	0
2 ← 3	5	3 ← 8	11	7 ← 8	11
2 → 4	5	4 → 5	3		
2 ← 4	3	4 ← 5	6		
2 → 5	4	4 → 6	2		
2 ← 5	4	4 ← 6	8		

Table 8 Combined Interview Theoretical Code Frequency Table

Group A Tabular IRD											
	1	2	3	4	5	6	7	8	OUT	IN	Δ
1		←	←	←	←	←	←	←	0	7	-7
2	↑		←	↑	←	←	↑	←	3	4	-1
3	↑	↑		↑	↑	←	←	←	4	3	1
4	↑	←	←		←	←	↑	←	2	5	-3
5	↑	↑	←	↑		←	←	←	3	4	-1
6	↑	↑	↑	↑	↑		←	←	5	2	3
7	↑	←	↑	←	↑	↑		←	4	3	1
8	↑	↑	↑	↑	↑	↑	↑		7	0	7

Group A Tabular IRD – Sorted in Descending Order of Δ											
	1	2	3	4	5	6	7	8	OUT	IN	Δ
8	↑	↑	↑	↑	↑	↑	↑		7	0	7
6	↑	↑	↑	↑	↑		←	←	5	2	3
3	↑	↑		↑	↑	←	←	←	4	3	1
7	↑	←	↑	←	↑	↑		←	4	3	1
2	↑		←	↑	←	←	↑	←	3	4	-1
5	↑	↑	←	↑		←	←	←	3	4	-1
4	↑	←	←		←	←	↑	←	2	5	-3
1		←	←	←	←	←	←	←	0	7	-7

Table 9 Group A Tubular IRD

Affinity Name
1. Negative Aspects
2. Ambivalence
3. Trepidation
4. Technological Advantages
5. Positive Feelings

Combined Interview Theoretical Code Frequency Table					
Affinity Pair Relationship	**Frequency**		**Affinity Pair Relationship**	**Frequency**
1 → 2	6		2 → 4	2
1 ← 2	3		2 ← 4	9
1 → 3	5		2 → 5	2
1 ← 3	4		2 ← 5	9
1 → 4	4		3 → 4	2
1 ← 4	6		3 ← 4	9
1 → 5	3		3 → 5	2
1 ← 5	7		3 ← 5	9
2 → 3	4		4 → 5	8
2 ← 3	7		4 ← 5	1

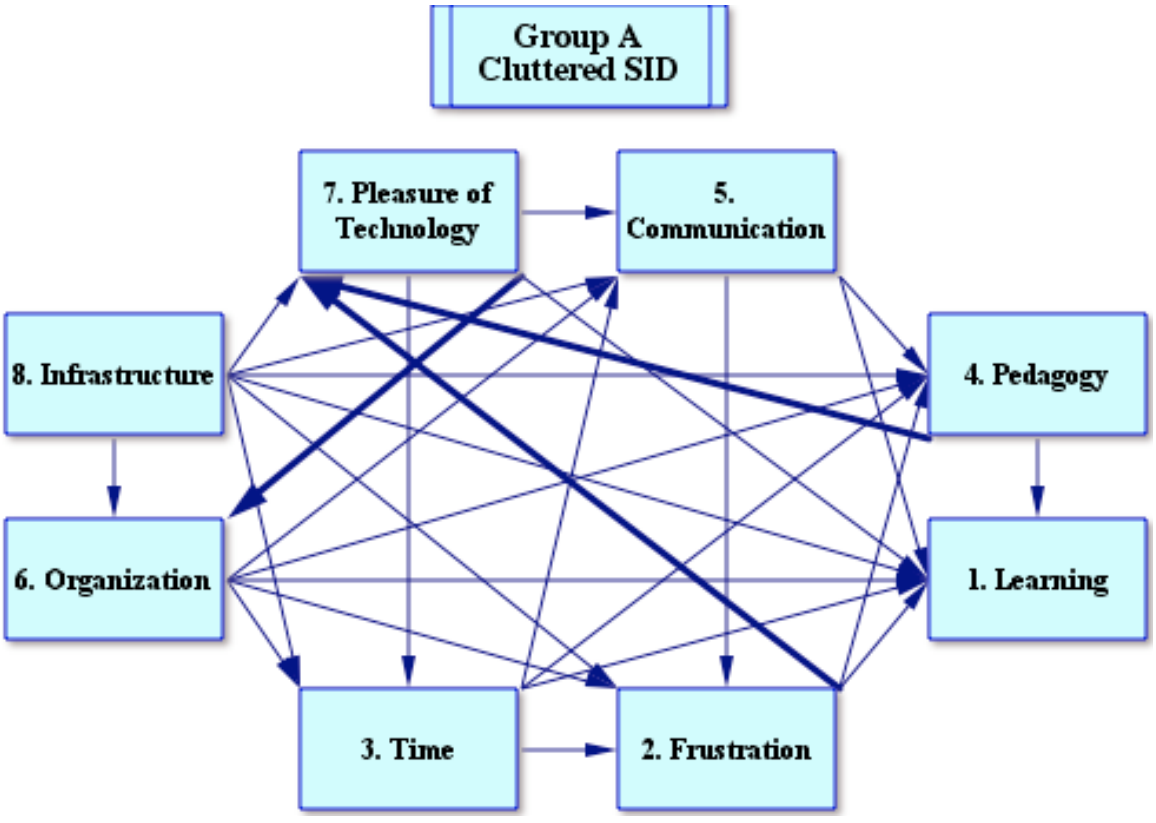
This table yields the following IRDs.

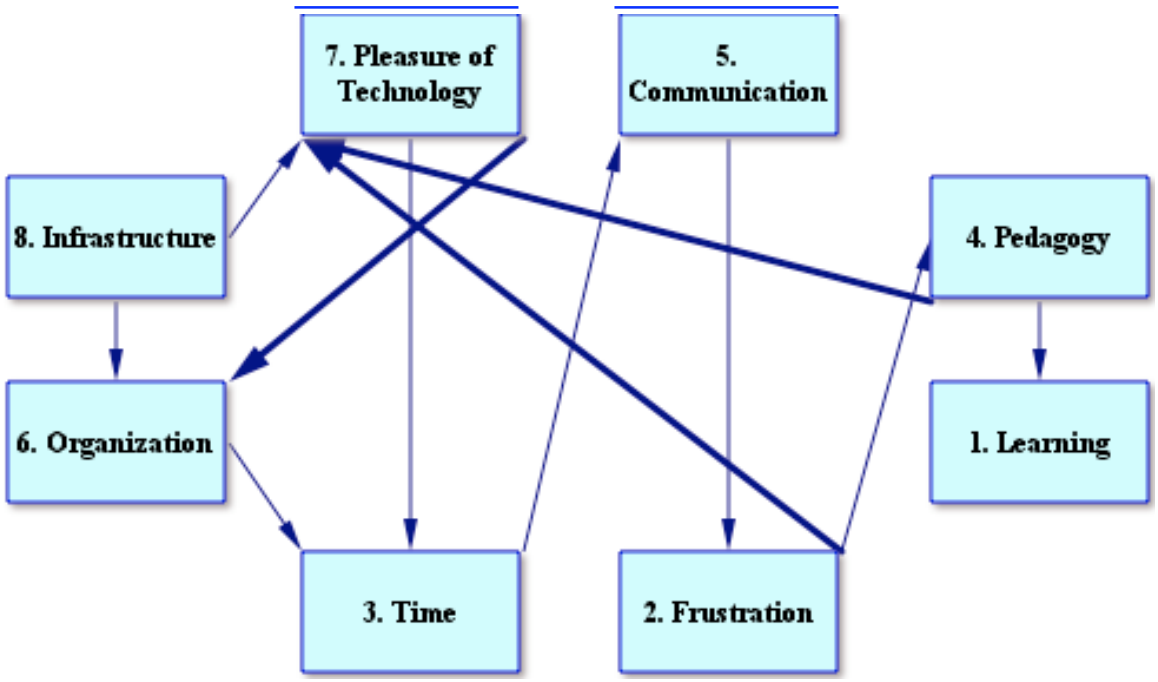
Tabular IRD								
	1	**2**	**3**	**4**	**5**	**OUT**	**IN**	**Δ**
1		↑	↑	←	←	2	2	0
2	←		←	←	←	0	4	-4
3	←	↑		←	←	1	3	-2
4	↑	↑	↑		↑	4	0	4
5	↑	↑	↑	←		3	1	2

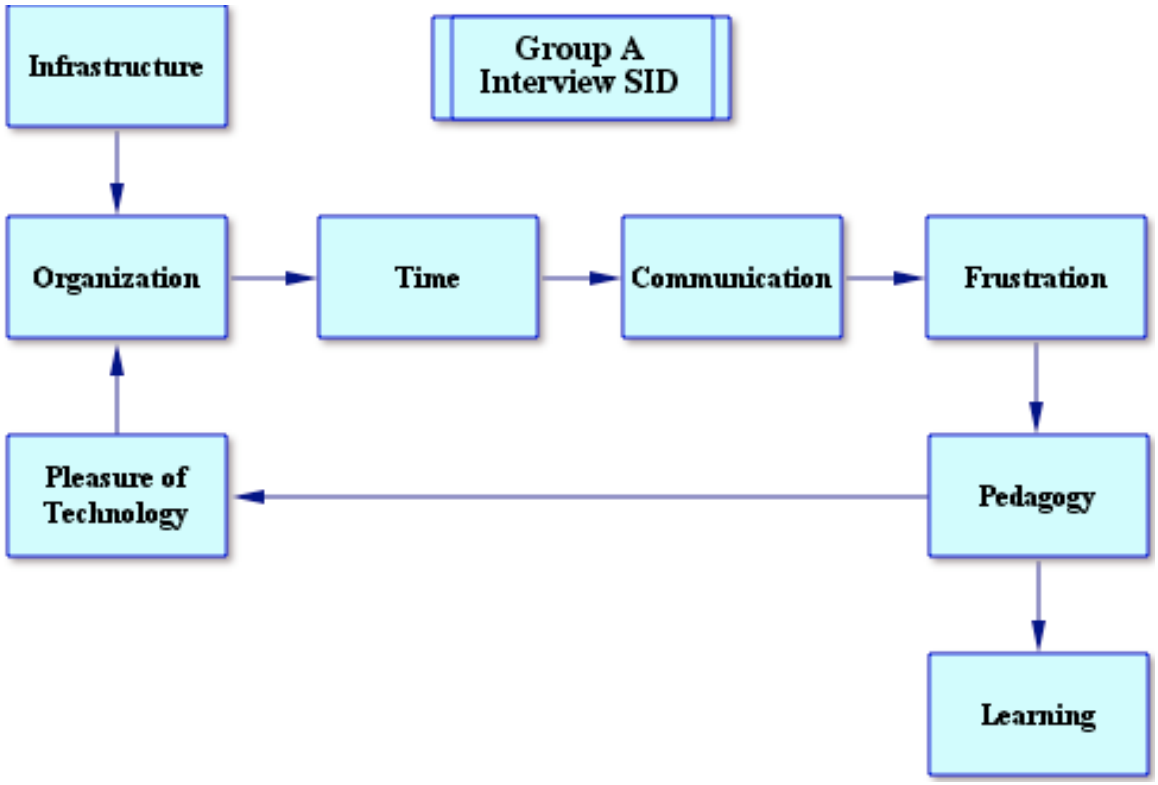
Tabular IRD – Sorted in Descending Order of Δ								
	1	2	3	4	5	OUT	IN	Δ
4	↑	↑	↑		↑	4	0	4
5	↑	↑	↑	←		3	1	2
1		↑	↑	←	←	2	2	0
3	←	↑		←	←	1	3	-2
2	←		←	←	←	0	4	-4

