A CASE STUDY OF UNIVERSITY FACULTY DEVELOPMENT
UTILIZING TECHNOLOGY:
PEOPLE, PLACE AND PROCESS

by
Judith Lynn Moreillon

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As members of the Final Examination Committee, we certify that we have read the dissertation prepared by Judith Lynn Moreillon entitled A Case Study of University Faculty Development Utilizing Technology: People, Place and Process and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

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STATEMENT BY AUTHOR

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DEDICATION

This work is dedicated

to

my husband Nick Vitale,

who reminds me what is really important in life,

to

my daughter Lauren Cleff,

who makes me want to be the best that I can be, and

to

my family and friends,

whose unfailing support and love
have helped me in so many tangible and mysterious ways
to reach for and complete this goal.

"Goodbye," said the fox, "And now here is my secret, a very simple secret: It is only with
the heart that one sees rightly; what is essential is invisible to the eye."

"What is essential is invisible to the eye," the little prince repeated,
so that he would be sure to remember.

"It is the time that you have given to your rose
that makes your rose so important."

from Le Petit Prince
by
Antoine de Saint-Exupéry
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ABSTRACT

The purpose of this case study is to describe the faculty development workshop experiences of the participants and facilitators of the Laptop Workshop, a workshop designed to support the reform of undergraduate teaching and learning at a Research I institution in the Southwest. In this case study, I utilize a qualitative research paradigm and take an interpretative approach. The research study includes in-depth interviews with the workshop’s designers and facilitators, beginning and ending workshop surveys administered to the participants in three 2001 workshops, an online questionnaire administered to 150 of 165 participants, a field study of one faculty participant, and interviews with seven faculty participants.

This study was nested in four timely areas of scholarly research, namely post-secondary faculty development, technology-centered faculty development, the diffusion of innovations, and educational reform. Through the research questions, I sought to understand the workshop from the perspectives of the facilitators and faculty participants. Their perceptions illuminated the ways in which this instructional intervention impacted their behaviors and beliefs about integrating technology tools and teaching strategies in their courses. The qualitative data reported and analyzed in this study are shared in the form of profiles and vignettes constructed from the study participants’ own words.

This faculty development initiative contributed to the success of another educational reform effort on this campus. It effectively addressed the participants' learning needs and helped to diffuse technology-enabled teaching methodologies. The findings suggest a unique convergence of people, place, and process created an effective learning environment that supported 21st-century university faculty development.
CHAPTER 1
PEOPLE, PLACE, AND PROCESS

Every day technology tools are becoming ever more pervasive in United States society. The World Wide Web is just in its tenth year and already it promises to revolutionize the way we conduct education and business, and the way we communicate and build community with others. The U. S. economy is fast becoming an information economy, one based on social and intellectual capital rather than on material goods. In order to participate in the new society, people of all ages and backgrounds must be able to use a wide variety of technology tools. We must acquire a high rate of literacy to sort through vast quantities of data and information and to think critically in order to make meaning. We must be able to collaborate with others and work in teams. We must learn perseverance and develop curiosity and creativity. In short, we must be lifelong learners. These are the skills and traits that the present generation of students needs in order to be successful in the world of 21st-century work (Bolter, 1991; Marx, 2000; Negroponte, 1995; Tapscott, 1998). Perhaps these are the skills and traits their teachers need as well.

"Functional literacy as we know it means that people are able to process print in their environments, whether it be, for example, newspapers, train schedules, or official government documents. Now included in this array of materials for which people must have functional literacy is information technology" (Valmont & Wepner, 2000, p. 5). In this increasingly complex culture, school "work" must be relevant to work and life outside of school. Learning within the academy must address the demands of the times. Says futurist Alvin Toffler, "Those who are illiterate are not those who cannot read and write, but rather those who cannot learn, unlearn, and relearn." The status quo in teaching
and learning is confronted by the changing needs of students and society. "The technology revolution is challenging and redirecting all forms of education, including higher education" (Groves & Zemel, 2000, p. 57). I believe it is imperative then that educators, at all levels, take the lead in designing and offering students technology-integrated, humanistic learning experiences that empower learners to think critically, to work collaboratively to solve the cultural, social, political, and technical problems of our age, and to enrich their lives and ours.

The purpose of this chapter is to place the workshop and this research study in a framework. I begin with a discussion of the campus context and specify the workshop's relationship to a larger educational reform effort within the University. As at many other institutions across the country, technology-enabled teaching and learning are the focus on many such initiatives. There is, then, a need to understand this type of faculty development and to discover and disseminate effective practices. Next, I share my personal and professional connections to the utilization of technology tools in learning environments and to the activity of technology-centered faculty development. My background and experience provide the rationale for undertaking this study. This information also reveals my perspective on the topic of this study. The research questions that follow define the issues related to technology-enabled faculty development that prompted this inquiry. In this section, I include a note about access to technology tools on this particular campus and a note about faculty development studies in general. Given access to tools and the impetus to utilize them in the service of student learning, this study is both timely and needed. Next, I outline the theoretical framework for this inquiry. This study was conducted from a qualitative research paradigm with an
interpretative approach; I employed a case study methodology. I conclude the chapter with a section that describes the organization of this dissertation.

Context of the Study

The faculty development workshop under study was designed to support the reform of undergraduate teaching and learning at the University of Arizona, a Land Grant, Research I institution. From May 1998 until June 2001, one hundred and sixty-five university professors and instructors participated in the workshop. During this three-year period, twenty-two workshops were held, each with six to ten participants. The workshop supported the mission of this university, which "prepares students for a diverse and technological world while improving the quality of life for the people of Arizona, the nation, and the world" (http://www.arizona.edu/home/mission.shtml). Beyond the increased instructional use of technology tools, this initiative set out to address issues related to evolving philosophies of teaching and learning and to meet the challenge of professional development for university faculty. The workshop was technology innovation embedded in educational reform; as such, it had the potential to transform teaching and learning.

For the first two years of its existence, the workshop was dedicated to General Education (Gen Ed) faculty, who within the up-coming academic calendar, would be teaching Tier One, Tier Two, or courses focused on issues related to gender, race, class, ethnicity, or non-Western area studies for freshman and sophomore students. (The Tier One and Tier Two courses include traditions and cultures, individuals and societies, natural sciences, arts, and humanities.) In its first two years, the workshop was an effort
to support the success of the Gen Ed curriculum, which was launched in the 1997-1998 academic year. The workshop was just one of a series of initiatives that grew out of this curriculum reform effort. In the third and final year, the workshop became a more "inclusive" faculty development program by extending its reach beyond Gen Ed faculty and out into the larger University community.

The Gen Ed program is university-wide; all students, regardless of college or major, must meet the general education requirements. The Gen Ed program is designed "to provide breadth of knowledge as a balance and complement to the depth provided by the major." The program has four main goals: to help students learn how different disciplines define, acquire and organize knowledge, to provide a basis for an examination of values, to develop skills useful for lifelong learning; and to provide a common foundation for wide-ranging dialogue with peers on topics and issues of significance (http://w3.arizona.edu/~uge/gened/nutshell.htm). Another goal of the Gen Ed curriculum is to engage lower-division students with experienced faculty early in their college careers. In this way, the workshop's original participant pool included experienced faculty who would have an impact on students' preparation for their college careers and beyond.

The workshop was one of the activities coordinated by the Learning Technology Partnership, an initiative for human and computing resources in support of teaching and learning with technology. The Learning Technology Partnership was originally called the Faculty Development Partnership. The name change reflects the trend at universities and colleges around the U.S. toward addressing the need to integrate the use of technology tools into learning and teaching. The Partnership is a collaborative effort to create an
effective teaching technology infrastructure; it includes the resources of six campus units as well as the Faculty Center for Instructional Innovation, the FCII.

The primary mission of the Learning Technology Partnership is to enhance the student learning experience at the University of Arizona. Through the workshop and other activities, the Partnership promotes the employment of successful teaching models facilitated and strengthened by new learning technologies. The Partnership works closely with faculty across the curriculum to create Gen Ed (http://catalog.arizona.edu/policies/994/gened.html) and advanced courses through which students acquire foundational as well as lifelong skills. The Learning Technology Partnership assists campus improvement initiatives, actively supporting ongoing classroom renovations and the new Integrated Learning Center, the ILC. (The state-of-the-art ILC opened with technology-supported classrooms in January 2002.)

The Learning Technology Partnership’s Web page suggests that the “creative application of information and technology resources helps to attract faculty and students to our institution, enhances student lives, and increases faculty productivity.” The Partnership credits successful integration of new learning technologies as a factor in this university’s prominence in academic leadership and has enhanced its worldwide reputation. The FCII, where the Laptop workshop was held, is “an active productive environment where faculty discover and explore new ideas, acquire new skills, create classroom materials, and share collegial experiences with each other” (http://www.facpartner.arizona.edu/about.htm).

The goals of this workshop parallel those identified in the University Strategic Planning and Budget Committee’s position statement for a student-centered learning
community. The workshop goals also support one of the University’s stated objectives: “to provide distinguished educational programs and support services that will attract, educate and graduate an excellent and diverse student body” (http://www opi.arizona.edu/facts/missionstatement.htm).

Along with other post-secondary institutions, this university has participated in the "Carnegie Conversations." Sponsored by the Carnegie Teaching Academy and conducted by the American Association of Higher Education (AAHE) Teaching Initiatives, faculty on campuses across the nation have gathered to discuss new ideas about teaching as "scholarly work" and new practices that enact those ideas, "including ongoing substantive conversations about teaching and learning, faculty investigations of their teaching practices, new ways of assessing the effects of powerful pedagogies, new forms for documenting teaching, and new rubrics and tools for gathering and reviewing evidence about teaching” (http://www aahe.org/teaching/Carnegie/bc_over.htm Backgroun).

Through the Carnegie Conversations, this Research I institution continues to engage in discussions related to the efficacy of teaching, particularly undergraduate teaching, and the definition of the concept of the "scholarship of teaching and learning.” Participation in this national dialogue regarding the "scholarship of teaching" spotlights the continuous need for university faculty inquiry into teaching practices:

The scholarship of teaching and learning is the study and development of a broad intellectual foundation about teaching and learning by the members of the learning community. It involves the identification and assessment of learning
outcomes; critical reflection on and peer review of individual practice, and the communication of the outcomes (http://www.carnegie.arizona.edu/).

This self-reflection has led a large number of students, faculty, and administrators to advocate for a more student-centered research environment at this university. As such, the workshop is an educational reform initiative. Within this study, I am defining educational reform as how the participants integrate technology into their teaching practices, their behaviors, and how the integration of technology tools can influence faculty toward a more student-centered approach.

Personal and Professional Connections

When I entered graduate school in 1990, I chose librarianship because I love literature and storytelling and the wide-variety of learning experiences possible in the rich resource of a school library. In 1992, when I earned a Master’s degree in Library Science, I was working in a school library that had no computers. Since that time, each year the library-learning environments in which I’ve worked have become progressively more infused with technology tools. Today’s library is dramatically different from the one in which I began my career. Automated circulation has made the collection more accessible to library users. Electronic resources such as CD-ROM and online databases have changed the way students access and utilize information. Authoring tools such as HyperStudio and PowerPoint and Web-authoring software have given students and teachers alike the opportunity to simply produce their own multimedia to demonstrate their learning and/or to teach. And last, but most powerful of all, the World Wide Web has literally broken down the walls of the library and extended the resources available to
our learning community out into the world. I believe that many librarians understand this digital transformation because we have experienced it first hand in our everyday work environment.

Many university faculty, classroom teachers, and some school librarians, however, have not been as impacted by the astounding learning potential of the tools of the Information/Communication Age. Many universities and K-12 school districts have not diffused technology tools into classrooms but, due to limited resources and/or shortsighted goals, have kept computers sequestered in libraries and/or in labs where many students and teachers use them as "add-ons" to their curriculum rather than as integral components. Even within structural barriers, however, many educators have succeeded in molding technology tools to meet instructional goals that have positively impacted student learning (Sandholtz, Ringstaff, & Dwyer, 1997).

In addition to my school site library responsibilities, I have served as a mentor and staff developer for teacher-librarian colleagues in the areas of library-classroom collaboration and technology-tools integration. I have also taught preservice classroom teachers and graduate library school students. In my work in professional development and post-secondary teaching, the behavioral and philosophical barriers that classroom teachers and school librarians erect in order to keep technology at bay have been a challenged for me. This study was a way for me to continue to explore the factors that contribute not only to the use of these tools but also more importantly to their effective integration into student-centered, constructivist learning environments.

Hypertext and hypermedia, including Web resources, have been touted as "constructivist" in nature. By allowing students more choice in directing their own
learning, these tools can be viewed as "student-centered." Learning styles are addressed in the multisensory components of Web sites and other electronic media. Students can negotiate multi-formatted texts in a nonlinear manner, customize their learning, and create the possibility for a unique construction of knowledge. As students navigate hypermedia, they are not only learning information but are also learning how to learn in an electronic environment. For students born and raised in the "Digital Age," these tools quite simply make learning relevant and fun. It is important, then, that educators study how to take full advantage of these multifaceted tools and utilize them to reach instructional goals, improve student outcomes, and empower learners to construct and share knowledge (Bolter, 1991; Marx, 2000, Negroponte, 1995; Sandholtz, Ringstaff, & Dwyer, 1997; Tapscott, 1998.)

Like many educators across the United States and around the world, I would like to rise to effectively meet the challenge of meaningfully integrating 21st-century technology tools into every content area of the curriculum. Many educational theorists and researchers believe that appropriating these tools for student empowerment holds the promise of democratizing education (Brown, 1999; Cummins & Sayers, 1995; Kinzer & Leu, 1997). This research study gave me the opportunity to explore the instructional context and methodologies created and used by the workshop facilitators and experienced by the workshop participants. Through my own participation in this program, I also had the opportunity to learn, to study, and ultimately to utilize what I learned in the workshop to appropriate technology tools to empower learners and to invite full participation in the co-construction of the learning environment. This study has greatly influenced my work as a teacher and librarian and as a preservice teacher and school librarian educator as
well. Using technology tools to reconsider teaching practices may be one of the most
effective ways to initiate pedagogical conversations with even the most seasoned
educators.

I am passionate about this topic. I have strong opinions and many experiences that
have influenced my perspective on the topic of technology tools integration into
curriculum. Throughout this study, however, I have strived to accurately represent the
lived-experiences of these workshop facilitators and participants and through their
perspectives add their voices to this timely and critical conversation.

Research Questions

An overarching research question frames this study: How does university faculty
development constructed around technology tools integration influence faculty movement
toward a student-centered classroom environment? I returned frequently to the
overarching question for this research study as a vehicle for investigating and explaining
how this innovation worked or failed to work. I reviewed the literature in the areas of
faculty development, technology-centered faculty development, the diffusion of
innovations, and educational reform. This scholarly work helped me formulate the sub-
questions of the study. The data collected in the study directly address both the
overarching question and the following sub-questions as well:

1. What are the perceptions of program facilitators and participants about their
   behaviors with regard to technology tools integration during and/or after this
   faculty development experience?
2. What are the perceptions of program facilitators and participants about their beliefs related to technology tools integration and/or teaching philosophies during and/or after this professional development experience?

3. What are the perceptions of program facilitators and participants about the components of the Laptop Workshop that invite educators to reflect on their teaching roles and instructional practices?

4. What meaning do the program facilitators and participants ascribe to this learning experience?

**Note About Access to Technology Tools**

The question of access to technology tools is a concern to students, faculty, and researchers alike. Similar to other resources, technology tools are unevenly distributed across populations. However, all instructors at this university, whether they are faculty, adjunct faculty, or graduate teaching assistants, have access to a wide-array of technology tools to facilitate both teaching and research objectives. Of course, an individual faculty member's access or proximity to a personal computer, departmental computer labs, the Multimedia Learning Lab, and the FCII is another factor that affects whether or not faculty utilize these tools.

All registered students at this university have access to seven computer labs and since January 2002, the Information Commons, a state-of-the-art computing center that bridges the University library and the Integrated Learning Center (ILC). During the fall and spring semesters, some of these labs are open 24-hours a day, seven days a week.
Although there is a trend for universities to make computer ownership a requirement for admission, this campus has not yet adopted that policy.

Given faculty and student access to the necessary tools, I believe that post-secondary faculty – like teachers at all levels – have the privilege and responsibility to integrate technology tools into teaching practices in order to address the various learning styles and preferences of students, to help prepare students for living and working in technology-rich environments, and to build student-centered curriculum that utilizes technology tools to empower learners.

Note About Studies in Faculty Development

In the literature there are references to common myths among faculty developers about their work. Boice (1996) collected some of those myths, which warrant consideration because this study hopes to address and to dispel some of these myths. The myths are:

1. That research is incompatible with good teaching or practice.
2. That research and quantification necessarily distort the teaching process.
3. That research-practitioners who do interventions are inherently evil, manipulative people.
4. That faculty developers, by dint of experience and conversation with other practitioners, know intuitively what works and what one does to facilitate teaching.
5. That faculty developers, because they are well intentioned and experienced at helping teachers, need not be held accountable to their campuses or colleagues for the effectiveness of their programs.

6. That research-based interventions are too difficult and time-consuming to become a part of everyday practice.

7. That measured, effective interventions necessarily will be resisted by faculty and that most faculty do not need such formal help (p. 427).

I believe that research and good teaching must go hand-in-hand. The disconnect between research and practice has long been a theme in K-12 education. Post-secondary researchers should take heed of this situation and begin to break down those barriers by conducting and writing research in such a way as to reach and influence practitioners. Otherwise, what is research for? Of course, as researchers we must be careful about how we influence the participants and phenomena under study. Attention to the qualitative paradigm concepts of "researcher as instrument" and reflexivity are places to begin.

I believe both researchers and faculty developers should be held accountable for the outcomes of their work. Manipulation should not be part of any learning or teaching situation; if it is, then it would be better to use terms like "coercion" and "oppression" to describe these activities. There is an art to teaching, and there are interpersonal skills and methodologies that can learned. All teachers work by intuition from time to time, but working by intuition alone is a shallow practice of our profession.

Certainly, an in-depth research study such as this one is not possible for every instructional intervention but evaluation is an essential part of good teaching and faculty developers are first and foremost teachers. Research-based interventions must be
practiced so that their replication can further the understanding and knowledge of the complexity of faculty development activities. If the final myth is true, that faculty don't want or need formal help, then, as I will suggest in the final chapter of this report, this should be the first order of business in further research on faculty development.

There are too few studies of faculty development that go beyond simple participant satisfaction ratings. Satisfaction is important, but it doesn't mean that learning has occurred or that changes in instructional practices will follow. This study is an attempt to explore one instance of faculty development at a deep level in order to understand if and how learning has occurred as a result of participation in this intervention and if and how change in practices and beliefs have grown out of that learning.

Theoretical Framework

In seeking to answer these research questions, I employed a qualitative research paradigm with a case study methodology. "Qualitative research begins with questions; its ultimate purpose is use" (Rossman & Rallis, 1998, p. 5). Qualitative studies are conducted in the real world, within a naturalistic context, by researchers who construct knowledge based on their observations of social phenomena, in this case a faculty development initiative. Multiple methods are used in qualitative studies; for this study, I employed surveys, questionnaires, observations, and interviews. Qualitative research is intended to improve the human condition. The purpose of this study is to describe and interpret the workshop and to share these results with these particular faculty
development stakeholders (workshop facilitators, participants, and administrators) as well as with the larger faculty development research community.

Like qualitative research, faculty development is multifaceted. The case study design addresses this complexity. It "offers a means of investigating complex social units consisting of multiple variables of potential importance in understanding the phenomenon" (Merriam, 1988, p. 32). I have chosen to look at the workshop as a phenomenon or case and to study the experiences of the stakeholders who participated in this study as "perspectives" on this case. In this case, each stakeholder offers a unique perspective on the learning event and its impact on beliefs and practices related to teaching and to technology-enabled teaching, in particular.

Case studies are often interpretative as well as observational; I took an interpretative approach to this study. I do not believe there are universal truths about human behavior. My goal in this research was to understand the people, the place, and the processes involved in the workshop. I also believe that groups construct realities. Therefore, it was critical to learn from the perspectives of as many of the stakeholders in the workshop as possible. Furthermore, I believe that all knowledge is local; that is, it is framed by the context in which it is located (Smith, 1989).

A qualitative research paradigm and case study design have allowed me to go out into the field, to the computer laboratory and to faculty offices, to observe and interview people in their own worlds. Learning from people in this context has provided me with a glimpse into the complexities of their "natural" worlds of learning and teaching. Through multiple methods, interviewing, observing, and surveying, I have involved the participants in an interactive, humanistic, and holistic study. I have made every attempt to
thoroughly and collaboratively describe and interpret this faculty development experience. "In a qualitative approach to research, the paramount objective is to understand the meaning of an experience" (Merriam, 1988, p. 16).

Certainly my perspective and worldviews have influenced this study. My presence in this faculty development learning environment and in the interview exchanges has affected the data and interpretations. I acknowledge the subjective perspective and biases of both participants and myself in the research frame (Goetz & LeCompte, 1984; Merriam, 1988). I am a proponent of the use of interactive student-centered learning strategies in the classroom; I believe that technology tools can be and should be appropriated by educators to support these strategies. My perspective is the lens through which I have observed and interpreted these data. I have adopted an attitude of reflexivity throughout the study and have vigorously utilized member checks to prevent myself from misrepresenting and misusing these data.

The conceptual framework I have applied to this study has been a flexible one. I believe in the emergent nature of data and have refined initial questions and discovered new questions as the result of interacting with the participants and with these data. Qualitative research is a complex, non-linear process. I have immersed myself in these data and moved back and forth in my thinking from individual perspectives to the global picture in order to fully describe and understand this faculty development initiative.

I acknowledge the impact of the sociopolitical and historical context of this study as well. This research is situated at the dawn of the 21st-century in the Information/Communication Age when conversations about reforming education to meet new challenges is one of the focal points in political, scholarly, and social life in the
United States. It is no accident that this study about the diffusion of teaching innovations centers on the adoption of technology tools.

There have been and will be many uses for the data and interpretations generated from this study. Rossman and Rallis (1998) identify four uses for qualitative research: instrumental, enlightenment, symbolic, and emancipatory use. Initially, the data were used instrumentally to offer a formative assessment of the impact of the workshop on faculty. The workshop facilitators applied this information to the final two workshops. After this faculty development initiative ended, the facilitators and a University administrator used the data as a summative assessment as well. Excerpts from the data were used in campus reports on the state of faculty development and as supporting evidence for an award nomination.

Due to competition for finite resources, it is too often the case that faculty development initiatives such as this one come and go and leave behind only anecdotal evidence of their successes or failures. One of my goals was to promote an enlightenment use of this study. Prior to receiving this research report, I believe that decision-makers, in this case University administrators and faculty developers, did not have a deep knowledge and understanding of the pedagogical practice and impact of the workshop. Intentions, beliefs, and values are complex and often ambiguous aspects of learning environments. This report makes a concerted effort to make these factors visible and comprehensible to the reader. In this way, this study has a symbolic use. With this knowledge and understanding, decision-makers can improve future faculty development practices within and beyond this university.
In a very real sense, this fact offers the possibility for an emancipatory use for findings of this study. At this point in time, educational institutions in the United States are engaged in significant educational reform efforts. One focus on these efforts is directed toward faculty development. Faculty, themselves, are not often asked to collaborate neither with administrators nor with faculty developers to determine the content and agenda for reform initiatives. Sharing the perspectives of the participants in this study in one way to give voice to the faculty who are the target of reform efforts.

My professional experience also informs this study. In my work as a mentor for classroom teachers and school librarians in a K-12 school district and as an adjunct instructor and graduate teaching assistant at the University, I have had first-hand experience with issues related to professional development for educators and with andragogist and constructivist teaching and learning practices being applied in the adult workshop and/or the K-20 classroom. Like many digital culture observers and 21st-century educators, I believe that utilizing computer technology tools in instructionally meaningful ways gives both adults and students opportunities to learn, teach, and live in the newest and most continually changing literacy of our time, technological literacy. The computer and the World Wide Web, in particular, can empower children, students, young adults, and adults alike, in taking control of their learning, in democratizing access to information and publication, in meeting the needs of learners with diverse learning styles, in motivating reluctant learners, and by initiating the skills and strategies necessary for lifelong learning in the Information/Communication Age (Bolter, 1991; Marx, 2000; Negroponte, 1995; Tapscott, 1998). A qualitative research method, an interpretive lens, constructivism and andragogy applied to faculty development, technology-enabled
faculty development, diffusion of innovations, educational reform efforts, and my personal stance as a "passionate participant" (Toma, 2000) form and inform my interpretations of the data collected in this study.

Organization of Dissertation

In Chapter 1 of this dissertation, I placed this research study in a historical context. It is not coincidental that a technology tool-centered faculty development initiative was launched at this Research I institution on the eve of the 21st-century. Along with an undergraduate curriculum revision, the "scholarship of teaching" conversation, and an effort to wire classrooms and diffuse technology across this campus, the workshop was positioned to support educational reform. The workshop was designed and implemented to address a need for faculty to improve their teaching and teaching with technology skills and strategies. This research study is also historically timed in my personal and professional life. This study has helped me deepen my understanding of the facilitation of adult learning, particularly as it impacts learning to use technology tools in student-centered, active learning ways. I also specify the research questions for this study and place my inquiry into these questions in a qualitative, interpretative theoretical framework.

In Chapter 2, I review the literature that has helped formulate the research questions for this faculty development initiative. I identified four broad areas of scholarship and research, namely faculty development, faculty development centered on technology tools, diffusion of innovations theory and practice, and educational reform.
Each of these areas of inquiry contributes to an understanding of the people, place, and process of this faculty development initiative.

In Chapter 3, I discuss the research methodology utilized in this study. First, I elaborate on the qualitative research paradigm and case study methodology employed in this study. I discuss my access to the people, place, and process of this faculty development initiative and primary and secondary data collection sources, the data collection site, and the process of the workshop in the form of the day-by-day agenda. The data analysis section is organized around the different data sources and perspectives on the workshop, namely, the facilitators' interviews, the field study and interviews, the workshop alumni interviews, and the workshop surveys and online questionnaire.

In Chapter 4, I begin to share the multiple perspectives on the workshop with the facilitators' perspectives. The first profile focuses on the workshop experience from a facilitator's point of view. Before this profile, I share a biographical sketch of this facilitator. After the profile, I give an explication in which I summarize the main points of the profile before I discuss her perspective in relationship to the literature. The remainder of the profiles in this chapter were constructed from the facilitators' interviews focused on meaning. I follow the same process with these data. Before each profile, I share a biographical sketch of the facilitator; after each profile, I offer an explication. After all the profiles, I engage in a discussion relating their perspectives to the literature organized around the four research sub-questions.

In Chapter 5, I share the field study participant's experience of the workshop. First, I share his biographical sketch followed by the workshop journal, which chronicles his daily experience in the workshop. Next, I share vignettes and explications from the
post-workshop interview and the one-year-later interview, each followed by a discussion of his responses to the workshop in relationship to the literature organized by the four research sub-questions.

Chapter 6 offers the profiles of seven workshop alumni. Before sharing each participant's profile, I give a biographical sketch; after each profile, I offer an explication of his or her perspective. Then I discuss their collective perspectives on the workshop in relationship to the four research sub-questions and the literature.

In Chapter 7, I share the survey and questionnaire data. These data sets offer samples of the workshop population's perspective on this faculty development experience. I share the methodology and data analysis for both the beginning and ending workshop surveys and the online questionnaire. I discuss the survey and questionnaire data in terms of the four research sub-questions and the literature.

Chapter 8 brings all of the perspectives together. I discuss each of the research sub-questions across perspectives. Before going on to the next question, I share my insights from the analysis of that question. At the end of this chapter, I share brief comments about two other stakeholders' perspectives, namely the perspectives of students and of one University administrator.

In Chapter 9, I conclude this study. The final chapter of this dissertation begins with a review of the different perspectives on the workshop. I summarize the findings for each of the four research sub-questions across perspectives. Finally, I address the overarching research question for this study. I suggest implications for faculty development and suggestions for further research.
Although the people, place, and process involved in this faculty development initiative are all important, my research paradigm privileges the people. Therefore, when I began to envision this research report, it seemed natural and logical to me to organize this dissertation around the participants' narratives. In order to not disrupt the narrative quality of the data, I have presented stakeholders' perspectives in the form of uninterrupted profiles and vignettes. Like Seidman (1998), I believe it is "a privilege to gather the stories of people through interviewing and to come to understand their experience through their stories" (p. xxi). This research study seeks to understand this instance of faculty development from the multiple perspectives of the workshop facilitators and the faculty participants. The participants' stories are the way they have made meaning of this experience; their stories are key to my understanding of this phenomenon as well.
CHAPTER 2
LITERATURE REVIEW

The workshop and this research study address key areas of timely interest in educational research, including adult education and faculty development theories and practices, post-secondary faculty development centered on technology tools, the diffusion of innovations, and educational reform efforts, especially those involved with technology tools integration. Figure 2.1 shows the convergence of these four areas in forming the context for both the workshop and this study and in influencing both the content and outcomes of the workshop. The figure suggests the importance of placing the workshop, an instructional intervention, in the larger sociocultural context of educational reform theory and practice.

Figure 2.1. Nested context of the study
Scholarly Framework

"The study of instructional interventions needs to derive from theoretical or conceptual bases" (Weimer & Lenze, 1991, p. 329). I conducted an extensive literature review focused on these four areas. Through this examination of the work of other researchers, I was able to fine tune the lens through which I studied the workshop. A closer look at the theories and practice of adult education, andragogy, constructivism, and principles of facilitation gave me the necessary background to understand the intentions, interpersonal skills, and teaching practices of the workshop facilitators. A search related to current faculty development initiatives focused on technology tools gave me a context in which to consider this case. Although this workshop is unique, other programs supported the effectiveness of various components of the workshop and suggested possible areas for future iterations of faculty development initiatives at this and other institutions. The diffusion of innovations and educational reform in higher education research addressed the ways in which this workshop had and/or could have an impact on learning and teaching at this university. Together, these four areas created a convergence at which I studied the people, place, and process of the workshop.

This literature review is organized around these four topics. Within each topic, I have identified specific subtopics that further suggest the connections among these theories, research, and practices and the workshop under study. This structure is intended to facilitate references to this literature in discussion, insights, and concluding sections of the data chapters as well as in the final chapter of this dissertation.

After an introduction to the topics of andragogy (Knowles, 1978) and constructivism (Briner, 1999), this literature review section on faculty development
applies educational theories to adult education and faculty development. Next, I explore the topic of faculty development facilitation through an examination of the work of Rogers (1969). Thirdly, I address themes in faculty development, including the need for pedagogical and pedagogical content knowledge, the importance of affective features in workshops, and other features of instructional interventions. Next, I discuss institutional support and barriers for faculty development. I conclude this section with implications for this study.

In the next section of the literature review, I discuss technology-centered faculty development. I begin this section with a brief overview of the debate on technology-enabled teaching as exemplified by researchers Clark (1990) and Kozma (n.d.). Then I look at technology-centered faculty development initiatives in more detail, including the organization and content of specific technology-centered programs, the affective features of these programs, and the utilization of technology tools for pedagogical change. Next, I look at the institutional context for faculty development and at technological paths to educational reform. I conclude this section with implications for this study.

The third major section of the literature review looks at the theory of the diffusion of innovations (Rogers, 1983). Along with the concept and practice of the diffusion of innovations (DOI), I discuss the three main components of this theory that impact this study, namely the characteristics of innovations, diffusion roles, including innovators to laggards, change agents and opinion leaders, and critical mass, and diffusion and institutional goals. Once again, I conclude this chapter with implications for this study.

The final section of this literature review focuses on educational reform. I begin with a look at the sociopolitical context for education reform. Next, I review the literature
for evidence of technology-enabled reform movements. I delineate two national thrusts in post-secondary education reform, namely principles of good practice in undergraduate education (Chickering & Gamson, 1991) and the scholarship of teaching (Boyer, 1990). Next, I make connections between K-12 school and post-secondary reform efforts. Toward the end of this section, I briefly revisit technology-enabled teaching by exploring whether technology tools integration in an entrée or an obstacle to reform in higher education. I conclude this section with implications for this study, and then draw conclusions for this entire chapter.

These four areas of theory, research, and practice informed the research questions for this study. The positioning of this study within these four topics provides a framework to support the discussion and ultimately the interpretation of the data presented in this research report. Each of these topics has influenced the behaviors and values of workshop facilitators, participants, and the sponsoring institution in different ways and to different extents. Faculty development, technology-centered faculty development, the diffusion of innovations, and educational reform efforts have impacted the people, place, and process under study.

Faculty Development

In higher education, the term "faculty development" covers many topics. According to Menges (1988), faculty development emerged as a significant movement in the 1960s as a response to student protests that felt "the educational system was removed and unresponsive to [students] interests and needs" (p. 256). Instructional improvement, however, is not the only theme in faculty development. In the intervening years, topics
such as career development, development as individuals, and organizational development have also been part of this activity. For the purposes of this study, however, faculty development refers to the development of post-secondary faculty as teachers. Faculty development as used here implies instructional interventions whose goal is to improve student learning.

Educational Theories Applied to Adult Education and Faculty Development

Philosophies of education describe the understandings and attitudes of educators toward learners, curriculum, and learning events. As such, philosophies of education shape the beliefs and behaviors of facilitators of learning. Theorists have identified six main philosophies of adult education (Elias & Merriam, 1980). Liberal, progressive, behaviorist, humanistic, radical, and analytic adult education are described by Elias and Merriam (1980). Of the six, progressive and humanistic philosophies are most clearly represented in the theories of Knowles (1975) and Rogers (1969).

Progressive education "came with the rise of modern science and modern philosophy. Change, relativity, and pluralism were introduced into human consciousness" (Elias & Merriam, 1980, p. 204). Dewey (1902) is the best-known scholar from the progressive education tradition. Dewey's work formed a foundation on which the constructivist learning theory was built. Humanistic educators focus on "the human potential for growth in both cognitive and affective areas of life" (Elias & Merriam, 1980, p. 204). Rogers (1969) is the foremost advocate for humanistic adult education. Knowles and Rogers were contemporaries who influenced each other's work. In this section of the
literature review, I have used these philosophies of education to provide a framework for describing the behaviors and values of faculty development facilitators.

**Andragogy and Constructivism**

There are many researchers writing in the area of adult learning and faculty development. Some of those theorists and researchers focus on the principles of andragogy (Brookfield, 1986; Knowles, 1998; Lewin, 1951; Vella, 1995) while others focus on constructivism in adult learning and professional development for post-secondary faculty (Ferro, 1993; Merriam & Cafferella, 1991; Stouch, 1993; Wiswell & Ward, 1987). Andragogy, the term used by Malcolm Knowles and others to distinguish adult learning from childhood and adolescent learning, consists of six principles that describe adults' motivations and actions as they learn. Constructivism, which has its roots in John Dewey's educational reform efforts that flourished at the dawn of the twentieth century, has only recently been applied to post-secondary and adult learning situations. Both andragogy and constructivism form frameworks in which learning facilitators design instruction that honors the autonomy of the learner and promotes active involvement on the part of the learner in the learning process. These are but two of the learning theories that have influenced this faculty development initiative. Other theories inform the decisions made by learning facilitators (Maslow, 1970; Rogers, 1969; Smith, 1992). All together these theories and practices provide schema with which to understand the perspectives adult education and faculty development facilitators.

Malcolm Knowles, who is known in the field of adult education as “The Father of Andragogy in the United States,” brought his ideas about teaching and learning with
adults from Europe to the U. S. in the early 1970s. The six principles of andragogy according to Knowles are the need to know, self-concept of the learner, prior experience of the learner, readiness to learn, orientation to learning, and motivation to learn (Knowles, 1978). For Knowles, these six principles can be used to describe and/or guide the behaviors of learners and facilitators in the adult learning context. One of the primary responsibilities of the facilitator of adult learning is to help the learners "become aware of the need to know" (Knowles, Holton, & Swanson, 1998, p. 64). According to Knowles, most adults have an assumption that "learner equals" dependent (Knowles, Holton, & Swanson, 1998, p. 65) and will resist learning in situations where they feel they cannot be self-directed. Knowles believes that learners in most adult education are more heterogeneous than in K-12 settings and therefore, adults require more individualization. Unlike K-12 learners, adult learners come "ready to learn." There is no need for facilitators of adult learning to consider what is developmentally appropriate. Adult learning must be related to real-life adult situations, and adult are internally motivated to keep growing and developing. The autonomy of the learner is a key concept in Knowles' principles. Table 1 elaborates on these principles.

Some researchers, theorists, and educators use the terms "student-centered" and/or "constructivist learning" to describe a learning model that puts the student in the central role in his or her own education. Constructivism posits that the learner "constructs" knowledge by building upon prior understandings or by discarding formerly held beliefs. Accessing and assessing prior knowledge is, therefore, an important feature of this learning theory. Learning in a constructivist environment assumes that the student controls and takes responsibility for his or her own learning. Students, therefore, are
actively engaged in questioning, in problem solving, and in the learning process itself. The constructivist teacher, therefore, values both the process and products of learning and understands the social context of learning. He or she provides students with opportunities to take many perspectives and learn from different points of view. One of the constructivist teacher’s goals is to ensure that students can transfer their learning to other contexts (Dewey, 1902; Piaget, 1952; Vygotsky, 1978).

For the constructivists, education is a social phenomenon. Vygotsky (1978) extends the social aspect of learning with his theory on the Zone of Proximal Development (ZPD). In this "borderland" where learners construct and/or deepen their understandings, they grow by engaging with peers, coaches, and/or content that reach beyond their knowledge to the edge of their uncertainty. Learning from peers is an important aspect of the ZPD. The constructivist-learning environment, then, is a socially interactive one.

In Knowles’ work, the principles of andragogy are contrasted with those of pedagogy. According to Knowles, “the pedagogical model assigns to the teacher full responsibility for making all the decisions about what will be learned, how it will be learned, when it will be learned, and if it has been learned” (Knowles, 1978, p. 62). Although he later conceded the possibility that androgogical principles could be applied to adolescent learners, Knowles takes a developmental view with regard to the autonomy of the learner (Boyer, 1984).

However, for a growing number of K-20 educators, myself included, the pedagogical model has been replaced with the constructivist model of learning and teaching. Table I compares the principles of andragogy with those of constructivism.
Cullen's (1999) principles of andragogy are distilled from the work of Malcolm Knowles.

The principles of constructivism are from the work of Martin Briner (1999).

Table 2.1

A Comparison of the Principles of Andragogy and Constructivism

<table>
<thead>
<tr>
<th>Andragogy</th>
<th>Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>The adult learner is self-directed and will take responsibility for his or her own learning, make decisions alone, and may reject or resist the imposition of ideas and decisions.</td>
<td>Constructivism is based on student's active participation in problem-solving and critical thinking regarding a learning activity that he/she finds relevant and engaging.</td>
</tr>
<tr>
<td>The adult learner comes to the classroom with prior experience and acquired knowledge. An adult's past experience is not always a positive influencing factor.</td>
<td>Through trial and error, the student balances pre-existing views and approaches with new experiences to construct a new level of understanding.</td>
</tr>
<tr>
<td>The adult learner is characterized by his or her need to know, which is often linked to a change in direction in life.</td>
<td>The student pursues a problem or activity by applying approaches he or she already knows and integrating those approaches with alternatives presented by other team members, research sources, or current experience.</td>
</tr>
<tr>
<td>Adult learners tend to be motivated by internal development such as self-improvement and personal development.</td>
<td>The teacher is a facilitator or coach in the constructivist learning approach. The teacher guides the student, stimulating and provoking the student's critical thinking, analysis and synthesis throughout the learning process. The teacher is also a co-learner.</td>
</tr>
<tr>
<td>Adults have a problem solving orientation to their learning. They want to learn in order to solve a problem or fulfill a need and they rarely learn for learning's sake (Cullen, 1999).</td>
<td>Learning is assessed through performance-based projects rather than through traditional paper and pencil testing (Briner, 1999).</td>
</tr>
</tbody>
</table>

Knowles' contemporary, psychologist Carl Rogers, describes his humanistic learning theories as "student-centered." Like Knowles and the constructivists, Rogers
believes that learning is a lifelong process and should not be confined to institutions of learning, or to curriculum, which is terminal in nature. Rogers suggests that self-directed inquiry is the most effective learning design regardless of the age of the learner (Rogers, 1969). Learning how to learn is the keystone of Rogers' theory.

According to Boyer (1984), the intent of Knowles and Rogers' theories is to "contribute to the actualization of the learner faced with outmoded institutions of schooling" (p. 20). I would add that it was the intent of Dewey, Piaget, and Vygotsky, the constructivists, to change outmoded schools into discovery centers where students could reach their full intellectual potential. Bringing together the work of these theorists can create a seamless lifelong learning philosophy. A faculty development workshop is one place where these philosophies can come together as they influence the adult workshop processes with the goal of diffusing these learning theories and practices into the preK-20 classroom.

In The Making of An Adult Educator, Knowles (1989) discusses his belief that if adult educators have the opportunity to directly experience the benefits of andragogy in a learning situation, they will then offer these experiences to other (adult) learners. "Instead of getting their kicks out of controlling learners, [these adult educators] experienced the joy that comes from releasing learners – from seeing the energy that is released when learners get excited about learning, from working on their own self-planned projects" (p. 93). According to Knowles, creating a learner-centered environment is one of the key responsibilities of adult educators.

Other researchers believe that as instructors build "learning to learn" into their courses, they will necessarily shift their role from that of content expert and source of all
knowledge to that of co-learner, resources person, and coach (Merriam & Caffarella, 1991). This perspective on the role of the teacher is often referred to as "facilitator" rather than "instructor." In his work, Rogers (1969) offers learning facilitators a list of ten precepts designed to foster a "learning to learn" environment. (These ten precepts are discussed in detail in relationship to the workshop facilitators' profiles found in Chapter 4.). If these processes are allowed to flourish, "there will be no such thing as adult education. There will only be lifelong education" (Knowles, 1978, p. 168).

What, then, is the definition of an "educated" person in the 21st century? Knowles (1989) would say the educated person is someone who is a continuous, self-directed, lifelong learner who is able "to anticipate new conditions and to change in ways that would enable a person to avoid becoming obsolete" (p. 132). A lifelong attitude toward education may be one goal of education at all levels, but it may be especially significant for post-secondary faculty (Hughes, 2001). A significant number of faculty teaching in today's institutions of higher education were themselves educated in a less progressive manner and/or may have created or found teaching niches that are no longer viable in a rapidly changing society with a 21st-century student population. "[All] learners are engaged in both the contexts of their learning and in the broader social world within which these contexts are produced" (Lave, 1991, p. 24). Educational reform movements at the turn of the 21st century necessarily address the need for teacher improvement. The demand to improve undergraduate education is a demand to improve undergraduate teaching.
Discussions of the techniques used to teach faculty is one large gap in the literature. In 1989, Algren's dissertation recommended adult learning principles be considered in the design and implementation of faculty development projects. In a longitudinal study of K-8 classroom teachers who were part of the Apple Classrooms of Tomorrow project in the 1980s and early 1990s, the researchers found that the constructivist approach in professional development for teachers was most effective (Sandholtz, Ringstaff, & Dwyer, 1997). Hands-on exploration and active learning that resulted in deeper understanding were two key components of this ambitious teacher and student learning project. In 1991, Stephens (1992) surveyed 170 colleges and universities with regard to their faculty development initiatives based on the use of technology. He found that there are no standards by which faculty development programs are evaluated. He asked, "What makes an effective program?" (p. 10). Ten years later, this question is still with us.

The Need: Pedagogical and Pedagogical Content Knowledge

The need for faculty development in higher education is well documented (Carnegie Foundation for the Advancement of Teaching, 2002; Ehrmann, 2000; Saroyan, Amundsen, & Li, 1997). Most post-secondary instructors enter the classroom with little or no preparation for their roles as teachers (Carothers et al., 1997). "To date, teaching, to the extent that it is being taught in university graduate programs, tends to be treated as an add-on to the knowledge of the discipline. Most programs allow for little synthesis between discipline knowledge and pedagogy" (Kreber, 2001, p. 80). Until recently,
teaching has been an undervalued activity in higher education (Martin & Ramsden, 2000).

Although there is agreement that "everyone who teaches in higher education should be, or be becoming, an expert in teaching" (Smith, 2001, p. 76), there is no single way to arrive at this goal. Like teachers at all levels, college and university faculty have been apprenticing for their teaching roles since they were in kindergarten; they have had many years to form their beliefs. Like all core beliefs, teachers' core beliefs about learning and teaching are resistant to change. Further, it is difficult to tell where teacher beliefs end and teacher knowledge begins. Teacher beliefs and teacher knowledge and behaviors are intertwined (Pajares, 1992).

There are two kinds of pedagogical knowledge. One type can be applied to any teaching and learning situation while the other is content-area specific. Pedagogical knowledge includes learning styles, individualization, the organization of instruction including individual, group work, and independent work, principles of course design, strategies for student engagement, and others. Pedagogical content knowledge refers to a teacher's ability to integrate what he or she knows about the subject discipline with how to best communicate that knowledge to students in order to facilitate their learning it. This ability to reach students is the result "of an ever-increasing repertoire that consists of metaphors, analogies, illustrations, activities, assignments, and examples to transform content into lessons and units of instruction" (Wilson, Shulman, & Richert, 1987, p. 120). "Graduate programs, with their emphasis on educating researchers, largely neglect the advancement of pedagogical content knowledge" (Kreber, 2001, p. 80). A significant number of post-secondary teachers teach without a background in either type of
pedagogical knowledge so developing an integrated paradigm of teaching and learning, then, is critical to achieving post-secondary educational reform (Saroyan, Amundsen, & Li, 1997).

**Affective Features of Faculty Development Programs**

The term "affective" refers to the aspects of personality and/or the environment that relate to emotional response, attention, and values. The affective components of the adult learning environment are critical (Ferro, 1993; Kidd, 1973; Smith, 1982, Wlodkowski, 1985). Many studies of adult learning refer to Maslow's (1970) hierarchy of needs that specify the multiple motivations for human behavior. Ferro (1993) identified six features that influence an adult learner's readiness to learn: feelings of self-esteem, fear, respect for authority, need for status, comfort with varying amounts of autonomy or structure, and previous experience in schools. Although these features may operate in all learners, similar to Knowles, Ferro suggests that adult learners may bring strong predilections to the learning environment because of their deeply held beliefs and the quantity and quality of their educational experiences.

One cannot motivate another; one can only motivate one's self. Helping the adult learner understand the value of the learning task in enhancing his or her own life is critical to success (Vella, 2000). Wlodkowski (1985) suggests the need to focus on the human perspective of the course content. Like the constructivists, both Smith (1982) and Kidd (1973) stress the importance of valuing the adult learner's prior knowledge and experience. Kidd (1973) writes about how adult educators need to facilitate satisfaction and achievement for adult learners. "Careful attention to the affective domain can
increase learner motivation and counteract, or at least minimize, the affects of [previous negative experiences]" (Ferro, 1993, p. 31).

Smith (1992) classified cognitive and psychosocial orientations that affect an individual's ability to process information. The achievement motivation, fear of failure, and fear of success are among the personality factors that influence a person's disposition toward learning. People's dispositions are not immutable; learning situations are co-constructed by facilitators and learners and can affect a person's dispositions (Smith, 1992). The affiliative motivation, which is the need to establish, maintain, or rebuild positive relationships with others, and its opposite the power motive, which places the need for power above the need for affiliation, may play a role in faculty development interactions. Interestingly, Smith identifies teaching as one of the "power-related careers," a career in which people exercise control over others. These motives may affect the faculty development environment, making it more or less conducive to learning.

**Features of Instructional Intervention**

Although the goal of the instructional interventions in faculty development is to improve student learning, instructional interventions are "methods used to motivate and inform instructional change, but the faculty member alone implements these alterations" (Weimer & Lenze, 1991, p. 294). Not all instructional changes are appropriate to teaching every concept nor are they appropriate for every student group. It is the informed, professional decisions made by faculty members that create opportunities for positive results in student achievement. Still, it is important to identify the features of instructional interventions that have been found to positively impact student learning.
This literature review offers several themes for describing and assessing the potential impact of faculty development initiatives.

Workshops are the most frequently used format for instructional intervention (Bland & Schmitz, 1988). Workshops vary in length from hour-long sessions to yearlong programs. They offer strategies in every area of instruction from methods of instruction to academic advising and counseling to understanding college students and how they learn (Erickson, 1989, as cited in Weimer & Lenze). These workshops are organized around lectures, discussions, and/or collaborative learning (Weimer & Lenze, 1991). The audience for many of these workshops is TAs, adjuncts, and new faculty, with no distinction made in the content for each of these groups. A smaller number of workshop interventions are directed toward established, practicing faculty.

"Instructional interventions are being used prior to rigorous empirical exploration" (Weimer & Lenze, 1991, p. 298). Levinson-Rose and Menges (1981) used five perspectives from which to assess the effects of instructional interventions: the teacher attitude from self-report, teacher knowledge from tests or observations, teacher skill from observer, student attitude from self-report, and student learning from tests or observer reports (as cited in Weimer & Lenze, 1991). According to Levinson-Rose and Menges (1981), the strongest evidence of the impact of instructional interventions comes from their impact on students while the weakest comes from the self-report of faculty. Still, according to Weimer & Lenze (1991), the effectiveness of any single intervention are more qualitative than quantitative. More detailed descriptive inquiries can illuminate the impact of interventions on faculty behaviors and student outcomes.
Most recently, many researchers have found that faculty-to-faculty sharing and a collaborative workshop/training environment are essential ingredients in successful faculty development programs (Anandam, 1998; Daigle & Jarmon, 1997; Duffrin, Dawes, & Hanson, 1999; Robinson & Borkowski, 2000; Rowe, 1999; Sorcinelli, 1999; Topp & Mortensen, 2000). Many programs utilize a one-on-one mentoring method to address the faculty member’s specific needs and learning outcomes (Milligan & Robinson, 2000; Signer, Hall, & Upton, 2000; Sprague, Kopfman, & Sorsey, 1998; Thompson, Hanse, & Reinhart, 1996). Independent learning projects, choice, and a variety of resources are also critical aspects of effective faculty development (Stouch, 1993). As the impact on student learning must be the goal of faculty development, several recent studies of these programs wisely focus on student outcomes (Anandam, 1998; Barry, Walvoord, & Laughner, 2000; Daigle & Jarmon, 1997; Duffrin, Dawes, & Hanson, 1999; Hueth, 1998). Details of these studies are found in the next main section of this literature review related to faculty development centered on technology tools.

**Institutional Support and Barriers**

Many studies address organizational structure and/or culture and institutional barriers to faculty members’ successful use and integration of technology tools (Cravener, 1998; Daigle & Jarmon, 1997; Hueth, 1998; Karlin, 1994; Mitra, Steffensmeier, Lenzmeier, & Massoni, 1999; Nnazor, 1998; Robinson & Borkowski, 2000; Signer, Hall, & Upton, 2000; Willis, 1994). One aspect of organizational culture is allowing sufficient time for faculty to learn the tools and to integrate technology into their teaching. Some researchers call for programs that are iterative and require long-term
Another aspect of institutional culture is the use of rewards and recognition for pioneering faculty who learn to use and incorporate innovative methods and technology in their teaching. Many studies call for consideration of faculty needs for rewards and recognition (Frayer, 1999; Duffrin, Dawes, & Hanson, 1999; Robinson & Borkowski, 2000; Signer, Hall, & Upton, 2000; Smith, 1997; Topp & Mortensen, 2000). Some researchers credit incentives, rewards, and recognition as critical components in the success of the programs they studied (Peterson, 1998; Rowe, 1999; Sorcinelli, 1999). At the end of the month long workshop at Forsyth Technical Community College (Rowe, 1999), each participant was presented a “Certified Distance Learning Instructor” certificate at an awards luncheon. TEACHnology participants at the University of Massachusetts-Amherst received a laptop computer, plaques, and had their achievements noted in publications and at awards dinners (Sorcinelli, 1999).

Academics who value scholarship may give greater credence to faculty development workshops and seminars based on theory and research (Kreber, 2001). A study conducted at McGill University set out to examine the degree of change in the participants’ conceptions of learning and teaching; graduate teaching assistants and faculty participated in this weeklong faculty development initiative (Saroyan, Amundsen, & Li, 1997). The goal of this program was to help participants realize that teaching and learning are inseparable. They were asked to assume both the role of instructors and the role of students. The researchers concluded that after the program the participants had a more sophisticated view of teaching. They changed from a view of teaching as
transmitting knowledge to "teaching as a means of attaining specific learning outcomes" (Saroyan, Amundsen, & Li, 1997, p. 106).

This study, however, was an anomaly in my review of the literature. According to Boice (1996) and Kozma (1985), many faculty developers have not gone beyond the satisfaction or dissatisfaction level of assessing faculty development initiatives. Although I have found many studies in the literature, I agree with Boice and Kozma that there are key areas in which the research is lacking. This study of the workshop attempts to fill in some of those areas such as the beliefs and behaviors of the facilitators of adult learning as they impact the learning environment and learning outcomes, the beliefs and behaviors of the participants with regard to teaching and technology tools, and the components of the workshop that invite participants to reflect on their teaching role and instructional practices. The qualitative interpretative research paradigm and case study methodology utilized to collect and analyze the data was most critical because it guided the inquiry into a profound look at actual changes in beliefs and practices; the theoretical framework for this study allowed me to go much deeper than superficial self-reporting.

Implications for This Study

There is consensus within the academy that faculty development as it relates to instructional intervention is a desirable activity for colleges and universities. In the 1990s, many universities have adopted a multifaceted faculty development strategy (Carothers et al., 1997); the university under study is an example of such an institution (Brown & Jackson, 2001). Faculty development in not only offered through workshops, but also through grants, individual and departmental consultations, faculty showcases and
demonstrations, graduate teaching assistant activities, newsletters and listservs, multi-day institutes, and longer institutes during semester breaks. The goal of all of these methods is to improve faculty teaching and ultimately, to improve student learning.

According to Mezirow (1991), most adult learners change their teaching practices when there has been a change in the basic assumptions they've held about themselves as learners, the role of the teacher, and the goal of education. As adult learners, faculty, too, may benefit from the self-examination of their assumptions through the faculty development process. More programs similar to the one offered at McGill University (Saroyan, Amundsen, & Li, 1997) can be initiated in order to deliberately create a context in which faculty can reflect on their core beliefs about teaching and learning.

Many scholars have described different processes for reaching excellence in teaching in higher education. Sherman, Armistead, Fowler, Barksdale, and Reif (1987) describe a four-stage process. First, faculty must move away from the model of "teaching as telling." Research shows that students learn by interacting with information. Secondly, faculty must design instruction that allows students to engage directly and intellectually with the content. Thirdly, there must be a shift away from a focus on content itself to a focus on how students will best learn the content. Finally, teaching itself must be viewed as a complex activity. Teaching is composed of the interactions among the students, the content, and the teacher; these interactions create opportunities for learning to occur. Increasing expertise in teaching requires risk-taking, practice, feedback, reflection, and time (McAlpine & Weston, 1999).

Adult learners bring challenges to the learning situation, and as a subset of adult learners, post-secondary faculty, may bring an even more complex set of challenges.
Integrating technology tools into faculty development initiatives may provide solutions to some of these challenges; they may also increase the challenges faced by faculty development facilitators. The next section of this literature review looks more closely at research on technology-tool centered faculty development initiatives.

**Faculty Development Centered on Technology Tools**

Workshop participants are motivated to attend the workshop in order to gain access to technology tools and to knowledge about technology tool use in instruction. The goals of the workshop focus on the use of technology tools to foster a more student-centered, active learning environment. The participants, however, identified specific technology and/or teaching goals for their workshop experience. Research regarding the use of technology tools in faculty development informs this study (Lee & Johnson, 1998; Padgett & Conceição-Runlee, 2000; Robertson, 1996; Shapiro, 1998).

The body of literature on the topic of post-secondary faculty development centered on technology tools is exploding (Lee & Johnson, 1998; Padgett & Conceição-Runlee, 2000; Robertson, 1996; Shapiro, 1998). In our technology-rich society defined by constant change, colleges and universities in the United States have been utilizing technology tools in faculty development initiatives to meet sociocultural needs and expectations. Although much of the literature focuses on specific software tools (Haneline, 2000; Holden, 1999; Robinson & Borkowski, 2000; Saad et al., 1999), a growing number of researchers have begun investigating the broader implications of the impact of these tools on faculty teaching innovations (Barry, Walvoord, & Laughner, 2000; Duffrin, Dawes, & Hanson, 1999; Sorcinelli, 1999).
Overview of the Debate on Technology-Enabled Teaching

The debate on the relationship between media and learning has raged for many decades. Recently, it has been summed up in the perspectives of two teaching-with-media researchers, Richard E. Clark and Robert B. Kozma. According to Clark:

The best current evidence is that media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition. Basically, the choice of vehicle might influence the cost or extent of distributing instruction, but only the content of the vehicle can influence achievement. Conversely, if teachers merely add on technology to ineffective instructional methods (e.g., electrifying the lecture hall), there will be no improvement in student learning. Those in higher education who expect results from asking faculty who have no training in instructional design to 'use technology' to improve learning will inevitably be disappointed (http://www.educause.edu/nlii/clark.html).

When research shows a difference in learning outcomes, Clark seems to attribute those differences to instructional and/or research methodologies rather than to the technological tools utilized in the learning event.

On the other hand, Kozma believes that some of the variance in learning outcomes may be the effect of the media itself. He suggests research methodologies, such as ethnographies, case studies, and think-aloud protocols, should be utilized "to understand the particular design mix (methods, media, contexts) that will work for a
particular task and learner or set of learners. Just as important, we will know *why* it worked. This is when we will advance theory and practice" (http://hagar.up.ac.za/rbo/construct/kozma.html).

**Technology-Centered Faculty Development**

Studying today's faculty development initiatives centered on technology tools can contribute insights into these apparently dichotomous perspectives on technology-enabled teaching. This case study, in fact, is an effort to understand if and why this workshop "worked" for participants in assisting them in adopting more effective student-centered teaching practices. Teaching methodology may not be the whole story as Clark posits but both researchers agree that it is at least part of the story. In fact, Ehrmann (1995) suggests that useful research questions can be spawned from both sides of this debate. First, we can "study which teaching learning strategies are best (especially those that would not even be feasible without the new technologies)." Secondly, we can study "which technologies are best for supporting those strategies" (Ehrmann, 1995, ¶27). In higher education, in particular, faculty development initiatives centered on technology tools may be one way to spread their use while introducing or reinforcing what is already known as best practices in teaching and learning.

"If one considers the massive education that the shift from conventional to information-based technologies will require, the mastery of staff training may be as important a competitive factor as the functional capabilities of the technology itself" (Gerstein, 1987, p. 191). Many people currently working in university faculty development believe that a critical mass of teachers is ready to integrate information
technologies into their teaching. Still, in most institutions, there are few models for
teaching with technology, insufficient support staff to facilitate teaching with technology,
and little conclusive research on the impact of these tools on student outcomes to guide
faculty as they implement these tools (Carothers et al., 1997).

A thorough search of the literature reveals that many published articles take a
broad view of issues related to integrating technology into the post-secondary classroom,
or take a narrowly focused view on faculty development initiatives centered on specific
tools. Articles like one entitled “New Ways to Link Technology and Faculty
Development” (Shapiro & Cartwright, 1998) take a broad view regarding the challenges
and issues surrounding the adoption of information technologies in higher education
and/or offer brief outlines of programs at various institutions (Brown & Jackson, 2001;
Hughes, 2001; Lee & Johnson, 1998). At present, the vast majority of workshops
conducted on-site for college-level faculty assists them in gaining skills in using specific
pieces of software, especially course management tools. These faculty development
opportunities can be described as “training” in that the focus is on computer applications
rather than on their implications and impact on philosophies of learning and teaching
(Groves & Zemel, 2000; Holden, 1999; Robinson & Borkowski, 2000; Shapiro &

Two recent examples of software training studies were conducted at the
University of Maryland (Robinson & Borkowski, 2000) and County College of Morris in
Randolph, New Jersey (Holden, 1999). In both cases, WebCT was the online course
management system under investigation. These studies included surveys of participants’
technology and software skills attainment but didn't include data regarding the impact of
the training on actual classroom teaching practices. Like many other studies that focus on WebCT and other course management tools, these studies do not address the impact of the tool on faculty members' beliefs about teaching and learning and how those beliefs interact with their usage of the tools (Haneline, 2000; Holden, 1999; Robinson & Borkowski, 2000; Saad et al., 1999).

Certainly technology users must be able to manipulate software but is that enough? Is application training an effective way to impact student-centered technology tools integration? Developing technological expertise involves mastering technical skills but it also requires translating those skills into specific course or curriculum content. It is in this second and critical phase of integration that most K-12 faculty technology development initiatives flounder and/or fail (Siegel, 1995). One might speculate that the same holds true at the post-secondary level as well.

Training faculty to use technology tools is much easier than getting them to buy into progressive teaching with technology methodologies. Still, for educational change to occur, computer instructional delivery systems must be a means of facilitating teaching and learning rather than an end in and of themselves (Kershaw, 1996). In short, training faculty to use the tools does not mean professors will change the ways in which they facilitate learning for students. Faculty development that is designed to transform teaching practices and to use technology as a tool is a relatively new practice. “As recently as a decade ago, it was unusual for a university faculty development center to offer instructors help in using technology in their teaching. Today, it is rare to find such an organization that does not include in its mission some reference to teaching with technology” (Shapiro & Cartwright, 1998, p. 50). The university under study’s Learning
Technology Partnership, formerly the Faculty Development Partnership, is a case in point (http://www.facpartner.arizona.edu/).

In the United States and Canada, there are a growing number of departmental and campus-wide initiatives and intercollegiate consortiums that support a deeper look at technology integration and how it can influence teaching practices. One department-level project, The Virtual Guild, was initiated as a “response to the discrepancy between available technology tools and resources and faculty skills” (Padgett & Conceição-Runlee, 2000, p. 325). The study of this project focused on the motivation of the participants and the content, seventeen learning experiences, six of which include an instructional integration component.

Project SYNERGY, initiated by Miami-Dade Community College, is a collaborative effort among eighteen community colleges and three four-year universities (Anandam, 1998). The project required faculty to first make a comprehensive list of learning objectives and then evaluate possible software tools based on these objectives. The study discusses how faculty expressed their belief in the potential of technology to help students and how the project improved retention rates. The researchers found, however, that for a number of students it takes longer than one semester to be successful (Anandam, 1998). The strengths of this program are the focus on student outcomes and that it recognizes and discusses the need for long-term training and support.

The American Association for Higher Education Web site (http://www.aahe.org) includes detailed descriptions of some projects that focus on teaching with technology. Partnerships like the one between Ameritech Corporation and the Ohio Foundation of Independent Colleges (OFIC) offer ability-grouped summer workshops at three levels.
The first level focuses on skill development while levels two and three explore learning styles, student-centered curricula, and collaborative work (http://www.ofic.org). These workshops are conducted primarily with instructors at small colleges where faculty development as it relates to teaching and learning practices has traditionally been a focus.

In order to facilitate ready reference, I have subdivided this topic of the literature review. The first section discusses the organization and context of technology-centered programs; in addition, this section provides specifics of four particular programs. The next section discusses the affective features of technology-centered programs. The third section looks at the literature related to using technology tools for pedagogical change. Finally, I looked at literature that describes the institutional context and its influence on technology-centered faculty development in particular.

Organization and Content of Technology-Centered Programs

Quantitative studies have been conducted to determine the critical factors that contribute to successful technology integration at the post-secondary level. Access to tools and technical support are essential (Ely, 1995; Groves & Zemel, 2000). Access to a home, as well as an office, computer has been shown to be a significant factor (Dusick & Yildirim, 2000; Topp & Mortensen, 2000). Effective workshops should include the use of tools for both personal and professional applications (Topp & Mortensen, 2000). Some researchers have found that technology users and non-users prefer different styles of training (Dusick & Yildirim, 2000) and others go even further to suggest that trainings should be tailored to ability and/or attitude (Topp & Mortensen, 2000) or to departmental
groupings in order to match technology applications to faculty members’ disciplines (Anandam, 1998).

There is a wide range of organization of instruction in technology-centered faculty development. From multiple hour-long sessions to one day, one week, one month or throughout a semester or all yearlong, institutions are experimenting with many different formats and varying content. Some faculty development initiatives under study have had just ten participants (Sorcinelli, 1999), or twenty-two (Rowe, 1999), or a presumably larger unspecified number of people in each session. Studies of programs at the University of Maryland, Notre Dame, Forsyth Technical Community College, and the University of Massachusetts-Amherst illuminate the relative strengths and weaknesses of various formats and content. These four studies represent the diversity of technology-centered faculty development and serve as reference points in this study.

At the University of Maryland, a faculty development initiative was composed of an initial introductory session followed by a 4-day training on WebCT that included lectures, guided exercises, and workshop time for individual reinforcement and/or skills practice (Robinson and Borkowski, 2000). The faculty feedback regarding this training was that too much information was packed into four days. Taking this into consideration, a second series of trainings at this institution consisted of 5 three-hour modules clustered around tools with similar pedagogical techniques and/or skills. Using faculty in the mentor role was an integral part of this round of training. Faculty from a wide variety of colleges on campus who have used WebCT for at least one semester showed what they’d done and learned. (Initially the mentor role was taken by one of the trainers.)
Another study, this one conducted at Notre Dame, focused on the “Teaching Well with Technology.” This one-day workshop proceeded after faculty identified learning goals for their courses (Barry, Walvoord, & Laughner, 2000). Among their organizing tools, the workshop developers and participants used the "seven principles for improving undergraduate education" as they selected appropriate technology tools for integration. These seven principles, often referred to as "Chickering's principles," state that good practice: encourages contact between students and faculty, develops reciprocity and cooperation among students, uses active learning techniques, gives prompt feedback, emphasizes time on task, communicates high expectations, and respects diverse talents and ways of learning (Chickering & Gamson, 1991). The seven principles are discussed more thoroughly in the educational reform section of this chapter.

The researchers report that the Notre Dame workshop "works well because the focus is on teaching and learning. Technology tools are treated like other methods and only selected when they will help meet learning goals and fit within the instructors’ style and other constraints" (Barry, Walvoord, & Laughner, 2000, p. 462). In fact, in the seven steps toward planning and implementing a learning outcome utilized in this workshop, reviewing the "technology tools options" and “choose the technology” are steps 5 and 6, respectively. With its focus on student outcomes, this workshop has the potential to influence educators’ beliefs and practices around utilizing technology to foster a student-centered learning environment. However, like the articles that focus on the use of course management tools, this study thoroughly described the workshop without referring to an evaluation of its actual impact on the post-workshop teaching practices and/or teaching and learning beliefs of the faculty.
At Forsyth Technical Community College in Winston-Salem, North Carolina a month-long workshop afforded faculty time to prepare and collaborate for facilitating distance learning courses (Rowe, 1999). The format includes an overview of software products, hands-on learning, and the production of individual projects. Twenty-two participants participated in one workshop. (Rowe, 1999). Each participant committed to implementing technology tools in at least one of his or her courses. In exchange for their commitment of time, faculty participants’ contracts were extended from nine to ten months and those on 12-month contracts were given release time. At the end of the month, each participant was presented a “Certified Distance Learning Instructor” certificate at an awards luncheon. This initiative addressed reward and recognition, one of the reported common weaknesses in faculty development programs (Frayer, 1999; Duffrin, Dawes, & Hanson, 1999; Robinson & Borkowski, 2000; Signer, Hall, & Upton, 2000; Smith, 1997; Topp & Mortensen, 2000).

TEACHnology was a yearlong post-tenure faculty development initiative at the University of Massachusetts-Amherst. In order to teach post-tenure faculty new teaching methods, the program utilized computer-based, collaborative, experiential learning. Each of ten participants from different disciplines across campus was given a laptop computer funded by the dean of his/her school or college. Participants met every two weeks during one academic year. The findings of the study of this workshop were that learning experiences must be targeted to individual needs, there must be an increased collegiality among participants, and faculty must be given sufficient time to learn and integrate new skills and strategies (Sorcinelli, 1999).
Some researchers believe that faculty development initiatives that come to grips with most professors' skepticism, lack of time, and/or models for effective teaching will be the most successful (Carothers et al., 1997). Small group, hands-on, and "how to" instruction as well as on-going support are critical to faculty success (Carothers et al., 1997; Rowe, 1999). Reward systems and incentives play a key role in the institutionalization of teaching innovations (Frayer, 1999, Robinson & Borkowski, 2000; Signer, Hall, & Upton 2000; Smith, 1997). Multi-faceted faculty development reward and incentive structures can include release time, replacement teaching, project support funds, and peer review (Carothers et al., 1997). When faculty are asked to take risks, "the incentives and support services had better be ample" (Gilbert, 1996, p. 11).

Affective Features of Technology-Centered Faculty Development

The affective features of the technology-centered adult workshop are critical to learning. In all learning environments, but perhaps even more so in post-secondary organizations, "there must be a clear focus on the people who use technology, not on the technology itself" (Kershaw, 1996, p. 48). Decreasing competition and establishing a collaborative environment have been found to be conducive to faculty learning (Robinson & Borkowski, 2000; Rowe, 1999; Sorcinelli, 1999). Faculty testimonials provide powerful confirmation for this finding. Said one Forsyth participant, "I must admit I left the workshop more confident and optimistic than I entered it. Perhaps what made it so was the camaraderie among the faculty members. In a world so traditionally cutthroat, it was both refreshing and encouraging to be learning in an environment filled with peers willing to stop and help you" (Rowe, 1999, p. 30).
The attitudes of individual participants are also critical in supporting the learning environment. Attitudes including anxiety, self-confidence, and perceived relevance influence whether or not a faculty member embraces the use of computer technology and/or applies instructional technology in the classroom (Padgett & Conceição-Runlee, 2000; Simonson, 1995; Woodrow, 1991). Knowles' (1975) principles of andragogy are based on the relationship between motivation and action in adult learning. Attitudes are a key factor in motivation. Several studies discussed the participants' beliefs about the benefits to students of using instructional technology (Anandam, 1998; Karlin, 1994; Peterson, 1998). These beliefs affect the relevance of technology-centered faculty development and strengthen the outcomes for these participants.

Many initiatives include a one-on-one mentor component. Graduate instructional technology students have been effectively utilized in this role at Iowa State University (Thompson, Hanse, & Reinhart, 1996), at George Mason University (Sprague, Kopfman, & Sorsey, 1998), and at Carson-Newman College (Milligan & Robinson, 2000). One strength of these programs is that they address each faculty member's specific teaching and technology needs. In addition to the mentor-centered projects, other faculty development initiatives included time for participants to work on independent, individual projects (Milligan & Robinson, 2000; Rowe, 1999). Considering the problem solving orientation of adult learners (Knowles, 1975), the one-on-one strategy and independent projects are possible components that help meet faculty member's personal professional development concerns (Signer, Hall, & Upton, 2000; Sprague, Kopfman, & Sorsey, 1998; Thompson, Hanse, & Reinhart, 1996).
Utilizing Technology Tools for Pedagogical Change

Many researchers discuss the relative strengths and weakness of utilizing technology-centered faculty development for pedagogical change (Duffrin, Dawes, & Hanson, 1999; Ehrmann, 2000; Frayer, 1999; Kress & Hafner, 1996; Rea, White, Mchaney, & Sanchez, 2000; Saad et al., 1999). It is impossible to know if this conflicting evidence is the cause or the result of not including pedagogical examples as a significant component in trainings and workshops. Still, the adoption and usage of technology tools can affect pedagogy and curriculum. “Without the pedagogical focus, faculty are often not equipped to succeed in these environments. It is the collaborative environment, a deliberate part of the training design, which supports the faculty and trainers in the process. We are learning together what works and what does not work in Web-based instruction” (Robinson & Borkowski, 2000, p. 226).

The pedagogical implications of technology-enriched faculty development are critical to my study of the workshop. A poor foundation in instructional design and teaching strategies may be at the root of the problem of effectively integrating technology tools for student-centered learning. “Faculty, too often, are poorly trained in educational methods and the newer technologies of instruction. Instructional technologies by their nature are often proactive and tend to take a lead in programs aimed at change – especially in the area of instruction” (Stephens, 1992, p. 2). Technology integration in faculty development initiatives can be effectively used to improve pedagogical content knowledge.

Selecting facilitators for technology-centered faculty development is one way the sponsoring institution sets up the expectation for pedagogical change. "Leadership for the
project should be drawn from the academic side of the institution, not the technical side. This sends a message that the emphasis is to be on the instructional and learner components, not on the technology itself" (Kershaw, 1996, p. 47). Although references to peer-to-peer modeling are more common, the background of facilitators is one aspect of faculty development that is rarely discussed in the literature.

Middendorf (1991) found that faculty at a large, research university rarely discussed pedagogy with one another and if they talked about teaching at all, their focus was on course content. Technology may provide the entrée into pedagogical conversations. Inviting faculty to learn about their colleagues' successful use of technology is one component of a campus culture that embraces technology tools for pedagogical change (Brown & Jackson, 2001; Frayer, 1999; Kress & Hafner, 1996; Saad et al., 1999). Other components of a conducive culture are stimulating individual faculty and departments to examine learning goals for students, providing faculty with information, strategies, and resources, and rewarding faculty for successful technology use (Duffrin, Dawes, & Hanson, 1999).

Peterson (1998) compared the use of technology and faculty attitudes about technology at a liberal arts university and at a Land Grant institution. Both universities developed a center of technology to initiate trainings. The liberal arts university responded to a mandate from its Governing Board. After creating the center, they revised the curriculum, invested in technology, and trained faculty. The Land Grant institution, however, had begun planning for its center before its Board mandated one. Grant funds were used to construct technology-enriched classrooms called “smart” classrooms, and faculty were offered incentives to utilize these rooms. In both of these cases, change was
initiated in a top-down manner, but both faculty and administrators believed that teaching and learning would be improved with technology tools use. On the whole, the researcher found that the faculty attitudes toward the resulting changes at the liberal arts institution were more positive than those at the Land Grant university (Peterson, 1998). The institution’s culture and its response to the change process are decided factors in the success of institutional change (Cravener, 1998; Mitra, Steffensmeier, Lenzmeier, & Massoni, 1999; Peterson, 1998; Nnazor, 1998; Signer, Hall, & Upton, 2000).

As the workshop under study was originally intended for faculty teaching Tier I and Tier II courses in large lecture hall settings, it is critical to note what other institutions are doing to transform teaching practices and to promote active learning in these large classroom environments. At the University of Stony Brook, faculty who teach introductory economics and chemistry classes and biology laboratories transformed large introductory classes into active learning environments (Duffrin, Dawes, & Hanson, 1999). According to the study, faculty promoted students’ thinking and communicating skills as they utilized cooperative group activities and projects and peer and self-assessment. These educators seemed to value both the learning process and the conceptual content of the discipline. This transformation of teaching practices indicates that these faculty were spending time thinking and talking about issues of effective instruction as well as curriculum content. The researchers suggest that technology tools may be a catalyst for these conversations (Duffrin, Dawes, & Hanson, 1999).
Institutional Context for Technology-Centered Faculty Development

Organizational structure and political climate are key factors in the relative success or failure of faculty adoption of technology. In a qualitative case study conducted at a large research university in the southeastern United States, Karlin (1994) interviewed ten faculty members regarding their perceptions of institutional culture and politics surrounding technology use. These educators perceived that the university environment for integrating technology into teaching was generally supportive even though research is valued over teaching at this institution. Faculty were utilizing technology in their teaching because they valued its capacity to motivate students and its potential to prepare students for life after college. These faculty members’ perceptions of themselves as responsible teachers were key in motivating them to make the effort to integrate technology into their teaching. The researcher also noted informal and voluntary communication networks were crucial to the faculty learning process and implement of technology tools (Karlin, 1994).

Nnazor (1998) looked at the structural barriers that inhibit technology tools use by faculty at both the faculty level and at the institutional level. He found that faculty barriers to tool use include perceived or experienced pedagogical limitations of technology, lack of time needed to learn or use the technology, lack of professional reward for teaching with technology, lack of appropriate skills, and lack of resources and equipment.

At the institutional level, the barriers were a lack of coordination of the various initiatives, the neglect of faculty motivational needs, and the decision to assign technology responsibility to units that do not have academic policy-making authority.
(Nnazor, 1998). Other researchers have found that time, access to technology, and tangible rewards are challenges for implementing faculty development training (Frayer 1999, Robinson & Borkowski, 2000; Signer, Hall, & Upton 2000; Smith, 1997). Willis (1994) found that some characteristics of the educational environment could act as inhibitors to change and innovation, specifically goal ambiguity, limited flexibility, low faculty interdependence, and the high vulnerability of academic programs.

Administrative attitudes, values, and support affect faculty adoption of technologies as do faculty development, access, and infrastructure (Heuth, 1998).

A “one size fits all” approach to faculty development in the area of technology tools, however, will not be universally successful across any particular campus or across campuses nationwide (Kuriloff, 2001). Like Kuriloff, I believe many technology tools, particularly course management tools, are most often utilized to reproduce “what we already know how to do.” Even when instructors aim for innovation in their teaching, they often find that the constraints of the tools or the limitations of their knowledge of the potential uses of the tools result in the technology dictating their teaching rather than vice versa. Replicating the transmission model of teaching with technology tools should not be the goal of 21st-century faculty development. “Institutions should be supported adequately and monitored skillfully as they implement this delivery technology so that the technology does not take precedence over pedagogy” (Rea, White, Mchaney, & Sanchez, 2000, p. 153).

Instructional technologies require a considerable investment of time on the part of faculty (Heuth, 1998). Robinson and Borkowski (2000) speculate that faculty, who for the most part have no experience as students in a Web-based course, will continue to
have difficulty gauging the impact of Web-based tools on students. These researchers concluded, therefore, that there is a strong need for the training process to be iterative, but the need for technology tools training is questioned by few. Anecdotal evidence gathered through experience suggests there is a "growing recognition of the power of information technologies to help improve the quality of teaching and learning, improve the motivation and attention of students, and improve students' career preparation" (Gilbert, 1996, p. 12).

**Technological Paths to Educational Reform**

"Most anthropologists would agree that the crucial turning points in our history have almost always been closely related to technological developments" (Bernard & Pelto, 1972, p. 217.) At some point in the future, educators may look back at the birth of the World Wide Web and the infusion of technology tools, Web-based tools in particular, into the educational environment and proclaim that this was the dawn of educational change. That will only happen, however, if the tools are appropriated for innovation rather than replication.

A recent study at the Rochester Institute of Technology (RIT) found that 89% of faculty learned online teaching applications on their own (Belle & Rappold, 2002). Ninety percent of the respondents were using applications such as communicating with students via email and using word processing to prepare course materials. Although the use of email is a relatively simple application of technology, studies are beginning to link email with increased participation of underrepresented students – women, minorities, non-English dominant students, shy students, and others (Brown, 1999; Gilbert, 1996: Warschauer, 1999).
Belle and Rappold (2002) also found that providing Web links for students, Internet research assignments, electronic classrooms, accepting assignments electronically, and class email distribution lists were used by 61-71% of the respondents. Forty-four percent of faculty were correcting or grading online, and 37% were developing Web materials for their courses. Only 18% were using more sophisticated [some of the more student-centered] applications such as instruction in the use of online databases, online simulations and/or experiments, electronic reserves, teacher-developed software, online student group work, online discussion, online grade books, online chats, and online quizzes and testing (Belle & Rappold, 2002).

Fifty-eight percent of RIT faculty learned from their peers while only 18 to 23% learned in formal structures such as workshops or from library staff or technology support personnel. These researchers conclude that much faculty learning occurs through informal rather than formal channels. Ehrmann (2002) has also advanced this finding in higher education, which is also supported by Fullan (1993) in the K-12 environment. Belle and Rappold (2002) suggest that this university become sensitive to the preference of faculty for independent learning and gear formal trainings to types of learning and types of faculty for whom informal training is less effective. However, the study did not determine if faculty learned the more sophisticated applications through formal or informal channels. This would be particularly important to ascertain if the goal of faculty development centered on technology tools is for innovation rather than on replication.

In his book, *Megatrends: Ten New Directions Transforming Our Lives* (1982), Naisbitt described the path of technological innovation. First, technology follows the path of least resistance. It is first applied where it does not compete with existing products or
processes; it is used in areas of human endeavor where its advantages do not upset the status quo. In the next phase, technology is used to replace old technologies and perpetuates the previously existing ways of doing things. This could be described as the "the better, faster, cheaper" stage. The final phase comes when technology is used in truly innovative ways. Using technology to solve unsolved problems or to satisfy unfulfilled needs is when innovation occurs. This is when technological innovation changes the way people live their lives. "Education is being transformed, but the inertia of the system is enormous, and the costs associated with widespread, 'deep' integration of information technology into teaching and learning are significant" (Gilbert, 1996, p. 13). For many faculty developers in higher education, "deep integration" involves educators using technology tools for innovation to truly change learning experiences, to change the daily lives, of students and teachers.

**Implications for This Study**

Inviting and encouraging people to change is at the heart of faculty development. "Effective change is not about introducing this or that new technology; it is about encouraging people to change the way they do things and the way they think about their roles in the organization" (Kershaw, 1996, p. 44). There will be a few innovators in every organization, but will they spread innovation and support its implementation throughout the social system? Diffusion is key if there is to be a measurable impact of the learning community, if there is to be significant change. The next section of this literature review looks at the work of Everett Rogers and others in the area of the diffusion of innovations.
Diffusion of Innovations

The diffusion of innovations is an important aspect of faculty development (Harris, 1998; Kershaw, 1996; Rogers, 1995). There is a strong need for institutions of higher learning to effectively disseminate best practices in teaching and in technology tools integration. Particularly in a large Research I institution with thousands of teaching faculty, an initiative that reaches just 165 people can be described as effective if the participants diffuse the teaching and technology innovations to which they were exposed into the wider campus community. Institutions must also consider the impact of their investments in faculty and to prudently utilize their faculty development budgets. This literature offers a perspective on the various roles faculty participants play as they diffuse their experiences and evolving teaching behaviors and beliefs throughout the learning community. Looking at this initiative from the diffusion perspective helps frame the implications of this study and may shed light on the challenges of diffusion in this and other large institutions. Attention to this literature may also suggest directions for the future of technology-infused faculty development initiatives.

The innovation process within organizations has been under study over a number of decades. The words "innovation" and "organization" used in conjunction with one another, however, may suggest an oxymoronic situation. By definition, an organization is a "stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labor" (Rogers, 1995, p. 403). As a result, the behaviors of most people within a social system are also stable, predictable, and prescribed. These behavioral norms fly in the face of innovation. Senge (1990) makes a case for the imperative for 21st-century organizations to create new and flexible
infrastructures, management ideas, methods, and tools to assist people as they exercise the capacity for change. When the administrators of an organization perceive a need for innovation, they launch initiatives to bring the mission and goals of an organization and its actual performance into alignment. It is not surprising, then, that the initiation of the change process can be perceived as a threat by members of the social system, particularly in a system that has not developed the attitudes and structures of a learning organization.

**The Concept and Practice of the Diffusion of Innovations**

"Getting a new idea adopted, even when it has obvious advantages, is often very difficult" (Rogers, 1995, p. 1). In 1962, Rogers first identified the factors, the beliefs, and the behaviors that underlie the rate at which new ideas and practices are adopted by individuals and subsequently by organizations. The diffusion of innovations theory (DOI) outlines patterns of adoption and the roles played by innovators, adopters, and laggards in diffusing or thwarting the spread of innovations throughout an organization. It discusses the roles of change agents and opinion leaders and the concept of critical mass to impacting meaningful change.

In the case of this university, undergraduate curriculum reform began as an effort to address the challenges of freshman and sophomore retention and to meet the needs of students at the dawn of the 21st century. In addition to revising coursework offerings, decisions to integrate student-centered teaching methodologies and technology tools into this reform effort required a period of innovation. This research study describes how some members of this institution, this social system, were exposed to and learned about these innovations and whether or not these innovations have been adopted and
implemented by specific individuals within the learning community, faculty who participated in the workshop.

**Characteristics of Innovations**

Rogers, a communications researcher, reviewed thousands of studies that involved the spread of innovations within social systems. He found similarities across technological disciplines, geographical locations, and time periods. Rogers (1995) learned that technological innovation is communicated through particular channels, over time, among the members of a social system. The DOI theory posits that there are four main elements in the diffusion of innovations: the innovation itself, time, communication channels, and the social system.

Both Rogers (1995) and Naisbitt (1982) agree that the nature of an innovation certainly affects the diffusion process. True innovations present the individual or organization with an alternative method of solving a problem. According to Rogers, innovations have these characteristics: relative advantage or the perception of improvement, compatibility or low threat to existing values, complexity or difficulty of use or understanding, *trialability* or opportunities for experimentation, and *observability* or visibility of the outcomes (Rogers, 1995).

Research conducted from the DOI perspective asserts that high-risk innovations are adopted more slowly than ideas with low risk levels. Ideas that save time and effort have a greater probability of being adopted, as are ideas that provide immediate reward. Innovations that are compatible with sociocultural beliefs and values or with previously introduced ideas and user needs and simpler innovations have a greater chance of being
adopted. If an innovation can be tried on a small scale, it will also have a greater probability of being adopted. Finally, if an innovation can be observed easily then it is more likely to be adopted (Caffarella, Caffarella, Hart, Pooler, & Salesi, 1982; Rogers, 1995).

Time is the second important factor described in the DOI theory. Adoption rates are dependent on the members of the social system as well as the external context. For example, although it was first proposed in 1900, it took fifty years for kindergarten to become standard practice in United States public schools. On the other hand, modern math was introduced in 1958 in the U. S. public schools. It was pushed forward by Sputnik (competition with the Russians), the National Science Foundation, and the U. S. Department of Education and became an instructional standard by 1963. The involvement of powerfully placed change agents combined with social and political factors resulted in the institutionalization of modern math teaching practices in just five years.

Communication channels are the third factor in the DOI. Rogers describes the communication channels in terms of diffusion roles, which are discussed in the next section of this review. These channels are closely tied to the fourth factor, the social system itself. The adoption of new ideas comes about through information exchanges in interpersonal networks. "The diffusion of innovations is essentially a social process in which subjectively perceived information about a new idea is communicated" (Rogers, 1995, p. xvii). This socially constructed nature of innovation adoption requires that those who wish to innovate take a deep look at the social system in which the innovation is expected to occur.
Diffusion Roles

Rogers' work is widely known for its descriptions of the diffusion roles played by various members of an organization and how communication travels between and among these types of group members. Rogers divides the agents within the social system or organization into five major categories: innovators, early adopters, early majority, late majority, and laggards. Each member's diffusion role makes an important contribution to the ultimate adoption and adaptation of the innovation within the organization.

Identifying the roles played by specific members of the organization may be one way to facilitate the diffusion and adoption of innovations. However, this task is not as simple as it might appear, particularly in a large, complex institution such as a Research I university. This section of the literature review on diffusion roles is divided into three subsections, namely innovators to laggards, change agents and opinion leaders, and critical mass. Delineating diffusion roles helps to underscore the complexity of the DOI.

Innovators to Laggards. According to Rogers, every social system is composed of a certain percentage of members who share the characteristics of people in each category. Innovators make up 2 to 3% of a system. Rogers calls innovators "venturesome" because they are self-motivated people who easily understand and apply technical knowledge. They form relationships and communicate with other innovators and have contacts outside the social system. Innovators have a global perspective and think in terms of the future. One of the greatest strengths of innovators is that they can tolerate uncertainty about the innovation and take an experimental approach to its adoption and/or implementation.
Thirteen to fourteen percent of a social system is comprised of early adopters. These people are well respected by their peers. Unlike innovators, who function on the fringes of the social system, early adopters are considered by their peers as "one of us." Early adopters have a local orientation rather than a global one. They are known among their peers as "successful but discrete" in their use of new tools, methods, or ideas (Harris, 1998). They serve the social system by being good role models. "Early adopters and innovators [are] your greatest allies in your efforts to diffuse telecommunications innovations" (Harris, 1998, p. 14).

Early majority people make up thirty-three to thirty-four percent of the social system. They have a great deal of interaction with colleagues but do not tend to hold leadership positions within the system. It takes early majority people much longer to decide to utilize a new tool. They "follow with deliberate willingness in adopting innovations but seldom lead" (Rogers, 1995, p. 265).

Late majority people are the other large group within a social system. Like early majority people, they make up thirty-three to thirty-four percent of the organization. These people are skeptical of new ideas and adopt innovations out of economic necessity or after strong peer pressure. For late majority people, the uncertainty of adoption must be removed. Once the use of an innovation becomes the norm then late majority people will adopt it. Before they implement an innovation, "the early and late majorities will need to be reassured that there is sufficient administrative and technical support available to them" (Kershaw, 1996, p. 47).

The final fifteen to sixteen percent of the social system is comprised of laggards. They are the most traditional, and their reference point is the past. Laggards serve an
important function within the organization; they remember its history and provide continuity. They regard innovations and change agents with suspicion and most frequently interact with other laggards. Laggards accept change "only when their survival depends upon it" (Harris, 1998, p. 15).

**Change Agents and Opinion Leaders.** Individuals within a social system take on other important roles in the diffusion of innovations. The speed with which social systems adopt particular ideas, methods, or tools has a great deal to do with the involvement of change agencies or agents. Change agents are people who mediate between change and the social system. In this university, administrators in charge of faculty development assume the role of change agents. Change agents diagnose and develop the need for change for individuals and groups within the social system. They create communication channels to translate their intentions into action. One goal of change agents is to create conditions within the social system, which will render the members self-reliant. Change agents may also attempt to slow the diffusion process and prevent the adoption of certain innovations if the effects are determined to be undesirable. Change aides, such as the workshop facilitators, promote the goals of the change agents and have direct and more intensive contact with members of the social system. Change aides must be trustworthy and have credibility with members of the social system (Rogers, 1995).

Opinion leaders are people who have informal influence over the behavior of their colleagues and coworkers. They are recognized as competent and tend to have higher social status than their follower colleagues. Not all opinion leaders, however, are innovators; opinion leaders are more likely conform to the system's norms. "When a
social system's norms are for change, opinion leaders are more innovative, but when the norms do not favor change, opinion leaders are not especially innovative" (Rogers, 1995, p. 295). Within a social system that is striving for change, the most influential opinion leaders are key targets for the efforts of change agents. By inference, in Rogers' model, change aides would also focus their efforts on opinion leaders.

The identification of opinion leaders, then, is a critical activity for change agents and aides. Rogers (1995) offers four methods for measuring opinion leadership: sociometric, informants' ratings, self-designation techniques, and observation. The sociometric technique involves surveying a large number of people to determine who within the system has the greatest number of informational network links. Informants' ratings rely on subjectively selected key members' selections of opinion leaders. The self-designating method asks individuals if they themselves are opinion leaders. Finally, observation of opinion leaders results from identifying and recording communication network links as they occur. According to Rogers, the sociometric technique and observation are the most valid methods. However, observation is only feasible within a very small system and the sociometric technique is only valid when everyone within the social system provides data. It is also true that opinion leaders may have specific areas in which they lead rather than being "all-purpose" opinion leaders.

"Sometimes change agents identify potentially effective opinion leaders among their clients, but they concentrate their change efforts too much on leaders, who soon become innovators and lose their former following" (Rogers, 1971, p. 221). Rogers cautions that it is counterproductive to make opinion leaders too innovative. People will stop listening to them and stop following them once they have deviated too far from
organizational norms. Identifying and promoting innovations through opinion leaders, then, is a complex issue.

**Critical Mass.** In order to reach a critical mass of users, which is especially important for telecommunications innovations, tools must be self-tailored, or reinvented by members of the social system in order to meet professional and personal needs (Rogers, 1986). According to Rogers, technological innovations pass through five stages: knowledge, persuasion, decision, implementation, and confirmation. At the knowledge stage, people begin to learn about the innovation and understand its function. Various types of media play a part in spreading the word. Persuasion involves forming a positive attitude toward the change. At this point, interpersonal communication is particularly important. Next comes the decision to adopt the innovation. The decision can be optional or left up to the individual, collective if consensus is reached, or authority based if the innovation is imposed upon the system. "Most teachers and school administrators are involved in collective and/or authority-based innovation decisions" (Rogers, 1995, p. 63). When a critical mass of the members of a social system implements the change, because the outcome was positive, the innovation is then considered *routinized*, or institutionalized, and becomes a norm within the system (Clarke, 1999; Rogers, 1995).

Rogers suggests several strategies for gaining critical mass. First, he suggests targeting top officers within an organization's hierarchy to lend prestige to the innovation. Secondly, change agents can be identified who will shape the perception of the innovation in order to increase its adoption rate. If members of the social system think this innovation is inevitable or desirable, adoption is likely to occur more quickly.
Thirdly, he recommends introducing the innovation to intact groups within the system whose members are likely to adopt at once. Finally, Rogers suggests that incentives for early adopters can be effective until critical mass is reached.

Rogers believes that "implementation is frequently the 'dependent variable' in the diffusion of new communication technologies" (Rogers, 1986, p. 122). Faculty development initiatives can be considered effective if they improve learning and teaching and if they create "advocates for innovation within the college" (Rowe, 1999). A faculty development report from the University of Delaware's Teaching, Learning, and Technology Roundtable noted: "Many innovators and early adopters mentor new faculty users within and across disciplines" (Carothers et al., 1997).

"The new communication media are tool technologies, representing techniques that can be applied in a variety of ways to diverse situations. Such computer-based innovations are frequently characterized by a relatively high degree of re-invention" (Rogers, 1986, p. 121). "Re-invention" means that innovations can be changed or modified by the user during the adoption and implementation process. In higher education where a high value is placed on academic freedom, empowering faculty with the ability and the "right" to apply re-invention to technological innovations can be a powerful component of faculty development.

According to the DOI, decentralized diffusion systems have definite advantages over those that are centralized. Innovations spread through localized systems tend to fit the users' needs and problems more closely. There is greater participation because adopters have a greater sense of control. Local systems also foster user self-reliance and are more popular with those who are affected by the change. The disadvantages of
decentralized systems are that there is often a lack of quality control and technical expertise at the local level. Coordination can be a problem and participants may lack a "big picture" concept of the effects of the innovation. People may also simply feel no need for a particular innovation and therefore, will not choose to adopt it (Rogers, 1995).

Elements of the DOI have been criticized for being historically and culturally specific, limited by Rogers' 1950s and '60s United States research context. According to Clarke (1999), DOI is a "descriptive tool, less strong in its explanatory power, and less useful still in predicting outcomes, and providing guidance as to how to accelerate the rate of adoption." Still, this paradigm continues to be utilized in the U. S. today to describe the diffusion process (Carothers et al., 1997; Harris, 1998; Klopfenstein, 1998; Musmann & Kennedy, 1989). Musmann and Kennedy (1989) compiled an extensive list of studies based on the diffusion of innovations theory in fields ranging broadly from agriculture and anthropology to education and technology. Klopfenstein's Web site contains over 50 citations for studies in education and industry based on the DOI theory (http://www.bgsu.edu/departments/tcom/diffusion.html).

**Diffusion and Institutional Goals**

If the diffusion of innovations requires the "leadership of an institution to provide some context for change" (Kershaw, 1996, p. 45), then part of the task of administering change is to make and promote a connection between vision and action, the future and the present. There is, then, a relationship between the successful diffusion of innovations and an institution's mission. Faculty development must, therefore, be integrally related to the institutional mission (Daigle & Jarmon, 1997). The beliefs and behaviors of
administrators are critical to the diffusion of innovations within an organization (Hueth, 1998). Reward and compensation structures are just one way that institutions demonstrate their values.

Diffusion of innovations within the social system is a component of this study. It is interesting to note the efforts made by faculty development administrators and facilitators to disseminate information about innovations within the university and/or to share it with the larger academic community beyond the borders of this institution. In 2002, the University of North Carolina's Teaching and Learning with Technology Collaborative developed a Web portal (http://www.unctl.org/pdp/) that allows faculty (and anyone else, for that matter) to search for news, events, organizations, specialists, training materials, projects, funding sources, and other materials. As of this writing, the authors of the site were in the process of expanding the portal to include professional development information. They plan to "develop a collaborative work area for the dissemination, review, evaluation, and discussion of all aspects of higher education" (Purdom, 2002).

Caffarella et al. (1982) developed a Dissemination Index based on Rogers' characteristics of innovations and a questionnaire for innovative project directors about their dissemination activities. Among the questions on the questionnaire were: How many presentations about the project were made at professional conventions? Was a brochure printed which described the project? Was a report on the project submitted to the Educational Resources Information Center (ERIC)? These activities suggest a certain amount of perceived project success and confer upon the project a certain amount of status.
The DOI theory is not the only social psychological theory applied to this process. In the literature, another theory called "social learning theory" (Bandura, 1977) is sometimes applied to studies related to the diffusion of teaching methodologies. The social learning theory looks outside the individual members of social systems at specific types of information exchanges to explain how behavior changes. Social learning theory focuses on the learner's social context and whether or not it promotes and sustains behavioral change. From this perspective, positive role models, who diffuse information across social networks, are one of the indicators of an effective context.

**Implications for This Study**

For the purposes of this research study, which focused on the activities of a faculty development initiative, Rogers' diffusion of innovations theory provides a descriptive referent for the diffusion roles played by the participants in this study. DOI also describes some of the support structures within social systems and some of the barriers to the implementation of innovations within organizations. Like all change processes, there are no invariable formulas for the diffusion of technology-centered teaching innovations.

The acceptance of innovations within social systems is predicated on personal decisions made by individuals. The diffusion of innovations process in education, then, is iterative. It often passes through multiple variations that begin with administrators and faculty first recognizing the need for change and then individuals being invited again and again to change the way they work and function within the organization. "The gee-whiz
futurists are always wrong because they believe technological innovation travels in a straight line. It doesn't. It weaves and bobs and lurches and sputters" (Naisbitt, 1982).

K-20 faculty play a decisive role in how successful and effectively technology will be utilized to meet instructional goals (Office of Technology Assessment, 1995). The diffusion of technological innovations is of great concern to K-12, community college, and university decision-makers and technology-centered faculty development planners. "It has become increasingly difficult to rationalize, explain or understand the reluctance on the part of higher education faculty to integrate instructional technology (IT) into the curriculum" (Lee & Johnson, 1998, p. 13). Describing the conditions that promote risk-taking among educators as they utilize electronic tools to question, evaluate, and modify and/or change their teaching practices to reflect a student-centered model for teaching and learning is a particularly relevant research topic.

According to Hughes (2001), a disproportionately large number of software and hardware inventions have come from the university community. If significant technological advancements are spawned at universities, then it might follow that innovative uses of those inventions could be spawned at universities as well. "The research university fulfills a role in the Information Society analogous to that of the factory in the Industrial Society. It is the key institution around which growth occurs, and it determines the direction of that growth" (Rogers, 1986, p. 15). I share this perspective with Rogers and believe, therefore, that the application of technology-enabled teaching and learning innovations in institutions of higher education influences the entire educational community. As a result, the university's use of technology tools has a significant impact on the use of technology in education at all levels and on the society as
a whole. There is, then, a direct relationship between the diffusion of innovations literature and the research on educational reform.

**Educational Reform**

Ultimately, educational reform (Chickering & Ehrmann, 1996; Chickering & Gamson, 1991; Fullan, 1993, 2002) is the goal of all faculty development initiatives. The literature highlighted in this review addresses reform in general and reform efforts more particularly as reflected in technology-infused professional and curriculum development (Cognition and Technology Group at Vanderbilt, 1997; Kent & McNergney, 1999; Papert, 1993; Sandholtz, Ringstaff, & Dwyer, 1997; Halpin, 1999; Thurston, Secaras, & Levin, 1997). The impact of appropriating technology tools to achieve changes in teaching behaviors and learning outcomes is precisely what the overarching question for this study attempts to address.

**Sociopolitical Context for Education Reform**

In the late 1980s and early 1990s throughout the United States, administrators at institutions of higher learning began experiencing increased pressure from outside the academy, as well as from inside, to make significant improvements in undergraduate education. "Dramatic changes in social conditions and economic requirements make effective postsecondary education a critical requirement of effective citizenship, productive work, and global competitiveness" (Chickering & Gamson, 1991, p. 1). Increasingly, boards of regents, state legislatures, the business community, and taxpayers,
have sought to hold educators more accountable; pressure that was once exerted on K-12 is now being applied to colleges and universities as well.

At the same time in Arizona and other states, state allocations for education diminished and universities turned to external funding sources to support educational reform initiatives. During this period, many philanthropic organizations also began to tie grant funding to reform efforts, and specifically to those directed at the improvement of undergraduate education. The Carnegie Foundation for the Advancement of Teaching (http://www.carnegiefoundation.org/CASTL/guidelines/background.htm) and its Academy, which focuses on the scholarship of teaching and improving undergraduate education, and the Kellogg Forum on Higher Education (http://www.kelloggforum.org/forum_history.html), which focuses on the public service mission of higher education are two examples of programs targeted toward educational reform.

Pressure has also come from within the academy itself. Some administrators, some faculty, and/or some department heads and deans, who have been involved with curriculum reform efforts through research or through professional development within or outside of their home institutions, are infused with a mission to improve teaching and learning on their own and other campuses. In some cases, more sophisticated student populations are demanding more from their college education, particularly in the area of technology. Parents, too, who are aware that four-year degrees are critical to their children's success in life are asking what the university is doing to prepare their students for the workforce.
Reform reports in this same time period authored by educators and researchers and supported by governmental and educational entities began to focus on the limited effectiveness of traditional teaching practices. Murnane and Levy (1996), quote Motorola executives:

For us here at Motorola, the most critical skill required by the workforce is just an ability to learn and keep learning. While most descriptions of necessary skills for children do not list 'learning to learn,' this should be the capstone skill upon which all others depend. Memorized facts, which are the basis for most testing done in schools today, are of little use in the age in which information is doubling every two or three years. We have expert systems in computers and the Internet that can provide the facts we need when we need them. Our workforce needs to utilize facts to assist in developing solutions to problems (p. xvii).

As societal expectations for progressive learning and teaching grow, undergraduate educational reform efforts are proliferating on campuses across the United States. Barr and Tagg (1995) describe the resulting paradigm shift as moving from a focus on teaching, the "instruction paradigm," to a focus on learning, the "learning paradigm". "In its briefest form, the paradigm that has governed colleges is this: A college is an institution that exists to provide instruction. Subtly but profoundly we are shifting to a new paradigm: A college is an institution that exists to produce learning. This changes everything" (Barr & Tagg, 1995, p. 13).
Educational Reform Movements

Education reform movements are varied, but the goal of reform centered on instructional intervention is to positively impact student learning. "Teaching responsibilities are an essential element in any academic career; yet, the professoriate has had an ambivalent attraction to teaching exacerbated by the dominance of the research ethic in higher education" (Menges, 1988, p. 258). As evidenced by the reward structure in most research institutions, greater weight is awarded to scholarship in the forms of research and publication than is given to teaching and service. Since the 1970s, the higher education literature has addressed efforts to improve teaching and the status of teaching, but as evidenced by the Carnegie Conversations at this university in the 1999-2000 academic year, this conversation continues and many related issues are as yet unresolved.

In this section of the literature review, I focus on four movements in educational reform. First, I explore the literature related to technology-enabled reform movements in higher education. These findings give a broader picture to the faculty-enabled faculty development research cited early in this chapter. Next, I focus on "Chickering's seven principles of good practice in undergraduate education" (Chickering & Gamson, 1991). These practices address instructional methodologies found to be effective with undergraduate students, the target population of the workshop under study. The next section looks at "the scholarship of teaching" movement, which is a key component of the Carnegie Conversations, a national effort to bring effective teaching in higher education into prominence. Finally, I conclude this section of the literature review with highlights from the K-12 research on technology-enabled teaching practices and
professional development. Together, these four areas provide a framework from which to view the potential impact of the workshop on educational reform.

**Technology-Enabled Reform Movements**

On some campuses across this country, many faculty development initiatives in the "learning paradigm" have been centered on the integration of technology tools into teaching. One indication of the importance of this faculty development strategy is that organizations, such as EDUCAUSE, have been formed to help guide technology integration into education. The EDUCAUSE mission is "to advance higher education by promoting the intelligent use of information technology" (http://www.educause.edu/about.html). A coalition of educational and corporate concerns, EDUCAUSE, formerly known as Educom, is engaged in professional development activities, print and electronic publications, policy initiatives, research, awards, and online information services. One of EDUCAUSE's initiatives is the National Learning Infrastructure Initiative (NLII). The NLII mission is "to create new collegiate learning environments that harness the power of information technology to improve the quality of teaching and learning, contain or reduce rising costs, and provide greater access to higher education" (http://www.educause.edu/nlii/). In its vision statement, NLII uses the terms "active and student-centered, dynamic and lifelong, collaborative, cost-effective, high-quality, and accessible" in describing an ideal future for higher education.

There is a relationship between the acceptance and practice of teaching and technology innovations and an institution's mission. This relationship is clearly shown in Educom's National Learning Infrastructure's five recommendations for faculty
First, faculty development must be integrally related to the institutional mission. Second, faculty development should be based on empirical data linking technology to student learning outcomes. Third, a collaborative, "train-the-trainers" model approach can support the diffusion of innovations. Fourth, faculty development should work toward transforming the teacher-learner relationship giving students greater access and choice with sensitivity for diversity. Finally, assessment of faculty development initiatives must be based on stated objectives and must be measurable and ongoing. "A strong human infrastructure is fundamental to the success of the technology-driven transformation of higher education" (Daigle & Jarmon, 1997, p. 38).

Some researchers, however, are more cautious about the use of technology tools in educational reform: "Information technology can provide the excuse and the means for transforming education... for better or worse" (Gilbert, 1996, p. 10). Some would argue that there is a dearth of conclusive research results that link the integration of information technologies into teaching with improvements in student achievement (Ehrmann, 2000; Gilbert, 1996). Others argue that "we have no consensus, nationally or on most campus, about even fundamental issues like whether to invest in classroom technology or distance technology – that is, whether to use technology to transform teaching and learning on campus or to use technology to support true anytime-anyplace learning" (Brown & Jackson, 2001, p. 57). Still, according to data collected in the years 1994 to 1995 by Green (1996), the percentage of faculty using key instructional applications of information technology doubled, the proportion of faculty with direct personal access to
computers grew past 50%, and the number of entering freshmen with experience utilizing computers in learning was also above 50% (as cited in Gilbert, 1996).

Whether or not one believes there is hard evidence in favor of the use of technology tools in teaching, practices are changing. It is, then, exceedingly important to investigate how faculty might appropriate technology tools to support and/or accelerate undergraduate educational reform practices, some of which have been under formal study over a period of years. Educational reform must focus on increasing professors' knowledge of educational research and learning theories (Carothers et al., 1997). In the literature, there are two concepts that command a great deal of attention and consideration. One is "Chickering's seven principles of undergraduate education;" the other is the concept of the "scholarship of teaching." Neither of these reform efforts was spawned from technology-enable teaching, but both could be used to support technological methodologies for addressing reform in undergraduate education and more specifically, for improving student outcomes.

Principles of Undergraduate Education

According to Gamson (Chickering & Gamson, 1991), Chickering's seven principles of undergraduate education reflect the findings of research studies conducted over decades. As such, the principles are "a collaborative effort among researchers, faculty members, and administrators from a wide range of U. S. colleges and universities" (Chickering & Gamson, 1991, p. 5). When they synthesized these research findings, Chickering and Gamson hoped to make the principles "accessible, understandable, practical, and widely applicable." In the principles, they de-emphasized
"education talk," which they believe makes faculty "impatient." Chickering and Gamson conducted workshops to disseminate the principles and went on to design inventories to help faculty and institutions self-assess their adherence to the seven principles.

These principles have become widely known as "Chickering's seven principles." They are important to this literature review and to this research study for several reasons. First, they are derived from over fifty years of research. Secondly, they reflect possible objectives and/or learning outcomes for faculty development. Finally, they clearly reinforce the student-centered orientation of progressive teaching philosophies. These principles, then, are compatible with the mission and goals of the institution under study as well as the goals of the workshop. The following is a brief summary of the seven principles and examples of connections to technology-enabled teaching and learning strategies.

The first principle of undergraduate education is that good practice encourages student and faculty contact. Studies have shown that frequent student-teacher contact both in and outside of class impacts student motivation, helps students who are struggling, and enhances students' intellectual commitment to learning in the classroom and beyond the course. Email is one example of a technology tool that can be utilized to increase student-faculty communication.

Cooperation among students is the second principle of good practice. This principle reflects the constructivist belief that learning is social. Instruction designed to encourage collaborative learning, rather than competitive, results in more student involvement. Through the process of sharing ideas and responding to those of peers, students develop critical thinking skills and develop their understanding of the content as
well as the process of learning. Synchronous or asynchronous online discussions and other Web-facilitated group work are examples of technology-enabled learning experiences that further this principle.

Collaboration involves active learning, the third principle. Active learning engages students in talking, writing, thinking, and relating new knowledge to prior understandings and experience. This principle asserts that students do not learn or retain much by passively listening to teachers, by memorizing, by completing pre-packaged assignments, or by regurgitating the right answers. Students must take part if learning is to occur. Electronic simulations and WebQuests are technology-enabled educational experiences that require active learning.

Good practice gives prompt feedback is the fourth principle. Students need to know whether or not they are mastering concepts in a timely manner so they can focus their learning energy. They need to know how to access their prior knowledge and competence. Students must receive suggestions for improvement and support for the means to make improvements. Students should have time to reflect on what they know and what they have yet to learn. This helps them develop the skills of a self-regulating learner. Online independent practice and quizzes can be constructed to provide immediate feedback.

Students' need for assistance in time management in reflected in the fifth principle: Good practice emphasizes time on task. This applies to both students and teachers alike. Effective studying and effective teaching are, in part, the result of allocating sufficient time for learning. Institutions also convey beliefs about time through expectations for in-class contact hours and homework expectations. The goal of all time
decisions should be to reach high achievement for all students and faculty. A fully developed, updated, and flexible online syllabus with easy access to course requirements and due dates can assist both students and teachers with time management.