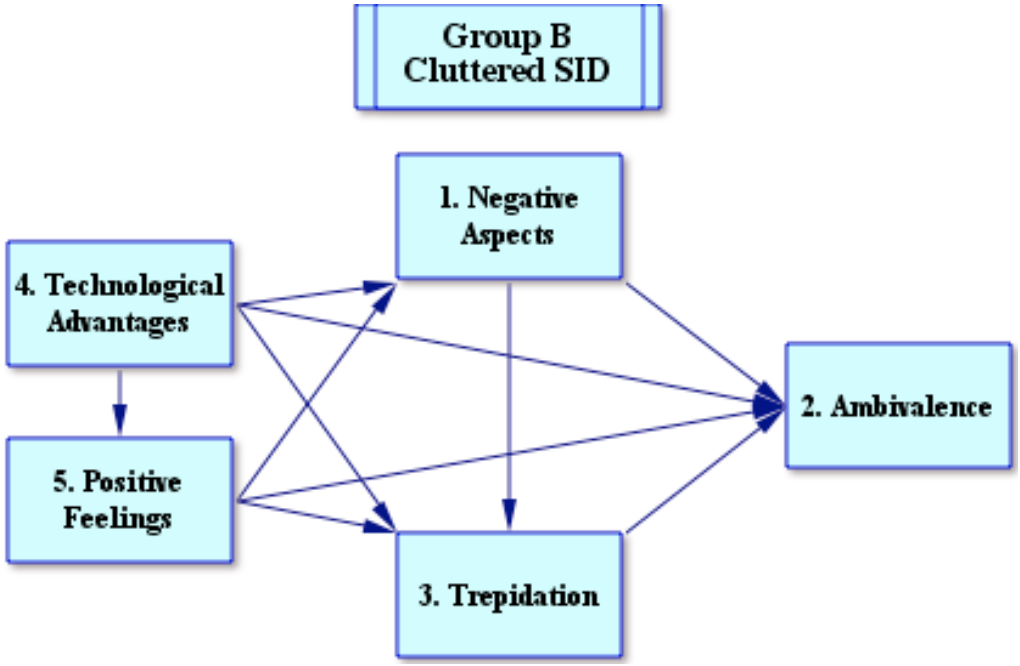
These tables then allowed the researcher to produce a composite mind map or SID for each group, which were developed using the process described in chapter three. The progression for each SID from cluttered to uncluttered is shown.

Figure 9 Group A Cluttered SID




7. Pleasure of Technology
5. Communication
8. Infrastructure
4. Pedagogy
6. Organization
1. Learning
3. Time
2. Frustration


Infrastructure
Group A
Interview SID
Organization
Time
Communication
Frustration
Pleasure of
Technology
Pedagogy
Learning


Group B
Cluttered SID
1. Negative
Aspects
4. Technological
Advantages
2. Ambivalence
5. Positive
Feelings
3. Trepidation

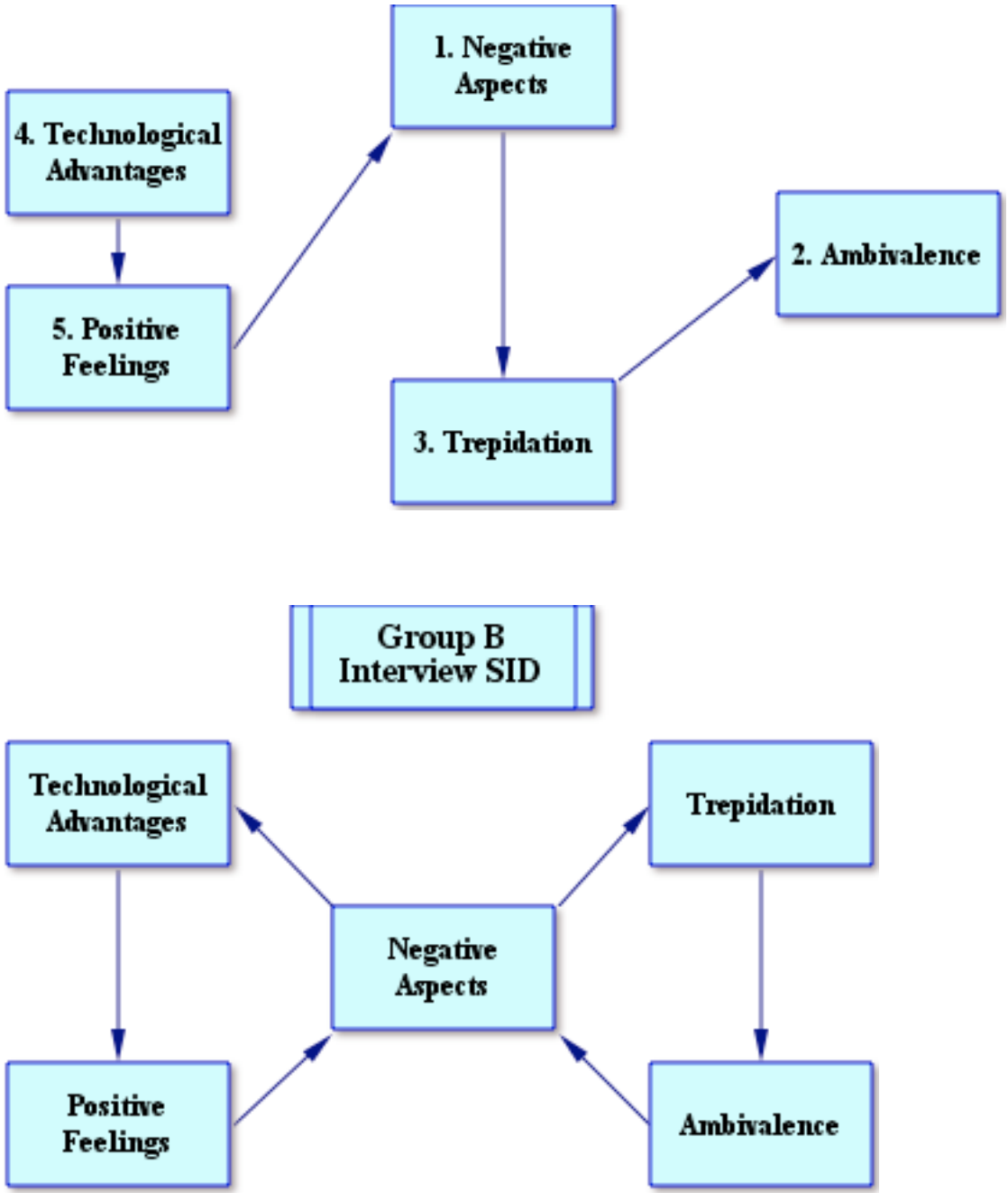


Figure 10 Group B nterview SID

COMPARISON

Focus Group A

In Group A, learning is the final outcome despite the obvious frustration. The SID formed by group A indicates that the way out of the frustration loop for them is through applications to teaching, and learning. One respondent verbalized the feelings of the whole group about the primary driver when they stated: *"learning influences the pleasures of technology, if you can learn how to do it better, you enjoy it better."*

The overall timbre of Group A was positive and optimistic. They still complained about the lack of support and help from the infrastructure of the university, but they were not so disappointed that they gave up in frustration. Group A still had complaints about the infrastructure and support not being there. "*I've had problems all summer long. Just about every-other class with that computer down the hall. And they don't come on time. That's not all, and supposedly they replaced all the computers last semester but.,,"*

This group decided to work through its frustration because they came to realize the benefits of teaching with technology in their own classrooms, which in turn drove their desire to learn more about technology. *" There will often be at least an initial frustration that goes along with the learning curve. Some of the frustrations will be almost insurmountable. If they survive the first semester around here, our students end up being pretty computer savvy. Those things change, but those frustrations go away."*

This, in turn, motivated the professors to learn more about the technology and to use it

themselves...*"Of course, communication with colleagues, scholarship, I did an article recently for Encyclopedia of Early Childhood on, and everything was electronically. From the invitation to do it, to the every step of the back and forth, it's all done electronically."* They found that by using technology they were able to become more organized while also facilitating a more effective learning experience for their students. *" I think it's incredibly important for our students in education. I think we have to recognize that the computers have become such an important part of their daily lives. These are young people, although we do have non-traditional students who have not as much affinity for the computer, or technology, as their younger counterparts. For future teachers, they've got to be at home with technology, and they have to see us model it, because research indicates that their going to teach like the last people they've seen teach, and that's their professors."*

FOCUS GROUP B

The SID shows two closed feedback loops. Normally feedback loops send information from the outside back into a body or system. Sometimes the information locks the group into maintaining a balance or equilibrium, allowing a steady state to continue over time. These types of feedback loops indicate that Focus Group B unrelentingly resists the introduction of new technology. The technology may come into conflict with deeply held beliefs and firmly established routines. Rather than complete the exhausting task of creating change within theses practices, the technology is rejected. The SID has not just one, but two feedback loops ---in fact, the loops totally comprise

the SID.

The loops reflect the ambivalence, negative perceptions and trepidation toward the integration of technology into the classroom. *"I wasn't interested in this at all"*. When something went wrong, it was out of their control to correct it: *I can see how the students and some of the instructors would be ambivalent about using technology in the language Classroom. I don't know how to fix it and I don't have someone right there who does know how to fix it."* The negative aspects of technology reveal a helpless attitude that plunges the group B into a hopeless by-pass. They have the same motivation for their students to have a quality learning experience, but when their best efforts are not enough to get the technology to work, they provide that quality learning as they always have, through lecture and other time proven ways.

"Even with your best efforts it doesn't work." There is no confidence among the faculty that what they have planned on teaching that day will be realized if technology is involved: *"There is always that anxiety of 'am I going to be able to do what I think I'm going to be able to do with this technology for this class, this period, this session, this hour?"*

There is also very little confidence in their own abilities to control the situation when technology fails: *"I'm always wondering if the technology will work, that's the main thing. It's negative but it is also OK, is it really going to be there? … Will it work and, when it doesn't work, what did I do wrong? Or, am I doing it right, or is something else is going wrong*?"

The overall timbre of the group is very negative, without much variation. The

positive aspects are technological advantages and positive feelings. Even though the circulator (point of recursion) is the first affinity, Negative Aspects traps the group in two negative feedback loops, with no way out.

Every time an idea is felt or a positive idea is tried, it is drowned out by the negative chatter of bad experiences. Failed attempts caused Group B to obsess over their lack of knowledge, and how poorly they looked to their students if they do not appear to be technologically savvy. Most feel that they must have "back up" in the classroom; they are flying without a net, on the edge of a fatal crash—trepidacious at best.

Ambivalence is the primary outcome because the positive and negative affinities are equal in number, but every time this affinity loops back to the point of recursion," negative aspects" reinforces their fears, making them more ambivalent, trapped in a spiral of downward negative feelings. Many of the attitudes held by the technology resistant are repeated in the closed feedback loop that spirals downward into a "no way out" situation. The faculty in group B are in a miserable place--they covet technology in teaching because it makes learning (and teaching) so much better but using it is such a bad experience for them they lack the motivation to learn and use it.

CHAPTER 5: Results, Implications, Suggestions

Within the study, the results of both focus groups support Roger's ideas of diffusion of innovation.