This leads directly to the sixth principle, which states that good practice communicates high expectations. According to the research, all learners' levels of motivation are affected by expectations and high expectations lead to students making an extra effort to succeed. This can be called a self-fulfilling prophecy that applies not only to students but to teachers and institutions as well. There are many ways to communicate high expectations. One technology-enabled method is posting to the Web exemplary student projects as models to guide classmates and/or students in the next offering of a course; example is one way of communicating high expectations.

The last of the seven principles is that good practice respects diverse talents and ways of learning. This principle reflects the research on learning styles (Claxton & Murrell, 1987) and "intelligences" (Gardner, 1983). This principle brings together the theories that people learn in different ways and that they demonstrate their unique gifts and understandings in different ways. Students need opportunities to develop their talents, and they can be stretched to develop their less-developed intelligences as well. Faculty and student-designed multimedia presentations can address students' various learning styles; students can also display and develop various intelligences through student-made multimedia presentations that demonstrate their learning.

In the literature, there are many documented obstacles to post-secondary educational reform. The lack of instructional design skills of college-level faculty is an underlying issue. Teachers' beliefs about students, learning, teaching, and subject matter
may be barriers in reforming educational practices (Pajares, 1992). The dissemination of Chickering's seven principles may be one way to encourage faculty to reflect upon their beliefs and help them self-identify areas of practice for improvement. Systematically studying and reflecting upon one's teaching is also a key concept in another undergraduate education reform effort, the scholarship of teaching.

The Scholarship of Teaching

At many colleges and universities, conversations around the "scholarship of teaching" are at the heart of today's educational reform efforts (Boyer, 1990; Kreber & Cranton, 2000; Smith, 2001). Combined with the undergraduate curriculum reform effort at this institution, the scholarship of teaching conversations have framed the campus teaching and learning culture. This effort to increase individual and collective knowledge and understanding of issues related to teaching and learning and to raise the status of scholarship involving teaching theory and practice, particularly in the disciplines, are important components of the context for this faculty development initiative and by extension, of this study.

In Scholarship Reconsidered: Priorities of the Professoriate (1990), Boyer put forth the concept of the scholarship of teaching. Boyer defined scholarship as having four essential components: discovery, integration, application, and teaching. In Boyer's conception, the scholarship of discovery is about finding and researching new ideas. The scholarship of integration occurs when those new ideas are synthesized into knowledge and expand understandings of the world. Application occurs when new ideas are applied in practice; the scholarship of application often adds to increased understanding because
when theory is applied to social problems, new discoveries are often made. Last, but in terms of this study not least, is the scholarship of teaching. Boyer believes that scholars must know their disciplines as well as know effective teaching methods for particular content; this is known as pedagogical content knowledge (Wilson, Shulman, & Richert, 1987). Boyer believes that scholars must be committed to lifelong learning both in their fields of inquiry as well as in the process of teaching and learning particular content. Like experts in all fields, faculty must continually seek out "new opportunities to further their understanding of problems" related to learning and teaching (Kreber, 2002, p. 13).

Boyer's work stresses the practice of teaching itself and is the cornerstone of the nationwide Carnegie Campus Conversations. "The scholarship of teaching is the process of transmitting perspectives, skills, and knowledge to others while remaining a vital learner oneself. . . . Basic to understanding the scholarship of teaching is that focus is always on the student—not the professor, not even the discipline" (Atkinson, 2001).

There is, however, no consensus about how faculty can and/or should demonstrate the scholarship of teaching. Some feel that teaching excellence should be determined by classroom performance and therefore, "assessed by students, peers, and instructor self-evaluation" (Kreber, 2002, p. 9). Others believe that peer-reviewed publication is the only "legitimate" assessment of this scholarship (Shulman, 2000; Smith, 2001). Research on teaching, both informal and formal, contributes to understandings related to "the advancement of pedagogical content knowledge and presents forms of the scholarship of discovery that overlap with, and are part of the scholarship of teaching" (Kreber, 2001, p. 15). Like Smith (2001), Kreber (2002) makes a distinction between excellent teachers and scholars of teaching, who, in addition to excelling at teaching, demonstrate and share
knowledge, have pedagogical content knowledge, and are self-regulated learners, who validate their knowledge through peer review. Kreber cautions administrators and faculty to be "careful not to undervalue excellent and expert teaching while valuing scholars of teaching" (Kreber, 2002, p. 19).

According to Shulman (2000), "we develop a scholarship of teaching when our work as teachers becomes public, peer-reviewed and critiqued, and exchanged with other members of our professional communities so they, in turn, can build on our work. These are all qualities of scholarship" (p. 50). Schulman believes that the attention given to the scholarship of teaching is appropriately timed to address the need for accountability in higher education. "For-profit providers, distance learning, and other new sources for higher education are creating a market wherein institutions must be prepared to document and display evidence that they are fostering learning, deep understanding, passionate commitments and civic virtues in the domains in which they educate" (Shulman, 2000, p. 52). Activities related to the scholarship of teaching and learning can provide the necessary evidence. Some researchers suggest that universities might apply "the models used to encourage and support research activity" as they encourage, support, and evaluate the scholarship of teaching (Carothers et al., 1997).

In the 1999-2000 academic year, the university under study made a significant effort to build consensus around the scholarship of teaching concept (http://www.carnegie.arizona.edu/). Individual members of the university community, university committees, and the Arizona Board of Regents produced several documents that highlight the University's attention to reform efforts in this area of scholarship. The University's North Central Association Accreditation Self Assessment Report 2000
(http://dizzy.library.arizona.edu/nca/) includes links to initiatives such as the "Student-Centered Research University" and the General Education Curriculum revision discussed in Chapter 1. Tenure and promotion (http://w3.arizona.edu/~uhap/chap3.html#3.11 and http://w3.arizona.edu/~uhap/3.11) as well as sabbatical and professional leave policies (http://w3.arizona.edu/~vprovacf/sabbatical/) also reflect attempts to institutionalize the value of teaching and place it on par with research performance and activities.

Educational reform, like learning itself, is a complex process. The nascent "learning paradigm" in higher education will involve constant inquiry into new structures and methods that will result in increased student learning. Since A Nation at Risk: The Imperative for Educational Reform: A Report to the Nation and the Secretary of Education, United States Department of Education (1983) was published, the focus in K-12 reform has been on student achievement. Technology tools have been more systematically integrated over a longer period of time in K-12 classrooms than they have been in post-secondary education. Therefore, in the areas of improving learning outcomes and of improving teaching and learning with technology, post-secondary educators may find keys to addressing the complexity of educational reform by reviewing the K-12 research findings on these topics.

Connections to K-12 School Reform

Fullan (1993), one of the foremost K-12 school reform scholars, reminds us that "learning for teachers as well as children must be seen as a means of increasing one's ability, not as a sign of inadequacy" (Fullan, 1993, p. 63). Even the term faculty "development" has a negative connotation to some K-20 educators. Viewed in a positive
light, however, faculty development suggests the perspective of learning as a continuous process. Lifelong learning has become an accepted and common goal in the academe (Hughes, 2001).

In order to create and sustain vibrant learning communities, teachers as well as students must become effective collaborators who value continuous learning (Fullan, 1993; Sarason, 1990). Teacher research, or action research, is one way to explore continuous learning and impact improvement in classroom practice. Though most often practiced by preK-12 classroom teachers, post-secondary teacher educators are beginning to assume the roles of researchers as they explore their own teaching practices from their own perspectives. Similar to the process described in the scholarship of teaching, teacher research involves teachers in "taking a reflective stance on their own teaching in order to conduct planned, systematic inquiry aimed at examining and improving both teaching and learning in their own classrooms" (Short, 1993, p. 156). As the scholarship of teaching and teacher research develop, the results of these inquiries can and should inform each other.

Collaboration is another value in a learning community. “Collaborative cultures create and sustain more satisfying and productive work environments. By empowering teachers and reducing the uncertainties of the job that must otherwise be faced in isolation, collaborative cultures also raise student achievement. Collaborative cultures facilitate commitment to change and improvement” (Fullan & Hargreaves, 1991, p. 49). It is interesting to note that collaborative learning is one of Chickering’s seven principles of undergraduate education (Chickering and Gamson, 1991). If students are expected to engage in this practice, then certainly faculty should engage in it as well. Collaborative
learning is becoming more widely used in post-secondary faculty development initiatives (Weimer & Lenze, 1991).

In higher education, for the most part, the predominant expectation is for faculty to learn about teaching through their personal teaching experience (Boice, 1992; Weimer, 1992). The research at preK-12 suggests that nurturing collaborative environments at the college level may provide structural support for educational innovation and reform. In their longitudinal study of the Apple Classrooms of Tomorrow, Sandholtz, Ringstaff, and Dwyer (1997) found that "schools with a high level of collegial sharing embraced technology and implement new instructional strategies more quickly" (p. 105). In the K-12 environment, teacher isolation has been identified as the most powerful impediment to reform (Lieberman, 1995). The same may hold true in higher education.

Technology-enabled faculty development has long been practiced at the K-12 level. Although the research indicates that insufficient training has always been a feature of attempts at K-12 technology integration (Kent & McNergney, 1999), there have been many lessons learned from a wide range of K-20 programs. These are a sample of findings as they relate to technology-enabled educational reform for K-12 practicing and preservice teachers.

The most effective technology trainings are conducted as hands-on experiences in lab settings held at regular intervals and supplemented by structured, motivating, between-session online activities (Harris, 1998). This format allows teachers to practice and integrate new skills and strategies and minimizes the risk of information overload. Although not conducted in a lab setting because participants were given laptop computers, this format was applied in the TEACchnology program at the University of
Massachusetts-Amherst (Sorcinelli, 1999). In that program, ten post-tenure faculty met every two weeks to explore technology topics of personal and professional interest. The long-term commitment needed to support a project such as this one can be problematic in large institutions.

Technology can be used to promote many educators' instructional goals, theories, models, and practices including literacy learning among diverse populations and fostering multicultural understanding (Pailliotet, 1998). The work of Cummins and Sayers (1995) that promotes online global classroom exchanges among K-12 students has been applied in preservice education (Johnson, 1999; Moreillon, 2001). Through online discussions, students engaged in these learning experiences have had the opportunity to explore critical conversations prompted by their responses to children's literature. These applications of technology tools demonstrate that technology is not value-free and careful attention to the cultural and sociopolitical implications of tool use is critical.

Integrating technology tools with teaching methods courses increased the probability that preservice teachers transferred computer skills into their classrooms as compared with preservice teachers who learned computer skills in an isolated manner (Halpin, 1999). This study reinforces the concept of integration. Technology tools are not a separate subject or a topic to be added on top of the curriculum. Technology tools are just that – tools, tools that can and should be applied when appropriate for authentic learning experiences. Post-secondary technology-enabled faculty development initiatives that retain a focus on learning and teaching, rather than on the technology tools themselves, support the findings of this study.
"Technology is not a panacea for educational reform, but it can be a significant catalyst for change. To those looking for a simple innovative solution, technology is not the answer. To those looking for a powerful tool to support collaborative learning environments, technology holds tremendous potential" (Sandholtz, Ringstaff, & Dwyer, 1997, p. 184). The pressures and challenges of integrating technology tools at the K-12 level are great. When people feel supported in risk-taking, they are more likely to take risks. Collaborative learning environments offer support all types of educational efforts (Fullan, 1993).

November (2001), an advocate for K-12 student-centered technology tool integration, talks about the differences between using technology to "automate" versus using it to "informate." Automating happens when technology is "bolted on top of standard operating procedures" (p. xxiv). Informating happens when technology is integrated into curriculum. Automating results in greater efficiency but it leaves the basic information or structure unchanged. Informating, on the other hand, results in new information, more information, and more accessible information in a wider variety of formats. Harris (1998) makes these distinctions when she asks two questions about the use of the Internet in curriculum-based learning events: "Will this use of the Internet [technology] enable students to do something they couldn't do before? Will this use of the Internet [technology] enable students to do something they could do before, but better?" (Harris, 1998a, p. 9). The effectiveness and appropriateness of tool use is dependent on educators' decisions about how, when, or if to utilize technology tools as they design learning experiences for students.
K-12 researchers affirm that the expertise of teachers is the deciding factor in student achievement (Leu & Kinzer, 2000). Colleges of education, and by extension all graduate programs that educate future teachers, must strive to graduate educators who possess pedagogical and pedagogical content knowledge as well as content-area knowledge (Wilson, Shulman, & Richert, 1987). Learning, however, cannot stop at graduation. The continuous evolution of technology tools coupled with the constant state of change in society requires effective teachers to continually develop their expertise in the area of technology-enabled teaching and learning. As a result, in the preK-12 environment, staff development for practicing teachers must be continuous as well (Wepner, Valmont, & Thurlow, 2000). In other disciplinary units in higher education where faculty often teach without pedagogical content knowledge (Kreber, 2001), this may be even more critical.

**Technology Tools Integration: Entrée or Obstacle to Higher Education Reform?**

As we have seen in the faculty development centered on technology tools section of this literature review, technology may provide an entrée into considering and reconsidering teaching practices. In 1998, Educom (now EDUCAUSE) awarded five medals for improving undergraduate education through technology. One of the recipients was Paul Velleman from Cornell University. When asked about faculty resistance to the integration of technology tools into their teaching, Velleman said:

Promotion in academe depends upon the evaluation of one's work by one's peers. If the other members of the faculty think that someone who develops information technology-based teaching materials is just a programmer, or that the work is just
teaching and not research, or worse, that someone might be making money from royalties on sales, then they will judge that work to be undeserving of promotion or of tenure. Unfortunately, this attitude cannot be changed by administrative fiats (http://www.educause.edu/ir/library/html/erm9915.html, ¶8).

Another 1998 Educom award winner, Richard Larson of the State University of New York at Stony Brook, has another perspective. He believes institutions are investing "too heavily in technology without proof that those investments will be returned in the form of improved educational quality and productivity" (http://www.educause.edu/ir/library/html/erm9915.html, ¶10). Larson believes that faculty skepticism about instructional technology is justified. He believes that instructional technology should be used to enhance education, not simply "to deliver the same old course or to substitute for face-to-face teaching." He goes on to say that, "Although technology does help us deliver a more intense and engaging course, the amount of effort on the part of the teaching staff to deliver that course is also greater." Larson wonders if the effort is worth the "marginal" results. Even Larson, who says he is "not a wholesale advocate of the use of information technology in education," admits that anecdotal evidence suggests positive results for his technology-enabled teaching, especially in the areas of engagement, student collaboration, and student participation (Larson, 1998).

Gilbert (1996) takes a critical look at "the obstacles to improving teaching and learning with information technologies" (p. 10). He enumerates eleven obstacles, which can be noted as cautions by technology-enabled faculty development. (I have paraphrased his work.) Obstacles include:
1. Limited and/or uneven distribution of resources (Student access and part-time faculty access are important considerations);

2. Fragmented institutional planning that puts the focus on technology rather than on teaching and learning;

3. Fragmented support services (Often there is no coordination among technology support people, librarians, faculty development experts and others);

4. Distrust and/or poor communication among board, administrative leadership, faculty, computing professionals, and staff;

5. "Anybody, anytime, anywhere," a misleading educational slogan (It may undervalue face-to-face participation in the learning event.);

6. Underestimating the difficulty of faculty adoption of new combinations of teaching with technology (Faculty need to see models and sensitivity must be exhibited when asking faculty to take a subordinate "learner" role.);

7. Lack of easily available information about "good practice," lack of access to good descriptions of good models, lack of training on the use of successful information technologies, and a dearth of reports on the strengths and weaknesses of particular applications;

8. Difficulty of understanding and obtaining use of intellectual property;

9. Faculty reward system and the need for recognized procedures to effectively communicate and validate teaching with information technologies;

10. Expectations for the products are too high, too soon;

11. Lack of comparison with comparable institutions (This lack of information can lead to rash decisions, or it can lead to paralysis.) (pp. 10-11).

Fear of being replaced by technology has also been mentioned in the literature (Brown & Jackson, 2001; Carothers et al., 1997). As distance education becomes more and more prevalent, college-level faculty may feel threatened by the loss of job security. Universities should develop strong statements about the use of the Internet as a "necessary but insufficient condition for effective education" (Carothers et al., 1997). Kerr (1996) warns us that "techno glitz" in the classroom is a legitimate concern for
educators and researchers alike. Technology for its own sake can increase students' expectation that school-based learning experiences should be "an entertaining, exciting package, with graphics, sound, and other elements routinely vying for attention, whether they add to the learning value of the content being presented or not" (Kerr, 1996, p. 23). Kerr cautions educators that human values and educational purposes should always take precedence economic or social considerations. Many researchers strongly propose that the teaching and learning process, rather than the technology itself, become/remain the focus of faculty development (Carothers et al., 1997; Ehrmann, 2000; Gilbert, 2000).

Brown and Jackson (2001) suggest three leadership strategies for stimulating debate on technology integration. First, ask questions that will enlarge debate making it broad and inclusive. Make sure questions reflect currently held institutional beliefs (achieved consensus). Secondly, it is important to avoid "premature closure on any controversial issue." Although consensus is rarely achieved in large social systems, the goal should be to keep the debate and options for solutions open for as long as possible. Finally, they caution campus leaders to participate in consensus building as proponents of particular innovations rather than as judges. (If, however, a decision for change has already been decided, leaders should not pretend to seek input.) Brown and Jackson conclude that it is critical for reform leaders to "create conditions for serious, sustained critical discussion, occurring not before or after particular decisions but all the time" (p. 57).

University administrators are responsible for initiating and/or supporting campus conversations that can lead to consensus building for educational reform. Similar to the nationwide conversations about the scholarship of teaching, discussions about student-
centered, technology-enabled education will require on-going discussion, experimentation, and refinement in order to build consensus on theories and practices. It is important that discussions remain focused on the goals of particular innovations rather than on the technology tools, the means, in and of themselves.

**Implications for This Study**

Ehrmann (2000) of the Teaching, Learning, and Technology (TLT) Group documents the difficulty of utilizing instructional technology to achieve educational change. On many campuses across the United States, faculty are being encouraged to utilize course management tools as a compromise between ignoring technology tools altogether and making the considerable investments in time, energy, and resources to use technology tools innovatively. Had I reported on the vast majority of current higher education faculty development research findings, the technology-centered faculty development section of this literature review would have captured the pervasive emphasis on course management tools as the focus of technology-enabled faculty development initiatives. There is, however, little evidence that these initiatives directly address the more important underlying issues of beliefs about teaching and learning.

Sandholtz, Ringstaff, and Dwyer (1997) found that "the introduction of technology to classrooms does not radically change teaching; instead technology can serve as a symbol for change, granting teachers the license for experimentation" (p. 171). Some researchers believe the types of teaching methods used by instructors are "more important than the media itself in the learning process" (Clark, 1990). This should then be equally true for the teaching methodologies applied by faculty development facilitators, a
topic rarely discussed in the literature. Others educators like Jacobson, Angulo, and Kozma (2000), who are positioned on the side of the technology tools debate that acknowledges the influences of the tools themselves, believe technological tools and technology-enabled learning experiences must be appropriately designed in order to provide students with constructivist, authentic experiences that develop deep understanding of concepts. Instructional methods are critical, then, on both sides of the debate.

Most researchers would agree "it is the whole culture of a learning environment, with or without computers, that can affect learning in important ways" (Salomon & Perkins, 1996). Tools without student-centered learning goals and objectives, without an active hands-on, problem-solving orientation to learning will quite simply be used to reproduce outdated education practices. And yet, many believe we cannot ignore the tools themselves. As Gamble (1999), then editor of the Community College Journal, said, “Our progress as an educated nation can be no swifter than our progress in technology” (p. 6). How then do current and how will future iterations of faculty development in higher education address this tension as culture, education, and technology converge in the 21st century?

Conclusion

The instance of faculty development under study was designed, created, and offered as part of a vigorous curriculum reform effort. Like the General Education curriculum revision, the larger effort in which the workshop developed, this faculty development initiative was a response to internal and external pressure for educational
reform. The pressures toward reform from within and from outside this university community helped create the context for this initiative. The theories, research, and practices of faculty development, particularly faculty development centered on technology tools, framed the learning environment created by the workshop facilitators and shaped the learning experiences of the participants. To build a bridge or make a connection between the workshop experience and widespread educational reform within the University, a process known as the diffusion of innovations must occur. The literature in these four areas, faculty development, technology-tools integration, diffusion of innovations, and educational reform inform the research questions for this study and form a framework for describing and interpreting the context, content, and impact of the workshop.

There are several important aspects critical to the understanding of the workshop context that are rarely discussed in the literature. The experience of the teacher-as-facilitator, the interplay between the facilitator’s beliefs and the lived experiences of the participants, and the dynamics of the educational helping relationship are important components of the workshop (Robertson, 1996). In the sociocultural context, these components are critical. All four research sub-questions for this study address the perspectives of the workshop facilitators as well as those of the participants.

To my knowledge, no qualitative case studies have yet been conducted that fully describe both the process and outcomes of a technology-enabled teaching faculty development workshop. As yet, I am unaware of any published studies that qualitatively describe a workshop in detail from the perspectives of the faculty participants nor studies that suggest the effectiveness of these workshops in achieving their stated goal of
transforming teaching. Neither are there studies about this type of workshop that address the role of the workshop facilitators' beliefs about learning, teaching, and technology and the interplay between these beliefs, the faculty participants' beliefs, and the teaching and learning behaviors of these stakeholders. These are some of the areas of scholarship in which this study can make a contribution.
CHAPTER 3

RESEARCH METHODOLOGY

Qualitative Research Paradigm

I utilized a qualitative research paradigm and employed an integrated case study methodology for this study. Rossman and Rallis (1998) identify eight characteristics of qualitative research. The following paragraphs describe the ways these characteristics relate to this particular research study.

Qualitative research is conducted in the "natural world." In this case, it was conducted, in part, during an in-progress faculty development workshop. I was fortunate to experience the workshop as a full-fledged participant. My participation in the workshop was a foundation on which I built relationships with the workshop facilitators; these relationships not only enhanced our interviews but also helped me design the surveys and questionnaire. I also shadowed one participant through his actual workshop experience. This allowed me to revisit the workshop experience through another participant's eyes. Although the seven workshop alumni interviews did not include an observational component, my participation in the workshop provided a shared framework for the interview process. Interviewees were aware of my workshop participation and when appropriate, I shared my workshop and/or college-level teaching experience.

Qualitative research uses multiple methods. I combined dissimilar data collection methods namely interviews, observations, surveys and a questionnaire in the same study (Merriam, 1988). I utilized methodological triangulation. These multiple methods were interactive and humanistic. Two of the three times the beginning and ending workshop
surveys were administered, I was on-site and available to answer participants' questions or concerns. The online questionnaire included information that allowed participants to contact Harrison or me for clarification; a few of them did. The interviews were conducted as dialogues, and member checking was used to more fully involve each participant in the research process.

In qualitative research there is a strong focus on context. The learning environment described in this study, one centered on technology-enabled teaching practices, is indeed a complex context. Through accessing multiple perspectives on the workshop, I have attempted to convey the complexity of this incidence of faculty development. I both describe and interpret the data in a holistic manner. I acknowledge the site specific qualities of this individual case.

The qualitative researcher uses reflexivity. Reflexivity is a process through which the researcher reflects on her effect on the research setting and on the participants. Although I maintained an awareness of my role as research instrument throughout the study, I recognized my impact most dramatically in my field study field notes. I have made a concerted effort to reflect on my influence on the data. Reflexivity is related to Rossman and Rallis's fifth characteristic: sensitivity to personal biography. My beliefs and practices with regard to the integration of technology tools into the learning environment, particularly in the college-level courses I have taught, greatly influenced my perception of the beliefs and behaviors of the workshop facilitators and participants. I understand that my perspective on the workshop is unique. I am open to the possibility that other interviewers and crafters of profiles would have told a different story (Fay, 1987).
In this study, I honored the emergent nature of the qualitative paradigm. Using an interview guide approach in the facilitator and faculty alumni interviews allowed me to establish some consistency across interviews while it gave me the freedom to follow the interests of the participants and engage in dialogues. The data generated from the field study was completely emergent; I had no preconceived notions regarding the participant's workshop experience or his one-year-later outcomes. On the beginning and ending surveys and the questionnaire, I included open-ended questions that allowed respondents to generate themes beyond those implied by the pre-figured questions.

Throughout the data analysis process, I maintained a stance that honored the emergent nature of the data. I investigated the diffusion of innovations literature more thoroughly, the research on the use of narratives in data analysis, and the meaning of metaphors after the data were collected. The content and qualities of the data suggested these directions. I also refined my research questions as I analyzed the data. Certainly, the suggestions for further research section grew from the new questions I discovered during the research process.

Rossman and Rallis's (1998) seventh characteristic of qualitative research is that it's a complex non-linear process. I began the research process with full participation in the workshop and a pilot survey of those workshop cohorts. I interviewed the facilitators. Then I conducted the field study. After revising the survey, I administered it to two more sets of workshop participants and analyzed that data. Harrison and I launched the online questionnaire from which I identified workshop alumni interviewees. Then we reposted the questionnaire, and I identified one more interviewee whose workshop experience differed in significant ways from that of the first six interviewees. I interviewed a
University administrator and then conducted the one-year-later interview with the field study participant. As I approached each perspective in this study, I revisited the place and process of the workshop and my overarching research question, which brought my focus back to the "whole" of the study. The analysis of these data was likewise iterative. Each perspective generated the need for cross-perspective references and comparisons that sharpened my thinking about the whole of the study and stimulated deductive reasoning, particularly about the implications of this instance of faculty development and its impact on educational reform efforts at this institution.

Finally, this study embodies the interpretative characteristic of qualitative research. My personal biography and the sociopolitical time in which the workshop occurred were the lenses through which I interpreted the data. I have made no attempt to disguise my personal experiences and bias related to technology tools integration. I have situated the study in the local sociopolitical context of faculty development focused on curricular reform on this particular university campus as well as in the national sociopolitical context of an increasing emphasis on the use of technology innovations and the push for educational reform.

Qualitative studies can be used for many purposes including instrumental, enlightenment, symbolic, and emancipatory use (Rossman & Rallis, 1998). It was my intent to design this study for multiple uses. The study served an instrumental use as it provided formative and summary data to the workshop facilitators and summary data to a University administrator. I intend for the results of the study to be used to improve the practice of faculty development by enhancing the understanding of this particular case. This can be considered an enlightenment use for this work. In many ways, faculty
development can be described as a "complex and ambiguous experience" (Rossman & Rallis, 1998, p. 14). Another goal of this study, then, was to make the experiences of the workshop facilitators and participants understandable and to communicate their experiences to the research community. This can be considered a "symbolic" use for the study. Although some may consider the emancipatory use of this study a bit of a stretch, I believe that this study has the potential to empower the participants through illuminating the process of this university's faculty learning. In the United States today, a great deal of pressure is being brought to bear on educators at every level. The voices of educators themselves are not a prominent feature in the research literature. One use of this study is to give faculty voice in the educational reform conversation.

Qualitative research is an optimal methodology for making sense of teaching and learning. Classrooms and schools or universities are constructed realities; co-constructed by all their stakeholders. Qualitative research allows the researcher "to be open to the play of diverse meanings, to find starting places for improvement and reform" (Greene, 1997, p. 210). It is my goal in this study to describe and interpret the multiple perspectives on this phenomenon of faculty development in hopes of suggesting possible pathways toward educational reform.

Case Study Methodology

The case study methodology has allowed me to conduct an intensive analysis that did not commit me to a limited set of variables and increased the possibility that critical variables and their relations were found. This case study seeks to understand the phenomena of faculty development through a deep investigation into the people, place,
and process of one instance of faculty development, this workshop. It is "the examination of an instance in action" (Guba & Lincoln, 1981, p. 371). The study asks and answers "traditional" case study questions: What is happening in this case? What are the behaviors of the key actors in this case? Why do they behave in these ways? (Rossman & Rallis, 1998).

This study is descriptive in nature and includes thick descriptions of the workshop from multiple perspectives. It also provides a means of interpreting the meaning of study "in terms of cultural norms and mores, community values, deep-seated attitudes and notions, and the like" (Guba & Lincoln, 1981, p. 119). The study follows a heuristic process. Its goal is to "illuminate the reader's understanding of the phenomenon under study" (Merriam, 1988, p. 13). In addition, my emergent stance vis-à-vis the data increased the likelihood of this study being a discovery experience.

"Case studies use prose and literary techniques to describe, elicit images, and analyze situations... They present documentation of events, quotes, samples and artifacts" (Wilson, 1979, p. 448). Using the participants' profiles and vignettes as units of study, a research methodology that is discussed in detail at the end of this chapter, was one way I sought to understand the meaning of this incident of faculty development. "In a qualitative approach to research the paramount objective is to understand the meaning of an experience" (Merriam, 1988, p. 16). This attention to the participants' narratives allowed me to actualize my belief that research is a "coordinated process of socially constructed meaning" (Carter & Presnell, 1994, p. 1).
Access to People, Place and Process

I gained access to the workshop facilitators and to the research study site through Dr. Christopher Johnson. Johnson, then Director, Humanities Computing and Technology and my mentor, was familiar with this faculty development initiative. He assisted me by offering me a letter of introduction to the co-designers of the program, Harrison and Austin, which I used in contacting them via email early in the fall of 2000. I then drafted a research project proposal. My investigation into the workshop began later that fall when I met with Harrison and Austin to discuss the proposal. They expressed an interest in learning from the data gathered throughout this research study and generously extended an invitation to me to experience the workshop first-hand.

I participated in workshop held from January 2nd through 6th, 2001. Along with the seven other participants in that week's workshop, I opened the box containing my laptop computer, loaded the software, and through mini-presentations, demonstrations, and conversations molded these tools to meet my personal and professional needs. I made notes and kept a journal of my experience in the program. This was the last workshop that Harrison and Austin co-facilitated. Snitzer and Williams were two of the technology facilitators at this workshop. Taking the computer out of the box on that first morning was a symbolic commitment to me to begin a journey in learning. I have represented the components in this journey in Figure 3.1. It is this unique convergence of people, place, and process that I have set out to unpack in this study.
People: Data Collection Sources

After my participation in the workshop, Harrison assisted me as I pursued this research study. She kept me informed on information related to up-coming workshops and to the "Aftercare" program. She supported me by making time in the 2001 workshop agendas for the beginning and ending surveys. Harrison provided me with the names of the May 2001 participants in advance of the workshop to facilitate my finding a participant for the field study component of this study. She administered the June 2001 beginning and ending surveys when I was unable to be present at the workshop. Harrison collaborated with me to construct the online population questionnaire. The actual online
questionnaire instrument was created and the data collected, under her auspices, by a member of the FCII staff. Without Harrison's support and encouragement this study could not have happened.

Before meeting in-person with the field study participant and the workshop alumni interviewees, I had email contact with them. Through these initial contacts, I began to learn about these participants' impressions of the workshop. We set up interview appointments via email. I shared the participants' biographical sketches and profiles or vignettes with them via email. I received their feedback via email as well. Electronic communication played a central role in providing access and maintaining contact between the participants in this study and myself.

**Primary Data Sources**

The participants in this case study were the primary sources of data for this research study: the co-designers of the workshop, Harrison, the last director, and Austin, who was the first director of the workshop, and Snitzer and Williams, who were technology facilitators for the workshop for varying lengths of time. Waits, who participated in the May 2001 workshop, was the subject of an in-depth field study. Through a question included in the online questionnaire, seven workshop alumni volunteered to be interviewed. (In this research report, the workshop facilitators and the University administrator requested to be identified by their actual names. All other participants in this study have been given pseudonyms.)

Both Harrison and Austin were involved in designing the workshop and were facilitators in the workshops. When the workshop began in May 1998 and until April
2000, Austin and Harrison were co-facilitators of nearly every workshop. In April 2000, Austin became the director of the VALA (Virtual Adaptive Learning Architecture) Project and Harrison assumed the role of workshop director. After April 2001, Austin provided support for the workshops but for the most part, Harrison was the main facilitator for the actual sessions. From time to time, she invited other members of the University teaching community, including Austin, to share the facilitator role. (There were two workshops, however, which Harrison was unable to facilitate. Both occurred in May of 2000. Along with substitute facilitators, Austin facilitated the first of those sessions and substitutes conducted the second session that month on their own.)

Snitzer was a participant in the workshop in August 2000. She was a technology facilitator in the January and May, 2001 sessions. In addition to her part-time work with the workshop, Snitzer was also the coordinator of the VALA (Virtual Adaptive Learning Architecture) Project. Williams had been a technology facilitator in the workshop since May of 2000. He assisted with eight workshops. He was also a FCII staff member.

In addition to her director and facilitator roles, Harrison had the responsibility of inviting faculty to participate in the workshop. Over the three years that the workshops were held, she maintained a waiting list of possible faculty participants. When inviting participants, Harrison attempted to balance gender in each workshop and tried to keep the number of participants from one single department to a maximum of two, the major exception being the all-English Department sessions. Initially, all participants were faculty assigned to teach the Gen Ed curriculum, coursework designed for freshman and sophomores. The workshop was part of the University’s undergraduate curriculum
revision initiative. The cost of the first two years of workshops was borne completely by the University.

Secondary Data Sources: Surveys, Questionnaire, and Administrator Interview

The beginning and ending surveys and the online population questionnaire provided secondary sources of data for this study. Sieber (1982) outlines four uses of quantitative surveys and questionnaires in qualitative research. First, quantitative instruments serve to guard against an assumption that all aspects of the case fit smoothly into an emerging theory; they often provide disconfirming evidence. Secondly, surveys and questionnaires can support generalizations made from a limited observation. In this case, I observed and/or interviewed a purposeful sample of the workshop alumni but the sample represented only five percent of the total workshop population. Thirdly, these instruments allowed me to verify my impressions from the fieldwork observations and the interviews. Finally, the surveys and questionnaire results helped me to understand the less apparent aspects of the observational and interview data (Sieber, 1982).

One hundred sixty-five university faculty participated in the workshop. The 2001 workshop participants responded to the beginning and ending surveys and 53 people from the total workshop population voluntarily responded to the online questionnaire. Several departments made the workshop a priority. The English Department scheduled two workshops that were attended solely by its members; additional English faculty participated in departmentally heterogeneous workshop groupings. A total of eighteen English faculty participated in the program, the most of any department. The support of the department head was undoubtedly a significant factor. The Department of East Asian
Studies had the second-highest participation with ten members. This fact was most likely
due to Harrison’s association with that department. The University library also made a
significant effort to send subject-area librarians to the workshop. Many librarians
attended along with faculty in their subject specialty and some partnerships collaborated
to create a final workshop week project. Nine librarians attended the workshop. The on­
going support of the department head in the Department of American Indian Studies was
also as factor in enrolling seven of its members in the workshop.

During the final year of the project (since the summer of 2000), participants’
departments have been required to supplement or, in some cases, totally fund the cost of
the workshops. Scheduling and the availability of financial resources contributed to
whether or not faculty from the waiting list actually took part in a workshop. For the final
year of this project, Harrison was charged by University administrators with ensuring that
people from a wide variety of teaching units across campus had access to this faculty
development initiative. The beneficiaries of the workshop extended beyond the Gen Ed
faculty. Table 3.1 shows the one hundred and sixty five workshop participants'
departmental affiliations.
Table 3.1

The Number of Workshop Participants (165) by Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>18</td>
</tr>
<tr>
<td>East Asian Studies</td>
<td>10</td>
</tr>
<tr>
<td>Library</td>
<td>9</td>
</tr>
<tr>
<td>American Indian Studies, History</td>
<td>7 each</td>
</tr>
<tr>
<td>Anthropology, Media Arts, Near Eastern Studies, Political Science</td>
<td>5 each</td>
</tr>
<tr>
<td>Humanities Program, Latin American Studies, Psychology, Russian &amp; Slavic Languages</td>
<td>4 each</td>
</tr>
<tr>
<td>Art, Classics, Geography, German Studies, Nutritional Sciences, Philosophy, Sociology, Spanish &amp; Portuguese, Theatre Arts</td>
<td>3 each</td>
</tr>
<tr>
<td>Linguistics, Mexican American Studies, Mining &amp; Geological Engineering, Planetary Sciences, Soil, Water &amp; Environmental Sciences, Tree Ring Lab, University Composition Board, University Teaching Center</td>
<td>2 each</td>
</tr>
</tbody>
</table>

The faculty participants in this study, then, were members of these units from across the University campus. The respondents in the beginning and ending surveys were the final twenty-six workshop participants in the workshop. The field study participant
was from the May 2001 workshop. The online questionnaire was completed by fifty-three of the one hundred sixty-five participants in the workshop, and seven of the fifty-three online questionnaire respondents became interviewees in this research study.

Online ending workshop surveys were collected but not systematically analyzed by the facilitators. These surveys, email correspondence between the participants and the facilitators, and anecdotal evidence comprised of face-to-face participant comments to the facilitators indicated that the workshop was overwhelmingly successful. At the time funding for the workshop ended in June 2001, more than sixty people were on a waiting list for the workshop. The original funding for this faculty development initiative came from the Gen Ed curriculum reform effort; subsequent funding came from the University's faculty development budget. The program, offered for three years to 165 participants, lost its funding when faculty development funds were redirected. Harrison was given partial funding to offer one workshop in the summer of 2002, which was attended by eight faculty from the College of Education. The college contributed half of the cost of the workshop. These workshop participants were not included in this study.

In the summer of 2002, one year after the final round of regularly scheduled workshops, I met with Dr. Sally Jackson, Professor of Communication and Vice Provost for Faculty Development and Educational Technology. (Jackson asked that I use her real name in this study.) The purpose of this interview was to share preliminary data from the workshop surveys and questionnaire and to access Jackson's perspective on the impact of the workshop. Although she was not an official participant in this study, her perspective, as it represents that of University administrators, was valuable to me as the researcher. I have included some of Jackson's comments in Chapter 8 of this research report.
Place: Data Collection Site

The workshop described in this case study was offered to faculty at a Research 1 institution in the Southwestern United States. The workshop grew out of the Faculty Development Partnership, an initiative begun in 1995 to provide human and computing resources in support of teaching and learning with technology. The Partnership is now called the Learning Technology Partnership and includes the state-of-the-art Faculty Center for Instructional Innovation (FCII) and the Multimedia Learning Lab (MLL). The Partnership "promotes employment of successful teaching models facilitated and strengthened by new learning technologies" (http://www.facpartner.arizona.edu/about.htm). The primary focus of the Partnership and therefore the workshop is to encourage General Education (Gen Ed) faculty to utilize technology tools to improve undergraduate teaching and learning. Gen Ed faculty teach freshmen and sophomore classes many of which are held in large lecture halls and some of which contain three hundred or more students.

The Faculty Center for Instructional Innovation (FCII) is a high-tech facility located within the University's Center for Computing and Instructional Technology (CCIT). The FCII has twelve high-powered Macintosh and PC workstations that offer the latest software and peripheral tools. Presentation, Web authoring, online-course building, and media creation software are available on all workstations. Optical scanners, CD-ROM burners, digital still and video cameras, and video conferencing are among the tools at the disposal of University faculty. A bank of carrels with network access is available for laptop computer users. At the time of this study, a full-time staff of 29
people worked in the FCII and was available to assist faculty members in achieving their teaching and technology integration goals. The FCII opened in April of 1998.

The first workshop was held in the FCII in May of 1998. All twenty-two of the workshops were conducted in the FCII, the last of which was held in June of 2001. Six to ten people participated in each workshop; three to five teaching and/or technology facilitators were available at each workshop. According to the workshop facilitators, this faculty development experience used the guiding principles of andragogy.

The one-week, forty-hour intensive workshop provided participants with hands-on software training opportunities as well as information on universal design and accessibility, copyright and intellectual property, sharing course content visually, library support for collaborations in learning and teaching, course management tools overview, and communication and collaboration through writing. Participants began the week by loading software onto a laptop computer that immediately became their own. Discussions centering on teaching practices including the writing process, cooperative and collaborative group work, learning styles, and active learning formed the framework for learning about the implications on teaching methodologies with the various software programs highlighted during the week. Participants learned to build course materials using PowerPoint and Web authoring software. Participants also self-selected a project, which they constructed during the workshop week and shared with colleagues in the afternoon on the final day. Many of the learning experiences offered in the workshop were designed to parallel ones faculty might then offer students in their courses.

The location of the workshops was important because the FCII offered on-going support for faculty beyond the one-week workshop. Throughout the duration of the
workshop program, an on-going "Aftercare" component was offered. It invited workshop participants to continue conversations about teaching while utilizing what they learned in the one-week workshop. In response to faculty requests, it also offered advanced how-to mini-sessions focused on particular software, particular components of software tools, and/or technology and teaching issues such as universal accessibility and instructional design.

This physical "place" – the FCII – is an important component of the workshop because it provides a context for one of the critical components of faculty development, on-going support (Carothers et al., 1997; Rowe, 1999). However, the FCII was not the ultimate "place" of this learning experience. Although I have discussed the sociopolitical context – or the historical "place" – of this workshop in detail in the introduction to this study, it is worth remembering that this instance of faculty development was an example of the most widely used of all post-secondary instructional interventions, namely workshops, seminars, and programs (Weimer & Lenze, 1991). Considering societal concerns for quality undergraduate education, institutions of higher learning will continue to need to assess faculty development strategies to determine the most effective allocation of their resources and activities in support of improving student achievement. The "place" of this workshop, then, can be viewed in this larger context; it can be considered for its contribution to national educational reform efforts.

**Process: Workshop Agenda**

As a January 2001 participant in the workshop, I had first-hand experience with the content and strategies applied in the workshop. Along with the learning experiences, I
received the binder containing the workshop week agenda, instructions for loading software, articles on learning, Web design, Web evaluation, communication, and collaboration, University resources to support teaching and teaching with technology, and two trade books to support thinking about teaching strategies. The contents of the binder were more than any person could digest within the time frame of the workshop week. Several of the articles and two chapters on student writing assignments were assigned as homework during the week.

The major thrusts of the workshop content, however, were the hands-on technology tools learning experiences, information brought to the participants by guest speakers, and discussions that were formally facilitated during the workshop week. (Except for those referenced in the field study, I was not able to document the informal conversations on teaching, learning, and/or technology.) The following workshop agenda will give the reader a sense of the scope of the content covered. I have used my field notes to document the formal discussions on teaching, learning, and technology. The reader should note that the guest speakers and subsequent discussions, or different discussions, might have happened at different times or not at all in the other twenty-one workshops. This agenda, then, serves as a basic outline of the workshop.

**Workshop: Day One**

On the first day of the workshop, participants met around the table to introduce themselves and briefly share their interests in participating in the workshop. The workshop facilitators presented an overview of the workshop content. They also outlined the participants' obligations and privileges that accompany the workshop experience.
Participants were given a survey about their general orientation toward technology and their teaching orientations. (In the last three workshops, participants were given the beginning survey for this research study as well.)

Next the participants set up and configured their laptops. Each went to an individual carrel and opened a box containing his or her computer. Participants used the directions found in the binder to configure their computers. They installed an Ethernet adapter. Each participant loaded software onto the laptop, including Microsoft Office, FrontPage, and Adobe Photoshop. Additionally, some participants loaded Dreamweaver and Flash. For most of the participants, these tasks took up the greater part of the morning; for some, this process continued after the lunchtime guest speakers.

While participants and facilitators ate lunch, two guest speakers, one from CCIT, the other a visually disabled graduate student, discussed the concept of universal design and its importance to students' accessibility to course materials. The speakers shared the laws, ethics, and practical aspects of universal accessibility. The participants had the opportunity to ask questions.

After lunch, while some participants continued to load software, others began personalizing their computers by saving Web site favorites, configuring email accounts, and the like. For the final hour and a half of the first workshop day, the facilitators led a discussion related to using technology in the classroom, the Integrated Learning Center, which was at that time under construction, and technical support for faculty interested in integrating technology into their teaching and research repertoires. The facilitators shared a sampling of course Web sites and gave a brief lesson on the use of search engines.
Participants were asked to prepare for the week by identifying a theme for their workshop work. They were asked to begin thinking about a project, which they would "show-and-tell" on the final workshop afternoon. The formal homework assignment was to look through the articles in the "Learning" section of the binder, select and read at least one, and write a summary and reaction to at least one article. The summary and reaction were to be saved onto the laptop for use in the next day's session. Suggested homework was also given. Participants were invited to look through articles in the "Web Design" section of the binder and to begin bringing materials related to the theme for scanning on day three.

**Workshop: Day Two**

The second day of the workshop began with a field trip to a seminar-sized classroom and to a large lecture hall classroom. In the seminar room, facilitators introduced the possible uses for PowerPoint in the classroom by sharing a sample presentation. The presentation included basic guidelines for design and animations, and ways to engage student in active learning via this tool. Participants were asked to use the PowerPoint instructions available in the binder to create a PowerPoint presentation that utilized what they learned from the learning article homework assignment. When most of the participants had completed their presentations, the group moved to a large lecture hall where some participants volunteered to share their work. The facilitators led a discussion about issues related to using PowerPoint in the lecture hall setting.

At lunch, a University librarian presented information about copyright and intellectual property issues related to Web publishing. In the discussion that followed,
participants had the opportunity to ask the librarian about rights to course publications, linking to journal articles, and the University library's collection of electronic journals and databases.

In the afternoon session, participants were given the opportunity to create PowerPoint presentations related to their workshop week themes. (In the workshop I attended, some of the participants did not follow the morning PowerPoint content instructions and had already begun their discipline-based presentations.) During this session, some participants received instruction on how to save and embed images from the Web into PowerPoint. Others experimented with creating custom animations and embedding hyperlinks to Web resources into their presentations.

The homework for day three was to bring materials, including objects for scanning, related to the participant's theme. The facilitators informed participants that digital cameras would be available for their use in capturing images of objects. The suggested homework was to peruse and read a few articles from the "Communication" and "Collaboration" sections of the binder.

**Workshop: Day Three**

The morning of the third workshop day was devoted to capturing and manipulating images. Participants learned the different characteristics of image formats and their standard uses. The facilitators introduced Adobe Photoshop, a software product that can be used to scan and manipulate images. Participants gathered at workstations in groups of two or three and followed directions from the binder to scan and manipulate
their theme related items. Each small group had exclusive access to a facilitator who supported their learning.

During lunch, a University librarian gave a presentation on developing students' skills and strategies related to information literacy and on initiating collaborative partnerships between faculty and librarians. She shared some technology-enabled student projects that were the result of faculty-librarian collaborative work. The workshop participants had the opportunity to ask her questions about issues related to her presentation and about the library in general.

In the afternoon, presenters from the Center for Computing and Instructional Technology (CCIT) talked about the electronic tools supported by their department. They talked about instructional uses of email and listservs. Participants had the opportunity to interact using the OldPueblo MOO, a "dynamic, synchronous online environment designed to promote student-centered distributed learning" (http://oldpueblomoo.arizona.edu/). They outlined the tools available on POLIS, a locally designed course management system, and WebCT, a commercial course management software product. Until the May 2001 workshop, the presenters also demonstrated the UAGradebook, another locally designed software tool, which became defunct at the end of the spring 2001 semester. The CCIT staff members also shared the types of technology support they provide to faculty.

The process of mindmapping was discussed after the CCIT presentation. Participants were asked to think about different ways of organizing information and then to create a sample mindmap together. The process was applied to developing a plan for a Web site. The assigned homework was to create an annotated map of a Web site based on
the theme, including notes on content, connections between components, and design. In addition, the participants were asked to read chapters five and six of *Engaging Ideas* (Bean, 1996); these chapters focus on formal and informal problem-based writing assignments. Participants were asked to draft both a formal and an informal writing assignment related to their themes and post them to the workshop's WebCT site. The suggested homework was to look through and/or read a few articles from the Web Design and Web Evaluation sections of the binder. Another suggestion was for participants to experiment with their scanned images and place these graphics in a PowerPoint presentation or prepare them for uploading to a Web site.

**Workshop: Day Four**

The morning of the fourth day was focused on creating and managing Web sites. After an overview of the Web and course Web sites, participants learned to use Microsoft FrontPage via a demonstration. (Step-by-step directions were also included in the binder.) Using the annotated maps they had created for homework, participants constructed a Web site related to their themes.

On this day, there was no guest speaker scheduled during lunch. Instead, participants had the opportunity to receive facilitator support to post their homework writing assignments to the workshop's WebCT site. Participants also sought support as they continued to work with FrontPage.

After lunch, the workshop focused on communication and collaboration through writing and technology. A speaker from the University's Composition Board led the group in activities related to building a philosophy for student writing. Using those
concepts, participants peer reviewed and revised their student writing assignments. The remainder of the afternoon was devoted to independent work on the theme-based project. Facilitators were available to support participants as they continued to plan and to prepare for the next day's "show-and-tell."

**Workshop: Day Five**

Participants had the lion's share of the morning of the last day of the workshop to complete their projects. In the workshops I attended, most participants constructed PowerPoint presentations related to the content of the courses they teach; some built Web pages for courses. Participants were encouraged to use both the technology tools and teaching strategies they learned during the workshop week as they prepared their projects. Facilitators assisted participants in finalizing their projects.

Just before lunch, participants were asked to wrap up their work and link to an online survey (http://www.fcki.arizona.edu/gened/survey.htm). The survey contained Likert-scale questions related to the workshop content. It gave participants the opportunity to elaborate on each response as well as to describe their level of satisfaction with the workshop materials, content, and organization through open-ended questions. The final question was: "Write a statement about your overall experience in this workshop and the ways in which you think it will affect your teaching. We will share these statements with those in charge of funding this kind of activity as we try to secure funding for another round of workshops." Participants in the 2001 workshops completed the ending surveys for this research project at this time as well.
After lunch, participants shared their projects. Some projects were presented as works-in-progress; others were complete. Participants had the opportunity to use their projects to simulate an actual teaching event. Rather than teaching with their projects, some participants chose to tell about their projects as they displayed them. Each project was discussed. The facilitators took the opportunity to connect the project content and underlying theories to the workshop content and to student-centered, active learning undergraduate education. The participants and facilitators gave feedback to the presenters, including suggestions for improvements to their projects. Participants packed up their laptops. (Some had carried them back and forth to and from campus all week; others were taking them home for the first time.) At the end of the workshop I attended, people expressed their appreciation for the workshop learning and the support of the facilitators. Likewise, the facilitators expressed gratitude for what they had learned from the participants during the workshop week.

**Interpretative Paradigm**

In this section of this research methodology chapter, I will elaborate on my decisions with regard to data sources, collection, and analysis. All of these decisions were made from an interpretative paradigm that "tries to understand the social world as it is (the status quo) from the perspective of individual experience" (Rossman & Rallis, 1998, p. 35). Capturing the workshop facilitators' and participants' learning experiences was a way for me to understand the perceptions of the stakeholders and to discover the meaning of this instance of faculty development. The interpretative paradigm, then, allowed me to explore and explain this phenomena without predicting or evaluating its outcomes. I have
made every attempt to ground the data in theory as it relates to this particular phenomena and have avoided generalizing theory beyond this particular case. Ultimately, the interpretation of this study is left up to you, the reader, based on your own feelings about the trustworthiness of the study and your ability to find parallels between the workshop under study and your own experience (Milam, 1992, p. 325). To that end, I have collected data from many sources and have provided "thick descriptions" (Geertz, 1983) of the participants' worldviews. I believe the data sources, collection, and analysis have supported a humanistic presentation of this workshop and this study.

**Integrated Methodology**

In order to accomplish this study, I have employed an integrated case study research methodology. I administered quantitative beginning and ending workshop surveys (Appendixes C and D) and an online population questionnaire (Appendix E) that included both pre-figured Likert scale questions and open-ended, three-part in-depth qualitative interviews with four of the workshop’s facilitators (Seidman, 1998), a one-week field study of one participant and two follow-up interviews, and one-hour interviews with seven workshop alumni, selected as a purposeful sample (Patton, 2002). Before meeting with interviewees, I took an interview guide approach by developing categories and topics to explore (Appendixes B and C), and I remained open to following the interests of the participants (Rossman & Rallis, 1998).

I made no attempt to apply statistical tests to the quantitative measures on the beginning and ending surveys or to those on the online questionnaire data. My stance in this study was that the data was emergent. I did not and do not hold preconceived,
measurable notions about what makes the workshop successful or unsuccessful. I did not attempt to compare the workshop’s effectiveness with similar faculty development initiatives. The context for this learning experience is unique and site specific. My research goal, therefore, was “to reach a deeper understanding of the participants’ lived experiences” (Rossman & Rallis, 1998, p. 85).

This site and my research questions were well suited for gathering qualitative data. The workshop emphasized individual outcomes for participants and in-depth information was needed about certain cases (the perspectives of facilitators and participants). There was interest on the part of the facilitators in improving this workshop and using the survey data to guide the two final workshops and all the data sets to plan for future faculty development initiatives. The data then provided them with both formative and summative evaluation information. There was also a strong possibility that the workshop affected facilitators and participants in unanticipated and unique ways that could be missed by relying completely on standardized interview protocols (Patton, 2002). A qualitative research paradigm and a case study methodology fit the goals, the research questions, and the site-specific context of this study.

Data Collection

For this integrated case study, I systematically collected interview data from the program facilitators and from faculty participants, survey data from the 2001 workshop participants, and questionnaire data from the workshop population. The following is a chronological account of the data collection. (See Tables 3.3 and 3.4 for matrixes of data sets, collection dates and methods, and dates of transcription or compilation.)
The facilitators' interviews focused on their histories with regard to teaching and technology, their workshop experiences, and the meanings they applied to the workshop (Seidman, 1998). On March 23, 2001, I conducted the first in-depth interview with Harrison, the co-designer of the workshop and its last director and main facilitator. March 30, 2001 was the first interview with Austin, the co-designer and former director and workshop facilitator. Each interview with Harrison was approximately 90 minutes in duration; each interview was held one week apart. Each interview with Austin was approximately 60 minutes in length; the first two interviews were one week apart, the third was two weeks after the second. In addition, I conducted one 90-minute small group interview with Snitzer and Williams, two of the workshop's technology facilitators.

All of the interviews were audiotaped and I transcribed each one word for word using a transcribing machine. Both Harrison and Austin videotaped an addendum to their third interviews focusing on the meaning of the workshop. I transcribed the audio portion of these videotapes as well and captured digitized video vignettes from these addenda. After each interview was transcribed I shared it with the participant, who made any necessary corrections for accuracy. All of the interviews were held at the FCII on the University campus. The participants' own words were then used to create their profiles of the meaning they ascribe to the workshop. In addition, I used Harrison's interview focused on the workshop experience to create an additional profile of her from that perspective.

The beginning and ending workshop surveys were administered to a total of twenty-six workshop participants. The beginning workshop survey was designed to gather data about the participants' motivation for attending the workshop, their previous
technology and teaching practices, and their beliefs about technology tools integration. The ending workshop survey was designed to gather data about participants' learning experiences and whether or not, as a direct result of the workshop experience, there were self-reported changes in their beliefs about teaching and/or technology tools integration.

I conducted a field study of one participant in the May 2001 workshop. I collected observational data through field notes and engaged the participant in think-aloud strategies to access his impressions of the workshop experience. I interviewed the field study participant two weeks after the workshop week and again one year later. In both cases, I audiotaped the interviews and transcribed them word for word. From the transcripts, I created a biographical sketch of this participant. With his own words, I composed vignettes related to his workshop experience and its impact on his teaching.