FOCUS GROUP A

Bandura states "self-efficacy is the belief in one's capabilities to organize and execute the sources of action required to manage prospective situations". (Bandura 1977) He also stated that, "self-efficacy affects the choices we make, the effort we put forth and determines how long we persist when we confront obstacles and in the face of failure how we feel". *"You put enough time in and you can learn anything."*

Much of our past dealings with learning culminate in our current level of self-efficacy. Self- efficacy closely relates to other motivational factors such as self-concept, self-determinism, and self esteem. *"I think that one thing that it's helped me do is put students in positions of expertise more. Because on any given piece of technology, there is likely to be a real big bell curve of ability in the classroom and I'm probably going to be sort of at the high average, but not the most expert user in the room. So if I run into trouble, I know, I'll put a student in charge. Now, I don't even wait to run into trouble. I will say: so and so, get this started while I take care of this, that, or the other."*

Group A professors, along with their Group B colleagues, exhibited high self esteem in their teaching abilities. While the Group A faculty felt frustrated and

exasperated towards the "Help Desk" (many thought of it as an oxymoron) the emotion of frustration was not driving their actions to the point of abandoning the new types of activities they were capable of conducting with technology. …" *All the time, it is so freaking frustrating*". Says another: "*I learned how to do something else that I was shocked that I never thought I could do, but it comes in odd moments, and it's not in the formal classes, it's very informal, like Leslie the librarian showed me. I had to go over there three times. Every time I did it, there was a kink. Gives you real patience-- that's the key. But, on the other hand, it's frustrating. I used to have the students take pop-quizzes in class and do stuff in class. But then they keep their laptops opened and they talk and they don't pay attention, they chat. That's another frustrating part of it. Learning software…"* The difference between the groups seems to be in their tolerance level or frustration-saturation point. Group B became exasperated with networks that were down, computers that could not access the internet, projectors that didn't work, instructions they could not decipher, they would try to make it work; but, eventually they would quit, frequently resorting to the older technologies of transparencies or hand-outs. Group A, on the other hand, had a very high motivation level to use the equipment because they held a firm conviction that the learning involved as a result of it was at a deeper level.

The overall timbre of the group B is negative, without much variation. The positive aspects are technological advantages and positive feelings. Even though the circulator (point of recursion) is the first affinity, the affinity Negative Aspects is the primary driver. This traps the group into two negative feedback loops, with no exit

possible.

Every time an idea is felt or a positive idea is tried, it is drowned out by the negative chatter of bad experiences. Failed attempts caused Group B to obsess over their lack of knowledge, and how poorly they looked to their students if they do not look technologically knowledgeable. Most feel that they must have "back up" in the classroom, that they are flying without a net, on the edge of a fatal crash —trepidations at best. Ambivalence is the primary outcome but every time it loops back to the point of recursion, "negative aspects" reinforces their fears, making them more ambivalent, trapped in a spiral of downward negative attitudes.

The overall timbre of the group is very negative, without much variation. The positive aspects are technological advantages and positive feelings. Even though the circulator (point of recursion) is the first affinity, Negative Aspects traps the group in two negative feedback loops, with no way out.

Every time an idea is felt or a positive idea is tried, it is drowned out by the negative chatter of bad experiences. Failed attempts caused Group B to obsess over their lack of knowledge, and how poorly they looked to their students if they do not appear to be technologically saavy. Most feel that they must have "back up" in the classroom, they are flying without a net, on the edge of a fatal crash —trepidacious at best.

Ambivalence is the primary outcome because the positive and negative affinities are equal in number, but every time this affinity loops back to the point of recursion," negative aspects" reinforces their fears, making them more ambivalent, trapped in a

spiral of downward negative feelings. Many of the attitudes held by the technology resistant are repeated in the closed feedback loop which spirals downward into a "no way out" situation. The faculty in group B are in a miserable place--they covet technology in teaching because it makes learning (and teaching) so much better but using it is such a bad experience for them they lack the motivation to learn and use it: "I used to have to lug around my slide projector to show examples of art on slides. Now if we are having a discussion, I can just bring up the picture, then and there! It's amazing...."

Very interestingly, group B is not so different from its student counterparts---For example, according to The Office of Educational Technology… "The students that assess themselves as 'beginners' in technology use, group are significantly less likely to have an …IM screen name and more likely to say that "they avoid technology as much as possible" and "do not value the role of technology in education" (OET, 2004).

This seems to confirm that the level of expertise and comfort of use in dealing with technology adoption may play just as vital a role as generational differences do in technology adoption. This does not mean, however, the voices of Focus Group B should be ignored or glossed over by the university's administrators.

It is important to listen carefully to critical voices—we can learn from them. Sherry (1998) found that late adopters were quite articulate in voicing their concerns about the impact of the Internet on their core teaching strategies. They felt that the Internet might not support their vision of learning. *"I find a lot of students are using technology to tune out. ...I think that in a lot of ways the dark side of technology*

separates and isolates people from each other. "…The negative aspects that I see have to do with some sort of distancing effect where I feel as though my communications with students is being effaced and eclipsed by the technology but I would say that is only about certain kinds of technologies…"

In order to integrate learning technologies into schools and universities successfully, leaders must be sensitive to the huge impact differing worldviews can have on the adoption process. Sherry contends "because schooling institutions often pride themselves in democratic processes of shared governance, we must continue the "values" conversation and maintain a respectful conversation concerning new technologies. Precisely because learning technologies are here to stay, discussion of values and goals are essential parts of the process, thus assuring that technology remains in the service of the community—and not the reverse."

The lens of diffusion allows us to peer at the social influence found in innovation and (in this case, technology) adoption. Rogers identified cultural compatibility (compatibility between technology and people's learning styles, self-concepts), as one of the five important user perceptions of an innovation. He defined it as "the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters". In this study, cultural compatibility includes school policies and norms of use (Rogers, 1995: 15).

Vygotsky's beliefs in the social origins of cognition were influenced by his research with children's learning interactions with their parents and teachers. Children begin to think by interacting with adults and peers. Only later do meaningful activities

become internalized in the form of mental activities such as constructed thoughts, representations, and abstract ideas. (Vygotsky, 111) He also stressed the distributed nature of cognition; that is, thinking and intelligence are distributed among a group of interacting people, and among their tools and resources. There are implications for adoption of learning technologies in this theory. The change agents in the adoption process rely on their social networks to spread innovation as they interact with them. The social aspects of Roger's theory of innovation can be capitalized on, Bandura's theory of modeling would encourage the adoption of technology by those early and middle majority who see the ease in which technology could be used. Elmore (1996) remarks that educational innovations that have helped teachers to do what they are already doing—but to do it better—are far more likely to be adopted than educational innovations that change the core of the teaching and learning process.

Rogers' Diffusion of Innovations (1995, 2004) includes a final chapter on the consequences of innovations. In this chapter he examines the value of implications of different innovations. Because not all innovations should be adopted, technologies need to be critically evaluated from utilitarian and moral perspectives before they are integrated into peoples' lives.

IMPLICATIONS FOR UNIVERSITY OF THE INCARNATE WORD

Most large institutions have recognized that to stay viable within their industry, they must encourage innovation in a variety of ways. Sometimes, it may seem to overworked faculty that they do not have enough time to do all that is asked of them.

"The infrastructure constantly causes me time, costs me time, has to make me think about time, has to make me fiddle with time-related issues."

IQA data collection/analysis techniques originated from Total Quality Management (TQM) processes that were designed to capture knowledge from organizational members to solve problems and improve processes. A major TQM assumption is that people who are closest to the job best understand what is wrong and how to fix it. Similarly, IQA data collection techniques assist members of a group close to a phenomenon of interest in describing and labeling their experiences, and in articulating perceived relationships among these experiences to produce a theory in perception or a conceptual map, which is a systems representation of how a person or a group understands a particular phenomenon.

This IQA study should provide the administration at the University of the Incarnate Word with a clear description of factors that their faculty members find either as a motivator or a barrier to their adoption of technology in the classroom. Furthermore, suggestions are recorded both from the Individual Interviews and Group Interviews from the faculty in this study on ways to make technology adoption more acceptable to them. This use of TQM- related theory, namely that those faculty closest to the problem can help name and fix the problem, can be both gratifying and electrifying to the faculty. Electrifying because once a problem is articulated the university can begin to discuss and resolve the problem in an insightful, intelligent way. Gratifying because one of the most important principles in good organizational management carries with it the notion of giving voices to those who most closely work the system. It can be

very gratifying and motivating to know that you are being heard from those working above you, to believe that they too, can understand and realize the basic issues that bring strife to your cause by listening to and giving merit to the faculty's suggestions. The IQA method used in this dissertation has translated the issues that faculty feel towards technology integration into a collective mind-map of their systematically analyzed thoughts and emotions surrounding this issue.

Infrastructure Support

Chief among attitudes held by both groups is what A group termed "Infrastructure Support" which was cited as a major barrier to technology integration and success. Both Focus Group A and Focus Group B felt strongly that in order for their experience of technology in their curriculum and teaching to be positive, adequate support must be provided. First, many faculty praised the 'technology initiative' that has been an ongoing part of the culture for at least 10 years. "The other thing, I find that the, I mean, some of the infrastructure is nice. I love that we've got all this wireless hotspots. I love that there is a data projector in my classroom and I don't have to mess with it. There are some really nice things."

> ***"I think that when you have an entire campus that is involved in technology and interested and committed to it, and that you have people who are willing to help you, and a COMPUTER ARTS program where the students know everything, it makes it a lot easier. I don't think I would have gotten this far technologically if I was somewhere where it's like, OK, you can have a computer if you want to."***

"I can use the Internet, to go to different countries, web-sites, etc. etc. to show (the students) them that different countries actually have different ways of thinking"

"I think they have a yeoman's job to do and very often do a really good job with it."

The negative voices drowned out the positive ones:

"The infrastructure constantly causes me to lose time, costs me time, has to make me think about time, has to make me fiddle with time-related issues."

Geogehan cautions that mainstream faculty who are struggling to adopt new technologies in teaching, often feel marginalized by the Instructional Technology departments placed within the university to pave the way for ease of use of technology.

"Because they can never help. It seems to me the only thing they know to ask is: Is your computer plugged in? Did you try shutting down and starting up again? I do those things before I call the help desk."

"They're often rude, they're rarely helpful."

"To be honest now, in the area of technology, I have two people (in other areas) that I know they know things and regardless of the issue, I'll call them. I either call _____at the media center or _____and that's it. They're my helpdesk."

":…whoever set up those computer carts has never taught. There are these carts where you can only get to them if you sit down, on a chair, with your back to the students."

> " I sound like a troglodyte here. I'm just outraged when they pulled all the overheads out of our building*, because we train teachers*. They've got to learn how to put a transparency on an overhead and come up with something that kids can see in the back row. That's a survival skill for a beginning teacher."

Faculty also felt that the current support infrastructure at UIW was not reliable or centered on looking out for faculty needs: *"Yeah, especially here at UIW. The machines won't work at all. So, when that happens, "I really get panicked. So, I never feel very comfortable with technology at all." "You've got to have Back Up in the classroom." "You've got to have a plan B with technology."*

Geoghegan goes on to assert that "our failure to recognize and deal with the social and psychological dimensions of technological innovation and diffusion: the constellations of academic and professional goals, interests, and needs, technology interests, patterns of work, sources of support, social networks play a determining role in faculty willingness to adopt and utilize technology in the classroom" (Geogehan).

Recognition and reward for work intensive integration of technology

Another issue cited by faculty was that use of technology was not taken into account by the administration for evaluations or promotions. Carr makes this point:

> Technology innovation in the educational community has often been hindered by the lack of a reward structure. Written publication has long been held as evidence of scholarly work that is worthy of recognition through promotions or tenure. In contrast, time consuming effort directed to pragmatic problem solving, instructional materials design and development or innovative

classroom teaching has rarely received similar recognition. Integrating a technology like the Internet into one's teaching is time consuming and "effort intensive," usurping time and energy that otherwise could be devoted to more traditional--and more rewarded--endeavors. If innovative behavior is to be sustained, there must be a recognized and acknowledged system of rewards parallel to, and equal to, that associated with "traditional" academic pursuits. The effort that faculty puts into teaching and researching brings promotion and tenure. The long hours struggling over converting curriculum from print based to technology based should be counted in this equation as well.

" I have, particularly on this machine and with this job, I have tried to departmentalize even more the pieces of my life. Every course has its own directory file on every machine that I own and use."

"I'm always focused on keeping it organized, getting it organized."

"I post everything that I've handed out, every power point that I used, all of those kinds of things. They're posted there for the students to be able to go back and look at. That's terribly important and helpful, particularly for the international students who have heard all of the words but they need to go back and take longer to look again at what were the ideas and so forth, because they're having to translate them, too."

"There were a few faculty members that resisted that, who unfortunately paid the price and are no longer here… Because of that, I had to put everything on power point because (Inaudible), and that was the wave, the coming wave…"

" I know my Dean certainly wants us to use technology after the fact is support of it, but I don't think she has a real sense of what is involved in the

trenches. We've got a new smart board, which I understand is a really cool tool, but we didn't get any adequate training. Some guy came out for half a day and then and said you can go to the website and finish up, well, except that the website never worked."

ISSUES, IMPLICATIONS AND QUESTIONS

Many of the faculty interviewed were concerned about the distancing properties of technnology between themselves and their students. If properly implemented, technology can enhance students' learning experiences, thus improving students' mastery of the course material. But if used excessively, technology can cause passive behavior toward the subject and impede the learning process.

Bandura's theories on social learning emphasize that modeling can teach while creating a sense of safety for those learning. *"For future teachers, they've got to be at home with technology, and they have to see us model it, because research indicates that their going to teach like the last people they've seen teach, and that's their professors."*_

Early success with the innovation, and ownership of and identity with the technology can be promoted through a variety of activities such as technology mentoring projects, e-mail, list serves and chat rooms. Shared development of resources and papers can be collaborative efforts in which individuals at different sites can participate at their own level at any given time.

Conclusion

The research in this study indicates a clear need for university administrators to support their faculty's learning efforts in adopting integration into their pedagogy. Most

of the capital involved in supporting technology at academic institutions has been involved in supporting the physical infrastructure of networking, housing and maintaining computer systems. Little thought has been given for the need to support faculty learning. Much of the research in the field has focused on effectiveness, teaching methods, and student response to mediated instruction. Little has been done to explore the diffusion of such technologies in higher education

It is imperative for academic institutions to equalize faculty abilities with technology to a close degree of proficiency of that which most students may hold. The value here lies in providing a 'common language of learning' that they both can speak. Prensky discusses digital natives and immigrants, which indicates a divide between two worldviews.

Until conducting this study, I believed I was well versed with new technologies and their implication for educators and education. I was, therefore, totally taken aback by parts of my research, especially to the cyber- generation gap between our children and their teachers (us). Prensky's metaphor of digital natives and digital immigrants hit hard. If the natives speak the current language, then we must seem to them like strangers in a strange new land—we speak the language, but with a heavy accent. What the native innately knows, the immigrant struggles to decipher. The nature of experience that grounds each group is different, and the reality each group has constructed are based on very different educational experiences. How can a native understand what we mean when we say "dial the phone"? Conversely, how many university educators have IM's, can work a cell phone as a multi-media device, or have the ability to "mind-meld" like

Spock to their digital providers in order to quickly and successfully access their information needs and desires? How will our individual and collective shared educational experiences come to be understood by both educators and their students?

I no longer feel that teachers need to "wake up, and smell the coffee", I feel we are in a psychological struggle with ourselves that could be our undoing unless we do come to understand the new ways of learning, teaching and assimilating knowledge. We cannot teach what we do not know in a way we cannot access.

For the first time in history, students are not limited by their teachers' ability and knowledge. Students have instant access to almost unlimited information. The answer to almost any question is sought through a search engine such as Google (so popular that we now use the verb "to google" to describe looking up information on the Web). Google and the communication technologies have fostered a culture in which the expectation is that answers and responses are available nearly instantly and for free. The use of search engines like Google have led to confidence that the right answer will always be found, and that typically it will be the first answer found (2005). Students no longer need their teachers to be the primary keeper and fount of knowledge for them. For today's students, information of all kinds is only a click away. Today's students need teachers who are a reservoir of deep knowledge in their field from which others can draw to learn deeper meaning of the subject matter. Faculties of higher education have the means to interpret knowledge in a way that encourages learning by adapting it to today's mindsets. What student's need now are teachers who have come to understand this and realize that besides imparting knowledge to their students, they must also act as

filters of knowledge, and mediate the information gathered by students in order for them to come to a true understanding of its meaning and context. Because of these needs, it is imperative that educators begin to realize the importance of holding common ground with their students.

Universities should encourage their faculty to adopt the necessary technologies to make their classrooms a viable place of learning for a new kind of net-generation student, so that a common ground for learning into the twenty first century can evolve in our educational institutions. Are some of these activities and tasks more likely to positively affect adoption/diffusion than others? How might they most effectively be introduced? Opportunities abound to develop resources and course material for alternative delivery on the Internet and World Wide Web, not to mention alternative, electronic publication of papers and research. Recognition by the university system would provide an incentive for technology incorporation into pedagogy. What is the current extent of professional recognition for development and publication of this sort? How might professional recognition be fostered?

Studies show that 90% of new innovations never get adopted. What tips the weight in favor of adoption? University administrators must encourage faculty to make the most of available technologies in ways that truly encourage: mentoring programs that can help bolster self-efficacy and self- esteem; and giving recognition for new types of work done with technology in curriculum and instruction. Administrators must legitimize for the faculty and administration the validity of technology use even for faculty who are still novices and late majority adopters, who may still maintain the

uncomfortable feelings of an expert in their own field, while being a novice in technology. Once the campus comes to realize that technology adoption is a process that will necessarily evolve and be adopted at its own pace, the acceptance level should raise the process of adoption diffuses through the university system.

University systems need to recognize the strong need for motivational drivers. To encourage and reinforce positive faculty attitudes toward adopting technology into their pedagogy and curriculum. Once faculty members are supported by the infrastructure in ways that they consider essential, they will not feel as though they are "flying without a net". This should enable faculty to ease out of their negative perceptions about technology and teaching. In turn, without the fear and ambivalence toward its use, the attractive merits of technology use will be able to emerge not just as a hope, but also as something achievable by everyday faculty. Most all of the faculty members in this study had very positive reports of technology and reasons for adopting it. Once the University makes ease of use more readily reliable, and provides adequate support for physical facilities and its users, the adoption rate should also climb, making University campuses a better place for both professors and their 21st Century Students.

Bibliography

Anderson, B.L. (1993). The stages of systemic change. Educational Leadership, 51(1),6.

Anderson, Cheryl. (Speaker). 2003. Perceived attitudes of faculty in higher education towards technology and change. Cassette Recording #3. University of the Incarnate Word.

Bandura, A. (1993). Perceived Self-Efficacy in Cognitive Development and Functioning. Educational Psychologist, 28(2), 117-148.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1989). Human agency in social cognitive theory. American Psychologist, 44, 1175-1184.

Bandura, A. (1991). Social cognitive theory of self-regulation. Organizational Behavior and Human Decision Processes, 50, 248-287.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. Educational Psychologist, 28, 117-148.

Babbie, Earl. (2003). The Basics of Social Research. Belmont, California. Sage.

Bateson, G. (1972). Steps to an ecology of mind. New York: Ballentine Books.

Barnes, Thom. ( ). Media Link. Atlanta, Georgia.

Baxter, G. P., Elder, A. D., & Glaser, R. (1996). Knowledge-Based Cognition and Performance Assessment in the Science Classroom. Educational Psychologist , 31(2), 133-140.

Becker, H. J. (1994). "How exemplary computer-using teachers differ from other teachers: implications for realizing the potential of computers in schools." Journal of Research on Computing in Education 26(3): 291-321.

Becker, H. J. (1998). “Internet use by teachers: Conditions of professional use and teacher directed student use”. Center for Research on Information Technology and Organization. University of California, Irvine and University of Minnesota. Retrieved March 6, 2004, from http://www.crito.uci.edu/tlc/findings/Internet.

Becker, H. J. (1998). *Internet use by teachers: Conditions of professional use and teacher directed student use*. Center for Research on Information Technology and Organization, University of California, Irvine and University of Minnesota. Retrieved March 6, 2001, from http://www.crito.uci.edu/tlc/findings/Internet-Use/startpage.htm

Berg, S., Benz, C. R., Lasley, T. J., & Raisch, D. (1998). Exemplary technology Use in elementary classrooms. *Journal of Research on Computing in Education*, *31*(2), 111-121.

Berger, Arthur A. (2000). Media And Communication Research Methods. Thousand Oaks, California.

Bitler, D. A., Rankin, W. P., & Schrass, J. M. (2000). Academic Affairs Online: A Survey of Information Available on Websites in Higher Education. *College Student Journal, 34*(3), 325.

Bloom, B.S., (1984) Taxonomy of Educational Objectives, Allyn and Bacon, Boston MA. Pearson Education

Bolocofsky, D. N. (1980). Motivational Effects of Classroom Competition as a Function of Field Dependence. Journal of Educational Research , 73(4), 213- 217.

Bonk, C., Ehman, L., Hixon, E., Yamagata-Lynch, L. (2002). The pedagogical TICKIT: Web conferencing to promote communication and support during teacher professional development. *Journal of Technology and Teacher Education. 10*(2), 205-233.

Borg, B. *Qualitative Research Methods for the Social Sciences*. (2004), Lincoln, Boston: Allyn & Bacon.

Brookfield, S.D. (1990). Discussion. In Galbraith, M.W. (Ed.) *Adult Learning Methods*. (pp. 187-204). Malabar, FL: Robert E. Krieger Publishing Co.

Brophy, J. (1999). Toward a Model of the Value Aspects of Motivation in Education: Developing Appreciation for Particular Learning Domains and Activities. *Educational Psychologist, 34*(2), 75-85.

Brown, C. A. (1999). From the what and why to the how of course support systems-The value of the teachers' perspective. *International Journal of Educational Telecommunications, 5*(4), 361-385.

Burge, L. (1988). Beyond andragogy: Some explorations for distance learning design. *Journal of Distance Education/Revue*. Retrieved April 6, 2001, from http://cade.athabascau.ca/vol3.1/burge.html

Carr VH. "Technology Adoption and Diffusion". DownloadedRetrieved July 6,2004 from http://tlc.nlm.nih.gov/resourcesresoces/publications/sourcebook/adoptiondiffusion.html.

Carlson, P. M., & Fleisher, M. S. (2002). Shifting Realities in Higher Education: Today's Business Model Threatens Our Academic Excellence. 1097+.

Cavallo, A. M., Miller, R. B., & Saunders, G. (2002). Motivation and Affect toward Learning Science among Preservice Elementary School Teachers: Implications for Classroom Teaching. *Journal of Elementary Science Education, 14*(2), 25+.

Chi, Michelene T., and Robert Glaser The Nature of Expertise. (1988) New Jersey: Lawrence Erlbaum Associates.

Chi, M. T. (1997). Quantifying Qualitative Analyses of Verbal Data: a Practical Guide. Journal of the Learning Sciences , 6(3), 271-315.

Chiero, R. T. (1997). Teachers' perspectives that affect computer use. *Journal of Research on Computing in Education*, *30*(2), 133-145.

Chipman, S. F. (2003). Chapter 2 Gazing Yet Again into the Silicon Chip: the Future of Computers in Education. In *Technology Applications in Education: A Learning View*, O'Neil, H. F. & Perez, R. S. (Eds.) (pp. 31-49). Mahwah, NJ: Lawrence Erlbaum Associates.

Collins, A. (1996). Whither technology and schools? Collected thoughts on the last and next quarter centuries. In Fisher, C., Dwyer, D. C., & Yokam, K. (Eds.) *Education & Technology: Reflections on Computing in Classroom.* (pp. 51-65). San Francisco: Jossey-Bass.

Clinton, William Jefferson. "1992 State of the Union Address. Downloaded from: http://www.pewinternet.org/press_release.asp?r=12.

Collis, Betty A., and Richard L. Williams. "Cross-Cultural Comparison of Gender Differences in Adolescents' Attitudes toward Computers and Selected School Subjects." Journal of Educational Research 81.1 (1987): 17-27.

Cooke, N. J. (1992). 3 Modeling Human Expertise in Expert Systems. In The Psychology of Expertise: Cognitive Research and Empirical AI, Hoffman, R. R. (Ed.) (pp. 29-55). Mahwah, NJ: Lawrence Erlbaum Associates.