The online questionnaire was administered to 150 workshop alumni. (This number represents the number of workshop participants who were still teaching at the University on September 2001, the time of the first invitation to participate in the questionnaire.) These pre-figured and open-ended questions were designed to gather data about the participants' use of the laptop itself, their use and integration of the software and teaching methodologies to which they were exposed during the workshop, and their impressions and opinions about the impact of the workshop on their teaching.

Through their response to a question on the online questionnaire, I identified seven workshop alumni to participate in face-to-face interviews. I selected a sample from which I believed I could learn the most (Merriam, 1988). Between March and May 2001, selected faculty participated in interviews lasting approximately one hour. (Three interviews were longer than one hour.) I transcribed these interviews word for word and
from them created a biographical sketch of each participant and composed a profile in his or her own words.

The overarching research question for this study is: How does university faculty development constructed around technology tools integration influence faculty movement toward a student-centered classroom environment? All data sets were utilized to illuminate the answer to this question. Table 3.2 shows the research sub-questions and the data sets analyzed for this study.
### Table 3.2

**Research Sub-questions and Data Sets**

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Who or How?</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the perceptions of program facilitators and participants about their behaviors with regard to technology tools integration during and/or after this faculty development experience?</td>
<td>Interview profiles of four workshop facilitators</td>
</tr>
<tr>
<td></td>
<td>Field study profile and interviews with one 2001 workshop participant</td>
</tr>
<tr>
<td></td>
<td>Interview profiles of seven workshop faculty alumni</td>
</tr>
<tr>
<td></td>
<td>Beginning and ending workshop surveys of 2001 workshop participants</td>
</tr>
<tr>
<td></td>
<td>Online population questionnaire</td>
</tr>
<tr>
<td>What are the perceptions of program facilitators and participants about their beliefs related to technology tools integration and/or teaching philosophies during and/or after this professional development experience?</td>
<td>Interview profiles of four workshop facilitators</td>
</tr>
<tr>
<td></td>
<td>Field study profile and interviews with one 2001 workshop participant</td>
</tr>
<tr>
<td></td>
<td>Interview profiles of seven workshop faculty alumni</td>
</tr>
<tr>
<td>What are the perceptions of program facilitators and participants about the components of the Laptop Workshop that invite educators to reflect on their teaching roles and instructional practices?</td>
<td>Interview profiles of four workshop facilitators</td>
</tr>
<tr>
<td></td>
<td>Field study profile and interviews with one 2001 workshop participant</td>
</tr>
<tr>
<td></td>
<td>Interview profiles of seven workshop faculty alumni</td>
</tr>
<tr>
<td></td>
<td>Beginning and ending workshop surveys of 2001 workshop participants</td>
</tr>
<tr>
<td></td>
<td>Online population questionnaire</td>
</tr>
<tr>
<td>What meaning do the program facilitators and participants ascribe to this learning experience?</td>
<td>Interview profiles of four workshop facilitators</td>
</tr>
<tr>
<td></td>
<td>Field study profile and interviews with one 2001 workshop participant</td>
</tr>
<tr>
<td></td>
<td>Interview profiles of seven workshop faculty alumni</td>
</tr>
</tbody>
</table>
The interview data sets were particularly important in describing and understanding the workshop from a sociocultural perspective. Observation alone cannot elicit data about feelings, thoughts, and intentions; in-depth interviews are necessary to reach a deeper understanding (Patton, 2002). The face-to-face interview data were critical in describing the facilitators' and participants' values and beliefs with regard to teaching, learning and technology integration and the meaning they ascribe to the workshop and were particularly illuminating with regard to the facilitators' intentions for the workshop. (Although these two sub-questions are mentioned in the Chapter 7: Survey and Questionnaire Data discussion, the survey and population questionnaire did not contribute significant data in the areas of beliefs and meanings.)

The beginning and ending workshop surveys were a means to begin to corroborate the impressions of the facilitators with regard to the benefits of the workshop to the faculty participants. This survey data pointed to possible critical incidents or topics during the workshop that may have resulted in participants modifying their teaching beliefs and/or practices. With the permission of the participants, all of the data from this preliminary study was shared with the workshop facilitators. The survey results were posted to the Web and shared with the workshop facilitators and with the twenty-six participants as well. This information may have influenced the teaching practices of the facilitators that could have, in turn, affected the outcome of the May and/or June workshops. (All of this data had the potential to influence the facilitators as they planned for future faculty development workshops.) Sharing the data and analysis from this study might also have influenced the beliefs and practices of participants. Some participants may have found it especially useful to compare their experience of the workshop, their
beliefs about student-centered learning and teaching, and/or the resulting technology integration with that of their peers.

**Narrative as a Research Methodology**

First-person profiles and vignettes are one way to honor the interview process because the data most clearly resembles the narrative form in which it was shared with the researcher (Seidman, 1998). This format acknowledges that the researcher has, through the transcription process, taken the speech of the participant and reduced it to words (Nelson, 1989). Each of the profiles or vignettes shared in this study presents the workshop experience in the participant’s own words. I have chosen this format because I believe in the power of participants’ own stories to illuminate their lived-through experience of the workshop. The narrative format is an attempt to be "sensitive to the storied quality of many qualitative data" (Coffey & Atkinson, 1996, p. 52).

Story represents a way of knowing and thinking about values and actions (Carter, 1993). In the semi-structured interview process, I encouraged each participant in this study to elaborate on his or her response to a question or a comment and to "tell" his or her story. Similar to literary stories, these spontaneous narratives were attempts by their speakers to communicate in a memorable and comprehensible manner (Olson, 1990). The stories invited and encouraged the participants to make sense of their workshop experiences. "Story" or "narrative" has been used as both a method and the object of inquiry in teaching and teacher education. Carter (1993) suggests that telling stories "with and about teachers to advance knowledge in the field" (p. 9) may be a conception of story that could utilized to inform research and to educate people for the teaching profession.
Reporting interview data in the form of story sharing has been called "storyspinning" (Langellier & Peterson, 1984, as cited in Nelson, 1989). Sharing data in story form (in the participant's own words) minimizes the perceived authority of the interviewer over the research process. Since people share their everyday lives in stories, this format supports a natural relationship between the interviewee and the interviewer, between the researcher and the data, and between the data and the research report reader. This format correlates with the naturalistic quality of qualitative research. In the interview and story sharing process, "time is placed into a personal history, where the past is given meaning in the present. Social actors organize their lives and experiences through stories and in doing so make sense of them" (Coffey & Atkinson, 1996, p. 68).

I realize that the interview process and crafting the profile involved me as the interviewer as well. Therefore, in those ways, the profiles and vignettes that form the heart of this study are both the participants' stories, and they are mine (Mishler, 1986). My agency was particularly apparent in my attention to the metaphors participants utilized in their stories. I have titled each profile and vignette with a metaphor or simile taken directly from the participant's narrative. For me, these metaphors clearly encapsulated the meaning each participant ascribed to the workshop experience. It was particularly critical to me, then, that during the member checks each participant "agreed" to my perception by identifying strongly with his or her own metaphorical profile title.

"Just as hypotheses are the reasoning tool of instrumental learning, metaphors are the tools of communicative learning" (Mezirow, 1991, p. 80). In the discourse analysis tradition, the metaphor as a speech act can be thought of as a way for people to make connections between prior knowledge or assumptions and new learning or the unknown.
Understanding metaphors is described by Schön (1979) as a tradition in which one "treats metaphor as central to the task of accounting for our perspectives on the world; how we think about things, make sense of reality, and set the problems we later try to solve" (p. 254).

I believe the participants in this study created "metaphors for extending meaning beyond the data as given" (Mezirow, 1991, p. 105). Ortony (1975) discusses three theses for metaphors. First, metaphors offer compactness and help the speaker transfer learning from the well known to the less-well known. The secondly thesis states that metaphors serve to increase the vividness of the event and its memory. Thirdly, metaphors can assist the speaker as he or she encodes symbolic experience into language; Ortony calls this the inexpressibility thesis. In all three theses, metaphors enhance the limitations of language. I have used the participants' metaphors to extend the limits of the text of their profiles and vignettes. For me, the metaphors are a frame of reference that added coherence to the text (Sticht, 1979).

Sharing these profiles and vignettes is one "way to find and display coherence in the constitutive events of a participant's experience, to share the coherence the participant has expressed, and to link the individual's experience to the social and organizational context within which he or she operates" (Seidman, 1998, p. 103.) As a researcher, however, I have also gone beyond the participants' stories. In the discussion sections of each chapter, I have shared how the participants' experiences relate to the literature on faculty development, technology-tool integration, diffusion of innovations, and educational reform. I have also shared confirmations of my intuition, my surprises, and my insights. In Chapter 8, the cross-perspectives chapter of this study, I have identified
the similarities and differences across the profiles. Certainly, in this research study, the participants' profiles are a critical piece of the data analysis and interpretation but they are not the entire story.

Data Analysis

The data analyzed in this research study is triangulated through comparison among the various data sets. The primary data sources were the workshop facilitators, the field study participant, and seven interviewed faculty. The secondary data sources were the last twenty-six faculty participants as reflected in the beginning and ending workshop surveys and the fifty-three participants who responded to the online questionnaire.

Table 3.3 shows a matrix of the primary source data sets, collection dates and methods, and dates of transcription.

Table 3.3
Matrix: Primary Sources

Data Sets, Collection Dates and Methods, Dates of Transcription

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Date</th>
<th>Instruments/Field Notes/Audio/Video</th>
<th>Transcribed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harrison</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Part In-depth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interviews</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview #1</td>
<td>March 16, 2001</td>
<td>Interview Notes and Audio</td>
<td>March 18, 2001</td>
</tr>
<tr>
<td>Interview #2</td>
<td>March 23, 2001</td>
<td>Interview Notes and Audio</td>
<td>March 25, 2001</td>
</tr>
<tr>
<td>Interview #3</td>
<td>March 30, 2001</td>
<td>Audio Interview Notes, Audio and Video</td>
<td>April 7, 2001</td>
</tr>
</tbody>
</table>
Table 3.3 (cont.)

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Date</th>
<th>Instruments/Field Notes/Audio/Video</th>
<th>Transcribed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snitzer and Williams</td>
<td>March 22, 2001</td>
<td>Interview Notes and Audio</td>
<td>April 9, 2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>April 18, 2001</td>
</tr>
<tr>
<td>Focus Group Interview</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Austin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Part In-depth Interviews</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview #1</td>
<td>March 23, 2001</td>
<td>Interview Notes and Audio</td>
<td>March 28, 2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>March 29, 2001</td>
</tr>
<tr>
<td>Interview #2</td>
<td>March 30, 2001</td>
<td>Interview Notes and Audio</td>
<td>April 1, 2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>April 10, 2001</td>
</tr>
<tr>
<td>Interview #3</td>
<td>April 12, 2001</td>
<td>Interview Notes, Audio and Video</td>
<td>April 13, 2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>April 20, 2001</td>
</tr>
<tr>
<td>Waits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Study</td>
<td>May 14 – 18, 2001</td>
<td>Field Notes</td>
<td>June 1, 2001</td>
</tr>
<tr>
<td>Follow-Up Interview</td>
<td>June 4, 2001</td>
<td>Interview Notes and Audio</td>
<td>June 10, 2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>July 23, 2001</td>
</tr>
<tr>
<td>One-Year Later</td>
<td>August 2, 2002</td>
<td>Interview Notes and Audio</td>
<td>August 10, 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>August 18, 2002</td>
</tr>
<tr>
<td>Interviews with Workshop Alumni</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holmes</td>
<td>March 20, 2002</td>
<td>Interview Notes and Audio</td>
<td>March 26, 2002</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>April 30, 2002</td>
</tr>
<tr>
<td></td>
<td>follow up – April 22, 2002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piich</td>
<td>March 25, 2002</td>
<td>Interview Notes and Audio</td>
<td>March 28, 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>May 2, 2002</td>
</tr>
<tr>
<td>Lennon</td>
<td>March 28, 2002</td>
<td>Interview Notes and Audio</td>
<td>March 31, 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>May 15, 2002</td>
</tr>
<tr>
<td>Trotsky</td>
<td>April 1, 2002</td>
<td>Interview Notes and Audio</td>
<td>April 3, 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>May 30, 2002</td>
</tr>
</tbody>
</table>
Table 3.3 (cont.)

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Date</th>
<th>Instruments/Field Notes/Audio/Video</th>
<th>Transcribed</th>
</tr>
</thead>
</table>
| Bernstein| April 4, 2002 | Interview Notes and Audio           | April 7, 2002
|          |            |                                    | June 5, 2002         |
| McCort   | April 5, 2002 | Interview Notes and Audio           | April 10, 2002
|          |            |                                    | June 8, 2002         |
| Renault  | May 23, 2002 | Interview Notes and Audio           | May 27, 2002         |
|          |            |                                    | June 10, 2002        |

Table 3.4 shows a matrix of secondary data sets, collection dates and methods, dates of transcription or compilation.

Table 3.4

**Matrix: Secondary Sources**

**Data Sets, Collection Dates and Methods, Dates of Transcription or Compilation**

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Date</th>
<th>Instruments/Field Notes/Audio/Video</th>
<th>Transcribed/Compiled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning and Ending Surveys</td>
<td>May 14 – 18, 2001</td>
<td>Surveys</td>
<td>July 14, 2001</td>
</tr>
<tr>
<td>Population Questionnaire</td>
<td>September, 2001 and April, 2002</td>
<td>Online Questionnaire and Postings</td>
<td>May 15, 2002</td>
</tr>
<tr>
<td>Jackson Administrator Interview</td>
<td>August 1, 2002</td>
<td>Interview Notes and Audio</td>
<td>August 12, 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>August 25, 2002</td>
</tr>
</tbody>
</table>
As I read through the interview data and open-ended responses to the surveys and questionnaire, I scanned the data for similarities and anomalies. I made lists of repeated words, phrases, and ideas in the margins of the transcripts. In addition to my own reading, I utilized technology to locate and verify some of these repetitions. The domain of my analysis was the words of the participants themselves. This allowed me to determine authentic themes. I further analyzed the themes suggested in the data to identify units of information from which I identified broad categories. I constructed the facilitator and faculty profiles from these broad categories. I further analyzed the profiles, or chunks of data, with the Van Kaam line-by-line method of analysis (Moustakas, 1994). This open-coding methodology allowed me to examine complete thoughts, either phrases or sentences, and allowed me to focus my analysis more precisely.

My overall data analysis strategy was to employ a constant comparative methodology (Glaser & Strauss, 1967). Glaser and Strauss (1967) identify four stages of constant comparative analysis. First, incidents are compared. This allowed me to identify tentative categories. Next, I compared the incidents within each category and ascertained whether or not the properties of each category were reflected in the data. Thirdly, I reduced these categories to a smaller number and began to develop hypotheses and a framework for understanding the data. I checked the data again and again to ensure that they fit the framework. Finally, I began to think in terms of theory based on the coded data (Glaser & Strauss, 1967). At this level of analysis, I was able to make inferences and begin to refine my theories regarding the interaction among the people, place, and processes of the workshop.
Throughout the analysis process I revisited my research questions. I searched the data for convergence and divergence. In order to honor the contributions of the research study participants, I utilized member checks for each of the data sets (except the online questionnaire). This allowed me to confirm or disconfirm my inferences. Finally, I was able to bring all the data and my initial interpretations together in the cross-perspectives chapter of this research report. I conducted explicit cross-checking for the meanings contained within the thematic topics among the various participants' stories/perspectives. My interpretation of the data and the subsequent implications and conclusion of this study are based on my interpretation of these "correlative thematic topics" (Nelson, 1989).

**Workshop Facilitators: Interviews**

I began analyzing the workshop facilitators' interview data in the transcription process. As I transcribed the audiotapes, themes began to form and were reflected in the decisions I made in formatting the data. I grouped portions of the narratives into paragraphs as I keyboarded the interviews so that when I began to analyze, many paragraphs or groups of paragraphs contained one or two major themes. After the transcriptions, I continued the process by reading over the participants' own words. I noted the major themes in the margins of the transcripts.

I used the initial interviews to compose a biographical sketch of each facilitator. Then I utilized the second and/or third parts of the three-part interviews or the third section of the small group interview, in the case of Snitzer and Williams, to create the profiles of the workshop facilitators. The focus of this analysis was on both the main
workshop facilitator Harrison’s experiences of the workshop and on the meanings all four facilitators ascribed to the workshop. After reading each transcript several times and coding it for repeated and emphasized words, phrases, and concepts, I created a profile from each facilitator’s own words. I added the words in brackets to clarify the speaker’s meaning. Although the text is not in the precise chronological order as it was spoken in the audio taped and/or video taped interviews, I have preserved the speaker’s meaning. I removed redundant responses but constructed each participant’s profile such that the most frequently repeated and/or most emphasized themes appear within the text. The participants each received a copy of their profiles for their review and approved the profiles and their metaphorical titles as reflective of their experiences.

Field Study Participant: Observation and Interviews

During the field study, I kept field notes that included a running record of the details of the participant’s experience and observer comments based on my own experience as the "observer as participant" (Merriam, 1988, p. 92). (The May 2001 workshop participants were aware of my research activities.) The running record included details of the workshop environment, direct quotations from the participant’s questions and responses to the facilitators, his fellow workshop participants, and myself, and my observations of the participant’s interactions with the content and other participants throughout the learning process. The observer comments included my personal responses to the participant’s comments, emotional reactions and insights into the workshop events as well as my questions about my observations. Together these field notes formed a basis
for the interview I conducted with the participant two weeks after the workshop experience.

I transcribed both this interview and the one-year-later interview verbatim. Similar to the experience of transcribing the facilitator interviews, I began to analyze the data during the transcription process. Personally transcribing the interviews helped me to immerse myself in the data and allowed me to begin to notice themes as they emerged. This initial analysis was reflected as I formatted the transcript on the computer screen.

Once the initial interview was transcribed, I created a biographical sketch of this workshop participant. As the data from both interviews was collected during open-ended informal interviews and was guided by my questions regarding my observations during the field study, the participant's testimony was more conversational than that of the workshop facilitators. After analyzing the interviews in their entirety, I utilized these results to create vignettes related to the themes that characterized the participant's interview data to reinforce the themes that emerged from his testimony. Similar to the profiles created from the facilitators' interviews, the content of the vignettes is not necessarily in the precise order it was shared; however, I have preserved the field study participant's meaning. He received a complete copy of the profile and vignettes and their titles and agreed that they accurately reflected his workshop experience.

Workshop Alumni: Interviews

With the seven alumni interviews, I followed the same data analysis procedures as I utilized for the workshop facilitator interviews. I personally transcribed all seven interviews. As with the facilitator and field study participant transcriptions, themes began
to emerge in this process. As I transcribed the audiotapes, emergent themes were reflected in the decisions I made in formatting the data into paragraphs. After the transcription process was complete, I continued to discover themes and categories within those themes by reading over the participants’ own words. I noted the major themes and categories in the margins of the transcripts.

I began organizing the analysis of the data by utilizing the first-person accounts from the one-hour interviews to compose a biographical sketch of each faculty participant. This helped me construct a unique "picture" of each participant. After reading each transcript several times and coding it for repeated and emphasized words, phrases, and concepts, I created a profile from each workshop participant's own words. Within the profiles, I added the words in brackets to clarify the speaker’s meaning. Similar to the facilitators' and field study participant's profiles, the profiles are not in the precise chronological order as spoken in the audio taped interviews. I removed redundant responses but constructed each participant’s profile to spotlight the most emphasized themes. I identified an insightful metaphor in each profile and utilized it as a profile title. The participants each received a copy of their profiles for their review and approved the profiles and titles as reflective of their workshop experiences.

**Workshop Surveys and Online Population Questionnaire**

I compiled each of the three beginning and ending workshop surveys by tabulating the responses to each prefigured question and aggregating the open-ended question responses. I compiled the data from the surveys from all three workshops after the final one was held in June 2001. I used a color-coding system to note the open-ended
question responses that related to the broad themes of teaching, technology tools, place, people, and technology support.

Under these broad themes, subcategories emerged as I analyzed participants' open-ended question responses. Some of these subcategories emerged directly from the questions; others developed across questions. From these subcategories, I identified and grouped responses related to participants' teaching and technology goals for the workshop and their achievements from the workshop, supports and hindrances in the workshop environment, assessment of the pace of the workshop and its components, teaching and technology behaviors, and beliefs about teaching with technology tools.

**Faculty Development Administrator: Interview**

Although not an "official" participant in this research study, Dr. Sally Jackson, Vice Provost for Faculty Development and Educational Technology at the institution under study agreed to meet with me and share her perspective on the workshop. Our meeting was prompted by my decision to share with her an early draft of the beginning and ending workshop surveys and online questionnaire data analysis found in Chapter 7 of this research study. I delivered the data in person and asked Jackson if she would be willing to meet with me again once she had the opportunity to review the data; she agreed to a meeting. I also provided her with a list of questions that addressed the administrative history and perspective on the workshop.

One week later, we met to discuss the data and converse informally around the questions I had provided her. I took notes during the interview and transcribed the audiotape verbatim. Her perspective helped me place the workshop on the continuum of
past and future faculty development initiatives at the University. Although I did not set out to specifically include the administrative perspective in this study, I have included some of Jackson's comments in Chapter 8 of this research report.

Researcher as Instrument

As a researcher, I have taken an interpretative constructivist stance in this study. I have a "pluralistic, interpretive, open-ended, and contextualized (e.g. sensitive to place and situation) perspective" (Creswell & Miller, 2000, p. 125) toward reality and my perspective has influenced this study. Above all, I have been a "passionate participant" in this study (Toma, 2000). As I became more and more involved in this project, first as a participant then as a researcher, I moved gradually but surely into an advocate role vis-à-vis the workshop. Developing trusting relationships with the workshop facilitators and participants allowed me to gain access to this faculty development initiative and improved the quality of the data I collected.

I have no doubt that my values have influenced my interactions with the workshop facilitators, the field study participant, and the workshop alumni whom I interviewed. The workshop facilitators and I have many shared values and beliefs. I entered into a partnership relationship with Harrison as we formulated the online questionnaire and shared the data that resulted from that data set. I share many of the concerns and goals of the faculty members I interviewed. Many of them expressed positive feelings of support for this study and thanked me for listening as they shared their stories with me. Many participants verbalized their perceptions that the interview process and the resulting analysis in the form of their profiles and vignettes helped them
reflect on the workshop experience and influenced the impact the workshop experience has had on them. "Our continued learning becomes dependent upon a reflective review of what we have learned, how we have learned it, and whether or presuppositions are warranted" (Mezirow, 1991, p. 109). I believe that engaging in the interviews was one way the participants continued and made sense of their workshop learning. Some participants asked that I share the final findings of this study with them. A sense of partnership and reciprocity has undoubtedly and inevitably influenced this inquiry (Guba & Lincoln, 1981).

In the literature, there are many examples of qualitative studies that can be characterized by the trust developed between the participants and the researcher and the advocacy of the researcher for the improvement of the lives of the study participants. Fine's (1991) study of high school dropouts, McLeod's (1995) study of social reproduction theory related to working class young adults, and McCarty's (2002) study of the bilingual bicultural school at Rough Rock on the Navajo reservation are three examples. Although I employed a case study methodology that did not explore the lives of the participants as deeply as the researchers did in these ethnographies, one of my primary goals in the interview process was to develop a sense of trust and reciprocity between the participants and myself. The interviews were transactional in nature; the participants and I helped each other as we explored the meaning of the workshop experience. I acted as a facilitator in the data collection; I have been a participant alongside the participants in this study (Toma, 2000). Through sharing these data and interpretations with University decision-makers and faculty development staff and with
the publication of this research report, I have advocated for people-centered faculty
development, another primary goal of this study.

It has been critical, therefore, that I constantly examined and reexamined my
motives and methods. I clearly shared with the facilitators and faculty participants my
passion for the topic of faculty development and the appropriation of technology tools for
student-centered education. During the research process and while writing this research
report, I have constantly questioned the influence of my biases on my interpretations of
the data. I have shared all the profiles and vignettes with the participants and listened to
their feedback and made appropriate corrections to the data. I have involved participants
in assessing whether the interpretations accurately represent their experience (Creswell &
Miller, 2000). Through member checking, thick description, and triangulation across
perspectives, I have attempted to present a valid interpretation of this case, this incidence
of faculty development. Throughout this research report, I have referenced my
perspectives on technology-enabled student-centered teaching and learning. Through
reflexivity and attention to ethical issues, I hoped to build and maintain trust with both
the participants in this study and its readers.

Conclusion

It is from this stance that I share the following data chapters. In them, I have
honored the participants in this study by sharing their experiences, their stories, in a
holistic manner. So as not to interrupt their narratives, I have presented their profiles and
vignettes intact and have reserved my further analysis and interpretation of the data for
the discussion section of each chapter. "Meaning is making sense of or giving coherence
to our experiences. It's the way we make sense of our experiences" (Mezirow, 1991, p. 11). These profiles allow the participants themselves to express their workshop experiences. Their stories were a way for me to make meaning from their experiences. Engaging with these profiles, with the participants' own stories, is a way to access the lived-through experiences of the study participants and to help the reader make decisions regarding the applicability of these finding to other faculty development initiatives.
CHAPTER 4

PROFILES FOCUSED ON THE FACILITATORS' PERSPECTIVES

In this chapter, I begin to describe the workshop from different perspectives. It is critical to begin with the workshop facilitators' profiles because they describe the intentions that frame the workshop and explain the motivation behind their decisions and behaviors; the facilitators' beliefs, values, and actions framed the workshop experience. Data from each interview has been "shaped into a profile that has a beginning, a middle, and an end, as well as some sense of conflict and resolution" (Seidman, 1998, p. 102). These stories illuminate the meaning the facilitators ascribe to this teaching-learning experience. These stories offer the reader a glimpse into each facilitator's personal frame or paradigm through which he or she views the world (Kuhn, 1962) and understands his or her workshop experience. Figure 4.1 shows the facilitators' perspectives as one of four perspectives on the workshop; it also suggests the forces that operated on their perspectives and the results that emanated from their actions.
The role of the workshop facilitators' beliefs and behaviors with regard to learning, teaching, and technology form the basis for an investigation into both the workshop design and its intended outcomes. This chapter includes biographical sketches of four facilitators, Harrison's experiences facilitating the workshop, and the meaning each of the four interviewed facilitators ascribed to this faculty development initiative. In order to preserve the narrative, I shared the facilitators' interviews in the form of uninterrupted profiles composed from their own words. After each profile, I have offered an explication, a brief explanation of that particular story. At the end of the chapter, I discuss the aggregate of these profiles based on the four sub-questions of this research study that inquire about the workshop from the facilitators' perspectives. I then share my insights and conclude the chapter with the facilitators' perspectives on the overarching
research question: How does university faculty development constructed around technology tools integration influence faculty movement toward a student-centered classroom environment?

Classroom context or ecology is an educational research paradigm that explores the impact of the "hidden curriculum." The affective factors that frame classroom experiences are critical to the learners' achievement. The learner brings affective factors with him or her to the learning situation in the form of emotions, values, and attention. These affective factors, however, can be modified by the decisions adult learning facilitators make about the classroom context (Ferro, 1993; Kidd, 1973; Smith, 1982; Wlodkowski, 1985), such as the formal or informal feeling of the environment, the norms for participation, and the seating arrangement, which is related to opportunities for discussion and for whole and small group work. All of these factors and more set up the classroom ecology and make silent statements about the extent to which the facilitator has allowed for authority and power sharing. These features are important factors in any classroom; they have been found to be particularly critical in the adult learning environment (Wlodkowski, 1985).

In a study focused on a faculty development training course at the University of Maryland on the use of the WebCT course management tool, these affective factors were identified: the importance of the faculty development training atmosphere in terms of trust, a non-competitive environment between trainer and faculty, the feeling of a shared exploration of new technologies, and a place where faculty can take risks to achieve learning goals (Robinson & Borkowski, 2000). The need to decrease competition and increase cooperation and collegiality among faculty participants has also been noted as
key in successful technology-focused faculty development programs (Rowe, 1999; Sorcinelli, 1999).

One particularly notable gap in the literature is a discussion of the techniques used to teach faculty. Christine Lee Algren’s (1989) dissertation recommended that adult learning principles should be considered in the design and implementation of faculty development projects. I have been unable to find studies in which the use of adult learning principles such as those proposed by Knowles (1975) were included in the description of the faculty development initiative. Stephens (1992) surveyed 170 colleges and universities with regard to their faculty development initiatives based on the use of technology. He found that there are no standards by which faculty development programs are evaluated. He asked, “What makes an effective program?” (p. 10). Ten years later, this question is still with us.

Methodology and Data Analysis

In the following interview data shared in the form of first-person profiles and data analysis, I set out to examine the beliefs and values and teaching methodologies of the adult learning facilitators for the workshop. It is through their perspectives on the experience and meaning of the workshop that I intend to share the first layer of understanding of this program, an understanding that may help to illuminate the experiences and meanings applied to this initiative by the faculty participants.

Using an interview protocol (Appendix A), I systematically conducted three-part interviews focusing on the facilitators’ history with regard to teaching and technology, their workshop experiences, and the meanings they applied to the workshop (Seidman,
Each interview with Harrison was approximately 90 minutes in duration; each interview was held one week apart. Each interview with Austin was approximately 60 minutes in length; the first two interviews were one week apart, the third was two weeks after the second. In addition, I conducted one 90-minute small group interview with Marcy Snitzer and Doug Williams, two of the workshop’s technology facilitators. This group interview was divided into three segments of approximately thirty minutes each as outlined above.

I utilized data from each facilitator’s interview focused on his or her history with regard to teaching and technology to sketch a brief biographical summary. I employ the third-person biographical sketches to introduce the first-person profiles. These sketches include quotations from their interviews. The profiles are composed of each facilitators' own words. These profiles suggest that there is an interpretative process from which these stories emerge. In this process, stories are "shaped by the moralistic impulses of the author" or speaker (Carter, 1993, p. 9). I believe these facilitators told me their stories as a way to make sense of their experience, as a way to shape meaning. By choosing to share their stories in their own words, I have attempted to privilege their perspectives and minimize my interpretation of their meaning.

Profile of One Facilitator's Workshop Experience

In order to illuminate the facilitators' perspective on the actual workshop experience, I have chosen to share Harrison's workshop experience profile. It seemed logical to choose Harrison's profile because she has been the most continuously involved in the program. It was also clear from the workshop experience data that the facilitators
had reached a certain level of consensus as to the experience of facilitating this faculty development initiative. Harrison's experience profile is representative of the others' experiences as facilitators. I do not believe that sharing all the facilitators' workshop experience profiles would have added significantly to the understanding of the experience of facilitating this instance of faculty development. Below is Harrison's biographical sketch, followed by her workshop experience profile, *The Gift of the Workshop*, and an explication of that profile.

**Biographical Sketch: Dr. Elizabeth Harrison,**

**Associate Director of the University Teaching Center**

Elizabeth "Beth" Harrison was hired to teach as an assistant professor in the Department of East Asian Studies at the University in 1991. Prior to that, she had taught four years in a study abroad program and two years at a liberal arts college. In her graduate degree program at the University of Chicago, she had not received professional training in teaching. In our interview, Harrison noted that she realized in graduate school that she might benefit from coursework in teaching methodology. When she asked her academic advisor, he said, "Don't waste your time." Like many university-level educators and six of the eight of the faculty participants in this study, Harrison learned to teach on the job.

In 1996, Harrison received a Dean's letter offering her a leave of absence (without pay) to focus on writing and publishing. She needed an income while she engaged in this responsibility. She mentioned that fact to an administrator, who was her mentor at the time. This person recommended Harrison to the director of the University's Teaching
Harrison was offered a part-time position at the University's Teaching Center during her sabbatical. At the Teaching Center, she discovered the "intellectual challenge" of teaching and developed a deepening desire to learn more about technology tools. She was exposed to a wide-array of resources; she attended the POD (Professional and Organization Development Network) Conference, a faculty development professional organization. Said Harrison about those first months at the Teaching Center, "It was like a whole universe opened up to me."

Also, in 1996, Harrison received the University's student-nominated Five Star Teaching Award. Harrison describes her ability to share her lived-through experience of Japanese culture as "oozing out" in her lectures. Said one student, "Her lectures are diverse, and she uses a variety of visual aids to teach." In issuing the award, a university spokesperson said, "The variety of techniques she used is what tipped the scales."

The year before, Harrison had been among the first University faculty members to participate in a workshop series on technology. The twenty-five participants met every two weeks, shared eight computers, and were mostly shown technology applications rather than invited to have hands-on experiences. At the end of the series, each participant was supposed to receive a $5,000 computer workstation in or near his or her department. These workstations didn't materialize and left Harrison frustrated by her inability to capitalize on what she had learned about PowerPoint, the software application that she felt could greatly impact her large lecture hall teaching.

It is no coincidence then that in 1997 when, along with Jim Austin and two other Teaching Center colleagues, she volunteered to brainstorm a technology-tool based faculty development program. Their plan was based on hands-on experience and
participant ownership of the necessary computer hardware and software tools. The first iteration of the workshop was based on departmental groups, software application station rotations, and a $5,000 technology grant to the departmental group upon completion of the sixteen-hour training.

Harrison describes herself as someone who "wants to be where things are happening." She knew from first-hand experience with PowerPoint that technology tools could make a huge difference in her teaching. By volunteering to work with Austin, Harrison had the best possible learning situation for herself – an ongoing private tutorial with him. She says, "He taught me everything I know." Although she felt like an "unprepared teacher" during those early workshops, Harrison persisted in learning the technology and keeping her focus on classroom applications.

While co-teaching these workshops, Harrison returned to teaching large lecture hall courses of 60 to 150 undergraduate students in the Department of East Asian Studies. She continued to use PowerPoint presentations to introduce topics for discussion and challenged students to use their writing as a means to grapple with ideas. More importantly, however, she designed experiential learning experiences in which students practiced one of the most significant Japanese cultural norms – the importance of the group over that of the individual. Students worked in small groups, shared their writing through peer evaluation, and received group as well as individual grades. She wanted students to "feel the [cultural] difference" not simply be told about it.

Harrison was the co-designer and co-facilitator of the Faculty Laptop Workshop that began in 1998 and was offered to University faculty for three years. The small group, person-to-person experience of the workshop was reminiscent of Harrison's graduate
school experience. She calls both "reciprocal learning environments" in which facilitators and students learn with and from each other. Creating a "living and learning" experience is one of her goals for the workshop just as it was a goal of her Japanese humanities course.

Harrison makes a strong distinction between "teaching" and "training." For her, as well as for Austin, the workshop is about showing participants the possibilities rather than telling them there's a right or a wrong way to do things. Even when Harrison shares the instructional strategy and technology tool choices she has made in the courses she teaches, she shares the reasons behind her decisions and suggests there are many other valid choices. Just as she honors the experience and understanding of undergraduate students, she honors the same in University faculty colleagues. Even though it wasn't until 2000 that Harrison learned about andragogy and adult education theorists Malcolm Knowles, Jane Vella, and Kurt Lewin, she believes that most of what she's learned from these theorists was concepts she had already "intuitively" employed in the workshop. In 1998, Harrison became the Associate Director of the University Teaching Center. She continues to teach as an adjunct assistant professor in the Department of East Asian Studies.

Profile: The "Gift" of the Workshop

We [Austin and Harrison] wanted to offer more ideas and possibilities. [In our view], the whole learning was going to come from people doing things, and we would answer their questions. So we had to figure out how to set that up so that we knew how much was enough to tell. And every group is a little different. [We talked about] how
much is too much of them sitting on their own because we found very quickly that the richness of this workshop was from the feeling that people could talk to each other all the time and work together and ask each other questions and answer each other’s questions and ask us questions and [we would] answer them.

I didn’t in any way want to make this a prescriptive thing. 'You’ve got to do it this way' or 'you’ve got to do this.' We knew that for faculty we had to say, 'You know what your situation is, you know what your background is, you know what your need is, you need to take what you see out of this that will be valuable and run with it. And we will do everything we can to be right behind you and catch you if you need catching.'

[The question for me is] how do we from the very beginning, day one, create an atmosphere that helps people feel comfortable enough that they could ask anything whenever they wanted to? And that’s why one of the things we say we’ve learned out of this is that at least one of the facilitators has to be someone who’s skilled or experienced in teaching. [The workshop] can’t be done by someone who is terribly skilled in technology but can’t deal with people and doesn’t know about teaching. It won’t work. It won’t be the same thing. I knew as we talked about it that we needed to do more on teaching and less on technology.

I will never forget the last day of that [first] workshop. As you know the last day in the afternoon is when every participant presents his or her project that they’ve been working on during the week. At that workshop, one of the participants was an elderly professor from a humanities department. He was close to retirement. And he was literally in tears when it was his turn to speak because he said he had been here for thirty or
thirty-five years and never had the University just come to him and said, 'You want to learn. Then come.'

And he was literally crying about that. And the rest of us couldn't [help but cry] at the same time. It was really something. And he thanked us from the bottom of his heart for the kind of experience he'd had and what he saw as support not in the sense of technical support but human support that he saw as finally coming to him as a faculty member from the institution. And part of it was the money that was spent on the laptop but it was the idea, too. It was: 'We want to do this for you.' We've had senior faculty all the way along [who] continue to say: 'this is the first time that anything like this has been done for me as a faculty member at this institution.'

And so I always feel 'gifted' in the sense of having received a gift if things have worked well because I don't think it's – yes, I have something to do with that certainly – but I can't make that happen. It has to come from sort of gestalt of everyone and the time and the place and everything. I feel very fortunate to be in a place, in a time, and in a situation where I can continue [the workshops] because I think that the most important piece is what individuals are taking away from it and how it's affecting their lives – not just their teaching – but [affecting] them as people. And that's what I see and that's part of why I value so much the smallness of this.

We started out saying we'd do no more than six [people] at a time because Jim knew that you really almost needed one facilitator for every two people. If I keep you waiting for me for fifteen minutes or twenty minutes until I can make the rounds – even if I say, 'I'm coming to you right after I go over here' – [there's] frustration, you forget, you lose the excitement, and you start doing something else. And we didn't want that to
happen. We wanted to be able to feed that excitement or that idea and keep it going and help [them] move towards [their goals].

And so it was really an experiment – that [first] group was – because we didn’t know what would happen if we put people at different levels together. Every once in a while we have someone who feels a little like they are holding everybody back and we continually say out loud, 'You’re not. Everybody’s on [his/her] own. They can go ahead and do it. Don’t worry. Just you do what you need to do from where you start and everybody understands that we start in different places.' I think that that’s been good partly because everybody gets ideas from everybody else. We have some people who’ve tried things in their classes. They can talk about that and that’s a good way for others to learn.

I wasn’t conscious until this fall [2000] when I read that Knowles chapter that I was dealing with adult learners. Of course, I knew I was [teaching] adults and I knew that I had to deal with them differently but it was intuitive. It was not anything that I knew on an intellectual level. And I also have always known intuitively that especially with adults, and even more especially with faculty who have very strong self images, I knew that I had to listen even better to each individual and react to each individual differently. And this [workshop] is eight sizes for eight people. And that’s part of why it works.

[In teaching adults,] I prefer to say, 'Here’s what we’re going to ask you to do, [and] here’s why. We’d like you to think about this, but go do it and see what happens and we’ll talk about it afterwards.' So I prefer to be above board and lay out ahead of time why and what for and let people then take that whichever way they want and then get back together and see what’s happened.
I just want everybody to know that there are other choices here. And we’re choosing one of them because we think it’s good but that doesn’t mean it’s the only one and it doesn’t mean that we think the other ones are terrible. It’s just that for our purposes we’re choosing this one. This [workshop] is about possibilities. And that’s why when we get together around the table [to] start a session, we try to give a kind of overview. Here are the things you can do with this and try to take questions at that more general level or sometimes [on a] theoretical level or abstract level and then send people back to their own machines to put that into their own situation and take it whichever direction they want to go.

There have been groups that say, 'We appreciate what you’ve done in working with each of us individually. We could tell.' Not everyone in all the groups does that – but some people in every group see that happening. And in some groups, everyone sees it happening. And part of it is, as you say, they are teachers and they can see it if they’re not too busy doing other things. They can see it and they can certainly feel it. Sometimes it’s someone in the group who brings that up to everybody’s attention.

I thrive on [the] situation where – and if it’s just two people that’s fine but even more so if it’s four or six or eight – people are sitting around a table all with their minds right in the middle of something and people are working on it. And we start doing that a little bit at the beginning not just introducing each other but start talking about teaching, and not that I think about as a technique or a decision, [but] that’s part of what gets rid of the competition. Isn’t it? Because we ask everybody to talk about [his or her] own experience, what [he or she] teaches and so forth, and so they’ve [each] brought something. Everybody is there and the minds are melding and so forth – that’s what I
thrive on most. And again, it happens whenever I’m working one on one with someone but for me it’s really most powerful when everybody has come together in a significant way. [In the workshop,] the real times that that happens are at the beginning and the end.

I guess I can say I like that because I also now have enough teaching experience under my belt that I feel like I can deal with anything that comes up in that way. And so I have less need to feel like I have to control [the learning]. My need is to feel like I can produce [that level of interaction], that I know how to dependably create that situation or experience for everybody.

Explication: The "Gift" of the Workshop

Harrison’s experience of the workshop is representative of the other facilitators’ experiences as well as her own. In her interviews, Harrison supports the intrinsic value of the workshop through anecdotal evidence as to its impact on students’ learning and faculty teaching behaviors. She also frequently mentions the concept of andragogy and the influence of the work of Knowles (1973) on her understanding of adult education. However, Harrison had been facilitating the workshop for almost two years before Snitzer, workshop technology facilitator and then master’s student in educational leadership, shared this body of theory and research with her. Harrison expresses the belief that many of the intuitive decisions she made as workshop designer and facilitator were in alignment with concepts of andragogy.

After reading and re-reading Harrison’s second interview, which focused on her experience as a workshop facilitator, I searched the data for evidence of the six principles of andragogy: the need to know, self-concept of the learner, prior experience of the
learner, readiness to learn, orientation to learning, and motivation to learn (Knowles, 1978). I employed a color-coding technique highlighting passages in which she addressed specific andragogical principles.

Her profile shows particular attention to the self-concept of the adult learner and his or her internal motivation to learn. Harrison respects the participants as autonomous, self-directed learners. She constructs the workshop around the belief that faculty are predisposed to decision-making with regard to their own learning. Harrison assumes that participants will apply learning to their own disciplines and unique teaching situations. She is also mindful and respectful of faculty members' internal motivation to learn. For a few of the participants, the workshop was undertaken after a strong recommendation by a department head or teaching colleague.

In her interview, Harrison remarks on the differences between early workshop participants who were more innovative and experimental in their approach to learning and later participants who were more product-outcome driven. This observation on her part seems to confirm trends in the diffusion of innovations (Rogers, 1995). The innovators and early adopters tend to experiment first with innovations while the later adopters sign on after the innovation has achieved a reputation for success.

Although less so, Harrison is aware of participants' prior experiences that either help or hinder them and their orientation to learning as they approach the content and process of the workshop. For some of the participants, their prior experiences with technology tools or faculty development initiatives have not been their most successful. One of Rogers' (1969) principles of facilitation is that the facilitator will clarify the general purpose of the group, in this case the goals of the workshop. As shown in the
beginning and ending workshop surveys, many participants came to the workshop with specific learning goals, many of which centered on the learning particular technology tools. Harrison, however, attempted to guide faculty away from an over-emphasis on the technology tools and a broader consideration of teaching practices and beliefs. For some learners, this created a tension that was or was not successfully resolved.

Harrison is much less focused on making explicit the learner's need to know and his or her readiness to learn. Her attitude is that by virtue of being present these learners have signaled that they are more or less open to content of the workshop. For some, who came to the workshop expecting a total focus on technology, the amount of attention devoted to issues surrounding teaching is surprising. For a very few this fact is disconcerting. "I feel there was a bit of unnecessary manipulation in discussions for the sake of drawing out participants' views of technology and teaching. It would have been more enjoyable to ask about what was wanted straightaway, without all the game playing and manipulation" (online questionnaire).

Discussion: Harrison's Profile Focused on the Workshop Experience

The role of the facilitator in establishing the learning environment cannot be underestimated. Harrison discussed the privilege and the responsibility she felt for creating and maintaining the learning environment. I compared Harrison's perception of her role with Rogers' ten precepts for facilitators of learning (Rogers, 1969). Since Harrison's interview focused on her own experience and not necessarily the experience she provided participants, this view of her work was more illuminating than the
comparison with principles of andragogy. These are Rogers’ guidelines. A facilitator of learning:

1. Sets the mood/climate of the group/develops trust;
2. Elicits and clarifies the purposes of individuals in the class (freedom to direct learning) and general purposes of the group;
3. Relies on each student’s desire to self-motivate;
4. Organizes and makes easily available a wide-range of learning resources;
5. Regards herself as a flexible resource for the group (counselor, lecturer, advisor);
6. Accepts both the intellectual content and emotional attitudes of the group;
7. As positive classroom climate is established, she can express her own view as participant learner, just one of the group;
8. Takes initiative in sharing self with the group;
9. Uses strong feelings in the group for constructive understanding;
10. Recognizes and accepts own limitations (Rogers, 1969, pp. 164-166)

Although nine out of ten themes were addressed at some point during the interview, precepts one, two, three, eight, and ten were the most frequently distributed in this particular interview data. Number nine was not evident in the interview; four, five, six, and seven were addressed just once. By far, Harrison’s self-perceived strengths and priorities as an adult learning facilitator fall into the purview of precepts one, two, and three. She is committed to setting the mood and climate for the development of trust, eliciting and clarifying the purposes of individuals and the general purposes of the group, and relying on each participant’s desire to self-motivate.

Harrison also freely shares her experience as an educator of undergraduate student with workshop participants. She also feels strongly about the fact that she is herself a learner alongside the participants. She offers them suggestions based on her teaching
and/or technology experience but insists there isn't one "right" way to do things. Harrison is open and honest about the limits of her abilities and/or experience. She feels this is one way she establishes a collaborative rather than competitive tone within the group.

The other facilitators' interviews based on the workshop experience contained similar data. (Although he retold the event in the interview focused on meaning, Austin also recalled the emotional last day of the first workshop when a veteran faculty member expressed his appreciation for the experience as a singular demonstration of the University's support for his professional growth.) Even though Snitzer was the only other facilitator who specifically mentioned the work of Knowles (1998), all of their interviews contained examples of his principles of andragogy and many aspects of Rogers' (1969) guidelines for learning facilitators. Respect for the autonomy of faculty participants was particularly strong in all the interviews and suggests that the facilitators have discussed the importance of taking this attitude toward participants. It appears the workshop facilitators reached consensus in all aspects of establishing the affective features of this adult learning environment; this impacts both the participants' and their own experience of the workshop (Ferro, 1993; Kidd, 1973; Smith, 1982; Wlodkowski, 1985).

Profiles of the Workshop Facilitators with a Focus on Meaning

The facilitators' profiles that follow were constructed from the third session or segment of the three-part interview process (Seidman, 1998). The focus of these interviews was on the meaning the facilitators ascribe to this faculty development initiative. Each profile, except for Harrison's whose sketch appeared above, begins with a biographical sketch. After each facilitator's first-person profile shared in his or her own
words, I have included an explication, or explanation of the profile. A discussion follows all of the biographical sketches, profiles, and explications.

Data Analysis: Facilitators' Profiles

After reading all four facilitators' transcriptions of their interviews focused on the meaning of the workshop several times, categories began to emerge. Those were defined as comments about teaching, technology, learning, people (relationships or support), and training. I also noted the number of times teaching and technology were mentioned within the same sentence or referred to in adjacent sentences. I used a color-coding system to highlight each of the five categories mentioned above. I noted the number of times a particular category was addressed by each facilitator and/or the quality and/or intensity of the comments in a particular category.

Within each theme, there were several subcategories that were evident across the interviews. The teaching, technology, and learning themes were often intertwined. The connections to teaching included specifics of teaching K-20 students and teaching adult learners, making a difference in people's lives and changing their outlook on teaching, developing relationships, and teaching philosophies and methodologies. The technology theme included mention of technology tools making teaching more interesting, technology as a symbol of change, and non-threatening technology support as a critical component during and after the workshop. In the learning category, using technology tools to address students' expectations and increase students' interest and a myriad of affective aspects of the learning environment including low-threat.
With regard to the people theme, all four facilitators mentioned building relationships and providing support. Harrison said, "Teaching [on the other hand] is the development of relationships – and one piece of that is the relationship between the learner and the teacher." The sense of community – or family feeling - built within the context of the workshop is even more powerful because the facilitators noted that it is an uncommon experience in the larger University culture. Said Austin, "We had an emeritus faculty member actually break down from the joy of finding out that this was something [different] – he’d found a place. And being a part of that [sense of community] has maintained itself through my involvement with all of the workshops." Unlike a "training," the workshop is not about the computer, software, or information. The facilitators stress that people are at the center of this learning experience.

After the initial coding, two other themes emerged around the terms “change” and “different.” I created an individual file based on these categories with the goal of comparing the data among the participants. This was the first stage in building an overarching theme for this faculty development initiative. I looked for uniformity among the examples and nuances between the uses of similar terms. I looked for different perspectives on the same events and explored conflicting retellings of those events (Rubin & Rubin, 1995).

Next I compared the material across categories. I examined the links between the terms “teaching” and “technology” more closely to determine the extent of the implied relationship in using the terms in the same phrase or sentence or in adjacent sentences. Putting these themes side-by-side allowed me to revisit my research questions and the stated goals of the workshop and the Learning Technology Partnership. I composed the
facilitators' profiles by focusing on the most persistent themes in each person's interview data. I noted the number of times a particular theme or subcategory was mentioned in the data and selected passages that reflected the emphasis or importance the facilitator placed on this theme or subcategory.

A cross-categorical analysis of the interview data shows a nearly equal focus in the workshop on people, teaching, and technology. Of the workshop's co-creators, Harrison's meaning of the workshop interview indicates a most persistent theme of concern for people, Austin's is strongest in the area of technology, and they both contributed equally in the area of teaching. Snitzer and Williams contributed strong statements and observations in the areas of teaching and technology. The distinction between "training" and "teaching" was unique to Harrison's interview.

The facilitators' interviews focused on the meaning of the workshop are presented as four separate profiles that illuminate each one's values and beliefs about teaching and technology and about their perspectives on the effectiveness of this workshop in particular. Except for Harrison's profile, The Teacher is a Learner, Too, a third-person biographical sketch introduces each facilitator's first-person profile. (Harrison's sketch is shared earlier in this chapter just before her profile entitled The "Gift" of the Workshop.) Each participant received a copy of his or her profile and had the opportunity to suggest revisions. I made a few minor edits to reflect their feedback.

It is my belief – one that is supported in the literature – that the facilitators' intentions have a significant impact on the participants' learning experiences (Robertson, 1996; Robinson & Borkowski, 2000; Rowe, 1999; Sorcinelli, 1999). The following first-
person profiles of the workshop facilitators focus on the meaning each ascribes to the workshop. The profiles clearly portray the convergence of people, place, and process.

Profile: The Teacher is a Learner, Too

Harrison, Co-Creator and Last Director of the Workshop

I learn so much from everybody. I learn new tricks, if you will, or techniques, things that I've never seen on the computer from the people who know more than I may ever will - even when they start the workshop. I learn new ways to look at things on the computer from people who don't know very much.

Every once in a while I - if I don't catch myself - and often it's at the beginning of a summer when we're about to start a new cycle, and I haven't done it for three or four months, I start to shift into panic mode and think, 'Oh, my God, I don't know enough to do this. Why am I the one who's standing here planning this and about to tell people what they should do?' But then I think back to the [workshops] we've done and remembered that this is supposed to be a learning experience for everybody and that it is for me, too. And that I never do - intend to and I don't think I do - set myself up to the participants as the one who knows everything. I don't do that in my regular classrooms either, for that matter, or I try hard not to. So I really do go into this every time [thinking,] 'What am I going to learn now?' And I like that a lot. That's why I'm in any of this business - to keep learning myself. And I learn so much about teaching. You know I consider myself the most fortunate person in the world to have this job, to be interested in teaching and to have this job.
Our idea [is] that training is giving information – communicating information –
getting across information and at the end saying 'thank you for coming. Hope you got it.
Goodbye. Give me a call if you have a problem.' But the information is what’s central
there.

Teaching [on the other hand] is the development of relationships – and one piece
of that is the relationship between the learner and the teacher. It goes back to my first
teaching in Japan when I had those American kids who were there on [an] overseas,
study-abroad program. My second son was just six-weeks old. I started teaching, sitting
in a rocking chair and the students – in Japan you sit on the floor, right? – so I had 20
students all around me on the floor and they were in my home. They became – and I
became for them – [we] became family. That’s sort of my image of teaching.

And the teacher I think is a learner, too. I think that what we have to do is for all
of us to understand that we are all – and should all – be teachers and learners both. And
that when we can do that – we can all be both teachers and learners, we will change the
world. I also try to teach the other facilitators ways that I think leave this 'open' and
don’t make it a 'training' workshop where we’re telling people the ways to do things but
really leave it – I really want us to leave it open because adult learners in general –
faculty in particular – are perfectly capable of taking and running [with their learning]
as long as we can put their feet on the ground or help them get their feet on the ground.
And that’s what it ought to be all about it seems to me. [In a training] the center is the
computer and not the teaching and the people who are there. And it really is the teaching
and the people who are here to talk about it [who] are really the center of this.
My father [who at the time was] in a medical school teaching position and is retired now [said to me] when I finally found that I really didn't like what I was doing as an assistant professor, 'Well you're at the wrong kind of institution.' And I understand exactly what he meant. This is a Research I institution. I say to myself, 'I should just go find a job somewhere else - a liberal arts college or a community college system that's good and [teach].' And I could do that but you know the other part of me says, 'This may be a Research I institution but it's got to have some of the other kinds of people in it. It's got to have some people who really want to focus on teaching or the students at this place lose.'

Two and a half years ago, when we started this, when I came in and tagged along with Jim and we started putting it together, then it seemed like it was isolated. It was a workshop unto itself. We were working with faculty and we were trying to get them to do things differently but it really seemed to stand on its own. It didn't relate to anything else except in those general terms.

Now all across the university, everybody's attention is now turning to [teaching and technology]. And so whereas before I felt like we were - not out on a limb because I don't want mean that sense of perilousness - but we were sort of out here on our own, a little isolated from everything else. Now in fact, we're at the center of everything. And that's exciting.

I really am looking to make a difference in people's lives. And it's when students or faculty or anybody comes up and says, 'Because of what you did, here's what I did.' And I can see those ripples going out that I feel like what I'm doing is worthwhile. And there is a part of me that's sorry that I quit the tenure track and that I'm not a card-
carrying member and I won’t be unless I go somewhere else and start all over again. I don’t think so – you never know but I don’t think I’ll do that. But I think in some ways [by working here] I’m making more of a difference in some people’s lives.

Because it’s so intense, the workshop in some ways feeds that need better for me [than teaching students]. And I get to know people much better than I do in something that’s dragged out over a long period of time and you know, you have an hour so you pay more attention to the ‘what’ rather than the ‘who’ when you have just an hour each week.

[The faculty participants] have found it a very, very rewarding experience. And what they say is as useful as the laptop and the software [are] that the best part of the workshop and the most satisfying [part] has been the opportunity to spend a whole week with people from all around the campus, the university, talking to them and listening to them. And that’s an experience that the University, the culture here, doesn’t create very often and doesn’t – it doesn’t discourage but it doesn’t encourage either. And so I think that a lot of the success of this workshop comes from the way we’ve been able to structure it so that everyone gets very close and spends lots of time together.

I’m hoping that we’ll get a large number of people from the workshop [working in the new Integrated Learning Center]. I’m not hoping that because they’ve got that background but because they’ve got that interest. And because they – most of them – are now, if they weren’t before, willing to think about doing things in different ways. And I think part of that is because there was no threat in the workshop and they felt what it was like to think and do things – try something – in a different way without feeling threatened in any way.
With the new Integrated Learning Center we will have even higher tech classrooms available. And we know that more faculty are interested in that because they've heard from their colleagues who've been through the workshop that using the technology and using it to rethink the way they teach and they structure their teaching is making a difference for the faculty. They like it more. It's more interesting to teach and for the students who are more interested in what's going on.

Explication: The Teacher is a Learner, Too

Harrison believes that a strong sense of community is a critical component in the meaning of the workshop – for both herself and for the faculty participants. For Harrison, people, not information, are at the center of the workshop and should be the focus in all teaching and learning situations. Her early college-level teaching experience in a study aboard program in Japan and at a small liberal arts college may have influenced her focus on the importance of building connections between people before making connections to content. She also stresses the importance of individualizing learning, which is easier to do in small, more intimate teaching and learning settings.

She received hands-on, individualized tutoring from Austin when she was learning technology tools. This was a successful process for her. Many technology-centered faculty development programs utilize a one-on-one mentoring method to address the faculty member's specific needs and learning outcomes (Milligan & Robinson, 2000; Signer, Hall, & Upton, 2000; Sprague, Kopfman, & Sorsey, 1998; Thompson, Hanse, & Reinhart, 1996). Harrison's own experience, then, has influenced her belief that a small
student to facilitator ratio is a desirable ingredient when learning to utilize technology tools.

Harrison is humble yet confident about the abilities she's developed to create a positive, low-threat cooperative learning environment. Decreasing competition and establishing a collaborative environment have been found to be conducive to faculty learning (Robinson & Borkowski, 2000; Rowe, 1999; Sorcinelli, 1999). Her attitude of the "teacher is a learner, too" is an important part of building that environment. This can be considered an attitude of a constructivist facilitator of learning (Briner, 1999). Harrison feels strongly that adult learners need to be given lots of choices and opportunities to work independently as they learn technology tools and new teaching methodologies. Harrison holds the belief that faculty can use technology tools to "rethink" the way they teach. She believes that technology tools can make teaching more interesting for faculty. She also believes integrating these tools can help make learning more engaging for students (Negroponte, 1995; Tapscott, 1998).

Biographical Sketch: Jim Austin,

Director of the Faculty Center for Instructional Innovation (FCII)

When Jim Austin was just ten years old, he was already experimenting with a mainframe computer. His parents were educators who were involved with the application of technology tools long before it was common practice. From an early age, using technology as a tool shaped Austin's thinking and learning.

Although he took a brief hiatus from computer technology in the mid-'70s, Austin returned to the use of technology tools when he became an elementary school teacher.
Whether in his fourth-grade classroom or from a van equipped with a dozen computers, Austin used computer applications to teach elementary school students and classroom teachers alike. Of his work at this time, Austin said, "This was all kid-driven and hands-on."

In 1982, his graduate work in math education and instructional design included a technology focus. In the mid-'80s, Austin taught a "Computers in Education" course for the University of Illinois and continued to influence the work of preservice teachers, graduate teaching assistants, and university faculty with regard to integrating technology tools into their teaching. He created modeling software for math students that "tied together [his] thinking and belief that people learn best by doing." This software also stressed the responsibility of the learner to develop a deeper understanding through self-correcting experimentation.

Austin describes his "love [for seeing] the little light bulbs go on." He left elementary teaching with a plan to return but realized he could "reach more kids by working with adults." In 1987, he worked with the University of Maine's Office of University Innovations. In this role, he provided inservice and consulting for K-12 teachers as they envisioned and implemented technology plans. Later, in a two-year program at South Maine Technology College, he expanded his influence by training technology people for business and industry.

In 1990, when he was about to be named Director of Network Services at the University of Maine, Austin accepted a position with a satellite communications delivery company in Tucson, Arizona. He worked in this position for five years. He missed teaching, however, and taught part-time at the community college.
In 1995, Austin answered an ad in the newspaper for a technology teaching position at the University's Teaching Center. During the first two years he was employed by the University, he trained ten or twelve faculty cohort groups in the use of technology tools. The department involved was given funding for a workstation after their participation in a training cycle. [Harrison participated in this training before Austin came to the University.] In 1997, Harrison joined the Teaching Center and along with Austin helped brainstorm the faculty development initiative that would become known as the workshop. As Austin put it, he wanted to "try another way," giving each participant his or her own laptop.

Austin describes himself as someone who is "fascinated by change." It "puzzles" him when people don't look at change as an opportunity, but over time he has accepted that some people don't see it that way. He believes that if "they come to the workshop, they are willing to be exposed [to new ideas] and will take away something [from the experience]." Although he realizes that a facilitator "can't pour in" learning, that the learner "must take responsibility," Austin's goal is for each participant to leave the workshop "fundamentally different" is some way related to learning, teaching, and/or technology.

Profile: The "Aha!" Experience

Austin, Co-Creator and Former Director of the Workshop

Fundamentally, I guess I like to lead people to a new place where they go 'Aha!' And that's what this workshop has done for something I'm passionate about. The notion of teaching and thinking about [learning] in different ways, the learning aspects of [the
workshop], and what it really means to be a facilitator of learning - that's what really has been the most powerful part of it for me.

I think the clue for me that something was going to be different out of this whole experience came at the end of the first workshop when we had an emeritus faculty member actually break down from the joy of finding out that this was something [different] - he'd found a place. And being a part of that [sense of community] has maintained itself through my involvement with all of the workshops.

I guess that the change [in people] is what kept it interesting for me. You could almost guarantee when there would be points in the process where people would go 'Aha!' And you know it was almost to the point where we could predict it. But it was so cool to see people as they reached these points and they'd struggle and struggle and we knew what they were struggling with. You don't say anything. You let it happen. People just go 'ooooo!' That was the piece that still sustains it. I think that for the first time in my professional career routine didn't mean deadly.

I think we've been very successful and so the emotional high of that, if you will, is where I derive my greatest pleasure. Seeing the light bulb go off, the 'aha' experience, the 'ooo, I get it' or 'wow' - that has meaning for me. [That] has been where the power has been in the workshop for me.

For the participants, I think every one of them has walked away with something different: either they've had a contact in a different way, or they've found a place to come to for help, or they found a place where they don't feel threatened and they can ask seemingly silly questions that they would not be able to ask elsewhere. Some of them have found new teaching strategies. Some of them have a cool piece of hardware or a new
piece of software. So I think the meaning has been just as varied for the 150 participants as it has been for me.

There have been a lot of responses saying 'best professional development,' 'came for the workshop, left with a different understanding of teaching,' 'best thing that I could have ever done,' 'best thing the University has ever done,' [that] kind of thing. Some like John found a community of people. Some found a place where they can get support and understanding. Bob Roberts keeps coming back – wonderful man – he describes [the FCII] as a place where faculty can get help without being threatened or belittled or made to feel dumb. I'll take a little bit of credit for that, for the way we've tried to set up this center. That's an important thing it seems to me. And that's why they keep coming back.

So many of the faculty make incremental changes in what they do that are so profound for them. I've still got a [professor] in English who comes to me to help him solve problems but his first change was to print out a test that included a picture and ask a different type of question. But it was so profoundly different than anything he'd ever done before. He personally took this huge risk in doing that. And when it came back that the students liked that he moved a little further on his own. And then he'd touch base and then he'd move a little further and a little further and he has Web sites now. He still teaches a traditional English class but it's different – three years later. I think that's cool.

We take [faculty] from where they are – and don't take them where we want them to go – but where they think they need to go. And there may be a little course correction and gentle steering in there but we certainly try, I think, to take them where they are and to take them where they need to be in their estimation. It's made a difference though in what we do here [in the FCII]. I mean our focus has certainly been on servicing
[workshop] people. So even though I wasn't a direct facilitator in all the workshops after I started with VALA, I was still touched by a lot of [workshop faculty] using the resources here.

When we ask faculty to make the radical thinking changes that we really are, I figure from a pure assessment standpoint their ratings and evaluations are going to crater—probably for the next three to five times they teach the class because they're trying so much that's different. And it's not all going to work for them but they're in there trying. It's the technology, it's the active learning concepts, and it's the group work concepts—all of those things that are so foreign to so many. What works, what doesn't? For some, this piece worked because they [faculty] had an affinity for it, or the kids themselves had an affinity for that particular strategy.

I guess I think about thinking in an emotional way. When I think about learning and change and all the rest, it's not an intellectual exercise for me. It's an emotional response. I think that's the only side of learning that we really use. All I've done is I've helped them see a different road, and I'll continue to help people see different roads be it through the workshop or the FCII or VALA or the ICL or whatever I do next. So in that respect it's just a continuum. We've been able to show a different path to success.

**Explication: "The Aha!" Experience**

Austin's interview and profile emphasized the importance of people, particularly in relationship to their response to the "aha!" learning experience. His background as both an elementary school educator and a K-12 teacher educator has made a strong impact on his teaching methodologies. He is an advocate for hands-on technology learning, active
learning, and group work concepts. He believes that people learn best by doing. Austin holds many constructivist beliefs about learning and teaching (Briner, 1999).

Austin's goal for facilitation is to help people change and see new ways to be successful in teaching. He is passionate about both technology tools and teaching methodologies and feels satisfaction when he can help a learner achieve the "aha!" experience. He believes that creating a safe emotional environment in which change can occur is key to the success of the workshop and the University's on-going technology support systems. As the director of the FCII, he has established a non-threatening facility where faculty can return again and again for on-going support for pedagogical and technological change. Careful attention to the affective features of the technology environments he oversees is one of Austin's strengths as a leader (Ferro, 1993; Kidd, 1973; Smith, 1982, Wlodkowski, 1985).

Austin acknowledges that learning new strategies and tools can take years for some faculty. He believes that faculty development facilitators should let faculty determine both the course and the pace of their adoption of these innovations. Self-determination a principle of andragogy (Knowles, 1975) and adoption as a choice is a concept discussed in the diffusion of innovations literature (Rogers, 1995). Learning, for Austin, is an emotional experience. He is sensitive to the emotions faculty bring to this learning experience. Still, Austin is convinced that using technology tools can change the ways in which faculty teach, that this is "a different path of success" that he can help faculty achieve. Like Kozma (http://hagar.up.ac.za/rbo/construct/kozma.html), Austin believes that the tools can and do make a difference.
Biographical Sketch: Marcy Snitzer,

Technology Facilitator

Marcy Snitzer was one of the younger members of the workshop's technology-support staff. After participating in the August 2000 workshop, she served as a technology facilitator for the final three workshops. At the time, she was also the coordinator of the VALA (Virtual Adaptive Learning Architecture) Project, which is a Web-based instructional delivery system that takes users' learning styles into account when presenting learning objects.

Snitzer was in junior high school when her aunt and uncle bought their family an Atari. She used computers a little bit in high school, but it wasn't until she attended college that Snitzer became a regular computer technology user. She says she needed skills to "take the computer literacy requirements and also to be marketable in today's workforce."

She describes her college professors' technology use as "pretty low-tech." In her undergraduate experience, the only place she saw PowerPoint being used was in a computer class. As a graduate student in Educational Leadership, her professors, although they themselves didn't use presentation technologies, encouraged students to do so in their class presentations. Snitzer was entering her last semester of graduate work when she first participated in the workshop as a participant; she went on to serve as a technology facilitator in three workshops. Snitzer introduced Austin and Harrison to the work of adult education theorist and researcher Malcolm Knowles.
Profile: Student-Centered, Technology-Center Research University

Marcy Snitzer, Technology Facilitator

I learned a lot [facilitating the workshop] that week. And I also enjoyed it from a personal point of view. As someone who was still in the student role at the time I did the first workshop, I think the technology in the classroom makes such a huge difference. And I can’t believe that more instructors aren’t using it. That’s a total bias on my side. I like being involved because I know there are so many benefits associated with using it that the more faculty who get onboard, who are interested and want to use it, the better. It just makes the educational experience so much more enjoyable. And it helps to reach a lot of learners in ways that a standard lecture can’t.

I think that has to do with [students] transitioning to college and so they think – and accurately – that it’s going to be a whole different environment for them. But also I think it has to do with how the university markets itself as a student-centered research university. And we’re putting in an integrated learning center so we’re setting up that expectation.

I’m sure that many incoming freshmen over the next couple of years are going to factor [that] into their decision-making. We have put out there that we’re technology-centered and we’re student-centered and it’s not unreasonable for them to expect their classes to be that way. But I think there’s still a disconnect. I don’t think a lot of faculty are ready to make the technology transition, and I think that there are a lot of philosophical differences. And that takes time to change.

I think [for] a lot of faculty their model for education was very much the lecture transmission style - faculty expert, the student learner absorbing the information. And
that is hard to change. That is the model that they've always seen. And it's been very accepted, and it's worked for a long time. But I think the model is changing. I think the technology is going to make it necessary. And I don't know that that was always the best model anyway.

I suspect that a lot of faculty may be reluctant to try some of the new technologies because that means changing their courses. And so much of their [student] evaluations count for their promotion and tenure. And if you do something really innovative, chances are the first few times you do it, it's not going to work very well and you won't get good student evaluations. Those are a significant factor in your overall performance evaluation. It could make you reluctant.

Explication: Student-Centered, Technology-Centered Research University

Snitzer's profile makes strong statements about the use of technology tools in teaching from the student's point of view. The youngest of these facilitators, Snitzer mentions the ways technology can be used to address students' various learning styles and their preferences and expectations for learning in technology-enriched environments (Negroponte, 1995; Tapscott, 1998). Snitzer believes the University has begun marketing itself as student-centered and technology-tools enabled, but it has a ways to go, as an institution, to actualize these characteristics and the philosophies on which they should be built.

She expresses an understanding for faculty reluctance to experiment with technology innovations. Like Austin, she suggests that student evaluations may not be as strong when faculty first introduce and utilize innovations in their teaching. Still, Snitzer
believes that technology tools integration will make instructional strategies change toward a more active learning model. Active learning is one of the components of constructivist learning (Briner, 1999) and one of Chickering's seven principles of undergraduate education (Chickering & Gamson, 1991). Snitzer believes that technology tools can be utilized to empower students (November, 2001).

Biographical Sketch: Doug Williams, Technology Facilitator

Doug Williams became a member of the workshop's technology-support staff in May 2000 when he was hired to join the FCII staff. He co-facilitated eight workshops. Computer technology has been part of Williams' educational and professional life for a long time. In 1970, he was studying electrical engineering and recalled the room-sized analog computer used in that department at the time.

After college, Williams worked in industry and utilized computerized test equipment in the aerospace and mining fields. He describes his relationship with computers at this time as "technically oriented" rather than instructionally oriented. It was also during this time that Williams had the experience of facilitating adult learning by conducting workshops to help fellow employees understand how to work around radioactive sources.

When he left business, Williams accepted a technical-support position with the University's SALT (Strategic Alternative Learning Techniques) Center. There he researched technology tools to support students with learning disabilities. It was at the
SALT Center that he developed his interest in the potential of technology to support all students in learning.

Williams' involvement in the workshop continued beyond the workshop week. In fact, even though the workshops have officially ended, as of this writing many workshop alumni continue to contact him as technology challenges arise when they begin to apply what they learned. When Williams is called on to answer questions and trouble-shoot problems, these conversations often "snowball into something else about what they're doing with what they learned. It's a lot of good, positive feedback." For Williams, there is a great deal of "satisfaction associated with being involved" in the workshop.

Profile: Stepping Into the Next Generation:

Doug Williams, Technology Facilitator

I learn something – and I'm not afraid to admit it – I learn something every time [I help facilitate a workshop]. And I think as much as I think I know about the computer system even, there's always something [new] that comes up and I've learned enough new things each time that it's still interesting for me. I like that part of it.

I've been through most of the workshops with Beth. She has a nice way of saying things like: 'This is how I do it but it's not necessarily how you need to do it. But I want to show you this so you can get an idea of how to get there.' And I think that seems to be the position generally taken with most of the subjects in the workshop. I think it's been pretty effective. It affects me. I learn by listening and watching some of these things as well.

I think we've heard a lot of participants afterward saying – the main thing is - how it has affected their outlook on teaching. I think that's kind of encouraging because I
think it’s like Marcy said, a lot of people feel intimidated in a lot of ways. Or maybe they
don’t have time and that’s probably understandable but here they take this one week.
They dedicate it pretty much and it’s pretty intense. It’s like taking you from point A to
point B and it looks to me like a nice way. I like the way.

I think there must be a lot of faculty right here at the University that feel that they
would like to step into the next generation – so to speak – and take advantage of some of
this. It does provide that other level of delivery for their classes. And they know they can
make [their courses] more interesting and they know that that’s what their students are
beginning to expect.

I have to say sometimes I get emotionally connected with what’s going on. I meet
the people who are in the workshops and I watch and I see the progress. And at the same
time, there are questions that come up each time – ones that I don’t know. I sometimes
have to go back in a corner and read or I have to dig out something. And I’m learning
right along with them. It’s sort of a realization that no matter how many of these
workshops I may do, I’m still not going to be at the point where I can feel like I’m some
sort of expert on this subject. It’s still – for me – it’s a realization that it’s ongoing.
Technology is changing. Questions are changing. For me, that part of it is there. There’s
some emotion. It’s like some satisfaction associated with being involved.

Explication: Stepping Into the Next Generation

From his perspective as a technology facilitator, Williams believes that many
participants’ outlook on teaching has been affected by the workshop. He believes the way
the tools are presented, as choices, is an effective strategy for faculty participants. Again,
choice is a critical component in andragogy (Knowles, 1975). Williams concurs with Snitzer that technology tools integration is what students expect, and that faculty have begun to recognize this. He calls this "stepping into the next generation" where technology can help make courses more interesting (Negroponte, 1995; November, 2001; Tapscott, 1998).

Williams makes connections between the changing nature of technology, workshop alumni changing their teaching tools, and his own experience of learning. Although he has had years of experience with technology in various educational and corporate careers, Williams realizes that technology tools and the questions they spawn are always changing (Hughes, 2001). He does not consider himself an expert. Rather, he is a willing and eager learner who receives emotional satisfaction from helping faculty learn to utilize technology tools. As a co-learner alongside the workshop participants and the FCII support users, Williams' attitude demonstrates one of the principles of constructivist teaching (Briner, 1999).

**Discussion: Facilitators' Perspectives on the Workshop Experience and Meaning**

The following discussion of the workshop facilitators' perspectives on the workshop experience and its meaning is organized around the four sub-questions of this research study. Although the facilitators speculate on the participants' perspective on the meaning of this workshop experience, this discussion deals only with the direct and personal experiences of the facilitators themselves. It is my belief that the intentions, experiences, and meaning applied to the workshop by these facilitators of adult learning frame the faculty development experience of the participants.
Technology Tools Behaviors

What are the perceptions of program facilitators about their behaviors with regard to technology tools integration during and/or after this faculty development experience? The workshop facilitators understand and practice the role of facilitators of adult learning (Knowles, 1978) and apply those principles in the context of technology-enabled faculty development. The workshop facilitators provided participants with many learning choices (Knowles, 1978; Dewey, 1902). They encouraged independent problem solving by making a wide variety of resources available – human, paper, and electronic – in a safe and supported learning environment (Stouch, 1993). The independent projects gave participants a simulated "on-the-job" experience of learning to apply technology tools and teaching principles (Stouch, 1993) and addressed a problem-solving orientation (Knowles, 1978) to the workshop content.

As they supported participants in learning technology tools, none of the facilitators had all the answers; no one was expert at every software application. The facilitators sat beside individuals and worked through problems as participants looked on or made suggestions. The facilitators demonstrated many different ways to solve technology questions as a matter of fact and to show participants that there was no one right way. They were often and literally co-learners with the participants and exhibited some of the characteristics constructivist teachers (Briner, 1999).

Both Harrison and Austin continually described the content of the workshop as influencing participants to do things, to teach, in a different way. They also noted that participants were free to adopt or not adopt the tools and that they would take away
different learnings from the workshop; some would apply these innovations on a small scale while others would take more risks (Rogers, 1995). Austin and Snitzer noted that experimentation with new technologies, particularly with more sophisticated applications, could result in lower student evaluations. Although they understood the reasons behind some participants' reluctance, they believed that the risks were necessary and would ultimately pay off in terms of student outcomes.

All of the facilitators talked about helping people through the change process. They all talked in terms of improving student learning and motivation. Snitzer, being the youngest on the team, made particularly strong statements about technology integration from a student’s perspective. Williams, who often helps participants with technology questions after they’ve completed the workshop, stressed that conversations with workshop graduates often turn from their initial technology focus toward a teaching focus.

**Beliefs Related to Technology Tools and Teaching**

What are the perceptions of program facilitators about their beliefs related to technology tools integration and/or teaching philosophies during and/or after this professional development experience? All four of these facilitators expressed the belief that technology-enabled teaching and learning can be utilized to meet the various learning styles and needs of students, to improve student motivation, and to prepare students for living and working in a technologically-rich society. They believe that workshop participants should have on-going access to tools and technical support (Ely, 1995; Groves & Zemel, 200) beyond the workshop week. Like the TEACHnology program at
the University of Massachusetts-Amherst, participants were in this workshop were given a laptop computer. The facilitators were instrumental in procuring personal laptop computers for participants as an essential component of the workshop and during the workshop week, they reinforce that belief through the activities of the FCII facility and staff.

Harrison, due to her dual classroom teaching and faculty development roles, shared examples of her own decisions with regard to integrating technology tools into the classroom. However, as was reiterated by Williams, Harrison did so with the caveat that it was up to each faculty member's understanding of his or her students, discipline, and learning goals to develop adaptations, or re-inventions, of the tools to meet his or her teaching needs. The fact that Harrison came from the academic side of the institution was an important signal to participants that the University valued the instructional and learner components of the workshop as well as the technology components (Kershaw, 1996).

In the context of this workshop, both Harrison and Austin fulfilled the roles of change aides (Rogers, 1995) in the diffusion of innovations process. They served as mediators between members of the social system, the participants in the workshop, and the University administrators concerned with change. Harrison noted that the first participants in the workshops were more innovative in their approaches to technology tools; she defined her role with these people as "getting out of their way." Rogers (1995) would call these participants innovators or early adopters. With later participants, who fit the majority adopter profile (Rogers, 1995), Harrison believed she needed to provide more concrete reasons for adoption and "cheerleading" to encourage participants to adopt these tools in their teaching. Each of the workshop facilitators acknowledged that the
participants should be encouraged to self-tailor the tools presented to meet their individual professional and personal needs (Rogers, 1995).

The workshop facilitators shared their experience and modeled their beliefs about lifelong, continuous learning (Fullan, 1993; Hughes, 2001; Sarason, 1990). From their perspective, the facilitators focused on the teaching and learning process, rather than on the technology itself (Carothers et al., 1997; Ehrmann, 2000; Gilbert, 2000). During the workshop, in the aftercare program, and in their on-going relationships with workshop alumni, the facilitators invited the participants to engage in critical discussions concerning teaching and the integration of technology tools (Brown & Jackson, 2001).

Workshop Components

What are the perceptions of program facilitators about the components of the Laptop Workshop that invite educators to reflect on their teaching roles and instructional practices? The facilitators designed the workshop to give the participants maximum autonomy. Facilitators support participants as they open a box containing a laptop computer, load software, learn to apply the software, and construct self-selected projects. The focus in the workshop is on the individualization of instruction (Knowles, 1978). The workshop designers constructed this faculty development initiative with a small participant to facilitator ratio. This organizational strategy suggests a high value is placed on individual attention. Facilitators also valued giving participants plenty of time to work on independent projects (Milligan & Robinson, 2000; Rowe, 1999).

The facilitators took a constructivist approach to teaching as well. They acknowledged that the participants control their own learning, and they create an
environment in which each participant is responsible for his or her own learning. Each facilitator brought his or her teaching style, ways of learning technology, and areas of technological and teaching expertise thereby providing the participants with multiple perspectives and points of view on the tools and their use. The facilitators believed they should act as coaches and encourage peer-to-peer interaction and learning. All of these behaviors suggest a constructivist approach to the learning event (Dewey, 1902; Piaget, 1952; Vygotsky, 1978).

As Robertson (1996) says, the facilitators’ beliefs and values about learning and teaching frame the workshop environment. According to the facilitators, the workshop is student-centered, or perhaps more appropriately to the adult learning situation, "learner-centered." They intended to promote a "learning to learn" strategy (Rogers, 1969) as they provided participants with the resources they need to be independent, yet supported, learners. The facilitators strive to excel at the ten precepts that foster "learning to learn" environment, particularly setting the mood and climate to develop trust, clarifying the purpose of the learning event, relying on the learner’s desire to self-motivate, sharing personal experience with the group, and recognizing and accepting his or her own limitations, in this case with regard to particular technology tools. (The latter two were most notable in Harrison's interviews.) The workshop facilitators intended to build "learning to learn" into this course and to shift their role from that of content expert and source of all knowledge to that of co-learner, resources person, and coach (Merriam & Caffarella, 1991).

The focus on meeting the needs of people and creating a community of learners is clearly shown in the data and supports the notion that this is an important aspect of the
workshop. The resulting "hidden curriculum" may have accounted for the large percentage of participants in the beginning and ending workshop surveys, 76%, who completely agreed that this was the best professional development experience of their careers. The facilitators perceived that they built a collaborative workshop environment, which researchers have found to be an essential ingredient in a successful program (Anandam, 1998; Daigle & Jarmon, 1997; Duffrin, Dawes, & Hanson, 1999; Robinson & Borkowski, 2000; Rowe, 1999; Sorcinelli, 1999; Topp & Mortensen, 2000).

Both Harrison and Austin talked about the goal of reducing participants’ anxiety while learning new skills and strategies as one of the strengths of the workshop. Opening the workshop week with a group sharing and discussion in which each participant's prior knowledge and experience was valued was one way the facilitators attended to the affective domain (Kidd, 1973; Smith, 1982). "Careful attention to the affective domain can increase learner motivation and counteract, or at least minimize, the affects of [previous negative experiences]" (Ferro, 1993, p. 31). This careful attention to the affective domain is another critical component of adult learning environments (Ferro, 1993; Kidd, 1973; Smith, 1982, Wlodkowski, 1985).

The facilitators were unfamiliar with "Chickering's seven principles of undergraduate education," yet through their teaching behaviors in this technology-centered workshop, they unconsciously introduced or reinforced them. The facilitators made communication with individual participants and meeting learner needs a focus of the workshop. They fostered cooperation among the participants and promoted active learning. They gave participants prompt and constructive feedback, followed an organized learning plan that was shared with participants, and communicated high
expectations to the learners. Finally, the workshop facilitators showed respect for the unique and diverse talents and learning styles of the participants (Chickering & Gamson, 1991). Harrison expressed the hope that participants would perceive the facilitators' instructional decisions as models for student-centered teaching. For participants who were conscious of the "teacher role" of the facilitators, Harrison, Austin, Snitzer, and Williams modeled these seven principles.

Meaning Ascribed to the Workshop

What meaning do the program facilitators ascribe to this learning experience? "A learner’s experience arises from a context that includes, among other important elements, a teacher or learning facilitator who is also operating on the basis of her or his lived experience or subjective reality" (Robertson, 1996, p. 7). All of the facilitators interviewed for this study express the workshop’s meaning in terms of who they themselves are as learners. They believed that technology tools can make a positive impact on student outcomes. One shared aspect of the meaning these facilitators' ascribed to the workshop is the belief that technology tools can make a difference in student learning and motivation. In addition, they share a belief in the importance of technology tool use in a technologically progressive society. Finally, the facilitators share the value of their role in helping faculty embrace the use of technology tools and interactive teaching methodologies.

The EDUCAUSE National Learning Infrastructure Initiative (NLII) (http://www.educause.edu/nlii/) and this workshop as an extension of the University's Learning Technology Partnership share a similar mission. Through this faculty
development initiative and with ongoing support from the FCII, this University intends
"to enhance the student learning experience at the University of Arizona. Strategically,
the Partnership promotes employment of successful teaching models facilitated and
strengthened by new learning technologies" (http://www.facpartner.arizona.edu/). The
workshop facilitators have a strong sense of being part of this mission. The facilitators
view their participation in this workshop as an important expression of Learning
Technology Partnership's mission. For them, this workshop means a collaborative effort
to improve learning and teaching at this institution.

Insights from the Facilitators' Perspectives

All four of these facilitators perceive that the affective features of this workshop
are critical to its success (Ferro, 1993; Kidd, 1973; Smith, 1982, Wlodkowski, 1985). The
emphasis they place on the non-threatening, supportive environment is clear in their
profiles and in my personal experience as a workshop participant. The workshop
facilitators believe they have made the shift from expert to coach as they engage in the
workshop experience as co-learners along with the participants (Merriam & Caffarella,
1991). The depth of the facilitators' conviction was a surprise to me. Many adult learners,
who have taken risks in learning new technology tools, have found technology support
personnel to be less-than-ideal teachers. Technologists tend to do particular operations in
a certain ways and expect that all technology users will be able to learn to perform
operations in the same manner. The mere facts that all four facilitators supported all the
participants and that all four facilitators had different ways to accomplish the same
technological goals could and should have demonstrated to participants that all learning –
or at least learning particular technology tools – is an individual process. The workshop facilitators modeled one of Chickering's seven principles: respect for diverse talents and ways of learning (Chickering & Gamson, 1991).

The learning and teaching backgrounds of the facilitators influenced who they are as facilitators of adult learning. Austin, who began experimenting with computers as a child and who utilized technology as a tool for learning with elementary school students and classroom teachers, has a particularly strong hands-on discovery approach to learning and utilizing these tools. Austin could be described as a constructivist teacher (Briner, 1999). His experience and beliefs influenced Harrison, as did her personal experience as his technology tools tutee. Prior to coming to this University, Harrison's college-level teaching background, which emphasized smaller and more intimate settings, was a perfect fit for Austin's philosophical stance toward active learning. Their shared beliefs about learning and teaching form a powerful foundation for the workshop.

It was, however, surprising to me that neither of the workshop designers had a strong background in research and practices related to adult education nor to undergraduate education. The theories and practices of andragogy, although practiced unconsciously, could have been strengthened through awareness. Like Kreber (2001), I believe that academics, who value scholarship in their disciplines, may benefit from faculty development initiatives based on learning theory and current research. Using a metacognitive approach, in which the workshop facilitators share with participants the reasons behind specific teaching behaviors as they related to good practice in undergraduate education (Chickering & Gamson, 1991), may have deepened the impact on participants of the teaching methodologies components of the workshop.
Before conducting the facilitator interviews, I suspected that Austin was the technologist and Harrison was the pedagogist in the team. After getting to know these two professionals better through their interviews and profiles, I would not now categorize them in this way. Both co-designers of the workshop have strong beliefs about instruction. In fact, Austin's beliefs come from formal schooling in instruction methodologies (learned while earning a K-8 teaching credential) where Harrison's come from learning on-the-job at the college-level and from Austin and other professional development activities. Snitzer, a graduate student in higher education, was also formally schooled in learning theory. Williams, on the other hand, who had on-the-job experience in facilitating adult learning in industry, was highly influenced by Austin and Harrison as he refined his facilitation schema. In total, I was surprised that it was Snitzer who introduced adult learning theory and practice to the workshop two years after it began and that the combined backgrounds of these workshop facilitators did not include a strong foundation in theories and practices related to adult education nor to undergraduate teaching.

Still, as far as Austin and Harrison are concerned, the focus of this faculty development initiative is on teaching strategies to improve undergraduate education, strategies that can be enabled by the thoughtful and innovative use of technology tools. Participants in the workshop may have perceived the emphasis on technology tools over teaching methodologies from the way the workshop was advertised, from its location in the FCII, and from the fact that a laptop computer was the reward for participation. This may be one aspect of the workshop – its intent – that could have been strengthened had the facilitators made their instructional decisions more visible to the participants, had
they had different theoretical backgrounds, and had they made some different decisions with regard to course content.

I was not at all surprised to learn of the focus these faculty development facilitators place on people, the workshop participants. From the small number of faculty involved in each workshop and the low faculty to facilitator ratio to the emphasis on choice and independence in the workshop content and processes, the facilitators' perspectives on the components that make this a successful experience for participants completely correlate with my personal experience as a participant in the workshop. Harrison's expression of the workshop experience as a "gift" synthesizes the attitude of all the workshop facilitators regarding the benefit of the workshop to the facilitators themselves. I believe this perspective on the facilitator experience is authentic. Of the three, people, place, and process, the facilitators' profiles indicate a strong emphasis on people above all.

How then does university faculty development constructed around technology tools integration influence faculty movement toward a student-centered classroom environment? The metaphors or expressions the facilitators used to extend the meaning of their workshop experience encapsulate their perspectives about how this workshop and/or technology tools can influence faculty toward incorporating active, student-centered learning in courses they teach. From the perspectives of the facilitators, their workshop behaviors provide a model that promotes faculty learning and, once experienced firsthand, participants can apply these behaviors in the undergraduate classroom. The facilitators have built the workshop with hands-on, learner-centered, "learning to learn," andragogist and constructivist principles. Like Merriam and Caffarella (1991), the
facilitators believe that after experiencing this learning environment, workshop participants can choose to shift their role from that of content expert and source of all knowledge to that of co-learner, resources person, and coach. Harrison's expression, "the teacher is a learner, too," embodies her belief in this co-learner perspective, a constructivist approach to teaching (Briner, 1999). Instructors who adopt the role of co-learner necessarily create a more student-centered learning environment.

Austin's learning as discovery philosophy is pervasive in the methods employed throughout the workshop. He believes that explorations with technology tools provide learners with opportunities for the "aha!" experience. His personal history and experience have solidified this belief. In the workshop, he thrives on the moments when participants experience "the light bulb turning on." Like Sandholtz, Ringstaff, and Dwyer (1997), Austin finds that hands-on learning with technology tools gives adult learners the license to experiment. Austin believes that participants experience the workshop as a community of learners – learners who are actively engaged in the learning process. This is also a student-centered learning environment. Again, this experience is a model for instructional practices that faculty can actualize in their teaching.

For Snitzer, who first recognized the opportunity to consciously apply andragogist principles to the workshop experience, the fact the University supports the workshop is a step toward constructing a "student-centered, technology-centered research university." She believes the workshop delivers the message to the participants and sends a message into the University community that attempts are being made to address the University's student-centered mission. She believes technology tools can meet the expectations of 21st-century students for a stimulating learning environment and be utilized to empower
students as well. Snitzer believes that the technology tools-centered workshop shows a
different teaching model – one that shows teaching is more than the transmission of
information via lectures. With its active learning organization of instruction, the
workshop, again, is a model for student-centered teaching and learning.

Williams believes that faculty want to "step into the next generation," the
technology-enabled generation, and the workshop is one way to do it. Like Snitzer, he
believes that technology tools can help faculty meet the expectations of students and
make course work more interesting to students. He notices, however, that although his
role as a technician brings faculty to his door with technology problems, he finds they
talk with him about the content of their teaching as much or more than its computer-
assisted delivery. The workshop encourages the participants to think about teaching and
has a positive impact on faculty members' outlook on teaching.

Conclusion

The values, beliefs, and intentions of the workshop facilitators, Harrison, Austin,
Snitzer, and Williams, have framed the workshop participants' perspectives on the
program (Robertson, 1996; Robinson & Borkowski, 2000; Rowe, 1999; Sorcinelli, 1999).
The student-centered, active learning, hands-on workshop serves as a model for faculty
who may be ready to reconsider their teaching practices. From the perspectives of the
facilitators, the workshop means faculty participants have a first-hand experience of this
teaching model. From that experience, workshop alumni can reconsider their instructional
decisions and can begin to adopt and adapt this model for their own classrooms.
In the next three chapters, I share data, analyses, and interpretations from a field study of an individual participant, seven workshop alumni faculty interviews, twenty-six beginning and ending workshop surveys and a population online questionnaire, Chapters 5, 6, and 7 respectively. These data provide multiple perspectives on the various components and the impact of the workshop on faculty use of technology tools and teaching methodologies. In Chapter 8, I compare all of the perspectives that comprise this case study and offer a cross-perspectives analysis and interpretation. The convergence of people, place, and process will be shown to be the most salient feature of this faculty development initiative.
In this chapter, the focus of this study moves from the perspectives of the facilitators to that of one individual workshop participant. An understanding of the facilitators' goals and pedagogical decisions provides a context for considering the impact of these choices on one learner's achievement. Again, I have chosen to share the participant's experience in his own words. This chapter includes first-person vignettes that focus on the major themes from the participant's interviews. These vignettes are shorter than the profiles found in the previous chapter; vignettes cover "a more limited aspect of the participant's experience" (Seidman, 1998, p. 102).

This data analysis methodology acknowledges the authority of the participant in relationship to the data (Langellier & Peterson, 1984). I have titled each vignette with a "revelatory phrase." I believe these phrases capture the essence of each vignette; they capture the lived meaning of the experience for the participant (Nelson, 1989). After each vignette, I've included a brief explication that summarizes that piece of data and builds a bridge to the next vignette.

The field study report that follows provided me with the opportunity to learn in-depth from the experience of one workshop participant, Dr. Dan Waits. His story begins within the context of the workshop week itself and continues through a follow-up interview and a one-year-later interview. His experience serves as a reminder not to judge the impact of a learning event too quickly; it has deepened my understanding of the process of adopting new teaching and teaching with technology methodologies. Learning requires change and change takes time. Exposure to new ideas, self-assessment,
experimentation, reflection, and re-invention are all part of the learning or change process. Waits' story illuminates this process and confirms the need for longitudinal qualitative studies to assess the effectiveness of faculty development initiatives.

Figure 5.1 shows the field study participant's perspective on the workshop as one of four perspectives. The forces that created the context and content of the workshop also influenced his perspective. His behaviors emanated out from the workshop experience as well.
Methodology and Data Analysis

This field study includes both observation and interviews; it also includes a glimpse at documents related to the participant's teaching both before and after the workshop experience. The benefit of the observational aspect of the field study was that it allowed me to "see" the workshop first-hand through another participant's eyes. The observation met the standards of a research tool because it served "a formulated research purpose," and was "deliberately planned," "recorded systematically," and "subjected to checks on controls on validity and reliability" (Kidder, 1981b, p. 264.) Combined with interviewing and document analysis, this observation supported a holistic interpretation of this participant's workshop experience (Merriam, 1988).

In May 2001, I shadowed Dr. Dan Waits, Assistant Professor, Geosciences, through the workshop. Four of the eight participants enrolled in this workshop responded in the affirmative to my request for a field study participant. I selected Waits for several reasons. One, he was already using some technology in his teaching. I speculated that because he was comfortable with some technology tools, most of the new tools would not require a steep learning curve. I also hoped I could access the impact of the workshop on his thoughts about teaching methodologies and beliefs because his comfort-level with technology would not present a significant barrier. Secondly, Waits planned to be available during the summer of 2001, affording me the opportunity to conduct a follow-up interview after the workshop week. Thirdly, I also selected him because he was scheduled to teach a large lecture hall class, NATS 101, in the spring of 2002. I reasoned this would provide me with data to study the actual impact of the workshop on his
teaching behaviors and/or beliefs as revealed in changes he might make when teaching that course post workshop.

To begin, I have composed a biographical sketch of Waits. (This is a pseudonym.) The sketch was drawn from many sources including informal email communication with the participant, Waits' beginning and ending workshop surveys, and data collected during the first follow-up interview. After this introduction to the participant and his background in teaching and learning, I share the workshop journal based on this single participant's experience in this one-week faculty development event. I interviewed Waits two weeks after the workshop week concluded. This interview and the workshop journal inform the vignettes that describe his workshop experience; after each vignette, I offer an explication of that data. I conclude this section with a discussion of preliminary findings with regard to the impact of the workshop on this participant.

One year after the workshop when Waits had had the opportunity to teach his Tier I course, I interviewed him again. The results of this interview are found in the "Impact of the Workshop One Year Later" section of this chapter. Again, I have elected to share the data in the form of vignettes that reflect the major themes of this interview: impact on course materials, perspective shift from teacher to students' point of view, "packaging" course content, and other workshop components. After each vignette, I offer an explication. This is followed by a discussion of this field study participant's workshop perspective based on the four research sub-questions of this study centered on the themes of technology tools behaviors, beliefs related to technology tools and teacher, workshop components, and the meaning ascribed by the participant to the workshop experience.
The chapter closes with insights into Waits' workshop experience and a conclusion for this chapter.

Waits received a copy of this entire chapter for his review; he did not suggest I make any changes. This longitudinal view of a workshop participant adds value to the study particularly because it reminds us that learning is an on-going process, and the effects of this faculty development program have continued and will continue to occur long after the last workshop was offered in June 2001. This was certainly the case for this field study participant.

Biographical Sketch: Assistant Professor Dan Waits

Dr. Dan Waits teaches in the Department of Geosciences. He has been teaching science at the college-level since attending graduate school in 1987 and has been teaching at the University since 1996. Waits has an impressive publishing record and has received significant grants and awards in his field. In the fall of 2001, four months after participating in the workshop, Waits came up for his five-year tenure review. He "passed with flying colors."

Once each year since 1999, Waits has taught a Tier I course for undergraduate students. Natural Sciences (NATS) 101 meets in a large lecture hall twice each week. There have been at least 150 and up to 350 students enrolled in the course each time he has taught it. In addition to the lecture meetings, NATS 101 students meet with a teaching assistant in 25 to 30 person discussion sections once each week. Students give Waits high marks on course evaluations especially in the “overall teaching effectiveness” and the “usefulness of in-class activities” categories.
At the time of his participation in the workshop, Waits had been teaching in some
capacity at the college level for fourteen years, and like a significant number of post-
secondary instructors, he had had no formal course work or workshops in teaching nor in
technology. The workshop was his first faculty development experience. On his
beginning workshop survey, Waits "completely agreed" that a colleague from his
department influenced his participation in the workshop. He "somewhat disagreed" that
attending the workshop was his own idea. He "completely disagreed" that he attended
this workshop in response to a request from the department chair and in response to
students' needs, desires, and/or demands.

Prior to attending the workshop, Waits utilized an online syllabus in his teaching.
Since the spring of 1999, the important points in the NATS 101 course have been posted
on the Web. Each semester he's taught this course, Waits has added content to the course
Web site; first, he added lecture notes and later added sample exams. In order to succeed
on all of the exam questions, students in this course have been required to utilize the
Web in guided research. Although he had utilized technology to post his course Web site
and had used various computer programs to create movies to demonstrate science
concepts, prior to the workshop Waits had not used PowerPoint, listservs, online
discussions, or course management software such as POLIS or WebCT in his teaching.
His beginning workshop survey also indicated he had never employed cooperative
learning strategies or small group discussions in the large lecture hall meetings, and he
had not used the Web as a publication venue for student work.
The Workshop Field Study Journal

While shadowing Waits through the workshop, I kept field notes highlighting his behaviors, questions, and comments. I also kept a journal of my own experience of the field study and recorded questions, reactions, nascent interpretations, and hypotheses to explain the phenomena I observed. Whenever possible, these notes were stored on my laptop. I kept pen and paper handy as well to record notes when we were away from our computers. I reviewed Waits’ beginning and ending workshop surveys and the material related to the workshop content that he produced before and during the workshop week. These included his online syllabi for NATS 101 and Mineralogy 306, curriculum vitae, and student evaluations. These documents provided background for this journal as well as enhanced its content.

The following field study journal is intended to reflect this participant’s actual workshop experience. It is presented in chronological order. While the workshop agenda information found in the research methodology section of this research report highlights the facilitator's goals, organization of instruction, and workshop content, this journal provides an in-depth participant perspective of that same basic agenda. This account is organized by the sequence of workshop agenda items and includes the most salient responses by the participant to the curriculum. Combined with the themes of the post-workshop interview, the participant's responses to the workshop curriculum form the major themes explored in the vignettes that follow this section: his beliefs and behaviors around teaching and learning and technology, his experience of the workshop curriculum, and his recommendations for improving and/or extending the workshop. Whenever
possible, I have included quotations from Waits, Harrison, and/or myself to help bring this retelling alive. Again, my goal is to allow the narratives of the workshop stakeholders to tell their own stories. The following is the story of one participant.

**Workshop: Day One**

Waits was the first participant to arrive at the May 2001 workshop. Two technology facilitators and I introduced ourselves to Waits, and Harrison did so shortly thereafter. (Harrison and four technology facilitators led this particular workshop.) Waits introduced himself as a professor in the Geosciences Department and mentioned his research interests. I asked him a few questions about his teaching responsibilities at the University, and we joined the other seven workshop participants and five facilitators at the opening table.

After introductions, Harrison outlined the workshop week. She stressed that time would be set aside every day for participants to work on their individual, self-selected projects. Each participant would have the opportunity to share his or her project on Friday. Waits asked about the length of Friday's presentation. Harrison said each person would have ten to fifteen minutes and that the sharing would create an opportunity to discuss teaching. Harrison continued by elaborating on what many participants have found most useful about the workshop; namely, an opportunity to meet and talk with people from all over the campus.

I distributed the beginning workshop surveys and gave a brief overview of this study, including the field study with Waits. As other participants were filling out their surveys, Waits asked Harrison and Williams about getting the equipment he would need
in order to share his work with superconductors. He requested an Elmo projector for Friday's presentation. Waits and one other participant did not complete their surveys until the end of the first workshop day.

As most people finished their surveys, they proceeded to their carrels where they found a box containing a laptop computer. When Waits opened his box, he said, "I'm glad it's a Dell. They have good [technology] support." He opened the Read/Write CD-ROM peripheral. He was surprised to find a mouse. I asked if he preferred a mouse to the touchpad. Waits then told me a story about having built a 100-foot cord for a mouse in order to facilitate giving presentations.

Each participant received a large binder containing directions, documents, and articles that would be used during the workshop. They also received two trade books entitled: *Tools for Teaching* (Davis, 1993) and *Engaging Ideas: The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom* (Bean, 1996). Waits opened the binder and began reading the directions provided by the facilitators for starting up the computer. As he entered his name and department, Waits told an anecdote about having his teaching laptop stolen. He hadn't realized it was missing until the police phoned to tell him they had it. He said, "There's a good reason to put your name and department on your computer!"

Technology facilitator Williams walked by the carrel and remarked that Waits was farther along than anyone else in the workshop. Waits smiled and asked about how long the battery power lasts and if he could purchase an additional battery for the laptop. As the participants booted up their computers, the facilitators circulated. Waits asked another question about upper and lower case letters, which was immediately answered. I
inquired if the facilitators' printed directions were consistent with what he was experiencing on the screen. He replied, "Fine so far, except for the lower case [letters]."

Waits asked another question of a facilitator who wasn't certain of the answer and immediately turned to Williams for the answer. Although Waits was not pleased with the answer about password security, he accepted it temporarily with a plan to customize access later. I asked Waits if he had previously taken a computer from zero and loaded everything onto it. With a wry smile he replied, "Not with instructions."

The network cable at Waits' carrel was defective. A technology facilitator immediately switched it for a functioning cable. Waits wasted no time; he launched the Web and began customizing his access by cleaning up the favorite bookmarks that came installed in the software. He then began to visit his favorite Web sites and saved them into the "Favorites" location. One of the passing facilitators remarked that Waits was very organized. With the assistance of another facilitator, Waits searched the Web for a free electronic calendar. He couldn't find one that satisfied his needs.

I asked Waits if he would describe himself as someone who "reads the manual." He then told the story of his friend from graduate school who in Waits' words is "a hardware and software whiz." In graduate school, they studied geosciences together. Waits did the programming for a crystal visualization project; his friend worked with the hardware. His friend, now the head of computer technology at another university in the Southwest, has sent Waits software that allows his friend to remotely configure and support Waits' computer. Said Waits, "I prefer people to manuals."

Waits continued to follow the directions to configure his computer. After receiving an error beep, or whenever he felt unsure of the next step, Waits read the
directions aloud. When having trouble removing the floppy drive to install the CD-ROM, he reread the directions several times before asking for assistance. One of the facilitators told Waits where to find the button to push and then allowed Waits to complete the installation on his own.

When asked a question by a neighbor, Waits took time out from his computer to help her. A technology facilitator joined the problem solving, and Waits returned to his own computer and to following the directions provided by the facilitators. He began to install software onto his computer. (At this point, Waits noted that one other participant was farther along in the process.) Once loaded, Waits perused the contents of Office Pro 2000 looking for a tool he often uses, Equation Editor. When attempting to open this tool, he received an error message and without hesitation asked a facilitator for help, but the problem wasn't clear or immediately solvable. Waits continued to install software. Rather than following the list provided, he chose programs to install first that he thought he'd use. He continued to have trouble installing Microsoft products. With Williams' help, Waits changed the disk allocation settings in the control panels and was able to proceed. (When his neighbor had the same difficulty, Waits showed her how to change the allocations.) The first thing he did was load Equation Editor from Office Pro 2000, a task he said he was determined to do before joining the others for lunch.

I asked Waits about his experience of the computer set-up and software installation process. "I say they should skip this step. Set it up in the backroom and give it to us. There are going to be a million problems. These guys aren't necessarily going to be able to solve all the problems on the spot. It's not exciting. It's just something you've got to do."
It was lunchtime and a presenter from the Disability Resource Center (DRC) was the guest speaker. She talked about various software designed to assist people with disabilities as they access electronic information. When the participants were introduced to the concept of universal accessibility, Waits asked about how screen-readers work. He also asked questions about voice recognition software. (Universal accessibility refers to "alt tags" for images on html pages or other textual explanations that allow people with disabilities to use specialized software to access all the information on the computer screen, graphics as well as text.)

Waits also shared a problem he had in receiving services for a student in one of his courses. He reported that the DRC asks for hard copies of exams two weeks in advance. Waits shared that he prepares exams the night before the test, so he gave up working with DRC and administered the exam to the student in his lab. "There were just too many hoops to jump through." After this session, participants returned to their carrels to complete the process of configuring their computers. Waits asked about email access and one of the technology facilitators helped him configure his email account.

The last item on the agenda for the first day was a tour of the Integrated Learning Center (ILC), which was still under construction. The participants donned hard hats and followed Harrison underground. As we toured, Harrison explained the technology tools that were planned for particular rooms. Participants asked questions and talked among themselves throughout the tour.

In one of the large lecture hall, Harrison posed the question: "Why do students come to class?" Waits shared a day when only 60 out of 200 students appeared for NATS 101: Introduction to Mineralogy and Natural Science. Waits reported that he told students
to email him by 6:00 p.m. that evening if they had been in class. Said Waits, "The bright ones come to class." He shared his belief that A and borderline A/B students are the most likely to attend class. Waits told Harrison that he doesn't know why students should attend lectures and privately he said to me that he has told students that they needn't come to class.

I asked Waits if the tour invited him to consider teaching in the ILC facility. He noted that the lecture hall in which he currently teaches has the technology tools he needs, and it's only one minute from his office and his lab. "There's no way," he said. "It's too far. Why would I walk fifteen minutes?"

**Workshop: Day Two**

The day began with technology facilitator Snitzer's presentation about the features and applications of PowerPoint. Harrison embedded some slides she uses with TRAD students. The slides contained images that engaged students in individual and small group active learning. After the presentation and a brief discussion, participants were invited to create a PowerPoint presentation based on one of the articles on teaching and learning they were to have read the previous evening.

Waits began reading the directions provided by the facilitators in the participant binder. He had never used PowerPoint. He asked aloud, "What is the definition of clipart?" One of the facilitators who was within earshot quickly answered. Waits quickly figured out how to import an image onto his slide. He discovered how to enlarge the image. He did this by trial and error, without reading the directions. He imported a graphic of a crystal structure. When I asked how he was doing, he replied, "I like any
course that lets me play with my own software [his crystal structure image]." (In anticipation of this, Waits had loaded several of his own files and programs onto his laptop after the first day of the workshop.) He then referred to the directions to add the next slide.

Waits immediately began to think of ways to utilize PowerPoint to solve a presentation problem. "How do you make a movie with this?" he asked. No one was around to hear or answer so he glanced at the instructions. He continued to experiment with the animation features of PowerPoint. He then remembered that Flash, another piece of software he'd loaded the day before, had an animation feature. Waits attempted to open it but found he didn't have the serial number. He made a disgusted face and returned to PowerPoint where he inserted a series of images.

Again, he asked aloud to no one in particular, "How do I turn those into an animation?" The facilitators were assisting other participants. Waits spent about two minutes experimenting before referring to the PowerPoint "Help" feature. He searched for an answer to his question but didn't find it. He changed the background to black and lost his black text; he quickly changed it back. He commented, "The easiest way to do this must be to bring in an animated gif file." Waits created a four-slide animation by looping the four slides automatically in one-second intervals. He then put these slides into another presentation and linked the first to the second.

At the end of the PowerPoint session, the group took their laptops into a large lecture hall classroom. Each participant was invited to attach his or her laptop to a projector and share what he/she had been working on in PowerPoint. Six people elected to share their work; Waits did not. Four out of six participants had used the time to create
a piece of a presentation related to his or her subject area rather than to the teaching and
learning articles as they had been instructed. One of the two participants who opted not to
share said he was not comfortable learning without a manual. He was referred to the
University's Computer Basic Training Web site for online tutorials.

During lunch, a University librarian spoke with the group about copyright and
intellectual property issues. Waits asked a number of questions related to his own
published work, such as the ethics of linking to pdf files of his published work from his
own Web site. He also asked about problems accessing the Web of Science database
from the library's Web page. A discussion about the cost of resources ensued. Waits
suggested that the library eliminate hardcopy journals all together. He asked if the
University could share electronic subscriptions with other state universities.

When participants returned to their carrels after lunch, one of them asked Waits if
he knew about a Web site called "pickaprof.com." Waits checked it out and learned that
this University was not among those indexed on the site. I shared the University's
"Student Link" Web page with Waits, and together we looked at his course evaluations
online. He didn't know this information was available to students. We noted that he
received high marks for "overall teaching effectiveness" and "usefulness of in-class
activities." When I queried Waits about the in-class activities, he responded, "[Students]
don't know what they're talking about."

The group reassembled and one of the technology facilitators did a presentation
about student access to course materials. When she asked the group about why they
might put PowerPoint on the Web, Waits replied, "You can post your lectures so students
can grab them." Waits brought up the problem of how to control pages and images so that students get complete and reasonable length pages when they do printout.

When Waits returned to his carrel, we looked at his NATS 101 course Web site. I asked him questions about the content. He recommends that students print the notes that he's posted for each lecture before they come to class. The notes include important points for each lecture followed by more detailed information. The notes include visuals, including atomic images and graphs, links within the site connect with larger images, links off the site connect to important information such as the Periodic Table, high-interest Web sites such as the "SETI@Home" site (Search for Extraterrestrial Intelligence at Home), and current events. Waits has also included brief movies of crystal structures on the course Web site.