Corno, L., & Mandinach, E. B. (1983). Using Existing Classroom Data to Explore Relationships in a Theoretical Model of Academic Motivation. Journal of Educational Research , 77(1), 33-42.

Creswell, John W. (2003). Research Design: Qualitative, Quantitative and Mixed Methods Approaches. Thousand Oaks, CA, Sage.

Csikszentmihaly, Mihaly (1991). Flow: The Psychology of Optimal Experience. New York, New York. Harper Collins.

Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal*, *38*(4), 813-834.

Culp, K.M., Hawkins, J., & Honey, M. (1999). Review paper on educational technology research and development. *Center for Children & Technology*. Retrieved June 17, 2002 from http://www2.edc.org/CCT/cctweb/public/include/pdf/01_1999.pdf

Daley, B. J., (1999). Novice to expert: An exploration of how professionals learn. *Adult Education Quarterly*. *49*(4), 133-147.

Daloz, L.A.P. (1996). Mentorship. In Galbraith, M.W. (Ed.) *Adult Learning Methods*. (pp. 205-224). Malabar, FL: Robert E. Krieger Publishing Co.

David, J. L. (1996). Developing and spreading accomplished teaching: Policy lessons from a unique partnership. In Fisher, C., Dwyer, D. C., & Yokam, K. (Eds.) *Education & technology: Reflections on computing in classroom* (pp. 237-250). San Francisco: Jossey-Bass.

Davidson-Shivers, G. V., Nowlin, B., & Lanouette, M. (2002). Do Multimedia Lesson Structure and Learning Styles Influence Undergraduate Writing Performance?. *College Student Journal, 36*(1), 20+.

Davis, W. E., & Chandler, T. J. (1998). Beyond Boyer's 'Scholarship Reconsidered': Fundamental Change in the University and the Socioeconomic Systems. *Journal of Higher Education, 69*(1), 23+.

Deal, W. F. (2004). Using Flash Technology for Motivation and Assessment. *The Technology Teacher, 63*(8), 16+.

Denzin, N. K., & Lincoln, Y. S. (2000). Introduction: The discipline and practice of qualitative research. In Denzin, N. K. & Lincoln, Y. S. (Eds.) *Qualitative research & evaluation methods* (2nd ed., pp. 1-28). Thousand Oaks, CA: Sage

De Vaney, A., Gance, S., & Ma, Y. (Eds.). (2000). Technology and Resistance: Digital Communications and New Coalitions around the World. New York: Peter Lang.

Denzin, N. K. & Lincoln, Y. S. (Eds.) (1994). Handbook of Qualitative Research. Thousand Oaks, CA: Sage Publication.

Dooley KE. (1999). Towards a Holistic Model for the Diffusion of Educational Technologies: An Integrative Review of Educational Innovative Studies. Educational Technology & Society ,2(4):1236-4522.

DuFour, R. (2001). In the right context: The effective leader concentrates on a foundation of programs, procedures, beliefs, expectations, and habits [Electronic Version]. *Journal of Staff Development*. *22*(1). Retrieved April 23, 2002, from http://www.nsdc.org/library/jsd/dufour221.html

Dusick, D. (1998). What social cognitive factors influence faculty members' use of computers for teaching? A literature review: Journal of Research on Computing in Education, 33(1), 123- 137.

Durrington VA, Repman J, Valente TW. (2000). Using Social Network Analysis to Examine the Time of Adoption of Computer-Related Services Among University Faculty. Journal of Research on Computing in Education, 33(1).

Fabry, D. L. & Higgs, J. R. (1997). Barriers to the effective use of technology in education: Current status. Journal of Education Computing Research, 17(4), 385-395.

Fordham,N. & Vannatta, R. (2004). Teacher Dispositions as Predictors of Classroom Technology Use. Journal of Research on Technology in Education, Vol. 36.

Forsythe, C., Grose, E., & Ratner, J. (Eds.). (1998). Human Factors and Web Development. Mahwah, NJ: Lawrence Erlbaum Associates.

Flowers, L., Pascarella, E. T., & Pierson, C. T. (2000). Information Technology Use and Cognitive Outcomes in the First Year of College. *Journal of Higher Education, 71*(6), 637.

Fox, Ronald. (1983). Student Evaluation of Teacher as a Measure of Teacher Behavior and Teacher Impact on Students." Journal of Educational Research 77.1: 16-21.

Ellsworth, J. Surviving Change: A Survey of Educational Change Models. ERIC Clearinghouse on Information & Technology; Syracuse University.

Ely, D. P. (1990). Conditions that facilitate the implementation of educational technology innovations. Journal of Research on Computing in Education, 23 (2), 298-305.

Gates, A. I., Jersild, A. T., McConnell, T. R., & Challman, R. C. (1942). Educational Psychology. New York: Macmillan.

Geoghegan,W. (1994). "Whatever Happened to Instructional Technology?" Paper presented at the 22nd Annual Conference of the International Business Schools Computing Association.

Glaser, R. A. (Ed.). (1978). Advances in Instructional Psychology (Vol. 5). Hillsdale, NJ: Lawrence Erlbaum Associates.

Glaser, Robert, and Schauble, Leona (ed). (1996) Innovations in Learning: New Environments for Education. New Jersey: Lawrence Erlbaum Associates.

Glesne, Corrine (1998). Becoming Qualitative Researchers: an Introduction. New York: Addison Wesley Longman.

Gonzales, C. L., & Thompson, V. (1998). Reciprocal mentoring in technology use: Reflecting with a literacy educator. *Journal of Information Technology for Teacher Education*, *7*(2), 163-164

Gordon, Sallie E (1992). "6 Implications of Cognitive Theory for Knowledge Acquisition." The Psychology of Expertise : Cognitive Research and Empirical Ai. Ed. Hoffman, Robert R. Mahwah, NJ: Lawrence Erlbaum Associates, . 99-114.

Gott, Adela (2006). (Speaker). Perceived attitudes of faculty in higher education towards technology and change. Personal Interview??== Cassette Recording #33. University of the Incarnate Word.

Guba E. G., & Lincoln Y. S. (1989). Fourth generation evaluation. Newbury Park, CA: Sage.

Guskey, T., & Sparks, D. (1996) Exploring the relationship between staff development and improvements in student learning. *Journal of Staff Development*. *17*(4). Retrieved March 1, 2001, from http://www.nsdc.org/library/jsd/f_gusky.html

Hopson, M. H., Simms, R. L., & Knezek, G. A. (2001). Using a Technology-Enriched Environment to Improve Higher-Order Thinking Skills. *Journal of Research on Technology in Education, 34*(2), 109+.

Hanson, A. (1996). The search for a separate theory of adult learning: Does anyone really need andragogy?. In Edwards, R., Hanson, A., & Raggatt, P. (Eds.) *Adult Learners, Education and Training 1: Boundaries of Adult Learning*. (pp. 99-108). New York, NY: The Open University.

Hanna, Donald. (2000). Higher Education in an Age of Digital Competition. Madison, Wisconsin: Atwood Publlishing.

Halford, G. S. & Halford, G. S. (Eds.). (1995). Developing cognitive competence: New Approaches to Process Modeling. Hillsdale, NJ: Lawrence Erlbaum Associates.

Harrell, T.A. (2004). Dissertation: How Teachers Think about Their Work; The First Step in Defining Quality Teachers.

Harris, J. (1993). Mining the Internet: Using Internet know-how to plan how students will know. *The Computing Teacher*. *8*(20), 35-40.

Harris, J. (1999). First steps in telecollaboration. *Leading & Learning with* Technology. 27(3), 54-57.

Harris, J. (2000). Taboo topic no longer: Why Telecollaborative projects sometimes fail. *Leading & Learning with Technology*. *27*(5), 58-61.

Harris, J. (2002). Wherefore art thou, telecollaboration? *Leading & Learning with Technology*. *29(*6), pp. 54-59.

Hase, S. & Kenyon, C. (2000). From andragogy to heutagogy [Electronic Version]. *ultiBASE*. Retrieved March 28, 2001, from http://ultibase.rmit.edu.au/Articles/dec00/hase2.htm

Hawkins, J. (1996). Dilemmas. In Fisher, C., Dwyer, D. C., & Yokam, K. (Eds.) *Education & technology: Reflections on computing in classroom* (pp. 35-50). San Francisco: Jossey-Bass.

Henson, K. T. (1987). Strategies for overcoming barriers to educational change. *NASSP Bulletin*. *71*(497), p. 125-127.

Henson, K. T. (1987). Strategies for overcoming barriers to educational change. NASSP Bulletin. 71(497), p. 125-127.

Honey, M. & Culp, K.M. (1996). Case Studies of K-12 Educators' Use of the Internet: Exploring the Relationship Between Metaphor and Practice. Center for Children

& Technology. Retrieved June 17, 2003, :http://www2.edc.org/CCT/cctweb/public/include/pdf/05_19 96b.pdf

Howe, N.& Strauss,W,(2000). Millennials Rising: The Next Great Generation. New York, Neew York: Vintage/.

Ingram, Judith K. "A Model Curriculum to Promote Teacher-Centered Use of Technology." PJE. Peabody Journal of Education 69.4 (1994): 113-130.

Jensen, K. B. (Ed.). (2002). A Handbook of Media and Communication Research: Qualitative and Quantitative Methodologies. London: Routledge. Retrieved December 4, 2006, from Questia database: http://questia.com/PM.qst?a=o&d=10334675

Jacobsen, D. M. (1998). Adoption patterns of faculty who integrate computer technology for teaching and learning in higher education. Proceedings of the ED-MEDIA AND ED- TELECOM 98: World Conference on Educational Multimedia and Hypermedia &World Conference on Educational Telecommunications, Freiburg, Germany

Jonassen, D. H. & Land, S. M. (Eds.). (2000). Theoretical Foundations of Learning Environments. Mahwah, NJ: Lawrence Erlbaum Associates.

Kurshan, B. (1990). Educational telecommunications connections for the classroom--Part 2. The Computing Teacher. 17(7), 51- 53.

LaLomia, M. J., & Sidowski, J. B. (1991). Measurements of Computer Attitudes: a Review. International Journal of Human-Computer Interaction , 3(2), 171-197.

Lesgold, A. & Glaser, R. (Eds.). (1989). Foundations for a Psychology of Education. Hillsdale, NJ: Lawrence Erlbaum Associates.

Lincoln, Y.S. and Guba,, G. E. (1985). Naturalistic Inquiry. Beverly Hills, CA: Sage.

Mandinach, E. B., & Cline, H. F. (1994). Classroom Dynamics: Implementing a Technology-Based Learning Environment. Hillsdale, NJ: Lawrence Erlbaum Associates.

McCoy. (Lecturer). 2005. IQA class lecture.

Mwaura, Catherine. Proceedings: Center for Innovations in Technology for Learning, (2001) [Online]. Available: http://www.citl.ohiou.edu (November 20, 2001).

McInerney, Valentina, Dennis M. McInerney, and Herbert W. Marsh. "Effects of Metacognitive Strategy Training Within a Cooperative Group Learning Context on Computer Achievement and Anxiety: An Aptitude -- Treatment Interaction Study." Journal of Educational Psychology 89.4 (1997): 686-695.

McKenzie, J. (2001). How teachers learn technology best. From Now On: The Educational Technology Journal. 10(6). Retrieved March 20, 2001, from http://fno.org/mar01/howlearn.html/.

Meloy, Judith M. (1994) Writing the Qualitative Dissertation: Understanding by Doing. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Mink, O (1993) Change at Work: A Comprehensive Management Process for Transforming Organizations. San Francisco, CA. Jossey Bass.

Mitchell, Andrew A., ed (1993). Advertising Exposure, Memory, and Choice. Hillsdale, NJ: Lawrence Erlbaum Associates.

Mioduser, D., Nachmias, R., Lahav, O., & Oren, A. (2000). Web-based learning environments: Current pedagogical and technological state. *Journal of Research on Computing in Education*, *33*(1), 55-76.