I noted that it seemed to me that he was already using a great deal of technology in his teaching. I asked Waits about his motivation for attending the workshop. A teaching faculty member of the Department of Geosciences recommended the workshop to Waits. He told Waits that he "didn't like what he was doing on his Web site." This colleague, a workshop alumnus, objected to Waits posting the entire content of his lectures on the Web. He suggested that Waits was "giving" the students too much. Waits asserted that he and his colleague have different goals for the course. While Waits wants students to recognize the importance of scientific advancements in their daily lives, his colleague believes the course is a recruitment tool for the department. Waits believes these goals are in conflict and are at the heart of their disagreement. Nonetheless, this colleague influenced Waits' enrollment in the workshop.
Workshop: Day Three

When Waits arrived at the FCII, he was very excited. He had decided to create a PowerPoint presentation for a talk he would be giving the next week at a Geo-chemical and Mineralogical Society of America conference. Although he has created many presentations with his own software, PowerPoint has the capacity of easily adding text adjacent to images and movies he's created. Again, Waits exhibited the adult learner's desire to apply what he learned to his work and to do so as quickly as possible.

The first presentation of the workshop day involved learning the characteristics of graphical formats. The facilitators used a hands-on, creative thinking small group activity that involved sending various sizes of images via the Web. Waits' group easily figured out their strategy, and Waits, in particular, showed impatience while waiting for the other groups to finish their task. When I asked what he was thinking, Waits replied, "Groups are the lowest common denominator."

From past experience, Waits has preferred gif to jpeg file formats. He wanted to test and to prove the point immediately. He and another participant examined a sample image stored on Waits' laptop. The difference was indiscernible. Harrison shared a brief PowerPoint presentation that included ideas for scanning. Waits asked if a black background and white foreground was best for projection. Harrison affirmed that rule of thumb.

The workshop participants sat with partners at the scanning workstations in the desktop computer areas of the FCII. A technology facilitator was assigned to each station. Waits happened to be alone at a station so he had a private tutor. After asking how to find the Photoshop application, Waits returned to reading the directions supplied by the
facilitators. He expressed frustration when the directions didn't match what he was viewing on the computer screen. The facilitator stepped in and got him off on the right foot. When Waits had scanned his first image, the facilitator asked him if he was happy with the image size? Waits replied, "Oh, I was going to move it into Paint [another software program] to fix that."

The facilitator then showed Waits how to accomplish this task in PhotoShop. "Do you like keyboard commands?" asked the facilitator. Waits smiled and learned the commands. The communication between this facilitator and Waits was direct, no nonsense, sparse, and apparently quite effective. Waits asked, "How should I save this?" Before the facilitator could answer, Waits remembered and answered his own question. He went on to complete a second scan of a transparency. He quickly cropped the image using the keyboard command he had been shown minutes before. I remarked on his quick learning curve. Waits explained that it was a similar command in a program he was already using. "The great thing about PhotoShop," said Waits, "was that you could bring up the images side-by-side." After comparing several images in gif and jpeg format, he decided there were different situations in which he would use each format.

Waits often talked aloud to himself while learning and answered his own questions. The facilitator allowed him to explore, make mistakes, and intervened only when asked. Waits asked the facilitator if the staff at the FCII was underutilized. When I asked why he inquired about that, Waits said he just wondered how long it would take him to get help from the FCII staff after the workshop week. I asked if he would physically come to the FCII. Waits replied, "No, I would email."
With the facilitator's help, Waits continued to add keyboard commands to his repertoire. He critiqued the software as he worked making suggestions for simple user-friendly features that could easily be added to programs. No one else came to use this scanning station, so Waits proceed to accomplish all his scans. When I asked why he was smiling, Waits replied, "I'm happy as a clam." He then told the facilitator about his decision to use these scans in a PowerPoint presentation that he would give at a conference the following week. The facilitator replied, "Dive in. Why wait?"

At the end of the scanning session, Waits thanked the facilitator, "That was great! You showed me some tricks that will save me hours." The facilitator helped Waits move his images from the desktop computer via the network to the hard drive of his laptop. Waits was anxious to move these scanned images into PowerPoint but he remembered a question about font creation software that sprang from a conversation with another workshop participant earlier that day. The facilitator had an answer, which Waits rushed to share with his workshop colleague. Waits returned to the carrel and immediately began working on his presentation, adding the images, and adding text in text boxes.

After lunch, Harrison reminded participants about the homework assignment — to bring an informal or formal writing assignment to share. In NATS 101, Waits gives six formal writing assignments during the semester. He immediately went to his computer and brought up an assignment. Waits said, "I hear that we're supposed to be teaching them to write in [Tier I] courses. This is my third year teaching here. I have never received any guidelines about teaching [students] writing."

He then initiated a conversation with Harrison about the possibility of teaching a three-week summer class. Waits expressed some concern for the feasibility of his "style"
in a course that meets every day. "Two one-hour lectures – [students] can't do it," noted Waits.

Harrison responded, "It would be a good way to experiment with what you do. We suggest even if you like that format – an hour essentially – after ten or fifteen minutes have students take a break and do a writing assignment or engage in a discussion with a neighbor or small group."

"I came through school with small classes," said Waits. "I've never even seen how to manage [a large class]. Now I'm teaching one. Breaking up a class of three hundred students into groups? I'd like to see that!"

"For example, there's a section of the class," replied Harrison, "[where I have students] sit down in a group and learn this. I have them work in small groups and be responsible to teach a concept, or to define terms, or make up a problem. Maybe it's examples – and then they derive the principles."

"It takes a lot of work," noted Waits.

"When you start, it's also a constant fight with students. They'd rather disengage. If they have to do something every day, it's a real different thing. From all the things we know about learning, people learn by doing, by using what they are trying to learn. The physical sense of that is what we're talking about."

Two technology support people from the Center for Computer and Information Technology (CCIT) gave the afternoon presentation. Their focus was on course management and electronic tool management systems, such as WebCT, Caucus, and POLIS. Waits asked about the purpose of a listserv or group list such as the "Click Mail" feature of POLIS. One of the facilitators noted that there is a difference between sending
information to students and requiring them to retrieve it from a Web site. He also talked about motivation and student involvement when they post their own thoughts and ideas. The other facilitator shared a key pal use of email.

Next, the facilitators described and demonstrated the OldPueblo MOO, a synchronous online environment. Waits inquired, "I'm thinking of using this, not with students, but for meeting with colleagues, research colleagues. Could we do this right away?" The facilitators described the process of setting up an account and giving users access to the MOO.

The facilitators then shared WebCT, a course management tool. They shared some of the options available to the instructor when setting up a course, such as an online syllabus, announcements, discussions, quizzes, and a place to post students' grades. They explained that the learning curve for this program is rather steep, but that the FCII offers support for instructors who want to use it to manage their courses.

Waits was somewhat interested in the online grade feature of WebCT. He was told that the Gradebook program was much simpler to use, but that it would not longer be available as the graduate student who designed and maintained it would be leaving the University in the fall. Learning about tools to give students a reliable, up-to-date report on their course assignments and grades was one of Waits' goals for the workshop. He wanted to prevent problems with students' papers being discovered "lost" or their grades being contested in the final weeks of the semester. After this session, one of the technology facilitators introduced Waits to the student, who was employed in the FCII, who was responsible for Gradebook. Waits expressed his frustration with the situation
and reiterated that a seamless, universal online gradebook should be the first priority of the University.

Several times during this presentation, Waits asked, “Can you give us an example?” The facilitators answered: “No, we don’t have a link.” Later, Waits expressed his feedback on this entire session focused on online course management tools in this way: "They did a terrible job. They didn't have examples to show us. That's basic." This session was the first learning low-point in Waits' workshop week.

Waits took the opportunity ask a workshop technology facilitator his question about drop-down menus. (He had posed this question several times during the week to different guest presenters.) The facilitator gave him the email addresses of two University Web programmers, and he sent them an email right away. Within an hour, Waits had a response from one of the programmers, who invited him to come to his office in the basement of CCIT to talk about his needs. The facilitator escorted Waits to the programmer's office where he described his indexing problem with a crystal structure Web site he authored and launched. The programmer didn't know how to remedy the problem but agreed to send out a request for help on several programmers' listservs. That evening and at the end of the week, Waits received an update from the programmer saying that no one he knew was able to solve the problem.

**Workshop: Day Four**

The fourth day of the workshop began with a presentation on writing by a faculty member of the University Writing Center. The presenter talked about using student writing to teach critical thinking skills. It only took a few minutes for Waits to comment,
"She's too long-winded." The presenter asked participants to bring up their writing assignments on their laptops. Waits appeared to be bored; he surfed the Web and continued to personalize his computer.

While the presenter continued to talk, Waits took a few of her suggestions, quickly made a few changes to his writing assignment, and returned to changing the settings on his laptop. Participants were asked to work in pairs. Using a set of questions given to them on a handout, they were to give each other feedback on the writing assignment each brought to share. (Waits confided to his partner that he was in a highly specialized Canadian undergraduate math program and that he didn't write a paper until his master's thesis.)

The facilitator circulated among the pairs. She read Waits' assignment and commented. "You're asking students to summarize a new field. This is difficult for them." I asked Waits about the support students receive from the graduate teaching assistants for the writing assignments. He described a sequence of discussion sessions: what are science articles, bring in articles, and then evaluate the articles in the group. Waits said he was surprised at first that students didn't know what a scientific article was, but "my job is to teach them."

Waits and his partner exchanged feedback on each other's assignments. Waits noticed that his colleague didn't give clear criteria for how he would grade students' work. This partner said he didn't understand the word "implications" in Waits' assignment. They discussed this. Waits' partner suggested giving students focusing questions such as: "Where does this fit in the scheme of science? Does this contribute to
scientific progress? Does it describe a research advance?” Waits appreciated this
feedback and made a revision to his assignment.

His partner asked Waits how to get the hardware specs on his computer. Waits
showed him and patiently explained how to change the size of a dialogue box. As the
presenter continued, Waits and his partner continued with their "off task" behavior. Once
Waits asked the presenter a question, which showed he was still listening, but returned
promptly to doing his own thing. When the presenter called on him to read a piece of his
assignment, he opened the document and read from the goals of the assignment. She gave
him feedback, which he incorporated. Once or twice he used his computer thesaurus to
look up words the presenter had used.

When the presenter suggested that students need to feel they can contribute
something "original" to the body of knowledge, Waits whispered that he had a problem
with that. Harrison interjected another interpretation of the presenter’s remark; students
need to make concepts their own. A discussion about modeling for students and student
responsibilities for learning ensued. Waits didn’t appear to be listening. At the end of the
session, I asked if he learned anything from the session. "Sure. I tuned up the assignment.
I may add a peer review. I may ask the TAs to spend a couple of discussion groups
talking about what science articles are. Students have brought in articles about the X-
Files! They have to be taught what science is. Having them teach each other is a more
effective use of my time.” I asked if he was listening when he was playing with the
settings on his computer. Waits said, “No, I was totally bored.”

After the presenter left, Waits asked Harrison why the writing discussion was
included in this workshop. Harrison noted that improving student writing is part of the
Gen Ed curriculum. Waits replied, "It didn't fit. Where was the discussion of how to use technology to improve student writing?" Harrison admitted the technology integration was weak in this presentation. She also noted that the presentation might not have been as appropriate for participants who teach outside the Gen Ed curriculum.

Participants took a break before the next presentation. Waits asked to be shown how to use the read/write CD-ROM. One of the technology facilitators shared that information with him. Another participant moved his laptop over next to Waits. He also wanted to learn how to use this tool.

A University librarian gave the next presentation about faculty-librarian partnerships. Using a PowerPoint presentation, the presenter discussed information literacy and the goals for collaboration. During the presentation, Waits showed his new neighbor the "Web of Science" database, and they began cruising articles. The presenter tried to engage the participants by asking them to visit specific Web sites on their laptops. Waits and his neighbor obliged. It was interesting to note that on every site, Waits searched for keywords related to his discipline. It wasn't long, though, before he was off on his own again. He explored the local newspaper's Web site while the presenter answered other people's questions.

Waits re-joined the conversation by repeating his question from day two of the workshop. "What's happening with the e-journal budget? Is the library actively trying to get us as many e-journals as possible?" Waits confessed that he would rather not go to the library to read hard copies of journals. He would rather have them on his desk via his computer. Waits then asked a specific question about searching for online journal articles using the library's catalog.
After the librarian left, the participants took a break and interacted with one another. With the help of another participant, Waits searched the Web for his own name using the Google search engine. (I taught him how to limit his search by putting his name in quotation marks.) Harrison showed Waits where to find the Outlook Express calendar. Waits wanted to know if a reminder would come up on the screen. She didn't know so he tested it by setting a reminder for fifteen minutes hence. It rang on time and a reminder flashed on the task bar.

An informal discussion began about ways to get students to write online on listservs and in online discussions. Someone posed the question of requiring students to have computers and Web access. Waits brought up the fact that other colleges require computer ownership for admission. While the discussion continued, Waits asked a technology facilitator about Eudora, an email program.

A workshop technology facilitator gave the last presentation of the day; he taught participants how to get started with a Web authoring tool called FrontPage. Before Waits opened FrontPage, he asked about his course being hosted by the Gen Ed server. He wondered about making FrontPage his default Web-authoring tool. (Note: This was the only technology tool presentation offered during the workshop week that was predicated on participants following along step-by-step with the facilitator and moving through the directions at the same time.)

One of the technology facilitators helped Waits find the dialog box to begin in FrontPage. He got ahead of the group and had to start over because he had renamed his default page. This time Waits remembered how to begin. He made two pages but was confused about what he was doing. All of the facilitators were occupied so I offered to
show him the navigation view of a FrontPage Web site on my laptop. Once he saw how it
was organized, Waits returned to building his site. He went to his course Web site to cut,
paste, and format information into FrontPage.

The facilitator showed the group how to create a table. Waits worked
independently and missed those directions. Waits then asked about putting an image on a
Web page. He followed along as the facilitator showed the group how to take an image
off the Web, save it onto a disk, and import it into FrontPage. With help, Waits figured
out how to save an image in his FrontPage folder and then insert it on a page.

Waits began formatting a table for grading explanations. He asked a facilitator to
help him change the background and formatting theme. He wanted to make a horizontal
rule across the entire page but that wasn't part of the theme he chose. Waits added links
between pages. The facilitator showed Waits how to add a form. "This is way too
advanced for one day," said Waits. "Let us do what we already know how to do, work on
it, and come back tomorrow to learn something new."

Waits believed that Web authoring was "the meat" of the workshop and should
have been shared a little bit every day. Participants could have practiced every night and
would have been ready to ask questions and receive new information each day. Another
participant noted that he had thought the entire workshop would be about Web authoring.
Another said the workshop should have been turned around; presentations offered on the
last days should have been first.

Another participant accidentally unplugged Waits' laptop, and as he had not saved
his work, the pages were on the server but not on his computer. "I lost everything!" cried
Waits. A facilitator helped him download the pages from the server. Waits took this
experience with good nature but overall he had expressed a great deal of frustration throughout the day. He had been annoyed with the length and content of the morning writing session. He didn't get his need for an online gradebook met. He felt the FrontPage session should have been spread out over the entire week. Learning how to develop his online syllabus was a primary goal for him for the week. Waits requested more guided learning with FrontPage for the next day but was told that is was not on the agenda.

**Workshop: Day Five**

Waits had been on time each day. On the last morning, he was late. When he arrived he reported that he had been dealing with a failing scholarship athlete before coming to the workshop. Waits initiated a brief conversation with Harrison about his failing student. (The student was a member of the University's championship softball team; the final exam for the course had been two hours before the "big" game.) Another student in the same course who earned an A is also a team member. What Waits didn't understand was why the two students hadn't studied together. Bob had empathy for the student; he was also a scholarship athlete. "In order to be successful, she'll have to learn to compartmentalize her life," said Waits. "She earned a failing grade so I gave it to her."

Harrison brought Waits a document camera to use in his presentation that afternoon. He was impressed by the compact size of the camera but was concerned about the angle of the projection. Waits went to his lab at noon to get the liquid nitrogen he needed to demonstrate some of the properties of superconductors.

Waits asked a technology facilitator to download more FrontPage themes onto his laptop. He checked and sent email, including notes to answer students' questions about
their grades. Waits then returned to working on his project and continued to make animations of crystal structure images. The previous evening he loaded a piece of software that would help him make animated gifs. Using it, he made a brief movie.

Waits searched the Web and found an image of a superconductor to add to his presentation. I suggested he include the image without telling us what it is.

"I'm not here to practice teaching," he replied.

"Why not?" I asked.

"There's nothing wrong with my teaching."

Waits noted that the workshop participants had no trouble recognizing when one or the other of the facilitators was more expert at certain pieces of software and/or possessed other technological expertise. He said, "they're 'good sports,'" meaning they were relaxed about saying they didn't know the answer to a question and passing it on to another facilitator. This is an interesting observation on Waits' part. I wondered if he connected this in any way to his own work or teaching environment. I didn't inquire.

Waits took a break from his project to ask Harrison to share WebCT's gradebook. She took him to her online course and attempted to edit the gradebook using Netscape 6.0. It wouldn't work. She then went to her office and showed him how to add a column and students' grades. As was common throughout the week when he was exposed to a new product, Waits critiqued the software. "This is too hard," he noted.

Waits volunteered some feedback on the course management software session from day three of the workshop. He remarked that the guest facilitators seemed unprepared. Their text was full of typographical errors; they didn't have examples of the tools they talked about to demonstrate for participants. "If workshop participants had
never before seen a particular tool, there was no way they could get it from this presentation."

After lunch, participants were invited to share their presentations. Waits volunteered to go first. He put a superconductor under the document camera, added liquid nitrogen, and projected it onto the screen. He answered questions about the superconductor. The audience, particularly the technology facilitators, was engaged by the demonstration. Waits switched projectors to share his PowerPoint presentation. It included an explanation of how superconductors work, a photo from the Web of a chip made of superconductor, and a Japanese superconductor train that travels 340 mph. He commented that PowerPoint could be improved and talked about how he used animation software to make the movie of the crystal structure of a superconductor. He shared the movie and ended with information about the future of superconductor research and its potential applications to solving real world problems.

The other workshop participants didn't give Waits any constructive criticism. Waits, however, made comments and gave feedback to the other workshop participants as they shared their projects. One participant was still looking for a way to put mathematical problems on the Web that students could manipulate. Waits suggested some freeware that might work for that and offered to share it with this participant. Waits suggested to another participant that he should add more graphics to his presentation saying, "Every example could have an interesting image." He also offered to help another participant save Word documents as pdf files for easy access on the Web. Waits complimented one participant on his course Web site and his use of a general introduction to his course with
links to specific information for a particular semester or year. "You can use that over and over again. That saves time," noted Waits.

At the end of the workshop, Waits provided more unsolicited feedback to Harrison. He remarked how much FrontPage will make a difference in his course preparation. "There is a part of me that wishes you could do a little bit of FrontPage every day. On the day it was shown to us, I wasn't ready to do forms. Now I want to learn more." Harrison predicted that beginning with Web authoring would have prevented some people from thinking about anything else.

Waits asked when there would be another workshop. Harrison said the next one would be a Macintosh workshop. Waits said that other people in his department want to participate in the workshop; Harrison shared that she had six more people from Geosciences on the waiting list.

While Waits was cleaning up around his carrel, he found the cable to connect the laptop to the TV. "Now I can play my DVDs! I am a happy man." Waits and I exchanged thank-yous, and we set up a time for a follow-up interview.

Explication: Workshop Journal

In this day-by-day retelling of his workshop experience, Waits clearly exhibits the qualities of adult learners noted by Knowles (1998). Waits repeatedly expressed his "need to know" in terms of working more efficiently and making his preparation time shorter. He also voiced his disappointment or frustration when the workshop did not provide answers to the specific learning goals he had brought with him to the experience. Waits came to the workshop with a strong self-concept in relationship to his ability to learn and
use technology tools and a great deal of prior experience as a self-directed technology tool learner. For the most part, he relied on the published directions and asked questions when he knew getting the answer would save time and/or aggravation. When I asked Waits if he would present his final project as though he were actually teaching the content to students, he replied, "I'm not here to practice teaching." His strongly held belief that he is an effective, successful teacher may have prevented him from seriously considering some of the teaching methodologies shared during the workshop week.

Waits came ready to learn the technology tool components of the workshop. He was open to hearing about all of the tools, but if he perceived they didn't fit his teaching situation (in a large lecture hall), he did not wholeheartedly embrace the learning. Waits' behaviors showed him to be a field independent, self-directed learner who was not afraid to diverge from the agenda in order to explore tangents of personal interest. Although he had an individualistic orientation, Waits provided assistance for other workshop participants and occasionally sought support from his workshop colleagues.

Although Waits marked "completely agree" on his beginning workshop survey that a colleague influenced his participation in the workshop, he also marked "completely agree" with regard to his confidence that he would use what he learned in his teaching. He came to the workshop with specific goals – all of them involved learning technology tools: "PowerPoint, listservs, html, appointment, online gradebook, and email." His motivation to learn seemed to arise from his "need to know" easier and more effective methods to use technology tools in his teaching, research, and personal life.
Post-Workshop Interview

Two weeks after the workshop, I audiotaped a one-hour follow-up interview during which I clarified my field notes and Waits' beginning and ending workshop survey data. Although I brought questions to the interview, which were answered during the course of our conversation, the tone of the interview was quite informal and collegial. I feel that Waits and I established a trusting and supportive relationship during the workshop week that positively influenced the interview. I believe this helped him be open and honest with me about his workshop experience and his beliefs about teaching, learning, and technology.

I transcribed the interview verbatim and read and reread the interview data. Using the Van Kaan line-by-line analysis (Moustakas, 1994), I allowed the interviewee's responses to build categories and themes. These themes created a framework for the vignettes that I constructed using the participant's own words (Seidman, 1998). The themes used to inform the vignettes are:

- the participant's beliefs and behaviors around teaching and learning and technology,
- his experience of the workshop week, and
- his recommendations for improving and/or extending the workshop.

As subcategories began to emerge, I further refined the teaching category to include how Waits learned to teach, his teaching goals and methods, feedback on workshop teaching components, and suggested follow-up faculty development centered on teaching. The technology theme included how he learned technology applications, what new tools he learned in the workshop week and their potential usefulness to him in
his teaching and research, feedback on workshop technology components, and suggested follow-up faculty development centered on technology. I also discovered and utilized categories related to Waits’ beliefs about teaching and technology and his teaching and technology-use behaviors. Waits received a copy of both the interview transcript and vignettes with interpretations for his review. He did not suggest any revisions and felt that the vignettes accurately reflected his experience of the workshop.

Field Study Vignettes and Explications

The vignettes and explications that follow describe Waits' teaching and technology background and initial responses to the workshop. These stories are one way for Waits to tell where he has come from as a teacher and learner. At the time of the interview on which these vignettes are based, Waits had not had much time to reflect on this workshop experience nor had he had the opportunity to integrate what he had learned into his teaching repertoire. These vignettes, then, provide background that can be considered alongside the data collected from Waits' second interview, which took place one year after his workshop experience.

Vignette Focused on Teaching: Figure It Out or Free Rein

In a follow-up interview conducted two weeks after I shadowed him through the weeklong workshop, I asked Waits if he attended the workshop in order to reexamine his teaching practices. Waits replied, “My teaching is fine. I’m not worried about how to stand up in front of a class and deliver it.” He learned what he knows about teaching from emulating his mentors. Said Waits, “My advisors were not trained to be teachers.
They were trained to be scientists." Waits said this when asked about how and where he learned to teach.

My graduate advisor was a great teacher – great teacher. He won an international teaching award for college professors. I try to emulate him. That’s the only thing I can think about. The rest of it is just me standing there. People in my department say I have charisma - that I have classroom charisma. I’m just one of those lucky natural ones. I prepare the material but it comes out spontaneously up there, and I have a good time and the students have a good time.

The bottom line that I got from [my graduate advisor] was: ‘Don’t sweat students having difficulty. You’re there to help them. You do everything you can to make it clear what you consider to be important in the material. And if you make that really clear to them and your tests and exams follow that, then the students will respect your teaching. It will work out.’ My advisor didn’t suggest I seek training in teaching.

[These students are freshman taking a science requirement.] We’re teaching them something for purposes other than that they are going to be great scientists. So if I’m teaching science another way, why not make it an enjoyable course where [students] walk away saying ‘I really learned something.’ Why continue with this idea that science is really hard? These guys [the students in NATS 101] aren’t going to do science. Why only give 20% of the class A’s so they all still think that science is a topic for geeks? Instead I know they leave my class saying, ‘I’m going to pay attention to what’s in the newspapers about science because it’s an exciting time we live in.’

My goal is that when these guys go out in the real world and they are making decisions with tax dollars, they will see what science gives them and they will be willing to put tax dollars into science. The reality of it is that science exists on tax dollars. If you took that away, it would come crashing down. And I really believe that our world is a better place
because we have a part of our society investigating science –
understanding the nature of the universe.

[One of the first classes I taught was] for students who were not
geology students; [they] were from engineering. That was fun because
[the department] gave me a textbook and they said, “Here’s the textbook
we would suggest. Would you teach this class? It’s called ‘Minerals
Laboratory.’” And that was it. I had no idea of what the content of the
class should be and when I asked them, they said, “Figure it out.”

I call it ‘free rein.’ I had a blast; the students had fun. I made a
bad mistake in [that class] and I learned a lesson. I told them that they
could drop their lowest grade and then I brought in the teacher
evaluations on the last day of class. Two people showed up out of the 30
students. That was the one they decided to drop. That was devastating to
me. I thought this was a great class. They’d want to come no matter what.
The bottom line was that they were all doing well, and this [was] the one
to drop. I’ve learned that students have a lot of responsibilities near the
end of the semester.

Explication: Figure It Out or Free Rein

Waits “likes” teaching and one of his teaching goals is for students in his courses
to “have fun.” He wants students to recognize the importance of scientific research and
discoveries in improving their everyday lives. Waits is charismatic and shares his
fascination with science through the demonstrations he integrates into his lectures.
Although, he takes his teaching responsibilities seriously and looks for ways to improve
the presentation of course content, like many of his post-secondary teaching colleagues,
Waits has not been schooled in instructional methods. This workshop was his first
professional development experience in teaching and in technology tools. In his career,
he has conformed to the expectation that faculty learn about teaching through their
personal teaching experience (Boice, 1992; Weimer, 1992).

Waits values the freedom he has been given to "figure out" how to teach. Waits may have an assumption that "learner equals dependent" (Knowles, Holton, & Swanson, 1998, p. 65), and he may have resisted any learning situation in which he could not be self-directed. As he clearly states, his mentors are scientists – not teachers. He has been given "free rein" to learn to teach through trial and error. He believes that teaching entails "delivering" the content; he is confident he does that well. This data shows that Waits' perspective on teaching comes from an "instructional paradigm" (Barr & Tagg, 1995), which puts the content and the teacher rather that the student and learning at the center. By example and through experience, Waits has learned the pedagogical model described by Knowles (1973), in which the teacher has "full responsibility for making all the decisions about what will be learned, how it will be learned, when it will be learned, and if it has been learned" (p. 62). This transmission model has been reinforced throughout his education and informs Waits' core beliefs about teaching and learning (Pajares, 1992).

Vignette Focused on Technology Use: Access to the Important Points

Waits is an educator who has been incorporating technology tools into his teaching to meet instructional goals. Like many technology users, he is self-taught. Since the spring of 1999, he has maintained Web pages to support his teaching. This is what Waits said during the interview about his experiences using technology in teaching.

*When I started teaching classes, I realized that computer programs used to visualize the crystal structures that we were talking about and [computer programs] to compute x-ray power diffraction patterns would*
be really good to teach with. So [the department] bought me the latest Fortran compiler that did graphics, and I sat down, opened up the manual, and learned how to program it.

I [launched my first online syllabus] in the NATS class in the spring of 1999. I had never taught a big class before. Based on the quizzes, I realized, about a quarter of the way into the class, that the students were not figuring out what were the important points. So I started my 'important points' overheads. I put them on a separate overhead – I really thought I was big-time because I used two overheads – and my TA [teaching assistant] would always point: 'There's the important point that he just addressed.' And the students would write madly for a moment, and then we'd move on to the next one.

About half way through [the course], I realized that this would be a lot easier if I put my important points on the Internet and that way [the students] could print them off and they'd have them right beside them [from the beginning of the class period]. What was happening is that they would be coming to class and be copying down the important points. For some people, it was good for them to be doing that – they're learning more by doing that. But I just saw them being busy doing busy work. So I kept the overheads but the overheads also became the Web page. So that was my original Web page – just my important points for each lecture put up [on the Web] in advance.

I launched my Web pages because it was easier for the students. It was harder for me. I had to get [the important points] on the Web. I just had the Word document and had to click to convert to html and I could just stick them up there. Only that doesn't work very well. So I had to learn how to do it in a different way. I learned how to use Communicator and Composer within Netscape.

The first year I did my NATS class all I had was the important points up there [on the Web]. In the second year, I started making each lecture into a Web page. The end of that year I was thinking I hand
delivered too much to them. A fair number [of students] quit coming to class. The grades went down. 75% got A's the first year I taught it. It was about 60% last year and then 52% this year.

So [I thought to myself] I'm giving them so much that they aren't doing any work on their own to learn. And so I decided I wasn't going to do it anymore. And then when I got my [student] evaluations, I changed my mind. The girl in the wheelchair said, 'You made this the best learning experience of my life since I've gone to school because you took away the need for me to record what I was learning.' That's a pretty strong statement from someone who - she can type on a typewriter - but she couldn't write, you know.

At the University, we have a whole lot of students who come in with learning disabled forms and from the SALT [Strategic Alternative Learning Techniques] program, that sort of stuff. All of them, one after another, [have said] 'you made it so we could listen' and the students who got A's liked it, too. Primarily it was 'you took away the need to make notes and we could actually listen and enjoy what you were talking about.' You know there's an entertainment side to this, but it was so overwhelming in that respect that I said, 'Well, I guess I should keep on adding them.'

Explication: Access to the Important Points

Based on pedagogical choices, students' needs, and student feedback, Waits has made a number of decisions to continue to utilize online support for the NATS 101 course. He has questioned how much he is giving students by putting the important points, his lecture notes, and previous semesters' exams up on the Web. He has noticed that a significant number of students don't come to class. "I wouldn't go to my lecture if I were a student because I would look at it as this guy has laid it out so I can succeed
without going to lecture. My first year at the university I didn’t go to too many classes. I would have loved to have had a class set up like this. Because that’s a winner!"

Waits utilizes technology tools to support a transmission model of teaching. This data suggests that he uses technology tools to transmit information and to reproduce what he already knows how to do in teaching (Kuriloff, 2001). Waits' own experiences as a learner, the teaching example provided him by his mentors, and the positive student evaluations he currently receives reinforce his beliefs in the transmission model of teaching and learning. His frame for teaching has evolved from a focus on teaching, not a focus on learning. As Naisbitt (1982) suggests, this technology use may represent the "path of least resistance" and the "better, cheaper, faster" stages of technology integration for Waits. Whether this is a phase or a destination, it is clear, that at this point in time, Waits has not changed his teaching framework; he believes in a transmission role for teachers and in a passive learning role for students (Barr & Tagg, 1995; Knowles, 1978).

**Vignette Focused on Teaching with Technology Tools: Out of the Box**

At the time of the follow-up interview, it was clear that Waits intended to expand his use of technology tools as a result of participating in this workshop. He also expressed an interest in broadening his use of technology tools beyond the workshop course content and would like to be shown some “out of the box” methods for integrating technology into teaching.

*In my mineralogy class, I’ll play with PowerPoint presentations because that’s not a bad way to learn. Because the way I do it might now, the whole thing is laid out like this, and I scroll through it as I talk and it would be better to do it page by page. And I’ve known that. It is too dry to*
do it that way. It's a presentation method [PowerPoint]. It could be more 
fun. [The lecture] could be more of a presentation and integrating the 
movies more smoothly is a benefit of PowerPoint. Right now all my stuff 
is disjointed. This way I can make it one package. 
[The workshop set us up] with the tools and then you have to follow it up 
with other things like what are some innovative ways to teach using the 
Internet? That was never discussed. Here are some 'out of the box' 
methods that have worked for people. And that's how I would do it. And 
then illustrate that with half a dozen different ways of doing it and then 
provide templates to follow those things as tools. Create a 'Tools Web 
site.'

Here's an example. You want to get surveys, real [time] survey 
data of stuff you're talking about [in class]. Imagine I want to use 
something where I take responses immediately. I don't know how to set 
that up. So it's a toolbox. They would show us this is how you make this 
work; here are some circumstances in which it works. Of course, you 
come up with your own set. And here's the template and let's go through 
it once and build something from it. Your own question could be: 'Do you 
think George Bush is a good president?' Your example could be as simple 
as that. Boom! There's an immediate distribution for all students to see.

Then give us some examples of how that is used effectively in the 
classroom because aside from those examples, how would I use that? 
[Let's say] I just finished teaching a section of the class. So you just pose 
a question to see if they get it or not. Or halfway through the lecture, you 
just pose the question before you go on to the next point. And then what's 
your answer. Gee, they didn't get this. All right, let me spend another 
minute on damage control or five minutes on damage control.

There are many ways to use this, but nobody would do it if it took 
them a week to figure out how to incorporate this in their classroom. 
That's what I mean by a toolbox of templates. And the gradebook, to me, 
would be one of things that should be given to us as a template.
Explication: *Out of the Box*

In this vignette, Waits reinforces his need for support in integrating technology tools into his teaching. When reflecting on what he learned about using PowerPoint, Waits talks in terms of "presentation." Although he talks in terms of using PowerPoint as a "way to learn," he still approaches technology tools from a teaching perspective rather than from the perspective of the learner. This data confirms one of Gilbert's (1996) findings: one should not underestimate the difficulty of faculty adoption of new combinations of teaching with technology; faculty need to see models.

Waits asked for more examples that he can adapt for his particular teaching situation, the large lecture hall. He expected the workshop to provide him with tools and to teach him ways those tools can help him save time. Waits would like access to a "Tools Web Site" where he could easily access support for the specific tools he's learned in the workshop. He wanted to be exposed to innovative, "out of the box," ways to utilize technology tools in the classroom. He doesn't feel the workshop offered him these strategies. Again, this data confirms another of Gilbert's (1996) findings namely the lack of information on strengths and weaknesses of particular technology applications. Carothers et al. (1997) believe that faculty development initiatives must provide models for effective teaching. At the time of this post-workshop interview, Waits did not have a sense of having been shown "out of the box" ways to integrate the tools he was exposed to in the workshop into classroom.
Vignette Focused on Improving University Support: Meeting Basic Needs

One of the principles of andragogy (Knowles, 1978) is that adult learners have a problem solving orientation to their learning. Waits came to the workshop with several technological problems that weren’t solved during the course of the workshop week. Many times during his interview, he referred to the fact that the University does not provide “basic” technological support for faculty. Eight times during the one-hour interview, Waits mentioned his unmet need for a gradebook software application. He also noted that he did not get adequate technological support for accessing his email off campus, Adobe Acrobat software for creating pdf files, or an electronic calendar that met his needs.

Waits inferred that unlike textbook editors in the following scenario, the University has not consulted him with regard to what kinds of support he needs to teach and to conduct research effectively. Waits believes that technology is not “integrated into the UA structure.”

The [technology] things I went into [the workshop] looking for like gradebook didn’t happen. If I were director of that group, that’s the first one that I’d do because that’s the one everybody would like to have. Do you realize how easy doing grades would be? You don’t have to do this form. You just go up there, click, click, click, and put your grades on the Internet.

Interestingly, the editors [of the textbook I use in] my NATS class came and talked to me about using it – what I thought was good and bad about it. And I had an advantage because I know the authors and why they wrote it, and I said, ‘One of the things you should give us - this is supposed to be an advanced book - is a CD [or] give us a Web site with every image from the book on it.’
I'm a professor. I have to teach a class in natural sciences. I don't care whose textbook I use. I'm going to use the one that makes my life the easiest and by making my life the easiest that means making my preparation time shorter. So if I have to spend two hours looking for a picture of the electronic wave orbitals for sodium when I teach electrons versus there it is on your CD, I'm going to get your stuff - not because what is does for the students, but because of what it does for me. [This textbook publisher is] doing that now.

I don't believe the University gives us very good support as professors - technical support - for teaching at all. This [workshop] was pretty good at showing us some of the stuff but you saw they don't even have a way for us to record grades - so students can get these things. There should be a single, generic way so every student sees the same interface; every professor can use the same interface. It should be a stand-alone thing. This is a basic. To me that's number one.

[Students] want to know what they got. What happens is they get their homework back with a grade on it? I don't have a grade recorded. Who knows what happened? [A student's paper] goes through graders and TAs and secretaries and these things happen and there's no way for the students to know that they didn't get that grade. There's a simple obvious thing that happens so often - by so often I mean five times a year in a class - that's too many times. So that's just a simple thing that they ought to be doing for us.

It's the management of teaching that [the University] should be intimately involved in. You build your own; you can change it at a moment's notice. These things are not rocket science stuff. These are simple things that a good Web designer can build for you – quickly. Simply tell [computer programmers] what you want. I think the problem is they don't know how to tell these guys what they want. This course is good but this [workshop] should be teaching us what they've got. Instead they're showing us everybody else's software.
Explication: *Meeting Basic Needs*

In this vignette, Waits shares his view that the University should be creating and providing faculty with management tools. He does not appear to see a role for the University in providing faculty development centered on teaching methodologies. At several points during the follow-up interview, Waits referred to professors as “smart” and not in need of training, particularly for teaching in the new high-tech Integrated Learning Center (ILC), which at the time of our interview was scheduled to be open for classes in six months. When addressing the need for faculty development for professors who will teach in the ILC, Waits said:

*Who’s going to want to give up two weeks of their lives for this? We’re smarter than that. We’re professors. We don’t need two weeks training.*

*Give us half a day. What can they possibly tell us about this class in two weeks? We have to know where the on/off switches are.*

Waits' comments suggest he perceived a lack of sensitivity on the part of faculty developers when they were asking faculty to take a subordinate "learner" role (Knowles, 1978; Gilbert, 1996). This may have precipitated a low response to this training, which was eventually cancelled.

Although Waits feels that he is only in need of technology support, he acknowledges that others might need support for teaching. When discussing the poor teaching evaluations of one of his colleagues, Waits clearly advanced the position that something should be done to help a professor who loves the course content yet can’t communicate it to students. He also noted that professors need help translating technology tools into teaching tools. “Nobody would use technology tools like real time
surveys if it took them a week to figure out how to incorporate them into their classrooms.” Again, Waits' stresses the need for models for technology tools integration (Gilbert, 1996).

One of the teaching-focused components on the workshop week is a morning spent on improving students' writing. Waits commented that technology should have been integrated into this strand, or it should have been cut from the schedule. He did, however, glean, at least, one useful teaching strategy from this session. “I like [peer review] because one of the hard things has been trying to define for students what is acceptable and not acceptable [in their writing]. This way they can somehow learn it internally. They’re learning [to write] by experience, by seeing other people’s work, and kind of comparing it to their own.” Although Waits may be unable to articulate this description as a constructivist learning experience (Briner, 1999), it may be that seeds were planted in the workshop that could impact the quantity and quality of active learning on the part of students in future course offerings.

Discussion: Waits' Workshop Experience

In the first follow-up interview, Waits talked about his expectations for the workshop week. He said, “It was the cost of getting a computer.” He remained open, however, to the workshop content and reported, “It was a fun week.” When asked if university faculty development constructed around technology tools was an effective method or model for moving faculty away from a lecture-orientation to a student-actively participating orientation to teaching? Waits replied, “Yeah. I don’t think it’s the only thing. I would certainly put it as one of the first things you’ve got to do. You can’t expect
anybody to do it unless they have the tools.”

During the interview, Waits made many positive comments about his workshop experience.

*I walked away [from the workshop] feeling more comfortable with this approach to teaching – incorporating this [technology tools] in more than teaching, in teaching and in the delivery of presentations to the public.*

*It was the environment that we were put in to [as well]. We were just thinking about [technology tools]; we were thinking about writing html for handicapped people. Who ever thought of that before?*

*I didn’t think much about integrating technology tools before [the workshop]. I didn’t think about it in a structured way. I only did what I had to do as I thought about it. I didn’t realize this was a subject.*

These comments may indicate that although Waits came to the workshop with goals related to learning specific software applications, he was beginning to place the use of these tools in the larger context of their application in teaching methodologies. This seems to support the constructivist learning theory that stresses that all knowledge is context bound. In the context of a workshop focused on teaching applications, Waits had begun to expand his view of technology tools. Throughout the workshop experience, he connected his learning to his individual needs. Making personal meaning of learning experiences is another feature of constructivism. Constructivism is emerging as a useful perspective for some adult learning situations (Wiswell & Ward, 1987, as cited in Knowles, Holton, & Swanson, 1998).

Waits’ overall assessment of the workshop experience was a positive one. He was a self-motivating participant in the workshop and used the workshop to the best of his advantage to accomplish self-selected projects. His prior knowledge of software applications and programming provided a strong foundation on which to build. The
project he shared with the participants on the last day of the workshop week was a presentation he subsequently shared the next week at a professional conference. Waits utilized FrontPage in creating the presentation, software that was totally unknown to him before the workshop week. In the follow-up interview, he reported that during his conference session he felt inspired by the ease of the presentation and that participants were positively impressed with both the content and technology tools he utilized in his presentation. “I just wanted to keep going.”

In spite of the fact that the workshop failed to address several of his specific technology goals, Waits credited the experience with getting him “excited” about teaching with technology. He reported that he is now more “comfortable” with using these tools and that he has a positive “attitude” and “mindset” about the possibilities technology affords teachers. He acknowledged that it is probably difficult for the facilitators to meet the needs of all the participants. He also said, “It was probably good to be in that [learning] situation. Every once in a while, it’s good to be a student.”

For Waits, the workshop seemed to be successful in addressing four factors involved in motivating adult learners: success, volition, value, and enjoyment (Wlodowski, 1985). The conditions in the workshop supported Waits in his desire to be a successful learner. He felt a sense of choice throughout the workshop. He felt free to choose to use or not use particular technology tools or teaching strategies; he felt free to diverge from the agenda and follow his own interests. Waits believed that the workshop would expose him to information that was valuable to him; he was totally confident that he would use what he learned in the workshop in his teaching. And finally, Waits, for the most part, experienced the workshop as a pleasurable learning experience.
Waits had many suggestions for follow-up faculty development. He believes “out of the box” teaching methods that apply technology tools should be on the agenda. He suggested that the University set up a “Toolbox Web Site” that provides templates for professors to use in their teaching. In addition to a gradebook, a “real time survey” template is one tool Waits would like to use. Assuming computer access, real time surveys could be used to instantaneously collect data to provide a distribution for students to consider in class or homework. (This capability is planned for several rooms in the ILC.) He also noted that real time surveys could also be used to poll students during the lecture to check for understanding. He believes these templates could be easily modeled for professors in brief workshops and practiced within those workshops. Faculty could then access templates of these tools on the Web and apply them to their teaching.

Overall, Waits took away from the workshop tools and skills that will help him facilitate the delivery of course content. He did not report potential uses of these tools in terms of engaging students in active learning. There is no evidence in these data to suggest that Waits’ underlying beliefs about teaching as a process of transmitting information from the teacher to the student were challenged by the workshop experience.

Impact of the Workshop One Year Later

In August 2002, I interviewed Waits, a little over a year after his workshop experience and after he’d had the opportunity to integrate his workshop learning into NATS 101. He taught this course in the spring of 2002. There were 150 students in the class; three TAs met with two groups each for discussion sections of about 25 students each. In order to ascertain the impact of the workshop on his large lecture hall teaching, I
brought specific questions to the interview. I asked about changes that I had noted to his online syllabus and lectures, his use of particular technology tools, and adaptations of teaching methodologies mentioned in our first interview, particularly group work and peer review in the writing process. The interview, however, was conducted in an informal conversational style and followed the interests of the participant beyond these initial questions.

I transcribed Waits' interview word-for-word and identified categories within the data. These categories were the components of the workshop that made an impact on his course materials, the content of his lectures, his current laptop use, use of the FCII for technology support, and his remaining technology questions. Again, I have presented these vignettes in his own words (in italics) in order to accurately represent his perspective. These brief stories represent a way of knowing and thinking about the workshop experience. They carry within them "the richness and the nuances of meaning" that describe his experience (Carter, 1993).

**Vignettes and Explications**

The brief vignettes and explications that follow describe an evolution in Waits' behaviors related to teaching and learning. These stories are one way to make sense of the apparent changes in Waits' decision-making as he planned in the fall of 2001 for teaching the NATS 101 course in the spring of 2002. He made changes in the course in terms of materials and lecture content and in terms of preparing TAs for teaching discussion sections. Through sharing these stories with me and by sharing my interpretations with
him, Waits began to understand his own development as an educator and to see his
workshop experience in a more significant light.

Vignette of the Workshop's Impact on Course Materials: *Focused on Student Interface*

In the one-year-later interview, I asked Waits if the workshop had had an impact
on the online syllabus and course materials he provides for NATS 101 students. Learning
more about html had been one of Waits' goals for the workshop week. He said that he had
modified every online lecture page and had made slight changes in the syllabus including
deleting one lecture. I asked him to elaborate on the connection between the workshop
and his making these changes.

*I thought about the structure of the html of my lecture component. I spent more
time. I was focused on my interface with [course materials] before, and focused
on how the students would interface with it this time. Every lecture page had
modifications at some level or another. The syllabus has minor changes. I deleted
one lecture and put something else in its place.*

*I developed my links more fully. I rehearsed printing out [the Web pages]
because students told me before that when they printed them out, half an image
would show up on one page and the other half on the next. I paid attention to that.
I even considered going to pdfs because they really control, but I didn't because I
don't think the students, with some exceptions, could handle that yet. You lose
some accessibility with that because pdfs require certain software to read.
Students have to know what they're doing. I was focused on the student interface.*

*Explication: Focused on Student Interface*

In the spring 2002, Waits reported that he did not "need" to add the universal
accessibility features to his course materials because there were no special needs students
in the class. He noted that he needs more training in order to accomplish this; this is one area in which he would like a follow up session. It is interesting to note, however, that a technology technique, universal accessibility, made a significant impact on Waits' thinking about his course materials. He did not directly use this technique to improve his course materials, but he utilized student access, the philosophy behind universal accessibility, to improve his course materials in other ways.

Focusing on the "student interface" is a perspective shift for Waits. Prior to the workshop experience and immediately after it as reflected in the first interview, his focus was almost exclusively on the teacher's perspective. He altered his perspective to that of the students as he invested time and energy to review and revise his course Web site. He made modifications to facilitate the students' access to course materials. He has begun to "see" his course through his students' eyes. This suggests Waits may have begun to make a shift from the "instructional paradigm" to the "learning paradigm" (Barr & Tagg, 1995).

Vignette Focused on Course Content: Thinking about Where Students Are Coming From

In this vignette, Waits shows that the workshop encouraged him to think about the students' perspective on the content of the NATS course as well. As he prepared for teaching by reviewing the course Web site and thinking about his lectures, he decided that students would be more engaged with his lectures if he spent more time talking about scientists as people, as personalities who reflect and influence their times.

*I also made a decision that I would spend a little more time on the personalities of the scientists. For instance, Ben Franklin – before Ben Franklin was a five-minute discussion on the origins of electricity and in our talks about electrons. (He invented half the words we use.) So this time, I did some extensive Internet*
searches and found biographies of Ben Franklin and made them part of the lecture.

I told [the students] a little bit about him because again I'm trying to make – with the audience – the science and the scientists are a good combination. These [students] aren't all scientists. Then I talk about the people as well as what they did. It makes [the students] more attentive. It worked. I did this for all the scientists I talk about. I developed links to their biographies. They're on the class Web site, and I talked about them as well.

Science is not an isolated event. There are people and morals and all sorts of things that come along with it. For the students, more important than the mechanics of the 'Big Bang' is its religious implications. Science affects society - more than a piece of knowledge sitting out there on a pedestal. Peoples' emotions get tied up in all this stuff. I never did that before.

[I was] thinking about where students are coming from. I know it was [talking about] the disabled students even though it addressed physical disabilities, [the discussion] was about accessibility.

Explication: Thinking about Where Students Are Coming From

Again, these changes in the lecture content seem to be related to the workshop discussion on universal accessibility. Waits made a powerful connection between technological or physical student access to course materials and intellectual access to course content. These changes affirm that, at least for Waits, the workshop's technology conversations influenced his approach to teaching – making it more student-centered.

Although he hasn't changed his transmission model of teaching, Waits has made a significant shift in thinking about what he is "transmitting" to students. He is actively seeking ways to connect 21st-century students with historical scientific discoveries.
through elaborating on the lives and times of the scientists who made them. He has begun to "hear" his course through the students' ears.

**Vignette Focused on the Organization of Instruction: I Packaged It in a Better Way**

During the workshop week, Waits expressed skepticism about applying group work strategies in large lecture hall classes. He said, "I just don't see [small group work] in the large lecture hall. I've never experienced it, and I don't see it." As a result, he was reluctant to experiment with this organization of instruction in the lecture hall setting. However, during the workshop's writing presentation and discussion, Waits showed an interest in the process of peer review. Two aspects of the teaching methodology presented in that session involved students working in small groups and providing peer review for each other.

Although Waits did not make changes with regard to the organization of instruction in his lecture hall teaching, he directed the TAs who lead course discussion groups to incorporate a collaborative small group assignment that included a presentation in the lecture hall. This is Waits' description of this new active learning experience for NATS students.

_I changed the discussion groups quite a bit. A large group of the students were going to attend the Gem and Mineral Show; it was in some sense training for the Gem and Mineral Show. First of all, we split up so there were group presentations. Each group discussed a certain type of mineral or rock. One person did the physical properties of the rock. [Another] did the physical properties of the rock. [Another] did how does society use [the rock]. They built up their presentations amongst each other. They did a presentation to the whole_
class. I had never done this before. This came from my decision to have the peer review part [from the workshop].

This group work project preceded the new peer review for students' papers that Waits incorporated into the course after hearing about these strategies in the workshop. Although the course requirement of six papers remained the same, Waits instructed the TAs to give students sufficient examples to help them construct an understanding of his expectations for a science paper before handing in their first individual paper assignment.

Then when we started the paper part, which I always had before, we went into it more slowly with the TA giving out a single article to everybody. [The students] all read it. For the first one, the TA wrote the paper in front of everybody – breaking it up into several parts. Then [the students] were given the assignment of doing [a paper] and passing it around to the other people in their group who criticized it. In the end, they came up with a group paper.

The bottom line was [in the past] it was taking three cycles of doing these papers before these students were figuring out how to do this. This way when they did the first on their own, they knew how to do it. They had the model by the TA and the model by their group.

I told the TAs to do [this]. I didn't participate in any of this. They all told me it was successful, and the students' feedback was like that, too. I could see [the papers] were better. My TAs got better evaluations from the students than they had in the past. This worked and it didn't take any more time because I took out stuff I didn't like from a year ago.

The goal at the end of the semester is the same: six papers from the literature of scientific articles. How they went about doing it was different; I just packaged it in a better way.
Explication: *I Packaged It in a Better Way*

This example, in particular, shows that Waits learned some strategies to better support students as they satisfy course requirements. He did not change the requirements or the content of the writing assignments, but he significantly changed the teaching methodology used to help students effectively and efficiently meet certain criteria. Students were given sufficient time to build, to construct, their understanding of Waits' expectations for the writing assignments, and the outcomes demonstrated that students were more successful. This suggests a more constructivist (Briner, 1999) approach to teaching and learning.

Although he remains skeptical about applying active learning strategies in the lecture hall, Waits was able to apply to the discussion sections of the course what he learned in the workshop about small group work and peer review. His decision to instruct the course TAs in how to utilize these methods improved the overall impact of this course on students' learning. This represents the diffusion of a teaching strategy, a diffusion of an innovation (Rogers, 1995) that furthers the impact of the workshop beyond the direct experience of the participants themselves. Students in the NATS 101 discussion sections were definitely more actively learning. In addition, Waits incorporated small group presentations into the lecture hall setting. This may appear to be a small change in the lecture component of the course, but could be significant in terms of Waits' decision to "share the stage" with students. This was a performance-based project (Briner, 1999) that could have given Waits a formative assessment of students' learning.
The Impact of Other Workshop Components

Waits made many general observations about the impact or lack of impact of the workshop on his work. Learning to access and use a convenient, universal online grading system was one of Waits' goals for the workshop week. Before teaching the NATS course in the spring 2002, Waits signed up online to use WebCT to post his grades. "Whatever the interface is, it's not self-evident. If there's a way to get help that's easy, it's not obvious. The workshop told me about it but not how to do it. I never used it." Fortunately, his department created an alternative system that reduced his problems with lost papers or unrecorded grades by 75%. Waits continues to maintain that the University should provide a universal online grading system.

Waits earned tenure in the fall of 2001. He noted that in his tenure review his participation in the workshop was not mentioned. Two upper administrators mentioned his excellent student evaluations, the highest ratings in his department. However, at the departmental level, his teaching was cited as a "weakness." Waits has accepted on-going philosophical differences around teaching goals and methodologies with members of his department.

Since the workshop, Waits has used the technology support services of the FCII. According to Waits, "The laptop screen fried. I called them up. The more senior of the technicians [Doug Williams] came to my office next day (or that day). He picked up the laptop and returned it to me the next day fixed. I was really impressed. He was extremely polite, too." Although he has not physically visited the FCII for support, Waits noted that he appreciates the University's commitment to helping him maintain the laptop.
He also noted that the workshop provided him with software that is essential to his teaching and research. "I'm in a bitmap world but the Internet is jpeg or gif. Photoshop allows me to convert. I have nothing else like [Photoshop]. I wish I could put it on my desktop computer. I use that a lot. [The workshop] gave me the Internet tools and I use them. I wish the University provided those things for all my computers but at least, I've got them on one of them [the laptop]."

As far as technology tools are concerned, Waits reported "the workshop taught [him] PowerPoint" which he has "used in all [his professional] talks since then." PowerPoint, however, has limitations in the areas of loading and playing videos and animations. Waits has decided, therefore, not to use it in his teaching; he continues utilizing his own software when making presentations to students. He notes that he would need more instruction on how to make his course materials universally accessible. He also noted that he didn't learn enough about FrontPage or other Web-authoring software so he still writes his own html code. He would like to learn how to access email from his laptop, which he always takes with him when he travels. Next year, he is going on sabbatical and will be out of the country. This will be particularly important for him during that time.

At the end of our interview, Waits summed up the major impact of the workshop on his thinking in this way:

*I'm glad I did it. It made me more conscious of the student interface. The [NATS] course was really built from my interface point of view. Maybe I would have gone there on my own; I don't know. As you get better, you expand your perspective.*
[The workshop] was the catalyst in making me think that way. Incidentally, all my majors classes that I teach are being altered to follow this stuff as well.

Although Waits identified technology goals for the workshop, he learned a great deal more. During the workshop, he perceived the focus on teaching to be extraneous to his needs as an instructor, yet it is clear that he internalized the information about student-centered teaching. He then used this information to take another perspective when revisiting course materials and content.