Motivation and Learning Strategies for College Success: A Self-Management Approach. Mahwah, 2000. NJ: Lawrence Erlbaum Associates. http://www.ntlf.com/

Mouza, C. (2003) Learning to teach with new technology: Implications for professional development. *Journal of Research on Technology in Education*, *35*(2), 272-289.

Murphy, K.L., Drabier, R., & Epps, M.L. (1998). A constructivist look at interaction and collaboration via computer conferencing. *International Journal of Educational Telecommunications, 4*(2/3), 237-261.

National Center for Education Statistics. (2000b). *Teachers Use of Computers and the Internet in Public Schools*. Retrieved January 25, 2001, from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000090

Neuman, W.L. (2003). Basics of Social Research: Qualitative and Quantitative Approaches, Boston: Allyn & Bacon.

Nickerson, Raymond S., and Philip P. Zodhiates. (1988). Technology in Education: Looking toward 2020. Hillsdale, NJ: Lawrence Erlbaum Associates.

Office of Educational Technology. (November, 2000). *Progress report on educational technology: State-by-state profiles*. Retrieved January 25, 2001, from http://www.ed.gov/Technology

Office of Human Research Protections. (2002). *Policy and assurances*. Retrieved September 18, 2002, from http://ohrp.osophs.dhhs.gov/polasur.htm

Office of Technology Assessment. (1995a). *Education and technology future visions*. Publication No. 0TA-BH-EHR-169. US Government Printing Office. Retrieved December 7, 2000, from http://www.ota.nap.edu/pdf/1995idx.html

Office of Technology Assessment. (1995b). *Teachers and technology: Making the connection*. Publication No. 0TA-BH-EHR-616. US Government Printing Office. Retrieved December 7, 2000, from http://www.ota.nap.edu/pdf/1995idx.html

Owen, T. (1990). Telecommunications in the classroom. Waiting to connect: The writer in Electronic Residence. *The Computing Teacher*. *17*(5), 46-49.

Page, M.S. (1999). Perils and promises: Using the internet in american education. *Information Technology in Childhood Education*, pp. 77-99.

Painter, S. R. (2001). Issues in the observation and evaluation of technology integration in K-12 classrooms. *Journal of Computing in Teacher Education*. *17*(4), 21-25.

Porter, B. (2003). Technology planning: Strategies for stoking the catalysts of change. *Leading & Learning with Technology*. *30(*6), pp. 6-13.

Patton, M.Q. (2002). *Qualitative research & evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Reilly, B. (1996). New technologies, new literacies, new problems. In Fisher, C., Dwyer, D. C., & Yokam, K. (Eds.) *Education & technology: Reflections on computing in classroom*. (pp. 203-220). San Francisco: Jossey-Bass.

Riel, M. (1992). Telcommunications: Avoiding the black hole. *The Computing Teacher*. *20*(4), 16-17.

Rogers, A., Andres, Y., Jacks, M. & Clausen, T. (1990). Telecommunications in the classroom: Keys to successful telecomputing. *The Computing Teacher*. *17*(8), 25-28.

Rogers, E. (1995). *Diffusion of innovations*. (4th ed.). New York: The Free Press.

Rogers, E. (2004*). Diffusion of innovations*. (5th ed.). New York: The Free Press.

Ronnkvist, A.M., Dexter, S.L., and Anderson, R.E. (2000) *Technology support: In depth, breadth, and impact in american schools.* Center for Research on Information Technology and Organization, University of California, Irvine and University of Minnesota. Retrieved March 4, 2001, from http://www.crito.uci.edu/tlc/findings/technology-support/startpage.htm

Ryan, G.W. & Bernard, H. R. (2000). Data management and analysis methods. In Denzin, N. K. & Lincoln, Y. S. (Eds.) *Qualitative research & evaluation methods* (2nd ed., pp. 769-802). Thousand Oaks, CA: Sage.

Sandholtz, J. H. & Ringstaff, C. (1996). Teacher change in technology-rich classrooms. In Fisher, C., Dwyer, D. C., & Yokam, K. (Eds.) *Education & technology: Reflections on computing in classroom* (pp. 281-299). San Francisco: Jossey-Bass.

Scheffler, F.L. & Logan, J. P. (1999). Computer technology in schools: What teachers should know and be able to do. *Journal of Research on Computing in Education, 31*(3), pp. 305-326.

Schwandt, T.A. (1997) *Qualitative inquiry: A dictionary of terms*. Thousand Oaks, CA: Sage.

Sherry, L. (2000). The nature and purpose of online discourse: A brief synthesis of current research as related to the web project. *International Journal of Educational Telecommunications. 6*(1), 19-51.

Starkweather, K.N. (2002). ITEA/Gallup poll: Interpreting what others think of technology teaching. *The Technology Teacher. 61*(8), 31-33.

Stuhlman, J. M. & Taylor, H. G. (1998). Analyzing the impact of telecommunications on learning outcomes in elementary classrooms. *Journal of Computing in Childhood Education,* 9(1), 79-92.

U.S. Department of Education Institute of Education Sciences (2003). Progress report on Computer and Internet Use by Students In 2003: Statistica Analysis Report. Retrieved Sept 11, 2006 from http://nces.ed.gov/pubs2006/2006065.pdf.

National Teaching and Learning Forum Newsletter, (2005) Volume 14, Number 5.

Northcutt, N. and Danny McCoy. (2004). Interactive Qualitative Analysis: A Systems Method for Qualitative Research. Thousand Oaks, CA: SAGE Publications.

Office of Educational Technology. (November, 2000). Progress report on educational technology: State-by-state profiles. Retrieved January 25, 2004 from http://www.ed.gov/Technology.

Pajares, Frank, and John K. Bengston.(1995) The Psychologizing of Teacher Education: Formalist Thinking and Preservice Teachers' Beliefs. PJE. Peabody Journal of Education 70.3 (1995): 83-98.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. Review of Educational Research, 66, 543-578.

Pajares, F. (1997). Current directions in self-efficacy research. In M. Maehr & P. R. Pintrich (Eds.). Advances in motivation and achievement (Vol. 10, pp. 1-49). Greenwich, CT: JAI Press.

Pajares, F., & Schunk, D. H. (2001). Self-beliefs and school success: Self-efficacy, self-concept, and school achievement. In R. Riding & S. Rayner (Eds.), Self-perception (pp. 239-266). London: Ablex Publishing.

Robert Paterson's Weblog (URL: http://smartpei.typepad.com/our_kids_their_future/

The Pew Internet & American Life Project: (March 2005). The Future of the Internet. Downloaded from http://www.pewinternet.org/pdfs/PIP_Future_of_Internet.pdf

Powers, Donald E., and Kathleen O'Neill. (1993). Inexperienced and Anxious Computer Users: Coping with a Computer- Administered Test of Academic Skills." Educational Assessment 1.2 (1993): 153-173.

Pisapia J. (1994). Teaching with Technology: Roles and Styles. Research Brief #5. Research extracted from the technology studies by the Metropolitan Educational Research Consortium. 5p. ERIC Clearinghouse No.: UD031892.

Postman, N. (1995). The end of education: Redefining the value of school. New York: Knopf.

Prensky, Marc (2001). On The Horizon. NCB University Press, Vol. 9 No. 5, October 2001

Price J, Burson J, Boger-Mehall S. (Eds.) Faculty Development. Faculty Development-SITE 96. Accessed 12/4/00: 45p.

Rogers E.Postman, N. (1995). The end of education: Redefining the value of school. New York: Knopf.

Rogers E. Diffusion of Innovations (4th ed.). New York: Free Press.

Rogers E. (2004). Diffusion of Innovations (5th ed.). New York: Free Press.

Rogers E. and Shoemaker, F. (1971). Communications of Innovations: A Cross Cultural Approach1995). (4th ed.). New York: Free Press.

Schunk, D. H. (1990). Goal Setting and Self-Efficacy during Self-Regulated Learning. Educational Psychologist , 25(1), 71-86.

Schunk, D. H. (1991). Self-efficacy and academic motivation. Educational Psychologist, 26, 207-231.

Schunk, D. H. & Zimmerman, B. J. (Eds.). (1994). Self-Regulation of Learning and Performance: Issues and Educational Applications. Hillsdale, NJ: Lawrence Erlbaum Associates.

Schunk, D. H., & Zimmerman, B. J. (1997). Social Origins of Self-Regulatory Competence. Educational Psychologist , 32(4), 195-208.

Schunk, D. H., & Pajares, F. (2002). The development of academic self-efficacy. In A. Wigfield & J. Eccles (Eds.), Development of achievement motivation (pp. 16-31). San Diego: Academic Press.

Shapiro, Amy M.(1998). Promoting Active Learning: The Role of System Structure in Learning from Hypertext. Human-Computer Interaction 13.1 : 1-35.

Sherry, L. (1998). Diffusion of the Internet within a Graduate School of Education. University of Colorado: Unpublished dissertation [On-line].

Sherry, L. (2000). The nature and purpose of online discourse: A brief synthesis of current research as related to the web project. International Journal of Educational

Telecommunications. 6(1), 19-51.

Stuhlman, J. M. & Taylor, H. G. (1998). Analyzing the impact of telecommunications on learning outcomes in elementary classrooms. Journal of Computing in Childhood Education, 9(1), 79-92.

Tapscott, Donald, (1998). *Growing Up Digital:* New York, N.Y. Free Press.

Tikhomirov, O.K. (1981): The psychological consequences of computerizaton. In J.V. Wertsch (Ed.) The Concept of Activity in Soviet Psychology. Armomk, NY: M.E. Sharp, Inc.

U.S. Publications, (2001). U.S. Department of Eduction Strategic Plan, 2002-2007.

U.S. Publications, (2004). "Toward A New Golden Age In American Education--How the Internet, the Law and Today's Students Are Revolutionizing Expectations"

U.S. Congress Web-based Education Commission. (2000). The power of the Internet for learning: Moving from practice to promise. Retrieved March 2, 2001, from http://www.ed.gov/offices/AC/WBEC/FinalReport/

Vygotsky, (2006) *Mind in Society: Boston Mass, Harvard University Press.*

Waugh, R. & Godfrey, J. (1995). Understanding teachers' receptivity to system wide educational change. *Journal of Educational Administration. 33*(3), 38-54.

Wells, J.G. & Anderson, D. K. (1997). Learners in a telecommunications course: Adoption, diffusion, and stages of concern. *Journal of Research on Computing in Education*, *30*(1), 83-105.

(Willis, 1992, Technology diffusion in the "soft disciplines": Using social technology to support information technology. *Computer in the Schools. 9*(1).

Waugh, R. & Godfrey, J. (1995). Understanding teachers' receptivity to system wide educational change. *Journal of Educational Administration. 33*(3), 38-54.
course: Adoption, diffusion, and stages of concern. *Journal of Research on Computing in Education*, *30*(1), 83-105.

Waugh, R. & Godfrey, J. (1995). Understanding teachers' receptivity to system wide educational change. *Journal of Educational Administration*. *33*(3), 38-54.

Wells, J.G. & Anderson, D. K. (1997). Learners in a telecommunications course: Adoption, diffusion, and stages of concern. *Journal of Research on Computing in Education*, *30*(1), 83-105.
p. 82).

Valente, T.W. (1995). Network Models of the Diffusion of Innovations. Creswell, N.J.:

Hampton Free Press

Windschitl, M. (1998). The WWW and classroom research: What path should we take? *Educational Researcher*. *27*(1), 28-33.

Windschitl, M. & Sahl, K. (2002). Tracing teachers' use of technology in a laptop computer school: The interplay of teacher beliefs, social dynamic, and institutional culture. *American Educational Research Journal*. *39*(1), 165-205.

Wolcott, L. & Betts, K. (1999). What's in it for me? Incentives for faculty participation in distance education. *Journal of Distance Education/Revue*. Retrieved April 6, 2001, from http://cade.athabascau.ca/vol14.2/wolcott_et_al.html

Wolcott, Harry.(2001) Writing Up Qualitative Research. Thousand Oaks, California: SAGE

Wolski S, Jackson S. (1999) Technological Diffusion within Educational Institutions:

Applying the Technology Acceptance Model. In: SITE 99: Society for

Information Te.chnology & Teacher Education International Conference (10th).