Discussion: The Field Study Participant's Perspective

The following discussion of the field study participant's perspective on the workshop experience is organized around the four sub-questions of this research study. This discussion deals only with the direct and personal experiences of a single participant. In sharing his experience through the interview process, Waits has illuminated the impact of the facilitators' instructional decisions on his learning. The reader should recall that the workshop has been Waits' only faculty development experience. Until this point in his career, he has been self-taught in the areas of teaching, technology tool learning, and teaching with technology tools.

Technology Tools Behaviors

What are the perceptions of this participant about his behaviors with regard to technology tools integration during and/or after this faculty development experience? Waits' experience of the workshop was that of an "autonomous learner." He clearly fit the description of an adult learner who was self-directed, required individualization, had a problem solving orientation, and strived to apply learning to his real-life situation.
(Knowles, 1978). His motivation to keep growing and developing as a teacher is less clear. A colleague influenced his participation in the workshop, but Waits clearly demonstrated internal motivation by experimenting with new methodologies in the year following his workshop participation. His learner behaviors, including applying previous understandings, searching for answers on his own, and struggling before seeking help, suggest he resisted the assumption that learner equals "dependent" (Knowles, Holton, & Swanson, 1998). Waits was adamant about his assessment about his own teaching; there was "nothing wrong with his teaching" and that his reason for attending the workshop was to learn technology tools.

Throughout the workshop, Waits demonstrated many constructivist-learning principles in action. He frequently applied his prior knowledge of other software programs as he learned new ones; through trial and error, he integrated the old and the new into his new level of understanding (Briner, 1999). Waits noted that some of the facilitators were more expert with particular technology applications, and he noted and appreciated the attitude of co-learner and coach that the facilitators modeled. During certain sessions in the workshop, he experienced boredom and drifted from the learning task when he found the content less relevant to his personal situation or when it was less engaging to him. Although he refused to take the teacher role during his project presentation on the last day of the workshop, Waits clearly benefited from spending time in the "learner" role. He may have made the changes in his lectures, described below, as a direct result of his mixed experience in the "learner" role.

Gilbert (1996) reminds faculty development facilitators that they should never underestimate the difficulty of faculty adoption of technology-enabled teaching.
methodologies. "Sensitivity must be exhibited when asking faculty to take a subordinate 'learner' role" (p. 10). From the first welcome session of the workshop, Waits displayed behaviors that indicated a concern about performance, a concern about being judged as both a learner and a teacher. Upon hearing about the individual presentations scheduled for the last day of the workshop, Waits' immediate concern was about having the necessary equipment for sharing his work. The workshop facilitators calmly addressed his concerns and assured him that they would be able to meet his needs. Through their repeated assertion that each participant could pick and choose from the technology tools presented, would translate the tools in ways appropriate to his or her discipline, and by assuming a "co-learner" rather than an "expert" role, the facilitators established and re-established a non-judgmental, non-competitive learning environment many times during the week. These factors contributed to a positive, effective learning experience for Waits.

As a direct result of his participation in the workshop, Waits made changes in his lectures that suggest his consideration for the students' learning perspective; he began to shift from a teacher-centered "instructional paradigm" to a student-centered "learning paradigm" (Barr & Tagg, 1995). In his lectures post workshop, Waits decided to include information about the lives of the scientists whose discoveries and inventions he mentions in this course. He believed that this broader view of scientists as people and science as it reflects and/or impacts society would interest students more. He reported that students were more attentive in lecture as a result. He used the Web to gather background information about the scientists, and he added this information to the course Web site as well. In this example, Waits demonstrated his efforts toward making the course content more intellectually accessible to students.
Beliefs Related to Technology Tools and Teaching

What are the perceptions of this participant about his beliefs related to technology tools integration and/or teaching philosophies during and/or after this professional development experience? Waits was influenced by a departmental colleague to participate in the workshop. This colleague had experienced the workshop and suggested to Waits that he would benefit from learning different teaching methodologies. On his beginning workshop survey, however, Waits identified learning specific technology tools as his goals for the week – not teaching goals. The workshop was Waits' first professional development experience in both teaching and technology. The data showed that the workshop made a significant impact on his teaching behaviors and methodologies and on his thinking about teaching in more philosophical ways.

Waits made several paradigm shifts in his thinking about teaching and learning as a direct result of his participation in the workshop. One of these changes in perspective was prompted by a technology technique, but it had a significant impact on Waits' teaching behavior. Waits attributed the workshop discussions centered on universal accessibility with inviting him to take a student's perspective when looking at his course materials. In this area, Waits moved from a "teacher-centered" perspective to a "student-centered" point of view. Through the simple act of printing out the course Web pages to see where the pages break and making some adjustments, Waits acknowledged that course materials are intended to serve students' learning needs.

Although he did not vary from a transmission style of teaching in his lectures, Waits directed the TAs who facilitate the course discussion sections to make significant changes in their teaching methodologies. Prompted by the workshop discussion about
peer review in writing, Waits outlined two new discussion components for the TAs. These were small group work leading to a whole class presentation and TA modeling, group writing, and peer review in the course paper assignments. In these examples, Waits instructed the TAs to better support students both individually and as groups as they constructed their knowledge through guided practice that modeled clear performance expectations. The TAs reported an improvement in student participation and in their final products. Although Waits did not utilize these active learning methods in the lecture hall as did educators at the University of Stony Brook (Duffrin, Dawes, & Hanson, 1999), group activities and projects and peer assessment increased active learning in the NATS course.

During the workshop, Waits engaged Harrison in conversations specific to teaching in large lecture halls. Although the conversations centered on the management of teaching methodologies more than their underlying philosophical basis, these were the seeds for significant pedagogical conversations. Like many faculty who were not educated in an active learning or a technology-enabled environment, Waits has trouble picturing the application of active learning principles and the student-centered use of technology tools in the large lecture hall (Robinson & Borkowski, 2000). He may benefit from observing a more progressive teacher's classroom and breaking through the isolation experienced by most K-12 and university faculty (Fullan & Hargreaves, 1991; Lieberman, 1995). Although he did not change the transmission style of his lectures, he incorporated student group presentations into the lecture time slot and instructed the TAs to make significant revisions to their teaching methodologies.
Workshop Components

What are the perceptions of the participant about the components of the workshop that invited him to reflect on his teaching roles and instructional practices? Waits' comments about the workshop suggest that he felt the facilitators had succeeded in their goal of focusing their attention on the people in the workshop, rather than on the technology itself (Kershaw, 1996). He made frequent mention of the amount of personal attention he received during the workshop as well as the supportive attitudes of the facilitators. Waits sought and benefited from learning software applications to meet both his personal and professional needs (Topp & Mortensen, 2000). He downloaded his preferred email program, searched for an electronic calendar, and was looking forward to playing DVD movies on his laptop. He always applied what he learned to his discipline and to his professional needs. It was important for Waits that plenty of time was given for a self-selected, individual project (Milligan & Robinson, 2000; Rowe, 1999).

Waits identified several components that would have improved the workshop experience for him. He asked for a demonstration of "out of the box" applications of technology to teaching. Although he was able to translate some technology skills into his teaching practice, he believed that he could benefit even more by being exposed to more specific applications to course and curriculum content (Siegel, 1995). He would have also appreciated more time to learn FrontPage and felt that learning this tool should have been integrated into the entire week. He was frustrated, but sympathetic, when he asked for more FrontPage instruction and learned it wasn't scheduled for the next day. Considering the comments made by Waits and several other participants, the option to guide or
modify the workshop content might have increased its impact on the learners, particularly with regard to the use of this tool.

Meaning Ascribed to the Workshop

What meaning do the participant ascribe to this learning experience? Waits attended this workshop at the suggestion of a departmental colleague. This professor had participated in the workshop a year earlier and believed Waits would benefit from the teaching methodology discussions. According to Waits, since his participation, this professor has made no mention of the workshop in their conversations. One explanation for this may be that the changes Waits has made to his NATS since the workshop may not be obvious to his colleague. As evidenced by their comments on his tenure review, Waits' departmental colleagues continue to view his teaching as a "weakness."

Thanks to the facilitators' explicit permission and encouragement to pick and choose and reinvent (Rogers, 1995), Waits used a technology technique, universal accessibility, and applied it to his philosophy of teaching – a philosophy that began to include the students' perspective as well as he own. He shared teaching strategies with TAs, who applied them in small group discussions. He diffused these innovations to graduate students who, as a result of Waits' participation in this workshop, increased both their pedagogical knowledge and their pedagogical content knowledge (Wilson, Shulman, & Richert, 1987). Incidentally, Waits became a trainer in these areas and indirectly affected the teacher-learner relationship and student outcomes in NATS 101 discussion sections (Daigle & Jarmon, 1997). The TAs assisted Waits as he made several strides in the area of "Chickering's seven principles," specifically in collaborative, active
learning, and prompt feedback. Similar to Naisbitt's (1982) assertion that technology innovations do not travel linearly, this is clearly an example of the diffusion of teaching innovations as a non-linear process.

Insights from the Field Study Participant's Perspective

"It follows that we cannot teach better unless we are able to see what we are doing from [the students'] point of view" (Ramsden, 1991, p. 86). I believe that through assuming the role of a learner during the workshop and then by taking the perspective of the learner when reflecting on course materials and teaching practices, Waits made significant changes in his behaviors and beliefs about teaching and learning. These changes were the direct result of his participation in the workshop.

During and immediately after shadowing Waits through the workshop week and after our initial interview, I did not anticipate he would make significant changes to his large lecture hall course. To me, Waits seemed firmly entrenched in the transmission model of teaching and learning. My perception was that he had gained a laptop computer and some useful software during the workshop, but that he did not perceive the teaching and learning components of the experience as being useful to him or applicable to his teaching situation. My hunches were incorrect.

During our one-year-later interview, I was surprised to learn the extent of the modifications Waits had made to NATS course materials and content. He had reviewed his course materials through his students' eyes and made changes. He had listened to the course lecture content through their ears and made changes. The fact that Waits attributed this breakthrough to learning about universal accessibility, a technology technique for
ensuring that handicapped students have access to online course contents, was most definitely an unanticipated outcome of this component of the workshop.

Even more significant, in the year since the workshop, Waits had broken through the barrier that his own mentors had erected between being scientists and being teachers. He shared the active learning and constructivist teaching strategies he learned during the workshop with the NATS TAs. Waits also included small group presentations in the lecture hall setting. These strategies grew out of the peer review in student writing presentation during the workshop week. Although he didn't implement all of these strategies himself, the net result of sharing them with the TAs was improved student learning.

Waits' experience demonstrates the complexity of learning. The discussion related to universal accessibility, which occurred during the lunchtime presentation on the first day of the workshop, did not occupy a great deal of time – an hour at most. Later in the week, this technology technique was referred to once or twice when Web or PowerPoint images were viewed on the projection screen. Yet, Waits was deeply influenced by the philosophy behind universal accessibility – student access. He even extended the concept of physical access to intellectual access to information. During the workshop's writing component, Waits seemed bored with the presentation and appeared to me more distracted than at any other point in the workshop week. Yet, he gleaned modeling and peer review strategies from that component that made a significant difference in student learning. I would not have guessed the impact these components made on Waits.

In fact, when I reviewed my field notes, there was no indication in his comments, his behaviors, or his responses to my questions at those times during the workshop that
would indicate the impact of these workshop components were having on him. Upon closer examination, however, it was clear in our first follow-up interview that access to course content by students with disabilities was a concern for Waits. He had made decisions related to the Web content of his course based on providing these students, in particular, with the necessary tools to meet course learning requirements. Although he said he was "bored" during the writing presentation, prompted by feedback from his colleague and the presenter, Waits did revise his writing assignments and noted that peer review would save him time. Learning is indeed a complex activity.

The workshop was a "catalyst" that invited Waits to reconsider Web-based teaching materials, course lecture content, and teaching methodologies used in NATS discussion sections from the students' perspective. For Waits, this faculty development initiative succeeded in inviting him to reflect upon his teaching practices. It is powerful to note that all of these changes involved teaching more than they involved technology tools per say. In fact, Waits identified some of the technology tools components of the workshop as areas where he needs more instruction. For Waits, the workshop succeeded in inviting him to reconsider some of his teaching methodologies and make changes that reflect a more student-centered, active learning, and even constructivist-learning orientation, in the case of the strategies used by the TAs to build students' understanding of the requirements for their writing assignments.

The affective features of the workshop learning environment made a difference for Waits (Ferro, 1993; Kidd, 1973; Smith, 1982, Wlodkowski, 1985). After initial concern about having access to the necessary equipment for his final project presentation, Waits became more and more comfortable with the facilitators and with his workshop
colleagues. He began to lose the feeling of competition, which may have resulted in increased learning, and worked – at times – collaboratively with his workshop colleagues (Duffrin, Dawes, & Hanson, 1999; Robinson & Borkowski, 2000; Rowe, 1999; Sorcinelli, 1999). Waits flourished in the trusting environment created by the workshop facilitators. He freely asked questions and gave suggestions for improving the workshop. He noticed that the facilitators were "good sports" about not being experts with every piece of software or with every aspect of computer hardware. He acknowledged their attitude of co-learners and coaches (Merriam & Caffarella, 1991).

Throughout the workshop, the facilitators responded to both his personal and professional software needs (Topp & Mortensen, 2000). Waits used the context of the workshop to search for an electronic calendar and to ask a technology question that pre-dated the workshop – his question about indexing for his crystal structure Web site. He immediately applied his learning by presenting his final project at a conference the week following the workshop. Although not all of his technology goals were met during the workshop week, Waits seemed satisfied with the content, except for wanting more time to learn Web-authoring software.

The amount of independence and freedom of choice provided by the facilitators in the workshop was a plus for Waits. Reminiscent of his "free rein" experience as a beginning instructor, Wait made the most of the opportunity to experiment. Although his prior technology experience helped him learn new tools quickly, he benefited from the support and interventions of the facilitators, particularly during his one-on-one tutorial experience while learning to manipulate images with Photoshop. Several times during the PowerPoint session, he asked for assistance when all of the facilitators were busy with
other participants. This did not seem to bother him terribly; he went on experimenting and using either the workshop binder instructions or online help to get him through to the next step in his learning. The independent learning project, choice, and a variety of resources helped Waits succeed in the workshop (Stouch, 1993).

Waits clearly exhibited all six of the traits of an adult learner as characterized by Knowles (1975). During the workshop he was self-directed and took responsibility for his learning. He made independent decisions about following or not following directions and about rejecting or accepting ideas advanced by the facilitators and/or his workshop colleagues. He came to this faculty development initiative with prior experience in learning, teaching, and technology. His experience of teaching as the act of transmitting knowledge from teacher to student may have been a barrier that challenged the facilitators and jeopardized his adoption of some intended outcomes for the workshop. Waits came to the workshop with a "need to know" that was prompted by a departmental colleague. On the beginning survey, he identified specific technology goals for the workshop week. Yet, during the workshop, his motivation appeared to be internal. He realized quickly that the tools and strategies he was shown could save him time and improve his performance when teaching or presenting his research to colleagues.

Increasing expertise in teaching requires risk-taking, practice, feedback, reflection, and time (McAlpine & Weston, 1999). Waits' workshop experience shows, in particular, the importance of reflection and time. Assessing his learning immediately after the workshop week did not yield a true picture of the impact of the workshop on his teaching behaviors. In the fall semester following his early summer workshop experience, Waits reviewed his course materials and content in light of the workshop content. He
reflected on two components of the workshop, universal accessibility and peer review in writing, and made significant changes to course materials, content, and teaching practices. Waits began to develop an integrated paradigm of teaching and learning, which researchers say is critical to achieving post-secondary educational reform (Saroyan, Amundsen, & Li, 1997).

Conclusion

In this chapter, I have described and analyzed the workshop experience of one participant. His experience, like the experiences of all learners, is unique. Although the learning environment created by the facilitators may have been intended to remain the same over the course of all the workshops, the blend of participants' personalities and prior knowledge, their collegiality and sense of trust, and changes in the external environment can create differences across the workshop experience and differences in its outcomes. It is beneficial to explore one person's perspective; it is critical to compare it with the experiences of others.

In the chapter that follows, I will share a glimpse into the workshop experiences of seven additional workshop alumni. Some of these participants had more prior experience with technology tools; some had less than Waits. Some of these participants had experience in their formal education with developing a philosophy of learning and teaching; others, like Waits, had none. Although not as in-depth as this field study, these faculty profiles illustrate the range of participants' workshop experiences and their learning outcomes. Added to the perspectives of the workshop facilitators and this field study participant, their perspectives will begin to broaden the reader's understanding of this faculty development initiative.
Learning is a complex human activity, and each individual learner's experience is unique. In this chapter, I have broadened the faculty perspective on the workshop to include seven additional workshop alumni. After closely describing and interpreting the workshop experience of one individual participant, it was important to widen the inquiry to include the impact of this faculty development initiative on more individuals. Through sharing their stories, each of the additional seven workshop alumni I interviewed put their learning in a context that helped me understand the meaning they made of the workshop experience (Nelson, 1989; Seidman, 1998). The research sub-questions I set out to explore required that I access the perceptions of educators themselves on the impact of the workshop.

Again, I have shared this interview data in the form of first-person profiles. During the interview process, the participant and I entered into a "cosearcher" relationship (Nelson, 1989). With each participant, I set out to establish rapport through our shared knowledge of the workshop experience, and then employing a reciprocal conversational style, together we explored the participant's perspective. These profiles help to convey the participants' perceptions of this learning experience and the impact on their teaching behaviors and beliefs. "Narrative, as autobiography, describes the way in which people articulate how the past is related to the present" (Richardson, 1990, as cited in Coffey & Atkinson, 1996, p. 68). As they explained their experiences, the participants revealed the changes in thought and practice that they believed were prompted by this faculty development workshop.
To learn is to change. These individual profiles offer the reader a fuller appreciation of the complexities and difficulties of change. The profiles also show respect for the participants (Seidman, 1998) through acknowledging their right to be accurately represented in this study. I could not have gained a deep understanding of this faculty development initiative without the stories of these participants. Therefore, I am grateful for their generosity, and I am honored to share their responses as holistically as possible within this research report.

I begin this chapter with information about how these seven participants were selected. I continue by introducing each alumnus with a biographic sketch. I present his or her profile next followed by an explication of the narrative. In the discussion section, I bring all of their perspectives together to discuss the four research sub-questions. At the end of the chapter, I share my insights and draw conclusions based on these data. Again, until the discussion section, I am writing across questions from the perspective of additional stakeholders in this faculty development initiative. In Chapter 8 of this dissertation, I will bring all the perspectives together in order to thoroughly consider the four research sub-questions for this study.

Figure 6.1 shows the interviewed faculty perspectives as one component of the workshop. It suggests that their perspectives were influenced by the other perspectives on the workshop as well as by the forces that formed the context and content of the workshop. Their behaviors also emanated out from this professional development experience.
The final question on the online population questionnaire was an invitation to participate in an in-depth interview regarding the workshop experience. Of the 53 respondents to the questionnaire, a total of 31 workshop alumni, or 58%, volunteered to participate in a face-to-face interview. In selecting participants from this pool of volunteers, I used a maximum variation model. I looked at sex, academic discipline, date of participation in the workshop, prior technology experience, and anomalies. Harrison helped me with the last two criteria. She supplied me with information about the volunteers' prior technology experience and anomalies such as participation in more than one workshop and participation as an adjunct professor.
I based the final selection of interviewees on these criteria for maximum variation. The interviewees include three men and four women. Three interviewees taught courses in the hard sciences and four were from the humanities and social sciences. Two interviewees participated in the first year of the program, three in the second year, and two in the final year. (One of the first-year participants participated twice; she participated in the final year as well.) Four of the interviewees had a great deal of technology tools integration experience before the workshop, and three had little or no technology tools prior knowledge. As the English Department had the highest participation in the workshop, I selected one interviewee from that department. I selected the one person who participated in the workshop twice, and one person who was invited to participate in the workshop after it was opened up to the wider campus community, beyond those teaching the Gen Ed curriculum.

I conducted the first six interviews in March, April, and early May 2002. Although each participant's workshop experience was unique, all six of the initial interviewees had had very positive experiences in the workshop. In pursuit of finding some conflicting evidence, I composed an email communication requesting a more critical assessment of the workshop. I had intended to send out this query to each of the six workshop alumni who volunteered to be interviewed via the April posting of the online questionnaire. Renault was the first person on that list, however, and she responded that she would fit that criteria. I interviewed her at the end of May 2002. I did not send that email to the other five April volunteers.
Methodology and Data Analysis

In choosing a face-to-face interview method for this data set, it was my goal to invite workshop participants to speak for themselves. Although I utilized an interview protocol as a means of framing our conversations (Appendix B), I remained opened to the divergent directions the participants chose to take in the interview process (Rossman & Rallis, 1998). I audiotaped each interview and transcribed it verbatim. I also took notes during the interviews. Before constructing their biographical sketch and profiles, I shared their complete transcripts with the participants. I invited them to make corrections to ensure accuracy. Two of the seven interviewees suggested changes. Then each participant received a draft of his or her biographical sketch and profile and was again offered the opportunity to make changes for accuracy, clarification, and to assure that the participant felt his or her anonymity was sufficiently maintained. The overarching goal of these member checks was to guarantee that each participant's workshop experience was authentically and ethically communicated through his or her biography and profile.

Each biographical sketch contains information about the participant's background in teaching and/or technology. It includes information about how long he or she has been teaching at the post-secondary level and the courses he or she teaches that are most impacted by the content of the workshop. The sketches include information about how and where participants use the laptop computers they received during the workshop. The sketches also include which workshop teaching or technology components the participant has integrated into his or her teaching, and some sketches include details about specific instructional engagements. The date of participation and how the participant learned of
the workshop, if known, is also included. The sketches contain quotations in the participant's own words from his or her interview.

Profiles are offered as completely as possible in the participant's own words and are presented in italics in order to signal this fact to the reader. I added the words in brackets to clarify referents and/or to create bridges between comments. Each profile contains information about how the workshop has impacted the participant's teaching, research, and/or service roles and in most cases, a complete description of an assignment that reflects instructional changes made after participation in the workshop. The participant's experiences in the workshop, Aftercare program, and/or on-going technical support and/or professional development opportunities are included. The profiles include each participant's opinions or feelings about the workshop and advice he or she would give to the University's upper administration regarding the program, or about faculty development in general.

After each profile, I have offered a brief explication of each participant's interview data. In addition to his or her biographical sketch and profile, I also referred back to the original interview transcript in order to support the explication of each person's perceptions regarding the impact of the workshop. I utilized the four research sub-questions for this study as an organizing frame from which to analyze these data.

1. What are the perceptions of the participants about their behaviors with regard to technology tools integration during and/or after this faculty development experience?
2. What are the perceptions the participants about their beliefs related to technology tools integration and/or teaching philosophies during and/or after this professional development experience?

3. What are the perceptions of the participants about the components of the Laptop Workshop that invite educators to reflect on their teaching roles and instructional practices?

4. What meaning do the participants ascribe to this learning experience?

I searched the data for their unique perspectives on these four areas, namely technology tools behaviors, beliefs about integration and teaching philosophies, notable workshop components, and the meaning they ascribe to the workshop. At the end of this chapter, I have offered a cross-case discussion of the faculty perceptions regarding the workshop. Again, I utilized the research sub-questions of this study to organize these data.

The following data sets are presented in chronological order based on the date of the participant’s engagement with the workshop. This arrangement seemed less arbitrary to me than basing it on the date of the interview or other possible considerations. First, I introduce each person through a biographical sketch. The sketch is followed by his or her first-person profile, presented in italics. Finally, I offer a brief explication of that data before moving on to the next interviewee.

**Biographical Sketch: Professor Carol Trotsky**

Carol Trotsky has been teaching at the post-secondary level for twenty-one years. She teaches in the Department of Russian and Slavic Studies. Her department head got her involved in the workshop. According to Trotsky, he said, "You have to do this. This
would be really great for you." Trotsky describes the impact of the workshop on her professional growth as "pretty exponential!" Says Trotsky, "[In the workshop,] I really started exploring, particularly with Web-based instruction."

Her teaching responsibilities include first-year Russian language and "The Balkans," a Tier II course. In the language course, Trotsky provides students with online grammatical exercises. Students fill in the blanks and get immediate feedback. She has also posted practice exams on this course Web site. "The Balkans" course includes a Web-based assignment called "The Albanian Virgin," which is described in the profile that follows. She has also posted students' class notes and projects on the course Web site. For both classes, she has made PowerPoint presentations available on the Web for students' review.

Trotsky utilizes her laptop to prepare for class, to present materials in class, to display activities and assignments, to demonstrate technology tools, to present at conferences, to conduct research, and to support her professional work with the U. S. Department of Education's Language Resource Center. In the past, she has used it to take notes in class. She moves her laptop several times a week.

Although Trotsky increased her use of email and cooperative learning strategies after participating in the workshop, she reported the greatest impact was on her use of PowerPoint in teaching. She has built Web pages and utilizes online syllabi and WebCT as a result of the workshop. The writing components of her courses have also changed significantly as the result of the workshop.

Trotsky is the only University faculty member who participated in the workshop twice. The first time was over two weekends in October 1998; that was a PC workshop.
She participated again in a weeklong session in June 2001, the only Macintosh workshop offered. At the time of this interview, technology preceptors were utilizing the PC laptop to support Russian language students in a mini-language lab situation. Trotsky personally uses the Macintosh laptop because it can better support her work in the area of linguistics.

The Macintosh workshop "gave me a compatibility with the people I'm working with in North Carolina. It also allowed me to go back and use the materials I had developed with the Mac [before the first workshop] that I couldn't transfer to the PC. Now I feel like I'm bilingual." Trotsky reported that although some parts of the workshop were the same, other parts were definitely different. "It is was a good refresher and also some of the technology had improved exponentially in just a couple of years."

Profile: A Great Way to Learn Without Losing Face

The biggest factor in the first [workshop] was that Jim Austin made [technology] understandable. He made it transparent. So that I didn't see it as a barrier that I had to overcome in order to do things. I realized that [technology] was a tool that I could actually manipulate – as opposed to being manipulated by it.

[The workshop] opened me to potentials that I hadn't realized. I would describe my teaching as interactive. I like to present and say, 'What are the different possible ways of looking at this? Why would you want to look at this one way over another way?' And go through the whole critical thinking strategy and try and recreate that rather than just tell the students what the word of God is. I hate lecturing. I don't lecture very well. I prefer to have a conversation with students in some form or another. I felt like my philosophy of teaching was valued in the workshop.
The people in the workshop value what I value, but they have all these great ideas on how to actually make it happen. It's not so much that it changed my philosophy but that it made me able to actually implement my philosophy in a much greater way. I would say that the ability to use technology in the classroom has encouraged my creative side. This has made my teaching more three-dimensional. It's made the artificial boundaries of the classroom no longer valid because my students can access me whenever. Since I've been using technology, I stay in touch with my students more, or they stay in touch with me more. Once the connection has been established in the classroom and they go on, the email connection is still there. It's interesting. They drop in on me periodically – electronically so to speak.

It did change my philosophy toward grading and expectations. I'm much more responsive to students' needs and much more aware of when I ask a student to do something, what it is I'm asking them to do. It made me very much aware of when I ask students to do something that I think will take them an hour to do, it may wind up taking them four hours because of things I hadn't thought of. There were a lot of eye-openers about what this really means for a student. I think that's because some of the people involved in the workshop were actually students – who were student workers in the FCII. Before the workshop we had a session here [in our department] on cooperative learning; The Teaching Center set it up. That's where I first got started on it. I found that the workshop gave me a lot more ideas about how to incorporate [cooperative learning] into my teaching.

I started ["The Albanian Virgin" assignment] as my project for the first workshop, and I upgraded it for my second workshop project. It's really a work-in-progress. It's a
staged writing component where [students] go to a Web site. They read the preface to the book. They have to write who they think the author is, what kind of person they are, what their gender is, what country they come from, what time they're writing about.

Then they progress to the next stage where they read the book cover, which has a picture of the author with the editor's description who the author is and what the time and circumstances are. Then they go to an excerpt where they read the author's account of The Albanian Virgin, which is a unique social reconstruction that exists even today in Albania. They are supposed to come up with what they think an "Albanian Virgin" really is, taking into account what the author says and who the author is. It's designed to get [students] to read critically – to do it in stages. [At the end,] they get to click and see a picture of an Albanian virgin – which is usually a shock because it's not exactly what they expect.

Teaching is very much a discovery process. There are as many different explanations for the same phenomena as there are students. It's funny how one thing will work with one student and another will work with another. I've found that some of my most interesting papers have come from answering a question that a student's asked me because he or she looks at something with completely different eyes. Teaching helps me look at what I do in a different way every time. That allows me to see new insights and I find it fuels my research. You have to be able to balance with giving to the class as a whole and giving a certain amount of individualized instructions.

I find that the return to the model of having these humongous lectures where you break out with a TA to be terrible. It's really a step backward. Technology, instead of facilitating the dialogue, becomes a way for the professor to actually distance himself—
almost like the Wizard of Oz behind the curtain. The technology becomes the star and the knowledge becomes disembodied. I teach small classes so I have to fight constantly to get into a wired classroom. The ability to spontaneously plug-in and access in response to a student's question is valuable.

Technology does take time. There's also an unrealistic expectation of administration as to how much time technology takes. When they talk about professors doing distance learning and online learning, the administration sees, 'Oh, this is a really cheap and down and dirty way of getting a lot done, a lot of bang for the buck.' But it actually involves, on the part of the instructor, a whole lot more time. I find that I'm putting a lot more time into my teaching.

I'm also now involved in the Language Resource Center, which is Department of Education funded at Duke UNC. We're designing Web-based instruction in Slavic and east European languages. So I've presented at their training workshop using my laptop, and I'm also on their national advisory committee working on some projects. This is a direct result of the workshop. I'm considered an expert there. They're really impressed. It has national implications. I've been involved in training instructors. Specifically, I'm giving a presentation on accessibility based on presentations and materials that I got in the workshop.

By constructing [the workshop] around technology, which is something that an academic doesn't mind admitting that they're ignorant about, you can get them to look at their teaching in a whole new way because you're looking at it from a technology [point of view]. Whereas if you put them in a teaching workshop, they would resent it. It's psychologically a brilliant way to get around the defenses that so many academics have
about how 'they know how to teach and they've been doing it for twenty years and there's nothing you can do to help them.'

But when you're using technology, they go, 'Oh, wow. This is neat!' You sneak all that other stuff in there and it gets in because it's okay to say, "Hey, I never thought of that." Because how could you think of it? You've never had this technology at your fingertips. It's okay not to know. It creates an openness. It's a great way to learn without losing face.

I think [the workshop] is something that has the potential to change the way the education business is run at this University. This is where the University ought to be spending money - not just on the workshops but the Aftercare and keeping people involved – just having people to talk about teaching with. I think the bottom line is that the administration still doesn't get the message across that they really do care about teaching.

**Explication: A Great Way to Learn Without Losing Face**

Trotsky credits workshop designer and facilitator Austin with making technology understandable and transparent. With the barriers removed, Trotsky felt she could utilize technology tools to actualize her interactive teaching style and unleash her creativity. She believes that technology allowed her to expand learning outside the walls of the classroom and continue conversations with students through electronic communication before the class period and beyond the course itself. She values this human interaction and connection with students.
Although she was exposed to cooperative learning strategies before the workshop, Trotsky credits the workshop with giving her more ideas for how to implement this strategy in her teaching. For example, she uses technology to support students in cooperative notemaking by publishing their notes electronically. The workshop and its student facilitators helped Trotsky reassess the length of time students need to accomplish tasks. In the workshop, she also learned to break down a task into manageable parts, a skill which she utilizes in "The Albanian Virgin" critical thinking assignment.

Trotsky makes a causal connection between her teaching and her research; they inform each other. Students' questions often challenge her to think through, research, and modify practice in language learning methodologies (Boyer, 1990). She believes in small class size where instruction can be individualized. "There are as many different explanations for the same phenomena as there are students." This positive and supportive attitude toward multiple ways of learning is one of Chickering's principles (Chickering & Gamson, 1991).

Trotsky prefers to work in a wired classroom where she can spontaneously respond to a student's question with examples stored on her laptop or located on the Web. She is wary of technology in large lecture hall classes where "it can be used to dump enormous amounts of information that can't be assimilated [by students]." She believes that "technology without the instruction is very dangerous." Regardless of where or how it's used, she notes that technology integration requires a lot more preparation time; Nazor (1998) identified time to learn new technologies as one of the barriers to tool integration.
Trotsky believes she has utilized her workshop learning in service to her profession. She is considered an expert and mentor on universal accessibility issues at the national Language Resource Center; Trotsky has become a change agent and has diffused this innovation beyond the campus (Rogers, 1995). Based on the amount of time she dedicates to preparing class assignments and professional presentations and to increasing her knowledge, Trotsky's reflections on her behaviors suggest that she highly values the integration of technology tools into her teaching, research, and service.

Trotsky says using a technology-focused workshop as a tool to invite faculty to reconsider their teaching practices is a "psychologically a brilliant way" to help veteran teachers. She credits the workshop with making a space for faculty where "openness" is possible. "It's a great way to learn without losing face." She also believes that from the administration's point of view, it's "cheap really - a few thousand per professor." "But for a professor [who says], 'Wow, this is so neat; this is something I could never have done. I feel like a whole new world has opened up to me. It's just so much more valuable because I have a new tool.'" Trotsky believes that integrating technology tools is one way to foster or to revitalize a professor's love for teaching and learning.

Biographical Sketch: Associate Professor Ralph Pilch

Ralph Pilch earned his degrees at this university. He holds a bachelor's degree in math, a master's in meteorology, and a Ph.D. in hydrology. Pilch has spent the greater part of his professional career in the administration of international agricultural research and development programs outside the United States, including Taiwan, Saudi Arabia,
and Sudan. He has been teaching at the post-secondary level at this university for seven years as an associate professor in the Soil, Water and Environmental Science Department.

Pilch co-teaches NATS 101: Introduction to Environmental Science, a Gen Ed course with about 130 students. He has incorporated a small group project into this large lecture hall course in which students independently study the current environmental problems of a particular country. On the course Web site, Pilch and the co-instructor use a color-coding system to help students navigate the concepts and assignments for each class session. He and his co-teacher also engage students in a weekly Readiness Assessment Test (RAT) that is conducted online. The RATs save class time for other activities, and students earn points while they prepare in advance for class sessions.

Pilch keeps his laptop computer in a file cabinet in his office. He utilizes it to prepare for class, to present materials, to display activities and assignments, to demonstrate technology tools in class, to present at conferences, and to conduct research. "It is my primary computer. I use it for advising students and for email." Pilch uses his laptop in the office and at meetings. Although he no longer takes his laptop to class because he's teaching in the ILC, Pilch says this about his laptop: "It's a tremendous incentive. I still use this. This is where I have FrontPage. This is where I create the things I'm using in the classroom. So whether I take it [to the classroom] or not, I take the ideas."

In the workshop, Pilch learned to create online syllabi and Web pages to use in his teaching. He uses WebCT because of his involvement in the workshop and began using this tool to post his grades online. He also began using PowerPoint differently after the workshop, including inviting students to create PowerPoint presentations to share their
work in class. The writing components in his courses have also changed because of the workshop. He learned how to scan images in the workshop, but he doesn't have a scanner easily assessable.

Pilch describes himself as someone who is "very timid about stepping into new areas." He credits the workshop most especially with his integration of Web-based learning into the courses he teaches. Although he has learned about teaching methodology from a wide-variety of sources, Pilch says the workshop helped him utilize his newfound knowledge and pull it together into "a plan for teaching." He participated in the workshop in January 1999.

Profile: It's Like Sitting on the Edge of the Grand Canyon and Missing It

I think the most surprising thing is there is a teaching discipline. I never had anybody tell me how to teach. You knew there were good teachers and bad teachers, but I think the assumption at the University [had always been] that if you know physics, you can teach physics. But that's not true. You have to know something about how to teach. Nobody [in my higher education experience] ever said, "You know you ought to take such and such a course because it will help you teach." Just the fact that there's a teaching journal for almost every discipline was such a revelation to me. That in and of itself has been a real eye-opener. All of this time at a university – it's like sitting on the edge of the Grand Canyon and missing it. You never knew it was out there.

Before I started teaching [at this university], I sat in on a course called "Teaching Agriculture at the College Level." I had to do some research [to develop] my teaching philosophy. Since then, I have learned about teaching from Knight [professor and Head of the Agriculture Education Department], from David Cox [Associate Dean for
Academic Programs in the College of Agriculture and Life Sciences], at the Wakonse [a college-level teaching retreat for faculty in the state university system], and from the writings of Eric Mazur [Harvard researcher and professor] and Sheila Tobias [author and science education consultant].

The workshop had a synergistic effect in releasing some of those [teaching] ideas and helping me to formulate those into a plan for teaching. I think that the technology forces faculty to re-examine their teaching style. [The workshop] allowed me to do things that I couldn't have done before — like using the Web more effectively for example. By taking advantage of some of the technology, you're able to maximize the interaction with students in class.

I knew Jim Austin from before [the workshop.] I knew if he was involved — and I knew Beth, too — that you were going to be in good hands. I like using [technology]. The analogy of driving a car and being a car mechanic is the right one for me. I want the car to go; I don't care what makes it go. I want to know how to make it go to make my teaching work.

I did the first version of the [NATS 101 Web site] in the workshop. This is now the second version. In our NATS class, we've given up on the textbook; we only use the Web. [Students] read something on the Web and then write [about it]. There's kind of a sub-agenda here. It is to get [students] to have familiarity with the Web and how to use it. I think people who aren't teaching think all of the modern students are just wired to the Web, and there are quite a few who aren't. We want the students to be able to see some of the real things that scientists do that haven't been watered down in a textbook article and to see some of the controversies in science. Our target is trying to prepare the students to
be good citizens. So if there's some issue that comes up in their neighborhood about water or the environment, they know how to find resources to solve it, to address it, or to participate in it.

[NATS] students come to two full class meetings and one two-hour activity session [facilitated by preceptors] each week. (We follow the preceptor model started in Geosciences.) The preceptor has to have had the class already and earned an "A." These are all undergraduates; some of them are sophomores but most of them are juniors and seniors. In a Gen Ed course, [some of the preceptors] are non-science students. The non-science students know the students better because they're coming from that same population. The preceptors spend about five hours a week in contact with other preceptors or students. They have a class called "Teaching Workshop." One week it's on teaching and learning and one week it's on the environmental science part.

There are about ten students for every preceptor. So there's somebody in that classroom [who] knows everybody's name in that group and can help [him or her] out — individually. I think that's an awfully important thing in a university that says it's a Research I university and it's student centered. I don't think they're there [student-centered] yet. It isn't a high-dollar pay-off like research is.

[In NATS 101], we use a group of mini-lectures. The idea of these mini-lectures came from somebody at The Teaching Center. We teach for ten or fifteen minutes. Then we stop and have a concept test. This test is worth no points. [In the future, we will] use some of the new technology in the ILC but until that's ready, we use cards that have "A-B-C" on them. If there's some diversity of answers, we ask them to convince their neighbor that they're right. Then we vote again.
I don't think I would have [volunteered to teach in the ILC] if I hadn't had the workshop. As far as new things, I'm still a little timid. But I do try to use things I've learned as much as possible. And I do experiment with things. I do try new things – like sending things to the ILC. And you don't have to take your laptop [to class] anymore; we don't even have to take a disk there now. You can send things via email to the ILC. But we do it in recognition of Murphy's Law. We went over there with our disk first and made sure it actually arrived there and that we could actually use it.

I think the FCII is a unique facility – certainly here [at the University] and maybe elsewhere. Jim Austin hires people for their social skills first, and then brings them up to speed on their technical skills. That is such a revolutionary idea because the normal 'techies' that you work with don't have the patience to put up with dummies. There is no question that is too dumb for [the technology support at the FCII] to address. And they'll never embarrass you, which is extremely important in my opinion.

[The workshop] would have been different if there wasn't a laptop. The thing that they did in the workshop – and they continue to do at the FCII – is to help you do something – not do something for you. The workshop is an important tool to get faculty who are not prone to use electronic media in their teaching to use it. It's a vital tool. I think the important thing is for the computer to allow you to better utilize your contact time with students. I certainly recommend the workshop highly to the administration if they ask.
Explication: *It's Like Sitting on the Edge of the Grand Canyon and Missing It*

Pilch's profile clearly shows his proactive stance toward learning how to teach. He has invested a great deal of time and energy and has taken advantage of many opportunities to increase his understanding of teaching and learning. Pilch believes that the workshop helped him put this knowledge into a "plan for teaching" that included online access to course materials, group work, technology-enabled formative assessments, and Web-based assignments.

Pilch credits technology tools with giving him more class time to interact with students and to increase student contact time outside of class; good practice encourages student and faculty contact (Chickering & Gamson, 1991). He identifies large class size as a barrier to a value he holds about teaching, namely the ability to know individuals and respond to their questions. In his department, the preceptor program has helped him address this value. He acknowledges a sub-agendium in his decision to incorporate Web-based assignments in this course; Pilch believes students need to learn to utilize 21st-century tools as they learn to think critically about current real-world environmental science issues.

As a learner himself, Pilch values the technology support he receives that helps him do something rather than having someone do it for him (Carothers et al., 1997; Rowe, 1999). He values having his technology questions answered in a respectful manner and credits Jim Austin with establishing this service attitude among FCII and workshop technology support staff. Pilch values the integration of electronic tools into his teaching and highly recommends the workshop to University administration.
Learning about instructional methodology and integrating technology tools has been a revelation, an inspiration, and a challenge for Pilch. Says Pilch, "I like the idea of using the computer but I’ve been very timid about stepping into new areas. . . . [And] I feel comfortable in what I learn." For Pilch, teaching at the university can be "like sitting on the edge of the Grand Canyon and missing it." Thanks to his thirst for knowledge about teaching methodologies, the opportunities offered at the University, and his eagerness to avail himself of them, Pilch has not missed it.

**Biographical Sketch: Instructor Paul Lennon**

Paul Lennon has been teaching at the post-secondary level for fourteen years. Currently, he teaches honors composition for freshman. Before the workshop, he was "heavily into word processing," but anxious about using technology in teaching. Before the workshop, he couldn’t see how technology could support his teaching style, which he describes as "theatrical" and "extemporaneous."

Along with five colleagues from the English Department, he participated in the workshop in November 1999. Although not a participant, the head of the English Department is a proponent of the workshop and has required members of the department to participate. Lennon said, "The other motivation on a personal level was I had to catch up at least a little bit to my four-year-old." This single-department workshop was held on two consecutive weekends. Lennon can see benefits to both homogeneous and heterogeneous groupings for the workshop. "For us, we had similar issues and helped each other. We were more in tune with each other's needs."
After the workshop, Lennon participated in many of the Aftercare sessions. He enrolled twice in the one-semester graduate level technology course targeted for preceptors and faculty. When asked why, he said, "I need to be told something four times. I'm halfway there."

Lennon utilizes his laptop in responding to students' essays, for advising students, and to conduct research. Since the workshop, he has increased his use of email and his requirements for students to utilize the Web for research. Also since the workshop, he has utilized WebCT and an online syllabus to disseminate information to students. "What has wound up happening is that I have a different relationship to technology – and while indirect is more significant than any kind of direct relation. A lot of my answers to using the laptop are 'no' but has it had a big influence? Yes."

Lennon uses his laptop at home and for professional travel. Since he began teaching in the ILC, he has no need to take his laptop to class but he still has most of his work stored on the laptop. "The things I learn on the laptop I can transport, but there's plenty of stuff I wouldn't store in the ILC simply because that's not 'home.'" For Lennon, his laptop computer is his work "home."

Profile: A Conversation on the Athenian Steps

The biggest benefit of the workshop for me was it overcame my anxiety about technology and once that was down or was gone or once that was abated then I could start to learn more about it. It has changed my conception. I'm more open and more guarded about technology use because I have some doubts or worries or concerns about it, and now I'm a little more able to know why.
[The workshop] was different. They had us unpack the box, plug in the socket. Someone else would say we're being treated like babies. For me, it was invaluable that I had to plug it in. [The facilitators] told you but they showed you, too and they allowed you to explore. In every case, they did a walk through or the hands on. First of all, I have to take a step back. Secondly, they are very open-minded to the possibility of individual predilections, individual inclinations, strengths, weaknesses so they were very in tune with presenting the same thing and if there are five people, five different applications.

The point [of the workshop] is here are some tools. If we pick them up, then how does what you do change? They left it up to us. They presented things to us and said well given these tools, which one is for you? Which would you pick up? Which one would you drop? Which one would you have to try to use? That was the pedagogy behind what they did. We're going to pick and choose and try and stumble. And the discipline is going to influence the choices you make but it's not going to be dependent on that.

I like to have an extemporizing quality to my work. What about calling up images after a student raises a question and says, "You have an accent where does that come from?" When I had the workshop, I recognized there are some vehicles out there that can help me to do what I've always wanted to do and what I always have been [trying to] doing. I think what [technology] has done is enable me to think that I might, in the future, go with my strengths and get them up to date with what's happening out there. Before I was antagonistic. I wasn't quite yet seeing the possibility. [The workshop] enabled me to see that the performance element might be accentuated or magnified. I'm more confident that my style is not necessarily in opposition with technology philosophy but that maybe the technology can also be better arranged.
I have my responses to student essays typed now. This is a very mechanical thing but it's been a significant improvement in my teaching because and it's very thin. I never knew what to do about that. I always lamented this is terrible but you have to write very fast and I write a lot so my comments now I think are clearer and slower and they're not taking more time because I'm a pretty good typist.

It's actually more efficient for me to comment on essays because I can read them anywhere. For instance if I'm in the car, I can read a few and then when I get home type comments [on my laptop]. That's a big change because typed comments in and of themselves carry a weight with students. Also I think I write better; they're just better comments. Sometimes it's as much as a single page, single-spaced. I would have done a single page handwritten but that's less contact and it's also less legible. My handwriting is very bad. It's had a big effect.

The most significant thing was that the laptop workshop overcame anxiety, with the other workshop actually came the hope that I could get pretty good at it. I can joke about my ineptness [with technology] now in ways I could never before because before it was out of insecurity. I'm just more comfortable with joking around that I'm not that good at this stuff. I address it instead of avoiding it. It's important.

A current preceptor told me that my course was "the most technologically advanced." Those were his words, and I laughed. It just so happens he has five classes; that's pretty amazing. I'm no longer feeling I'm at the bottom of the pole here. In the University, I'm discovering I'm probably on the upper end, not just moving up.

I wouldn't have had the courage to [teach in the ILC without the workshop]. I did see it as a kind of a challenge. Some of the things that attract me about doing that are spatial
and architectural. And anyone can have those. But I wouldn't have approached it if I had had that fear. After the workshop, I said I wasn't going to be intimidated by the ILC. Beth and the others made it very clear that it was okay to take your time and learn as you go. They made it clear to us that you just have to have a willingness to try. And I had that. That's pretty much what I have. I [know] I can get this over time and it can be fun. That's Jim's approach, "Let's have fun!" and it can be a disaster. But the fact is that it helps to hear it, and I've had fun.

[I use] the visual of the Pink Floyd Dark 'Side of the Moon' [album] jacket to show [how a] beam of light crosses through a prism then provides a spectrum of color. I use that on day one. I was talking about thesis statement, specificity, how the narrower the thesis, the more possible the goals and things. I was saying that while the image was on. We play music a lot. I think that's one of the great things about [the ILC]. I say, "I'd like song number four." I give [the preceptors] cues. It's like directing an orchestra.

We've had visuals. I've drawn on the board; I've used the "white board". We've had students bring in essays. And we put them up [with the projector]. We look at them and that's extemporizing. None of us have seen them yet. In the past, I've had to respond orally – I'm pretty good at that but it's hard for students to keep up. So with the visual of the essay up there, students can keep up when I'm extemporizing a reaction to it, and the students make comments, too.

I see the ILC in a humanistic way but who knows what someone else is thinking about—money, cost, efficiency down the line. I don't know about these things. My mind doesn't work that way. I doubt that everyone is on the same wavelength.
I had my students construct metaphors of the ILC. I think we can come up with wonderful humanistic conceptual metaphors anything from Da Vinci's 'Universal Man' standing in the middle of it touching the tips of these places to a big dollar sign. Who's doing what to whom? I'm not in the position to know.

I like the idea of a "hub" to the universe of the campus. It's like the [Greek philosophers] on the Athenian steps of wisdom. The metaphor I have is that the kind of conversation that could happen under one of those little trees in the ILC might rock the foundations of it because it was so of the moment and in the moment and timely to its place and space that it could not have happened anywhere else.

I do appreciate that I'm allowed to work [in the ILC] and allowed to grow and experiment there. And especially since it's clear to me that my value to it is not because I'm proficient and/or a proponent of it, but that I'm eager to experiment and experience and grow. I do appreciate that. That's very encouraging. That's nice.

Explication: A Conversation on the Athenian Steps

Lennon credits the workshop with helping him overcome his anxiety about technology. Catching up to his young son was one of his motivations for using learning technology tools. He utilizes the laptop computer extensively as a portable tool to respond to students' writing, advising students, and sending email. He refers to the laptop as "home," the repository for his professional life.

Lennon values his autonomy as an educator. Two components that made the workshop a success for him were the facilitators' ability to address individual learning styles and to support each individual's learning goals (Knowles, 1978). He gives the
workshop, on-going professional development, and the ILC technology facilitators high marks for not forcing particular tools or instructional strategies on him. Having choice contributed to Lennon's consideration of the possibilities technology tools offer him in teaching.

In his choice of technology applications, Lennon has opted to add visuals to his instructional repertoire. Whether to spontaneously share feedback on students' writing or to illustrate a concept, Lennon believes he is meeting more students' learning styles through the use of visuals (Dunn & Griggs, 2000). He has come to see visual representation as a way to enhance the extemporaneous and theatrical qualities he values in teaching. He believes visuals also help students' understanding and can be used to invite them to think critically as they learn.

Lennon credits the workshop with giving him the "courage" to teach in the ILC. Says Lennon, "After the [workshop], I said I wasn't going to be intimidated by the ILC." He describes himself as someone who is now "willing to try." Following Jim Austin's model, he approaches experimentation with an attitude of "let's have fun." He see technology tools as giving him license for experimentation (Sandholtz, Ringstaff, & Dwyer, 1997). He believes that his growing knowledge and understanding of technology tools has helped him to be both "more open and more guarded" about their use in teaching. Lennon expresses concerns about whether or not technology is being utilized in humanistic ways and suggests that educators and the University remain vigilant in ensuring humanistic applications of technology tools. He says, "I think it's imperative that the academic institutions be forerunners in making use of [technology] so that the dangers of it don't get expounded."
Since his participation in the workshop and in ongoing professional development centered on technology tools integration, Lennon has come to believe that technology may be able to help him actualize one of his goals in teaching—spontaneity. He likens teaching in the new high-tech ILC to engaging in "a conversation on the Athenian steps." For Lennon, the ILC can become the "hub" of learning where students and teachers engage in spontaneous critical conversations and technology, humanistically applied, may be part of the synergy that will make that happen.

Biographical Sketch: Associate Professor Nancy Renault

Nancy Renault, an associate professor in the Department of Materials Science and Engineering, teaches a Tier I (TRAD) course entitled "Technology and Society." She is currently a member of a team conducting research on the effects of the computer/Internet culture on the academic working environment. She was a participant in a May 2000 workshop.

Including her graduate school teaching experience, Renault has been teaching at the post-secondary level for thirteen years. She participated in the University's Gen Ed curriculum reform conversations and remembers the power of sitting down with colleagues to talk about teaching and learning goals. For Renault, another venue for "really good discussions about teaching" has been working with the Undergraduate Proficiency Writing Exam grading team. She has served on this team for several years in order "to tune [her] class to University standards for writing production."

Renault utilizes her laptop to prepare for class, to present materials in class, to display activities and assignments in class, and to conduct research. She uses it at home, in her office, and in the classroom. Her motivation for attending the workshop came from
a desire to own a laptop. "I finally decided I wanted a laptop and couldn't afford it on my own. So I would cough up a week of my life and get one."

Renault describes herself as a "competent" technology user. Before attending the workshop, she had used most of the tools and methodologies introduced in the workshop, including email and listservs, online syllabi, the POLIS course management tool, assignments that involved students' searching the Web, online discussions, cooperative learning, and preparing and presenting course materials with universal accessibility in mind. Since the workshop, she has built more Web pages for use in her teaching. She also began using PowerPoint extensively as a result of her workshop experience but has decided to abandon it "for a lot of reasons," which she elaborates on in her profile.

At the time of our interview, Renault was preparing to return from sabbatical. She was actively thinking about how to restructure the TRAD course she would be teaching again in the fall. Renault is a reflective educator who is reconsidering the effectiveness of some teaching methodologies and the use of technology tools. She does not believe that "using technology in teaching equals good teaching." Says Renault, "Educators need to spend a lot more time discussing what it means to be a successful instructor."

Profile: Aiding and Abetting Popular Culture

_The workshop in a certain sense is an example of what works. It [has] concrete carrot benefit – it's really nice having a laptop. The other part of the workshop, which is much harder to assess, is the intellectual teaching community part of it. In an ideal world without time pressures and budget constraints, I think we would all willingly spend more time doing that. Most faculty have good intentions and want to be effective instructors._
The workshop worked for a lot of people to sort of pull together the community working around particular issues like effective instruction. And they did it in such a way that made you feel 'we assume you're already good and we want help you teach even better.' It was definitely presented as a set of benefits rather than a set of deficits.

What was the most fun about it was the eight other faculty who were there. We bitched and moaned and complained and got ideas and saw bits of each other's teaching in productive ways. That was a lot of fun. You learn how smart your colleagues are – you learn something about fields you didn't know. That was the best part of it – the chance to see someone try to get across something they knew very, very well to undergrads. It was like having mini-lectures on whatever. And then talking about so 'How do you handle?' whether it was a behavioral problem or a problem with abstraction. Talking with faculty who were actually doing this – that was the most engaging part of it.

The classroom is an odd, kind of sacred space. We don't necessarily get to see each other teach and when we do, it's usually in an evaluative mode so it's very judgmental. What was good about the workshop was that we weren't judging each other.

I'm teaching [the TRAD] class again in the fall. I have to basically redo the whole class in PowerPoint because things have changed. I'm talking about current technology so things have changed. It's a whole lot harder for me to revise the PowerPoint and go through and redo the lectures. I think there will be parts of the lectures that will stay the same, or I will throw up a couple of overheads, or tell them a good story and not worry about if there's a slide to go with it.

I had gradually moved from 60 up to 170 [students] – adding a couple of sections. I thought that with the technology, I could handle more, but it didn't work. [I thought] that
communication across 170 students would be easier – from me to the students for the most part – sending out reminders, deadlines, and have some of the assignments come in electronically. The data processing ability of the Web – IT [Information Technology] – would be better.

But it wasn't. I knew fewer of the students. I got swamped with email. I think they got information more easily, but it certainly didn't make teaching any easier on me. I have done this class twice since I put the whole thing on PowerPoint. I tried to do too much. It allowed me to speed up way, way, way too much. One of the things I have to do is cut back. You can only go through thirty slides in an hour. The way PowerPoint works it encourages a sort of brain dump, [and] what students want is a really close correspondence between what I said and what was on the slides. So I couldn't put up a key idea and then just talk. They didn't like that disjuncture.