San Antonio, TX, February 28-March 4, 1999: 7p. ERIC Clearinghouse No.

IR019671.

Yoder, M. B. (2003). Seven steps to successful online learning communities. *Leading & Learning with Technology*. *30*(6), pp. 14-21.

Young, E.B. (1991). Empowering teachers to use technology in their classrooms. *Computers in the Schools*. *8*(1/2/3). 143-145.

Zammit, K., Nanlohy, P., & Corrigan, G. (1999). Integrating on-line learning: A first attempt to integrate the Internet into a teacher education core curriculum subject. *ultiBASE*. . Retrieved March 28, 2001, from http://ultibase.rmit.edu.au/Articles/aug99/zammit1.htm

Zammit, S.A. (1992). Factor facilitating or hindering the use of computers in schools. *Educational Research, 34*(1), 57-66.

Zhang, Y. & Espinoza, S. (1997). Affiliations of computer self-efficacy and attitudes with need for learning computer skills. *Journal of Educational Computing Research, 17*(4), 371-383.

IQA RESEARCH DOCUMENTS

Valerie Greenberg
C&I
UT Austin
June 15, 2006

APPROVED BY IRB ON: 04/06/2006 *EXPIRES ON: 04/05/2007*

Title Faculty/Technology Interchange
IRB PROTOCOL # 2005-05-0080
Conducted By: Valerie Greenberg
Of University of Texas at Austin: Curriculum and Instruction; Telephone: 1-512 471-5942

You are being asked to participate in a research study. This form provides you with information about the study. The person in charge of this research will also describe this study to you and answer all of your questions. Please read the information below and ask any questions you might have before deciding whether or not to take part. Your participation is entirely voluntary. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. You can stop your participation at any time. To do so simply tell the researcher you wish to stop participation. The researcher will provide you with a copy of this consent for your records.

The purpose of this study is to **Discover Professor/Technology Interchange**

If you agree to be in this study, we will ask you to do the following things:

- Participate in one focus group session and possibly participate in one personal interview if you are chosen to be an interview candidate.

Total estimated time to participate in study is

2 Hours for the Focus Group
1 Hour for possible follow-up interview if you are chosen to be interviewed.

Risks and Benefits of being in the study

- "The risk associated with this study is no greater than everyday life. You may experience a risk of possible loss of confidentiality.

Compensation: None

Confidentiality and Privacy Protections:

- Discussions in the focus groups will remain strictly confidential.
- All data will be coded numerically so that no names or other identifying markers will be available to associate persons in the focus group with their responses or opinions.
- The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

The **records** of this study will be stored securely and kept confidential. Records will be kept in locked filing cabinet in the researcher's office with no access available to anyone other than the principal researcher. Authorized persons from The University of Texas at Austin, members of the Institutional Review Board, and (study sponsors, if any) have the legal right to review your research records and will protect the **confidentiality** of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify you as a subject. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

Contacts and Questions:

If you have any questions about the study please ask now. If you have questions later or want additional information, call the researchers conducting the study. Their names, phone numbers, and e-mail addresses are at the top of this page. If you have questions about your rights as a research participant, complaints, concerns, or questions about the research please contact Lisa Leiden, Ph.D., Chair of The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects, (512) 471-8871 or email: orsc@uts.cc.utexas.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read the above information and have sufficient information to make a decision about participating in this study. I consent to participate in the study.

Signature:_____ Date: _____

_____ Date: _____
Signature of Person Obtaining Consent

Signature of Investigator:_____ Date: _____

UNIVERSITY OF THE INCARNATE WORD

1881 125 YEARS OF SERVICE 2006

Dr. Denise Doyle
Vice President, Academic Affairs
University of the Incarnate Word
San Antonio, Texas 78209

March 1, 2006

Dr. Lisa Leiden, Ph.D
Director, Office of Research Support and Compliance
P.O. Box 7426 Campus Mail
Austin, TX 78713
Lisa.leiden@mail.utexas.edu

Dear Dr. Leiden:

The purpose of this letter is to grant Valerie Greenberg, a doctoral candidate and graduate student at the University of Texas at Austin permission to conduct research at The University of the Incarnate Word, San Antonio, Texas. The project, "Attitudes of Faculty of Higher Education to Teaching with Technology" entails conducting 2 focus groups each comprised of 15-10 faculty members in higher education at the University of the Incarnate Word between March 1 and April1, 2006 in order to discover their attitudes towards the use of technology in their classroom. The University of the Incarnate Word was selected because of its student composition of 61% Hispanics, making it an Hispanic Serving Institution and because of the close proximity to the researcher. I am a professor in the Communication Arts department at the University of the Incarnate Word.

I, Denise J. Doyle do hereby grant permission for Valerie Greenberg to conduct the research "Attitudes of Faculty of Higher Education to Teaching with Technology" at The University of the Incarnate Word.

Sincerely,

Denise Doyle

IRB Approval

The University of Texas at Austin
April 06, 2006

OFFICE OF RESEARCH SUPPORT & COMPLIANCE

THE UNIVERSITY OF TEXAS AT AUSTIN

P.O. Box 7426, Austin, Texas 78713 (512) 471-8871 - FAX (512 471-8873)
North Office Building A, Suite 5.200 (Mail code A3200)

FWA# 2030

Date: **04/07/06**

PI(s): **Valerie K Greenberg** Department & Mail Code:

Dear: **Valerie K Greenberg**

IRB APPROVAL – IRB Protocol # **2005-09-0080**

Title: **The Effects of Negative Attitudes towards New Technology by Faculty in Higher Education**

In accordance with Federal Regulations for review of research protocols, the Institutional Review Board has reviewed the exempt status assessment of the above referenced protocol and found that it meets exempt approval under the category designated below for the following period: **04/06/2006** - **04/05/2007**

Any research involving surveys, interviews, or observation of children is not eligible for exempt review, unless it consists only of observational research where the investigator(s) do not participate in the activities being observed. Research that is FDA regulated cannot be granted an exemption except for category 6. (Research is FDA-regulated when it involves the use of a drug or medical device, other than the use of an approved drug or medical device in the course of medical practice, or when the results are to be submitted to or held for inspection by the FDA.) Unless otherwise required by Department or Agency heads, exempt research must fall within one of the following categories:

___1. Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as:
(i) research on regular and special education instructional strategies, or
(ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
(iii). The research is not FDA-regulated

_x_2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i.) Information obtained is recorded in such a manner that human subjects can be identified, directly or through

identifiers linked to the subjects: and
(ii.) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subject's financial standing, employability, or reputation; or
(iii.) The research involves surveys, interviews, or observation of children (where the investigator does not participate in the activities being observed);
(iv.) The research is not FDA-regulated

___3. Research involving the use of educational tests, survey or interview procedures, or observing public behavior that is not exempt under number 2 above, if the subjects are public officials or candidates for public office or a federal statute requires that the confidentiality of personally identifiable information will be maintained throughout the research and thereafter. The research is not FDA-regulated

___4. Research involving the collection or study of existing data, documents, records, pathological or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, either directly or through identifiers linked to the subjects. To qualify for exemption, the data, documents, records or specimens must be in existence before the project begins. The research is not FDA-regulated

___5. Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate; or otherwise examine:

i. Public benefit or service programs;
ii. Procedures for obtaining benefits or services under those programs;
iii. Possible changes in-or alternatives to those programs or procedures; or
iv. Possible changes in methods or levels of payment for benefits or services under those programs.
v. The program under study must deliver a public benefit (e.g., financial or medical benefits as provided under the Social Security Act or service (e.g., social, supportive, or nutrition services as provided under the Older Americans Act).
vi. The research or demonstration project must be conducted pursuant to specific federal statutory authority;
vii. There must be no statutory requirement that an IRB review the project;
viii. The project must not involve significant physical invasions or intrusions upon the privacy of participants;
ix. The funding agency must authorize or concur with this exemption.
x. The research is not FDA-regulated

___6. Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

__x__Please use the attached approved consent forms

____Waiver of Documentation of Consent

____Waiver of Informed Consent

RESPONSIBILITIES OF PRINCIPAL INVESTIGATOR FOR ONGOING PROTOCOLS:

(1) Report immediately to the IRB any unanticipated problems.
(2) Proposed changes in approved research during the period for which IRB approval cannot be initiated without IRB review and approval, except when necessary to eliminate apparent immediate hazards to participant. Changes in approved research initiated without IRB review and approval to eliminate apparent immediate hazards to the participant must be promptly reported to the IRB, and reviewed under the unanticipated problems policy to determine whether the change was consistent with ensuring the participants continued welfare.
(3) Report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to take part.
(4) Insure that only persons formally approved by the DRC enroll subjects.
(5) If relevant to your study, please use only a currently approved consent form (remember approval periods are for 12 months or less).
(6) Protect the privacy and confidentiality of all persons and personally identifiable data, and train your staff and collaborators on policies and procedures for ensuring the privacy and confidentiality of participants and information.
(7) Submit for review and approval by the IRB all modifications to the protocol or consent form(s) prior to the implementation of the change.
(8) Please note that this office will send out a reminder prior to the end of your approval period (typically at the end of the 12 months). At this time we will ask you to give us an update on whether the study is still in progress and/or has had any changes that need to be reviewed for approval.
(9) Notify the IRB and the DRC when the study has been completed and complete the Final Report Form.
(10) Please help us help you by including the above protocol number on all future correspondence relating to this protocol.

Thank you for your help in this matter.

Sincerely,

Lisa Leiden

Lisa Leiden Ph.D., IRB Chair,
Director of the Office of Research, Support, & Compliance

Title Faculty/Technology Interchange
IRB PROTOCOL # 2005-05-0080
Conducted By: Valerie Greenberg
Of University of Texas at Austin: Curriculum and Instruction; Telephone: 1-512 471-5942

You are being asked to participate in a research study. This form provides you with information about the study. The person in charge of this research will also describe this study to you and answer all of your questions. Please read the information below and ask any questions you might have before deciding whether or not to take part. Your participation is entirely voluntary. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. You can stop your participation at any time. To do so simply tell the researcher you wish to stop participation. The researcher will provide you with a copy of this consent for your records.

The purpose of this study is to **Discover Professor/Technology Interchange**

If you agree to be in this study, we will ask you to do the following things:

- Participate in one focus group session and one personal interview

Total estimated time to participate in study is

2 Hours

Risks and Benefits of being in the study

- "The risk associated with this study is no greater than everyday life."

Compensation:

- **None**

Confidentiality and Privacy Protections:

-
- The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

The **records** of this study will be stored securely and kept confidential. Authorized persons from The University of Texas at Austin, members of the Institutional Review Board, and (study sponsors, if any) have the legal right to review your research records and will protect the **confidentiality** of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify you as a subject. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

Contacts and Questions:

If you have any questions about the study please ask now. If you have questions later or want additional information, call the researchers conducting the study. Their names, phone numbers, and e-mail addresses are at the top of this page. If you have questions about your rights as a research participant, complaints, concerns, or questions about the research please contact Lisa Leiden, Ph.D., Chair of The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects, (512) 471-8871 or email: orsc@uts.cc.utexas.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read the above information and have sufficient information to make a decision about participating in this study. I consent to participate in the study.

Signature:_____ Date: _____

_____ Date: _____
Signature of Person Obtaining Consent

Signature of Investigator:_____ Date: _____

Statement of Research with Human Participants

Note: This form (with copies of required approval forms) must be submitted to the Office of Graduate Studies on or before final submission of your dissertation. However, all research projects with human participants conducted by students associated with The University of Texas at Austin must receive ethical approval **before** the research is begun.

Please check one box

☐ My research does not involve human participants (no other forms needed)

☑ My research does involve human participants, and attached are the appropriate forms containing DRC/IRB approval.

Name Valerie Kesner Greenberg

Signature Valerie K. Greenberg

UT EID valprof

Date 10-/16/05

For up-to-date information on research with human subjects for university students and researchers (and for forms) go to
http://www.utexas.edu/research/rsc/humanresearch/
For information on whether your research is exempt from IRB review, go to
http://www.utexas.edu/research/humanresearch/exemption_cat.htm

Statement of Non-Conflict of Interest

Statement of non-conflict of interest in Study # 2005-05-0080

It is the responsibility of every research investigator to avoid misconduct and to assure integrity in the collection of data for use in their publication. In the matter of a conflict of interest between the researcher, Valerie K. Greenberg and her research subjects comprised of randomly chosen members of the faculty of the University of the Incarnate Word, the Principal Investigator forwards this assertion:

That although the researcher and the subjects are both colleagues employed by the same Institution (the University of the Incarnate Word) problems that are typically considered conflicts are not involved:

There is no significant financial interest or connection between the researcher and the subjects.

The information obtained will be kept confidential and anonymous since I plan on keeping all data from the focus groups private and no names or identities of the respondents will be revealed in the dissertation or elsewhere to anyone at the University of the Incarnate Word or anywhere else.

There is no power or authoritative relationship existing between the researcher and the subjects, and the issue of adoption of technology, while important, is not one which is ordinarily associated with "office politics" and issues of power.

While I am sensitive to issues arising from interviewing/focus grouping with colleagues, the topics of the interview are determined by the groups themselves, rather than myself as the researcher which minimizes any possible planned conflict of interest.

Call For Focus Group Participation

Affinity Relationship Table

Created by Group A

Early Adopters of Technology Focus Group

4/25/06

Group A = Early Adopters Focus Group

Affinity Name
1. Learning
2. Frustration
3. Time
4. Pedagogy
5. Communication
6. Organization
7. Pleasures of Technology
8. Infrastructure
9.

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 → 4		6 <> 7
1 ← 3		3 → 5		6 ← 8
1 ← 4		3 → 6		6 9
1 ← 5		3 ← 7		7 ← 8
1 ← 6		3 ← 8		7 9
1 <> 7		3 9		8 9
1 ← 8		4 ← 5		
1 9		4 ← 6		
2 <> 3		4 ← 7		
2 → 4		4 → 8		
2 <> 5		4 9		
2 → 6		5 <> 6		
2 → 7		5 <> 7		
2 ← 8		5 ← 8		
2 9		5 9		

Affinity Relationship Table

Created by Group B

Technology Resistant Faculty Focus Group

2nd DMS Focus Group
Technology Resistant

Affinity Name
1. Negative
2. Ambivalent
3. Trepidation
4. Technological Advantages
5. Positive Feelings
6.

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Affinity Relationship Table

Affinity Pair Relationship		
1	→	2
1	→	3
1	←	4
1	←	5
1	N/A	6
2	←	3
2	←	4
2	←	5
2	N/A	6
3	←	4
3	←	5
3	N/A	6
4	←	5
4	N/A	6
5	N/A	6

MT

Affinity Name

1. Negative
2. Ambivalent
3. Trepidation
4. Tech. Advantages
5. Positive Feelings
6.

Possible Relationships

A → B
A ← B
A <> B (No Relationship)

Affinity Relationship Table

Affinity Pair Relationship	
1 →	2
1 →	3
1 ←	4
1 ←	5
1 N/A	6
2 ←	3
2 ←	4
2 ←	5
2 N/A	6
3 ←	4
3 ←	5
3 N/A	6
4 ←	5
4 N/A	6
5 N/A	6

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship
1 ← 2
1 → 3
1 ← 4
1 ← 5
2 ← 3
2 ← 4
2 ← 5
3 ← 4
3 ← 5
4 ← 5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship	
1 →	2
1 →	3
1 →	4
1 →	5
2 →	3
2 ←	4
2 <>	5
3 ←	4
3 <>	5
4 ⇄	5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and ~~loathing~~ in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship
1 ← 2
1 → 3
1 ← 4
1 ← 5
2 → 3
2 ← 4
2 ← 5
3 ← 4
3 ← 5
4 ← 5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship	
1 →	2
1 <>	3
1 →	4
1 →	5
2 ←	3
2 ←	4
2 ←	5
3 →	4
3 →	5
4 →	5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

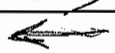
Interview Affinity Relationship Table

Affinity Pair Relationship
1 ↔ 2
1 → 3
1 → 4
1 → 5
2 → 3
2 ← 4
2 ← 5
3 ← 4
3 ← 5
4 ↔ 5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship
1 <> 2
1  3
1 → 4
1 → 5
2  3
2 → 4
2 → 5
3 → 4
3 → 5
4 ← 5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship
1 → 2
1 → 3
1 → 4
1 ← 5
2 ← 3
2 ← 4
2 ← 5
3 ← 4
3 ← 5
4 ↔ 5

both influence equally

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (~~fear and loathing~~ in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship
1 → 2
1 ← 3
1 ← 4
1 ← 5
2 ← 3
2 ← 4
2 ← 5
3 ← 4
3 ← 5
4 → 5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship
1 < 2
1 < 3
1 < 4
1 < 5
2 > 3
2 > 4
2 > 5
3 < 4
3 < 5
4 > 5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship	
1	2
1	3
1	4
1	5
2	3
2	4
2	5
3	4
3	5
4	5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship
1 ← 2
1 → 3
1 ← 4
1 ← 5
2 → 3
2 ← 4
2 ← 5
3 ← 4
3 ← 5
4 → 5

Affinity Name
1. negative aspects
2. ambivalence
3. trepidation
4. technology advantages
5. positive feelings (fear and loathing in technology)

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship
1 → 2
1 ← 3
1 ← 4
1 ← 5
2 ← 3
2 ← 4
2 ← 5
3 ← 4
3 ← 5
4 → 5

Affinity Name
1.
2.
3.
4.
5.
6.

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Affinity Relationship Table

Affinity Pair Relationship	
1 →	2
1 ←	3
1 ←	4
1 ←	5
1	6
2 ←	3
2 ←	4
2 ←	5
2	6
3 ←	4
3 ←	5
3	6
4 →	5
4	6
5	6

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 ← 6
1 ← 3		3 → 7
1 ↔ 4 (Both)		3 ← 8
1 ← 5		4 ← 5
1 ↔ 6		4 ↔ 6
1 ↔ 7		4 → 7
1 ← 8		4 ← 8
2 ← 3		5 ← 6
2 → 4		5 ← 7
2 ↔ 5		5 ← 8
2 ← 6		6 → 7
2 → 7		6 ← 8
2 ← 8		7 ← 8
3 → 4		
3 → 5		

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 ← 6
1 ← 3		3 <> 7
1 ← 4		3 ← 8
1 ← 5		4 ← 5
1 ← 6		4 ← 6
1 → 7		4 <> 7
1 ← 8		4 ← 8
2 ← 3		5 ← 6
2 <> 4		5 <> 7
2 ← 5		5 ← 8
2 ← 6		6 <> 7
2 → 7		6 <> 8
2 ← 8		7 ← 8
3 → 4		
3 ← 5		

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview
Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 ← 6
1 ← 3		3 ← 7
1 ← 4		3 ← 8
1 ← 5		4 ← 5
1 ← 6		4 ← 6
1 ← 7		4 ← 7
1 ← 8		4 ← 8
2 ↔ 3		5 ← 6
2 → 4		5 ← 7
2 → 5		5 ← 8
2 → 6		6 ← 7
2 → 7		6 ← 8
2 ← 8		7 ← 8
3 → 4		
3 ← 5		

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 → 2		3 ← 6
1 ← 3		3 ← 7
1 ← 4		3 ← 8
1 ← 5		4 → 5
1 ← 6		4 ← 6
1 ← 7		4 → 7
1 ← 8		4 ← 8
2 ← 3		5 ← 6
2 ← 4		5 <> 7
2 ← 5		5 ← 8
2 ← 6		6 ← 7
2 <> 7		6 ← 8
2 ← 8		7 ← 8
3 <> 4		
3 ← 5		

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 → 6
1 ← 3		3 <> 7
1 ← 4		3 ← 8
1 ← 5		4 ← 5
1 ← 6		4 ← 6
1 ← 7		4 <> 7
1 ← 8		4 ← 8
2 ← 3		5 ← 6
2 ← 4		5 ← 7
2 ← 5		5 ← 8
2 → 6		6 → 7
2 → 7		6 ← 8
2 ← 8		7 ← 8
3 ← 4		
3 → 5		

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 ⇄ 6
1 ← 3		3 → 7
1 ← 4		3 ← 8
1 ← 5		4 ← 5
1 ⇄ 6		4 ← 6
1 ← 7		4 ← 7
1 ← 8		4 ← 8′
2 ⇄ 3		5 ← 6
2 ⇄ 4		5 <> 7
2 ⇄ 5		5 ← 8
2 ⇄ 6		6 <> 7
2 ← 7		6 ← 8
2 ← 8		7 ← 8
3 → 4		
3 → 5		

<>

'moving in" Sarah Branock Ban

" proper communication alleviates frustration a theme —

If its not organized, its frustrating

good communication saves time

if you are organized, you will have the time

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

6/9/06

pf

Interview
Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 ← 6
1 ← 3		3 → 7
1 ↔ 4		3 ← 8
1 ← 5		4 ↔ 5
1 ← 6		4 ← 6
1 ← 7		4 ◇ 7
1 ← 8		4 ← 8
2 ↔ 3		5 ← 6
2 ↔ 4		5 ◇ 7
2 ↔ 5		5 ← 8
2 ← 6		6 → 7
2 → 7		6 ← 8
2 ← 8		7 ← 8
3 → 4		
3 → 5		

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 ← 6
1 ← 3		3 → 7
1 ↔ 4		3 ← 8
1 ← 5		4 ↔ 5
1 ← 6		4 ↔ 6
1 ↔ 7		4 → 7
1 ← 8		4 ← 8
2 ↔ 3		5 ← 6
2 ← 4		5 ← 7
2 ← 5		5 ← 8
2 ← 6		6 ← 7
2 → 7		6 ← 8
2 ← 8		7 ← 8
3 → 4		
3 ← 5		

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview
Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 → 6
1 → 3		3 ← 7
1 ← 4		3 ← 8
1 ← 5		4 → 5
1 ← 6		4 ← 6
1 → 7		4 ← 7
1 ← 8		4 ← 8
2 ← 3		5 ← 6
2 → 4		5 ← 7
2 → 5		5 ← 8
2 → 6		6 ← 7
2 → 7		6 ← 8
2 ← 8		7 ← 8
3 → 4		
3 ← 5		

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview
Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 ← 6
1 ← 3		3 ← 7
1 ← 4		3 ← 8
1 ← 5		4 → 5
1 ← 6		4 → 6
1 ← 7		4 ↔ 7
1 ← 8		4 ← 8
2 → 3		5 ← 6
2 → 4		5 ← 7
2 → 5		5 ← 8
2 ← 6		6 ← 7
2 ← 7		6 ← 8
2 ← 8		7 ← 8
3 → 4		
3 → 5		

Affinity Name
1. learning
2. frustration
3. time
4. pedagogy
5. communication
6. organization
7. pleasures of technology
8. infrastructure

Possible Relationships
A → B
A ← B
A <> B (No Relationship)

Interview
Affinity Relationship Table

Affinity Pair Relationship		Affinity Pair Relationship
1 ← 2		3 ← 6
1 ← 3		3 → 7
1 ← 4		3 ← 8
1 ← 5		4 → 5
1 ↔ 6		4 → 6
1 → 7		4 → 7
1 ← 8		4 ← 8
2 → 3		5 ← 6
2 → 4		5 ← 7
2 → 5		5 ← 8
2 ← 6		6 ← 7
2 → 7		6 ← 8
2 ← 8		7 ← 8
3 ← 4		
3 → 5		