I've gotten tired [because] I usually have to beg and borrow and steal GTAs. So I got tired of fighting battles so it's also a question of getting enough GTAs to teach a large number of students. I think there are ways that I could do more effective delivery to more students using the technology, but you still need TAs, and there are no TAs for discussion sections. I categorically refuse to teach a class without discussion sections with face-to-face. It doesn't matter if you have MOO time or MUD time.

It's kind of bizarre that to improve your teaching means to use technology. Any other modes? [Technology has] completely overridden any other thought of improved pedagogy – to use technology is 'it.' I think [that value is] somewhat administrative. I [also] think it's cultural. The American culture is completely entranced with technology – it must be good. In our culture, speed is everything. On one hand, this is one of those
tensions I feel. So that's the dominant model in American culture. [A student's] attention span is 35 seconds. Should we be aiding and abetting that with IT? Again, there's a tension between recognizing the model that students watch on TV [and] live and thinking critically about that. I always think of that as aiding and abetting pop culture. We are instant gratification people. On one hand you have to teach with that and try to teach against that [too].

I still fail as many students as I used to fail before all the IT. Student satisfaction may be good because they got this very nice dog and pony show with PowerPoint and they've got lecture notes up on the Web. They feel good about things, but I still have to fail 10% despite using technology to remind them to turn their work in. IT doesn't change [students'] motivation necessarily. Some [students] get entranced by the dog-and-pony-show but it doesn't generally change their behavior. I can point them to all the different campus resources: study skills, thinking critically on the Web, whatever. But if they're not going to do the work, technology is not going to change that.

I think we need a lot more discussion about what it means to be a successful instructor. For the most part, a lot of us [after the workshop] ended up taking what used to be transparencies and making them into PowerPoint. Is that really that much of a technological or pedagogical revolution? So we didn't necessarily talk that much about what the implications of what these things might be pedagogically. So we moved from lectures with transparencies to lectures with PowerPoint.

There was a great presentation; I loved the title: "They came, they surfed, they went back to the beach: Adolescent rejection of Internet technology." Who are these people who are finding [IT] not so compelling? And when we faculty are represented as
rejecting technology, well maybe it's for a good reason. I'm definitely going to change. I'm going to "de-technologize" this class, in part, because I spent a whole lot more effort on the technology, and it doesn't keep me from failing students.

They don't necessarily do any better on particular kinds of activities that either rely on the technology or are separate from it. So I think, is it worth it? I think I gave it an honest effort. No, it's not cost effective. It's not time effective. It doesn't enhance my relationship with the students, which is why I do this. I don't know them any better. I spend more time niggling over html codes than thinking about what's the best way in any medium to get this idea across, what's the best way to figure out if the students are getting it, what's the best way to get both the content and the larger story-theory-model, "Big Picture," out there? I think for the most part, the technology is getting in the way. I'm going back to the beach - me and some 3 X 5 cards.

Explication: Aiding and Abetting Popular Culture

Renault's motivation for attending the workshop was to get a laptop computer. In their research project, *Universities in the Information Age*, Renault and her team have found that "faculty follow reward structures just like everybody else." This finding is confirmed in the literature, particularly when learning new technologies is involved (Frayer, 1999; Duffrin, Dawes, & Hanson, 1999; Robinson & Borkowski, 2000; Signer, Hall, & Upton, 2000; Smith, 1997; Topp & Mortensen, 2000). Renault believes the concrete benefit, the laptop, is part of what works in the workshop. Another component that works is the attitude of enhancement; the workshop facilitators presented the contents of the workshops as benefits. Renault has experienced the "we know you can
research good but you can't teach" attitude in other faculty development programs. According to Renault, "the [workshop] didn't have that."

She came to the workshop having already used the majority of the technology tools introduced there. Although watching others teach was a positive component of the workshop, her opinion is that not enough time was devoted to discussions and problem solving related to teaching undergraduate students. (It may be significant that the May 2000 workshop in which Renault participated was lead by a substitute facilitator, not by Harrison.) However, Renault also talked about the place of teaching in a Research I institution. She said, "Before I got tenure, [I was told] that excellent teaching is at most neutral in your evaluation; what counts is research. It's not like there is some huge ideological conflict for me between research and teaching. [Research] is what am I going to be rewarded for." Again, reward structure is a factor for Renault as it is for most faculty.

Still, Renault actively pursues campus conversations about teaching and learning. She is deeply concerned about the ten percent of students that she fails each semester in her TRAD course. She wonders what professors do or should be doing particularly with regard to some students' lack of preparation for learning, their behaviors, which are counter-productive to learning, and their motivation or lack thereof. She believes those conversations were part of the strength of the workshop, but she had hoped for more specific discussions about the "larger goals" and challenges of teaching undergraduates. Although not unique to this Research I institution, Renault continues to find a dearth of campus conversations related to best practices in teaching (Middendorf, 1991).
Renault is concerned that the focus on integrating technology tools into teaching has overshadowed or even thwarted other teaching innovations. She says, "[If you use technology], you must be teaching better and anything else you might do just falls off the map." Although integrating technology tools may increase student satisfaction, Renault questions whether or not it actually positively impacts their learning. The "dog-and-pony-show" aspects of teaching with technology are part of what she considers "aiding and abetting" popular culture. As a social scientist, Renault is concerned that "we're doing all these experiments with new instructional technology, or new technology in our lives with no control group."

Renault has been exploring the idea of "technological determinism" with her students. On a recent test in the TRAD course she asked students to comment on a phrase that was associated with the University's new high-tech ILC: "This building will turn freshmen into sophomores." Says Renault, "[This is an example of] technological determinism as an ideology - technology will change things. I had great student responses to that prompt. It doesn't change motivation; it doesn't change behavior; it doesn't change your preparation. So this is sort of emblematic of this belief that the technology must be good."

Biographical Sketch: Adjunct Assistant Professor Helen Bernstein

Of the eight faculty participants in the interview and field study portions of this research project, Bernstein is one of two who had formal training as a teacher. Bernstein has been teaching as an adjunct assistant professor in the College of Education's Department of Special Education, Rehabilitation, and Psychology for three years. Before
coming to the University and during her doctoral work, she served as a K-12 educator of visually impaired students for approximately seven and a half years. She was hired by the University to set up six online courses for her department and worked with technology support staff at CCIT and the FCII, where she learned about the workshop. Bernstein teaches primarily Master's level students, a significant number of non-degree seeking students, and just a few undergraduates. Says Bernstein, "I snuck into Laptop School."

Bernstein utilizes her laptop to prepare for class, to present materials in class, to display activities and assignments in class, to demonstrate technology tools, to present at conferences, and to conduct research. She does "most of her work on the laptop" including email communication and posting students' grades. She uses her laptop in her office and at meetings, and for professional travel. Before she taught in a high-tech room, she used it in the classroom as well. (Bernstein, who does not drive due to her visual impairment, does not take her laptop home due to the fact the laptop is too heavy for her to carry between the bus stops and home and office.)

Since the workshop, Bernstein has added images and digitized video to her PowerPoint presentations. Although it is not her tool of choice, she utilizes WebCT as a course management tool and uses it to post grades online. (Before the workshop, Bernstein posted students' grades online using an Excel spreadsheet.) She has built different kinds of Web pages to use in her teaching since the workshop and has been much more conscious of universal accessibility since the workshop. She teaches people to work with visually impaired people and ten percent of the students in the courses she teaches are visually impaired. She said, "I'm very conscious of what I put up on our Web pages now."
Bernstein has used technology in teaching K-12 since the mid-80s; she's used it with university-level students since the mid-90s. She describes herself as "extremely comfortable with computers." Although she was familiar with much of the software introduced in the workshop, Bernstein didn't know about many of the features available to her within a program such as PowerPoint. "I guess I could have looked in the "Help" files, but I don't do 'Help' files; I do humans." She participated in the workshop in July 2000.

Profile: A Picture's Worth a Thousand Words

I wanted a laptop because I had a 386 desktop. I am a non-tenured person so there is no money to buy me a computer. I just wanted a computer – to be perfectly honest. I knew what I wanted to do with it; I just couldn't do it with what I had. Not that it didn't give me any ideas, but I came [to the College of Education] and there were no tools. So I wanted a computer that could actually do something. Plus I figured there would be things to learn and there were. I had never used PhotoShop (That was a big plus for me.), or put pictures into PowerPoint. So I definitely got some stuff out of it.

I was so excited to go [to the workshop]. I drove everybody nuts before I went. The five days I went I was excited to get on the bus to go to UA at some ungodly hour when I could have been on my bicycle - to go knowing that I would learn something different or new that day. I might know half of what they talked about but there would always be some new stuff or a new tool that I didn't know about.

Maybe that day was the day they were going to do PhotoShop, and I knew nothing about PhotoShop. I might be a little bit bored during PowerPoint but they did teach me
how to digitize videos. If they had not told me about that tool, I wouldn't have known
the Multimedia Learning Lab was there – that I could get a digital video camera to
borrow. I didn't know how to scan slides – I only knew how to scan pictures – and I had
about 400 slides – professional slides – I had taken along the way. Actually, I ended up
paying a student to scan my slides. But had I not learned it, I wouldn't have known that
was an option for me.

We had four [facilitators] most of the time and there were only eight of us. So you
got a lot of individualization even though there was a lot of group stuff. I knew the basics
and they got to do a little more advanced stuff with me. I think for me one thing I really
liked about it was they were very well organized. I felt that there was very little wasted
time.

And that they gave us time to work on our project – I think it was a really nice
thing to culminate with those projects at the end. It gave me an opportunity to see what
other people had learned during the week. I thought it was nice to have something to
bring back to your colleagues. I created a PowerPoint with pictures that we used in our
student orientation the next month. That was kind of neat that I had something that I had
made.

It has made my presentations more visually appealing to the students. If you use
that phrase, "A picture's worth a thousand words," I think I can illustrate points better
now. I think it did help – I feel like it's still one of my weaknesses – for me to realize
you've got to make it more interactive for the students and technology is a really good
way to do that. My goal in my intro class is to have one activity and one video for every
lecture and I'm getting close.
My ideal philosophy of teaching is that it's very interactive. (The reality is that I lecture more than I ever want to.) I do believe this, and I tell students this from the get-go, I think a big part of university teaching especially when you're preparing teachers – more so perhaps than optical sciences or NATS 101 – is I'm teaching you how to search for resources and how to problem-solve. Part of what I'm supposed to do is to give you the tools. We can't teach it all to you in the courses.

Teaching is very diverse and the [visually-impaired] children are a very heterogeneous group of kids. If I'm being a good teacher, then my students get to do something during the class, even if students are just watching a video and commenting on it. I try to do some group activities – in some classes I do better on that than in others – and that they learn about resources out there, learn to ask questions, and who to ask questions of. And I periodically try to give them problems to solve.

I have influenced three colleagues. One to a minor extent, one to a major extent, and one very slowly but we are making progress. We're a specialization. The tenured person is [Sally] – who can't make a folder but knows how to import an image into PowerPoint. There's my colleague, [Ginger], who had to teach the third distance class. She started out with me saying, 'You just type your stuff into Word then you come over to my house and I'll put it into FrontPage. I'll help you put pictures into it.' She could go home and look for a picture from the CD [that had our scanned slides on it]. We'd put it all in FrontPage. Then we graduated to me sitting next to her and her doing that. Now she can now do everything even digital video clips. She has a beautiful presentation she just did for conference with 50 slides with lots of pictures of kids' eyes. She's come full circle. She posts her grades on WebCT. She uses the discussion on WebCT.
And I'm on the verge of influencing two other colleagues. When I've done something really neat, I make them come in and "oooo". I call it "ooooing." My colleague [Sally] called me at home the other day and said, 'When you come in, you have to come "oooo" with my stuff!'

In January, the laptop and I went to present at a state conference. In my field there are only 25 university programs that prepare teachers to work with visually impaired kids; everybody knows everybody. This one colleague in that state, who I thought extremely intimidating, was one of the first to do distance education – back when I was doing my doctorate in 1996. Anyway she came to my presentation – I could show you that PowerPoint; it has lots of pictures and nine embedded videos that play. The clipart would say what the name of the activity was then they would have a sheet in their folder. It was color-coded. You would pull out your pink sheet. It was a real interactive four-hour presentation. Anyway, she said that was a nice presentation.

Then I was at a conference in New York this week, and I went to her presentation. She had two videos that played – babies showing motor development. So I went up to her afterward and said, 'Those babies in those videos were great.' 'Oh,' she said, 'You inspired me with your videos. So that was a real compliment from somebody of that caliber who's been presenting at conferences probably since before I was born – who's been doing PowerPoint stuff for years.'

I think you want people to be innovative in their teaching, regardless of what their field is – for me it's teaching. How can teachers teach kids to use technology if they don't get exposed to it in their preparation program? I don't think it matters what the field is. This is important. But I think the faculty member needs to model that. If you have a
faculty member who is teaching with black and white overheads and doesn't use
technology and doesn't have any technology requirements in his course, you aren't going
to get people over the hump.

Explication: A Picture's Worth a Thousand Words

Bernstein says that owning the laptop computer was her motivation for attending
at the workshop. It is clear from her profile, however, that she was also highly motivated
to learn new features of technology tools and integrate them into her teaching practices.
She talks about the workshop in terms of her excitement about learning "something
different or new" every day. Bernstein openly and actively pursues lifelong learning
(Hughes, 2001).

She believes that the individualization of instruction in the workshop was one of
its best attributes. Bernstein came to the workshop with a great deal of technology
experience and because she had "a slightly different learning curve," the facilitators
helped her learn more advanced or sophisticated technology applications. She was
pleased to have time to work on an independent project, a visually enriched PowerPoint
presentation, which she was able to bring back to her colleagues and share with students
in their fall orientation. Bernstein says that she required and received a great deal of
individualized instruction (Knowles, Holton, & Swanson, 1998).

Bernstein found that integrating technology tools has helped her achieve more
interactivity in her teaching, through encouraging students to ask questions and giving
them opportunities to learn to work in groups. She believes that part of her job is to give
university students the tools they need to find answers to their questions and to problem
solve. She believes K-12 teachers in her courses, in particular, need to have experience utilizing technology tools so they can offer these types of learning experiences to children in their own classrooms. Bernstein sees herself as diffusing technology-enabled teaching innovations into the K-12 educational community (Rogers, 1995).

Bernstein is the only person in her specialization to attend the workshop, and so she has also diffused the use of technology tools in her department. She has influenced and tutored her colleagues and has inspired the technology tool use of a nationally known scholar in her field. Bernstein believes that people need to be "innovative in their teaching" and having access to technology tools is part of that. She says, "I think that every faculty person, whether a tenure track person or a non-tenure track (.50 person) should have access to updated technology. There are no resources in this college to get updated computers unless we're a tenure-line faculty person. I think that's appalling."

Bernstein credits the workshop with making her more vigilant about universal accessibility issues on the Web and in class presentations and with helping her learn to enhance her teaching with visual images. Whether through scanned photographs, slides, or digitized video, Bernstein believes that "a picture is worth a thousand words;" she believes that images enhance students' understanding of key course concepts. These are particularly powerful values for someone whose teaching and research are centered on the learning needs of visually impaired children and teens.

Biographical Sketch: Assistant Professor Diane Holmes

Along with Bernstein, Diane Holmes is the only other workshop participant interviewed in this study who had formal teacher training. She holds a bachelor's degree
in education and a master's in nursing. Thirty years ago, she started a Patient Education Program for a 600-bed hospital in the Midwest. She is currently the continuing education chairperson for the National Association of Nurse Practitioners (NapNap). "It's rare," she says, "but I am a teacher and a nurse." Holmes describes herself as someone who "writes learning objectives" in her sleep.

At the time of our interview, Holmes had been teaching at the post-secondary level for six years. She is a non-tenure track Assistant Professor of Clinical Nursing. She's also the Site Placement Coordinator in the College of Nursing; she places graduate nursing students at clinical sites. Holmes teaches both undergraduate and graduate nursing students and participated in the workshop in May of 2001 after it was opened up to a wider audience within the University.

In order to learn more about technology grants, Holmes volunteered to be a technology grant reviewer. It was there that she met Harrison and learned about the workshop. Holmes believes educators "do not have a choice about using technology." When she said that when she participated in the workshop she "didn't want to resist [technology] any more." She came to the workshop "ready to learn."

Holmes utilizes her laptop to prepare for class, to present materials in class, to present at conferences, and to conduct research. She uses it at home, in her office, in the classroom, at meetings, and for professional travel. Holmes, who describes herself as "directionally challenged," added a map program to her laptop in order to assist her in her car as she navigates to site visits. Says Holmes, "I carry my laptop with a bounce in my step and use it everywhere!"
Profile: It's Like the Bubbles When You Throw a Rock into a River

Before participating in the workshop, I was an incompetent technology user. I thought I couldn't do it [technology]. I was afraid of failure. I remember coming in here [the FCII] and seeing the box [containing the laptop computer] on the desk. Along with everyone else, I was starting from scratch. It was total excitement. And all around me was assistance. They [technology facilitators] were not too busy to help. I could fail – and then succeed within a few moments. Everyone in the room started at the same place – with that box. Everyone was equal.

The workshop raised my consciousness. It made me think about teaching and creativity. It increased my confidence. The workshop opened the door for me to more possibilities. I saw that they [the facilitators] did it differently, that they used different examples, that they had different styles. And one wasn't right and one wasn't wrong. The rotating staff was good. I got to learn different ways to do the same thing from different people. [That affected my teaching.] I have more guest speakers [now]. I don't feel like I have to control everything. It's good to have different people, different perspectives. The most important [way the workshop has changed the way I teach] is really believing that there are lots of ways to be right. And I have the freedom to fail.

It's funny to me about how frustrated I am about how much time it takes to do things the old way. Whereas always before, I couldn't do the technology because it took so long. One student told me how important it was that I don't read the PowerPoint slides. She said that's what other professors in other courses do. I put less and less on
PowerPoint and talk more and more. Sometimes I give the students an outline. [So] I've even used the technology to decide I want to use less technology.

My philosophy of teaching is [that it is] an ongoing process. I learn something every day. Every day someone new walks through my door, and I learn something. I'm always thinking about what I want students to learn. I do hands-on, and I show students [too]. My students would say that I believe in sharing experiences. I'm not good at lecturing. I'm better when I tell them, 'This is what happened today. What would you do?' I like to pose problems.

One of [the students] came up with the idea of an online journal club and everyone chimed in. 'Couldn't we do it online?' [they asked.] They're asking for that because they're finding out they don't know how to read research in order to put it into practice. We're talking about evidence-based practice. We could select a [research] article; everybody reads and responds, perhaps in a chatroom kind of thing. And the students asked for that. I think that's really neat. This is something they really want to do and they know they're not going to get any credit for it. I think the reason the students are starting to use [technology] is because we [professors] are starting to use it.

It's like the bubbles when you throw a rock into a river. [Students] are bringing what they've learned to the community. My students are out there now – in various medical practices all over town. They're out there helping people figure out how to use the technology they have in the office. If you have education and you go out into the community, you should be able to bring the latest research and technology into those situations. And if we don't do a good job teaching [students] here, then our community suffers from that.
I have made sure everybody [in my department] knows what a wonderful program [the workshop] is. If the workshop were offered now, you'd have twenty applications from our department [The College of Nursing]. The University is very good about giving help for using technology, but you have to want it or you have to see its value to you personally.

I have taken technology classes at the medical school [since the workshop]. I have taken one on the palm pilot and an advanced PowerPoint class. I could learn more because I understood what I was doing. I now understand the language [of technology] so I can learn. When I took classes before [the workshop], I didn’t understand what they were talking about. It didn't make sense. I couldn't do anything after those classes. [The workshop] gave me a place to start from.

[Since the workshop] I called the FCII twice for support and I got answers. I [also] get support from the department's technology support staff. I've used a lot less technology support but I've used it better. I ask questions; I know what questions to ask [because of my participation in the workshop]. That has changed the attitude of the tech support people toward me. I still have a powerful lot to learn.

[Listservs] would be a good topic for continuing education. Our minds were so full of what we were learning there [in the workshop]. Even if we had done listservs, it would have gone right over our heads. Because some of the things that we had to do there were so basic and you have to focus on things. It would be good to have [continuing education workshops] in the mornings or afternoons, too. The evening time didn't work for me last fall. Maybe we need an online chat where we can drop in or we could be a group that connects through a Web page. I [also] think we should share. I think we
should commit to share once we've done [the workshop]. Now that I'm using it [technology], it's easier to see other areas that I'd like to expand to.

The laptop computer is very important to me. When I get ideas, I'm not always in my office. I can use my laptop anywhere. I use it in my teaching to keep in touch with students even when I'm traveling. I use it in my service work in the community. I use it at meetings. The workshop is a privilege. Maybe it should be a reward for service. The University doesn't owe professors this but the University gets back what it costs in increased productivity, increased quality of teaching, and increased good spirit.

Explication: It's Like the Bubbles When You Throw a Rock into a River

Holmes described herself as resistant to new technologies before she attended the workshop, but she came ready to learn. Holmes credits the workshop facilitators with establishing a supportive climate in which she felt free to fail and, with their support, she could quickly experience success; the affective features of the workshop were critical for Holmes (Ferro, 1993; Kidd, 1973; Smith, 1982, Wlodkowski, 1985). Although she feels she still has a great deal to learn, Holmes is confident about what she learned and has integrated it into her teaching.

The workshop "raised [her] consciousness" and made Holmes think about teaching and creativity. She feels that she learned a great deal from experiencing the different teaching styles and strategies offered by the workshop presenters and facilitators. She made a connection between this experience and her own teaching practices and as a result, she feels more comfortable with multiple perspectives in her own classroom.
Holmes has integrated much of what she learned into the workshop into her teaching. After the workshop, she reassessed the writing components of her course and developed a bibliography assignment that promotes cooperation among students. Students use technology to accomplish this project. The examples of technology tool integration offered in the workshop helped Holmes integrate these tools into her teaching (Gilbert, 1996). From her increased technology knowledge base, she has also made decisions that result in "less technology."

Holmes believes it is important for teachers to model technology use and that as a result, students will become more comfortable with technology and advocate for its use in the classroom, in the workplace, and in the community. She responded positively to students' request for an online journal club even though she's not sure how to initiate and facilitate a listserv. She uses technology to support her belief in her approach to teaching as "sharing experiences." Like Bernstein, Holmes openly exhibits lifelong learning behaviors and approaches teaching as a co-learner along with her students (Briner, 1999).

Holmes believes she has influenced her departmental colleagues with regard to the workshop; they are aware of the impact it has made on her teaching both in the areas of technology tools integration and instructional methodologies. She reports that many of her colleagues would now want to participate because they can see the value – for themselves - of the workshop. She believes that participation in the workshop is a privilege and that the workshop is a productive use of University resources.

Says Holmes, "I let [the workshop] prove to me the value of using and expanding my use of technology in teaching." She has practiced this value in her classroom, in her department where "half the faculty are still not using technology at all in their teaching."
and in her service work in the community. As a result, students in her courses are requesting more technology integration and are taking their learning out into the field and post-graduation, out into the workplace. Her departmental colleagues would like to learn what she knows. She wonders about establishing a listserv for members of the NapNap continuing education committee. As Holmes says, "it's like the bubbles when you throw a rock into a river."

Biographical Sketch: Assistant Professor Timothy McCort

Timothy McCort, who holds an M.F.A., is an assistant professor in the Media Arts Department. He's been teaching at the post-secondary level for five years. He teaches a range of film, video, and multimedia production classes. McCort has a different relationship to technology than the other workshop alumni who were interviewed for this research study. Teaching the use of technology hardware and software is "a crucial part" of what he does with students. He participated in the Macintosh workshop in June 2001.

McCort uses his laptop to prepare for class, to present materials in class, to take notes in class, to demonstrate technology tools, to present at conferences, and to conduct research. He uses his laptop at home, in the office, in the classroom, at meetings, and for professional travel. He moves his laptop every teaching day. Since the workshop, he has used online syllabi, PowerPoint, and Web pages differently in his teaching. He also uses Web resources for teaching and to conduct research to a greater degree.

In our interview, McCort talked affectionately about his laptop computer. "I like certain technologies because of their styles as well as for what they do. I don't usually go 'gaga' over technology, but I must say that I developed strong and positive feelings
toward this thing very soon. I came to love it very quickly." McCort earned a teaching award and used the prize money to fund his participation in the workshop. He said the workshop was "an opportunity to get a laptop at what seemed to be a financially incredible bargain . . . and secondarily, was the possibility that the workshop itself would be beneficial to me as a teacher."

Before attending the workshop, McCort described himself as someone who was "running on empty as a teacher." He said he had not had the chance to develop "many teaching techniques and methodologies as an adjunct." When he asked for assistance with teaching, the associate dean of his college suggested that he talk with Harrison with whom he has continued an "unofficial mentoring relationship." "I look at her as someone who has an enormous background and care about teaching and as well has all of these interesting methods and skills."

Profile: It Was 'The Bait and Switch'

_The significant change for me from of that workshop was not a radical increase in technology; I think in Beth's words, it was 'the bait and switch.' The 'bait' was the iBook [laptop]. And of course the 'switch,' which was actually much more significant, was this wonderful week of thinking about teaching and listening to other people talk about it and seeing other styles modeled – all of this was really quite invigorating. It was a lifesaver for me that summer in terms of my teaching. It gave my teaching a real boast. What was very clear to me last year was that week of stopping everything was really worth it._

_Prior to doing [the workshop], I had just moved into overheads. The whole notion of being able to organize a lecture such that you had an outline was one of these methods_
when someone explained it to me. I said to myself, 'That makes a lot of sense. Why
didn't I think of that?' I'm receptive to reconsidering my teaching approach because
one of the things I'm suggesting is that I had no teaching approach. Absent any
teaching approach, I had a grab bag of tricks, which weren't very tricky and were
pretty limited. What the workshop did was offer me a chance to talk to different people.
Most interestingly, see people from outside of my discipline – what they had to teach
and how they chose to do it.

    Typically, this is the way I [now] use [what I learned in the workshop.] Most of
my classes are an hour and thirty to an hour and fifty minutes – when they are lecture
classes. What I try to do now is start with a question – pose a question that becomes
essentially an entryway into the lecture, possibly its organizing principle. I mix a formal
lecture, which I dip in and out of, with clips and examples, possibly some in-class work
or demonstration. What I will do is use the lecture as the set-up for the larger discussion
about the material – looking at media. Or sometimes I literally use the PowerPoint all
class long and dip into it. This is just much more efficient. It really allows you to do so
much. What I find is that it frees me up to think. [PowerPoint] gives me the chance to be
organized and flexible.

    From the workshop, simply using PowerPoint as an organizational tool has
helped. Students don't comment on it, but what's clear to me – and I have to stop myself
from laughing when it happens – is that when I pull out the old iBook, the pens are ready.
It's on the screen; it's written down.

    I do have a course Web site. I had been developing it prior to the workshop. The
workshop was very useful in showing us these great examples that faculty had developed
for pushing the syllabus out there as the most important document in all of world history. And then showing us the changes the students made; the syllabus was just useless.

We're now doing all digital media and [posting student projects to the Web] as a way for them to say, 'Okay, somebody's going to see it.' I have noticed [students'] work has improved – maybe ironically. This is a big issue due to the fact that you can do things digitally instead of analog, does that make students' work better? I'm noticing the students' work is getting better – technically – and conceptually – possibly. What may be at the root of that is this notion of what 'non-linear' lets you do, which is to go back and revise. I also think that it's just – in student terminology – 'sexy'; it's 'cool' so they take it more seriously.

The useful subcomponent about technology – which I've only begun thinking more strongly about but which I've grown more and more frustrated with – is I'm teaching them how to learn. Maybe put another way is I'm teaching them to teach themselves. That is my philosophy [of teaching], as I would like it to be.

The [workshop] environment was an environment in which it was possible for a week to think about teaching – not to worry about all this other stuff. I think the workshop offered me the chance to literally ask the question, 'What do you think makes a good teacher?' I had the chance to address that question, which on a daily basis you wouldn't be able ask. I do remember that week as one in which as a matter of habit – or as a part of the structure of the workshop – I saw ten or twelve different people use ten or twelve different teaching styles. Simply being exposed to them was very interesting.

It's really corny to say this, but I'm coming to the notion that a teacher should be a leader as well as many other things. Modeling a certain approach to the material,
modeling a certain approach to learning that material, inspiring students to push past the 
preconceptions they had of the material and their relationship to it, to invigorate them, to 
challenge them. And yet, at the same time, not lose sight of the nuts and bolts, the nitty-
gritty.

That was something I was very aware of last fall [after participating in the 
workshop] – that notion of being a student. It is seems absolutely ridiculous to be a 
teacher and not at some point be a student on somewhat of a regular basis. I'm sure that 
half my students are sitting there frustrated in the same way – I hope not half – maybe a 
third - but I know that some of them are.

I would say to [the upper administration] that the workshop and the continuing 
access to the laptop has made a significant difference in every area of my work as an 
assistant professor – teaching, research, and service. I think I've made both qualitative 
and quantitative changes in all those areas. But I think more so the week of the workshop 
itself – the joke that several of us had was that we were at summer camp – with this 
notion that we were at some place and completely cut off from some other stuff – and 
summer camp may sound frivolous – but it was a strongly bonding time – within a week's 
time. It made me feel like I was a member of the University. It is very rare that I feel 
myself part of a larger whole here – very rare – even within my department.

It is rare for me to feel that we have a common mission that guides us day-to-day 
or week-to-week and less so at the university level. This is a very significant feeling that I 
was left with – this notion of being part of something larger. All [the hype] was put into 
practice for me that week, and [the workshop] allowed me to put that into practice, too. It
allowed me to feel like it wasn't just "stuff." I really was investing time and effort and there was going to be a pay-off in the classroom. I was going to be a better teacher.

Explication: It Was 'The Bait and Switch'

McCort stated that he came to the workshop with "no teaching approach." Without formal training in teaching and absent opportunities to see colleagues teaching, he benefited from observing and discussing a variety of teaching styles and methodologies. Says McCort, "As a part of the structure of the workshop, I saw ten or twelve different people use ten or twelve different teaching styles. Simply being exposed to them was very interesting." It was important to McCort to see various models for teaching (Carothers et al., 1997). He also appreciated learning how people from various disciplines solved instructional challenges. In the workshop, McCort also was reminded what it is like to be a student, to experience frustration when learning something new. He believes teachers need to regularly revisit the emotional side of learning.

McCort noted that he has appropriated PowerPoint as an organizational tool in his class sessions. He frames each session by posing a question then uses his laptop and/or PowerPoint presentations to organize lectures, to show examples, to demonstrate technology tools, and to share digital projects. McCort has noticed that when he opens his laptop, students respond to the information he projects by taking notes.

McCort believes that students' projects are improving through the use of digital media. He suspects this could be the result of "what 'non-linear' lets you do, which is to go back and revise." He also thinks "that it's just -- in student terminology -- 'sexy.' It's 'cool' so they take it more seriously." McCort has begun posting students digital projects
on the Web to provide them with an authentic audience for their work. He is open to the possibility that this too may affect the quality of their projects.

McCort reports that the workshop has positively impacted all three areas of his professional responsibility: teaching, research, and service. He credits the workshop with giving him the opportunity to ask and think about what it means to be a good teacher. He is coming to believe that teaching is about leadership, about modeling, inspiring, invigorating, and challenging students.

While participating in the workshop, McCort had the experience of being part of "something larger," of the University community, and taking an active role in addressing its teaching mission. For McCort, this technology-centered faculty development experience created a collaborative environment (Sandholtz, Ringstaff, & Dwyer, 1997). He was surprised to learn that the workshop grew out of the University's undergraduate reform efforts. Says McCort, "Just the existence of any effort of reform in education, to me, that literally comes as a welcome surprise." Affordable ownership of a laptop computer was McCort's motivation to attend the workshop, but he acknowledges the time spent seeing, thinking, and talking about teaching was the "more significant" aspect of "the bait and switch."

Discussion: Faculty Perspectives on the Workshop

In the discussion that follows, I have further analyzed these seven faculty perspective profiles using the four sub-questions of this research study as a framework for comparing and contrasting these participants' workshop experiences. I coded each profile for the broad themes of technology tools behaviors, beliefs about teaching and
technology tools integration, effective workshop components, and the meaning ascribed to the workshop by these participants. I searched the data for similarities and differences, for confirming and disconfirming evidence, and for the unique contributions of each participant to the understanding of the workshop. Each of the following sections begins with the research sub-question and is followed by a composite view of these data.

**Technology Tools Behaviors**

What are the perceptions of participants about their behaviors with regard to technology tools integration during and/or after this faculty development experience? After the workshop, all seven of these workshop participants reported that they used technology tools in their teaching to a greater extent than they did before the workshop experience. Although some of their applications of technology tools may indicate a move toward a more constructivist approach to teaching, that is not clearly evident across the board. As Kershaw (1996) remarks, the goal of technology-centered faculty development should be on encouraging educators to change the way they think about teaching and learning more than focusing on the tools themselves. On the other hand, changing teaching behaviors to include technology tools can be considered a being step that can lead to changes in their teaching philosophies. Adoption that replicates familiar ways of doing things often precedes innovation (Naisbitt, 1982).

The integration of PowerPoint in teaching was mentioned specifically by McCort, Holmes, Renault, Trotsky, Pilch, and Bernstein. All but Renault have found that PowerPoint has improved their communication and presentation of course concepts. McCort utilizes PowerPoint as an organizing tool for class periods. Bernstein and Trotsky
post some of their PowerPoint presentations to the Web for students' review. Pilch reported that he invites students in his courses to make presentations using this tool. Each of the participants describes experimenting with new technologies and adapting them to his or her own needs and/or the learning needs of students. These activities suggest Rogers' (1983) concept of "re-invention;" innovations can and will be changed or modified by users during the adoption and implementation process.

Renault and Trotsky would agree with Gilbert (1996) that "information technology can provide the excuse and the means for transforming education... for better or worse" (p. 10). Both of these workshop participants expressed the concern that PowerPoint can be used to dump information on students. These educators question the practice of using PowerPoint to automate a transmission model lecture as an example of an improvement in instructional practices. Renault reported that students want and expect a one-to-one correspondence between her lectures and her PowerPoint presentations. On the other hand, both Trotsky and Holmes reported that students praise them for not reading their PowerPoint presentations verbatim the way some professors do. All of these participants might agree that if the teaching and learning process, rather than the technology itself, remains the focus of faculty development, these abuses of technology tools may be less likely to occur (Carothers et al., 1997; Ehrmann, 2000; Gilbert, 2000).

Incorporating visual images in teaching is one way to address some students' visually dominant learning style (Dunn & Griggs, 2000) and multiple intelligences (Gardner, 1983). McCort, Holmes, Lennon, and Bernstein stressed the impact of the workshop on their integration of visual images in their courses and teaching materials. McCort shared a PowerPoint presentation with me in which he placed images side-by-
side for the purpose of technical comparison. Holmes also talked about integrating images into PowerPoint presentations as a means of illustrating important points. Lennon talked in terms of using images as metaphors for key concepts. Bernstein's use of images, and digital video in particular, has made an impact on her departmental colleagues and other scholars in her field as well as on students. The fact that these participants adapted the integration of visual representations into their various disciplines to support specific content and/or to address students' learning needs may be the result of the permission and encouragement to do so given them by the workshop facilitators as well as the nature of the tools themselves.

Universal accessibility is another topic that they saw as an important part of the workshop. Bernstein, whose teaching and research involves working with visually impaired people, and Trotsky both mention the impact this learning has had on their course materials. Bernstein credits the workshop with making her more vigilant in ensuring all students' access to course materials. In addition, Trotsky has taken this information into her professional community and has impacted the knowledge and application of techniques for addressing universal accessibility with colleagues across the nation. Within her professional community, Trotsky has assumed the role of a change agent (Rogers, 1995).

In addition to Trotsky, two other participants stressed their efforts toward the diffusion of technology innovations beyond this particular campus community. Bernstein does so to influence preservice K-12 classroom teachers, who will then facilitate technology tool use with students in their classrooms. Holmes does so to influence nursing students as they take their knowledge into the workplace and community. Their
roles as change agents, who have diffused these innovations beyond the classroom and beyond the campus, increases the perceived project success and confers a greater measure of status to the workshop content within larger professional communities (Caffarella et al., 1982).

Participants demonstrated several of Chickering’s principles of good practice (Chickering & Gamson, 1991) in their application of these tools. Trotsky and Holmes mentioned cooperative learning strategies (facilitated by technology tools) that grew out of their workshop learning. Trotsky has engaged students in cooperative notemaking; she posts students’ notes to the Web for everyone’s benefit. For a bibliography assignment, Holmes has students create their work collaboratively and then she shares it with the class electronically. Pilch experimented with collaborative groups posting their independent research portfolios to the Web but found formatting was a problem; disappointed, he returned to having students turn in their work in hard copy. Cooperation among students and active learning are two of Chickering's seven principles.

Several workshop alumni mentioned uses of technology tools that were unique among those interviewed. Pilch mentioned the online quizzes he uses before class lectures to assess students’ readiness to learn. This technology application addresses prompt feedback, another of Chickering's principles. Pilch also requires students to read and respond to Web-based scientific articles. McCort has begun posting students' digital projects to the Web; publishing for a World Wide Web audience is one way to communicate high expectations and place high value on student work. Lennon talked about his extensive use of music as a prompt, support, or metaphor in his writing course;
this integration addresses students' multiple intelligences (Gardner, 1983) and speaks to
the principle of diverse ways of learning (Chickering & Gamson, 1991).

Lennon, Renault, and Holmes acknowledged they have also made informed
decisions to use less technology in their teaching. Both Lennon and Holmes have used
the knowledge they gained about technology tools to critically evaluate its use in their
teaching. When they elect not to use technology, they can now articulate sound reasons
for their decisions. For Renault, this decision arises from her experience of having to fail
ten percent of the students in the TRAD course with or without technology tools
integration. Renault has decided to "de-technologize" the course because technology is
more work, and if the percentage of failing students is the criteria, then technology hasn't
improved the effectiveness of this course.

Experimentation, reflection, acceptance or rejection of specific technology tools
and/or instructional strategies shows that participants are developing an ever more
sophisticated pedagogical content knowledge (Wilson, Shulman, & Richert, 1987). This
is particularly critical for post-secondary faculty who may not have had formal education
in teaching methodologies. These profiles show that these workshop alumni perceive that
they have increased their teaching repertoire and that the result has been to better
transform content into learning experiences for students.

Beliefs Related to Technology Tools and Teaching

What are the perceptions of participants about their beliefs related to technology
tools integration and/or teaching philosophies during and/or after this professional
development experience? Several interviewees report that their beliefs about using
technology tools were born during the workshop week or were strengthened after participation in the workshop. Renault reported that she began questioning her belief in utilizing technology tools after student outcomes were unimproved by her use of the tools. Others reported that the tools they learned to use in the workshop helped them actualize their ideal or previously held teaching philosophies. (In the participants' biographical sketches and in their profiles, I made an attempt to identify influences besides the workshop on the participants' beliefs. Ultimately, I believe that is not possible to establish cause and effect between the workshop and changed beliefs. Such assertions can only be made from the perspective of the participant him or herself.)

These are the changes or reinforcements to beliefs that participants reported in their interviews. Bernstein, Trotsky, Lennon, Pilch, McCort, and Holmes believed students respond more positively to content presented with technology tools. They believed these tools make the learning environment more relevant to students (Negroponte, 1995; Tapscott, 1998). Pilch shared that the sub-agendum for his course is to get students using 21st-century tools, and the Web in particular, in their learning. He also noted access to current environmental events via the Web has helped him achieve relevance in course content that impacts both his lectures and students' projects. McCort reported that students believe that new technologies are "sexy," and they respond to his PowerPoint presentations by spontaneously taking notes. Holmes credited the workshop with proving to her the value of expanding her use of technology tools in her teaching. On the other hand, Renault believed that the dependence on technology tools might "aid and abet" popular culture in ways that are not ultimately conducive to student achievement. In all of these cases, these educators demonstrated a "learning paradigm"
that focused on students' perspectives and learning outcomes rather than on transmitting information to students through "providing instruction" as in the "instructional paradigm" (Barr & Tagg, 1995).

McCort reported that the workshop both gave him time to consider and examples to learn from as he develops a belief about what it means to be a good teacher. His learning may have been strengthened had the facilitators made direct references to Chickering's principles of good practice. Bernstein believed that professors need to be "innovative" in their teaching and that access to technology tools is part of that. The expectation for innovation is a first step toward exhibiting the characteristics of a scholar of teaching (Boyer, 1990). Renault believed that from the perspectives of the administration and the culture at-large technology innovations have and will continue to overshadow any other types of teaching innovations. Her perception may reflect the pressure to utilize technology tools in learning and in teaching exerted by society and therefore, by some university administrators (Brown & Jackson, 2001; Hughes, 2001; Lee & Johnson, 1998).

The following faculty comments further addressed the intersection of the integration of electronic tools and Chickering's principles for promoting active learning and addressing diverse talents and ways of learning (Chickering & Gamson, 1991). Bernstein, Lennon, and McCort believed that the images they have incorporated into their teaching materials promote students' understanding of key course concepts. Trotsky, Holmes, and McCort talked about technology tools allowing them to actualize their goals for an interactive teaching style and to support and encourage their creativity. Lennon believed that technology tools helped him enhance the extemporaneous and theatrical
qualities he values in teaching. Both he and Trotsky praised technology tools for their ability to support their goals of being able to spontaneously respond to students' questions. This feedback may suggest that these workshop participants made decisions about the use of technology tools based upon the impact of tool use on student learning experiences. This testimony may suggest that, like Kozma (http://hagar.up.ac.za/rbo/construct/kozma.html), these educators seemed to suspect that the technology tools themselves might have an additional impact beyond the instructional methods in which the tools are employed.

Lennon believed that educators and educational institutions must be leaders in appropriating technology tools humanistically. Where Kershaw (1996) stressed that people, rather than the technology, should be the clear focus of faculty development initiatives, Lennon applied the same criteria to focusing on students in classrooms rather than on the applications of technology tools themselves. Trotsky believed that utilizing technology tools without consideration for underlying principles of effective instruction is "very dangerous." Trotsky and Renault concurred with Clark (http://www.educause.edu/nlii/clark.html) that "electrifying the lecture hall" without attention to effective instructional methods will be disastrous for student learning.

It is critical that faculty perceive agreement between an institution's mission statement and its faculty development and reward practices (Daigle & Jarmon, 1997). Renault and Trotsky expressed the belief that the University does not value quality teaching to the extent implied in its mission statement. Renault reported she was told that research, not teaching, would be the foremost consideration in her being awarded tenure. This might indicate that although more recently published policies at this institution, such
as tenure and promotion guidelines (http://w3.arizona.edu/~uhap/chap3.html#3.11 and http://w3.arizona.edu/~uhap/3.11), have made significant attempts to increase the value of teaching and put it on par with research performance and activities, these attitudes and practices have not yet been institutionalized. Trotsky believed the workshop is one of the University's few manifestations of valuing and supporting the improvement of teaching. McCort expressed "surprise" and then pleasure that the workshop originated from an undergraduate teaching reform effort.

**Workshop Components**

What are the perceptions of participants about the components of the workshop that invite educators to reflect on their teaching roles and instructional practices? Six out of seven of these participants believe that the workshop is an effective way to invite faculty to reconsider their teaching practices; therefore, the effective components they identified should lead to this result. (Although Renault was less convinced about the over-all effectiveness of the workshop, she made positive contributions to the data on individual effective components.) The participants identified affective, organizational, and content-related components of the workshop as instrumental in supporting a productive and empowering workshop learning experience.

Four participants placed a significant value on the affective features of the workshop (Kershaw, 1996). Lennon remarked on the way Austin invited the workshop participants to adopt an attitude of "let's have fun." Trotsky credits Austin with making technology "understandable and transparent." According to Trotsky, one of the ways that was accomplished was through the low-threat learning environment. In her interview,
Holmes talked about having the "freedom to fail" in the workshop. Pilch mentioned the respectful attitude of the workshop facilitators (and all FCII support staff). These participants felt safe and supported in the workshop (Padgett & Conceição-Runlee, 2000; Simonson, 1995; Woodrow, 1991). Establishing a trusting supportive learning-to-learn environment is the first of Rogers' (1969) ten precepts for facilitators of learning.

Making decisions related to the organization of instruction is another way workshop facilitators impacted participants' learning. Bernstein, Lennon, and Holmes praise the workshop for its focus on individualized instruction. The low learner to facilitator ratio and the time to work on a self-selected independent project contributed to meeting this need. Lennon and Pilch mentioned the facilitators' approach of helping participants "do" something rather than having it done for them (Rowe, 1999). At least for the period of the workshop itself, the low participant to facilitator ratio resembled a mentor relationship and fostered participants' success at hands-on individual projects (Signer, Hall, & Upton, 2000; Sprague, Kopfman, & Sorsey, 1998; Thompson, Hanse, & Reinhart, 1996).

Lennon and Holmes especially benefited from taking the computer out of the box and loading the software. This gave them a sense of ownership and control of the technology tools. Both Lennon and Holmes did not describe themselves as competent technology users before participating in the workshop. On the other hand, Renault, who did describe herself as a competent technology user, thought this aspect of the workshop was a waste of her time. Renault's experience may have been improved by offering the workshop in ability groups based on prior technology knowledge, an organization of instruction preferred by Topp and Mortensen (2000).
Bernstein, Lennon, Renault, Holmes, and McCort all remarked on the importance of experiencing the various teaching styles of the workshop facilitators and/or their faculty colleagues and the variety of teaching methodologies shared in the workshop. Holmes credited the demonstration of various styles and problem solving techniques with inviting her to be more open to multiple perspectives in the courses she teaches. Bernstein talked about getting an idea from an English professor that she could adapt to an eye study assignment. The opportunity to learn from models helped some participants overcome a barrier to technology tools integration identified by Gilbert (1996). Renault commented on the non-judgmental nature of the faculty sharing, particularly the project presentations at the end of the week. She values peer teaching and finds it is a rare experience at the University. Researchers have identified peer teaching as one of the benefits or possible improvements to some technology-centered faculty development initiatives (Carothers et al., 1997; Rowe, 1999) and to the success of educational reform efforts (Gilbert, 1996).

Although she didn't feel enough time was devoted to these discussions, Renault valued the conversations she had with colleagues regarding the ways they teach and/or solve teaching challenges, especially those related to students' preparation and motivation. The dearth of pedagogical conversation among graduate students preparing to teach at the academy (Kreber, 2001) and a similar lack among practicing post-secondary faculty is noted in the literature (Middendorf, 1991). Although others mentioned learning from each other and from the facilitators' models, it is important to note that the other six interviewees did not mention teaching discussions per say as a valued feature of the workshop.
All of these affective, organizational, and content features could be applied and/or adapted for use by the workshop alumni in their classrooms. Holmes made a one-to-one correspondence between some of the organizational features. McCort remarked on the benefit of spending a week in the role of "student." Of course, various components of a learning experience are more effective for some participants than others. Renault and Bernstein, both advanced in their utilization of technology tools before the workshop, had totally opposite experiences. Renault experienced boredom during the workshop week, and Bernstein reported there was "very little wasted time."

**Meaning Ascribed to the Workshop**

What meaning do the participants ascribe to this learning experience? Meaning is the way we make sense of our experiences. "Meaning is an interpretation" (Mezirow, 1991, p. 11). The meaning of the workshop to the participants arises from their stories regarding its impact on their behaviors and beliefs. In the following paragraphs, I have gleaned the larger themes from these profiles to suggest what this faculty development initiative means to these seven participants. I have also included the title of each participant's profile, his or her metaphor, in order to further establish and support the meanings they convey.

Lennon and Holmes credit the workshop with relieving their fears and anxiety about technology. For them, the workshop has meant a foundation on which they can and do continue to build expertise in integrating technology tools into their teaching practices. Trotsky talked about the workshop as being instrumental in "removing barriers" to her appropriation of technology tools. For Trotsky, the workshop is "a great way to learn
without losing face." The perspectives of these participants indicate that the facilitators'
attention to the affective features of the workshop was a significant part of the learning

Bernstein, Trotsky, and Holmes talked about the impact their workshop learning
has made on the other members of their department and/or colleagues in their
professional associations. These three participants have widely diffused the use of
technology tools in instruction. For Bernstein, who has shared with her students and
colleagues the power of images to convey concepts, the workshop meant "a picture is
worth a thousand words." For Holmes, the meaning of the workshop has come from
sharing technology applications with colleagues who have taken their learning into their
classrooms and professional activities and with students who have taken their learning
out into the community; "it's like the bubbles when you throw a rock into the river." In
addition, these three participants plus Pilch specifically and strongly recommended that
the workshop continue in order to further the diffusion of innovations among their
colleagues. For these participants, who have spread these innovations via their social
networks, the diffusion of innovations (Rogers, 1995) has added significant meaning to
the workshop.

Similar to the program at the University of Stony Brook (Duffrin, Dawes, &
Hanson, 1999), this workshop was intended to utilize learning technology tools as a
catalyst to discuss effective instruction. Renault expected more in-depth discussions
about the issues and challenges surrounding teaching undergraduate students.
Considering the workshop's origin and Renault's participation in the Gen Ed curriculum
reform conversations, this is an understandable expectation. The message that technology
tools innovations have more status and are given more attention by the facilitators than other kinds of innovations in instructional practice is a concern for her. For Renault, the workshop meant an over investment and dependence on technology in teaching, which she described as "aiding and abetting popular culture." For her, the meaning of the workshop reflects Kerr's (1996) fears about "techno-glitz" and Clark's (http://www.educause.edu/nlii/clark.html) concerns about "electrifying the lecture hall."

By contrast, two other participants found a place where they could ponder and collect their thoughts about what it means to teach; they found support to actualize a philosophy of teaching. For the first time in his career, McCort, whose initial motivation for attending was acquiring a laptop, felt that he began to develop a teaching philosophy and learned about instructional strategies that could support that philosophy. For him, the workshop meant "the bait and switch." He came for the technology; he left with a great deal more than that. For Pilch, the workshop meant a place to develop a "plan for teaching" because to teach at the University without learning about teaching is "like sitting at the edge of the Grand Canyon and missing it." For McCort and Pilch, the teaching and learning process, rather than the technology itself, provided the predominant meaning for this faculty development experience (Carothers et al., 1997; Ehrmann, 2000; Gilbert, 2000).

For McCort, Holmes, Bernstein, Trotsky, and Lennon, the fact that this workshop existed at all to support professors in learning technology applications and teaching methodologies meant that the institution, through its investment in their learning, placed a value on improved teaching practices. For these participants, the relationship between the workshop and the institution's values and mission is meaningful and affirming (Daigle &
Jarmon, 1997). For Lennon, the workshop, other technology-centered faculty
development experiences, and teaching in the ILC have meant "a conversation on the
Athenian steps" is possible. The learning opportunities in which he's participated are
supporting him in his goal of student-centered teaching; he feels he is now better able to
have unique and valuable student-teacher interactions, one of "Chickering's seven
principles." The fact that the workshop is no longer funded is a concern to these
workshop alumni. Again, Bernstein, Trotsky, and Pilch and Holmes suggest that upper
administration reinstate the workshop.

Insights from the Faculty Participants' Perspectives

Learning to teach – like all learning – is a complex process. The results of this
instance of faculty development from the perspectives of these seven alumni underscore
the unique experiences of learners in any given learning context. Surely the workshop
had variation from session to session; the various influences of time of year, the
combination of participants' personalities and teaching and technology experience, and
their willingness to explore and to share affected the workshop outcomes. Some of these
factors were outside of the control of the workshop facilitators. Still, for the most part,
these profiles tell an overwhelmingly positive story. Even for Renault, who was specific
in her criticism of the workshop and the dangers of technology-enabled instruction,
believed the workshop was a good way for many faculty to learn about technology tools.
From these profiles, it is clear that the overall impact of the workshop on participants'
behaviors and beliefs about teaching, learning, and technology-enabled teaching was
significant.
I agree with participant Trotsky's insight into the workshop; the workshop appears to be a "psychologically a brilliant way" to invite faculty into a faculty development program. Three of these participants, Renault, Bernstein, and McCort, reported that the laptop computer was the reason they enrolled in the workshop. Faculty, who have extensive expertise in their disciplines, can be open to a workshop that purports to address something they don't know – namely how to utilize and integrate technology into their teaching. Perhaps McCort is correct in his perception of the workshop as a case of "the bait and switch." However, I would argue that the end, in this case learning about teaching and technology-enabled instructional strategies, justifies the means.

Technology-centered faculty development may indeed be a catalyst for conversations related to addressing teaching and learning challenges (Duffrin, Dawes, & Hanson, 1999). Bernstein, Lennon, Holmes, Pilch, McCort, and even Renault, who didn't get enough teaching focus, all noted that it was the teaching content of the workshop that was the most meaningful to them. These workshop participants noted the various teaching styles and strategies the facilitators and guest speakers employed in the workshop and the styles and strategies of their colleagues in their final project presentations. They learned from observing these models in practice. For these participants, the workshop helped relieve the isolation that can be a barrier to professional development (Fullan, 1993; Lieberman, 1995; Sarason, 1990). To a lesser degree, these participants had opportunities to view their colleagues' successful use of technology in teaching, one component of a campus culture that embraces technology tools for pedagogical change (Brown & Jackson, 2001; Frayer, 1999; Kress & Hafner, 1996; Saad et al., 1999).
Being innovative in teaching is a priority for several of these participants; Bernstein, Holmes, Lennon, and Trotsky specifically expressed this goal for their teaching. As Bernstein noted, access to technology tools is one of the necessary conditions for 21st-century innovation. While Renault questions the wisdom of technology-enabled learning and teaching, she goes a step further to propose that innovation in teaching is equated with innovation in technology. This dilemma reflects the Kozma and Clark debate about the role of technology-enabled teaching and learning in student achievement. It is important that faculty, at all levels, question their use of technological tools, as Renault, Holmes, and Trotsky discussed, in terms of meeting learning goals. Yet, in our technologically driven society, it may also be unwise not to consider using the tools of the times in which we live and work.

It could be that academics give greater credence to faculty development workshops and seminars based on theory and research (Kreber, 2001). That could have been the case for Renault, particularly if the workshop had included extensive discussions of applying theory, research, and best practices to challenges related to undergraduate teaching. The introduction and discussion of reform efforts such as "Chickering's seven principles" and "the scholarship of teaching" may also have strengthened some of the participants' learning with regard to teaching practices and the connections between teaching and research.

According to Mezirow (1991), adult learners change their behaviors when they change their basic assumptions about themselves as learners, the role of the teacher or facilitator in guiding learning, and the goal of education in general. Although this assertion seems in conflict with the idea that changes in belief follow changes in behavior
(Fullan, 1993), I believe these seven narratives suggest that for these college-level faculty changes in their basic assumptions preceded, or at least accompanied, their changes in behaviors. Several of these participants had to overcome their fears of failure to participate in this workshop. Some had to come to believe that learning to use technology tools was worth their time. Others had to first see themselves as teachers who had something to learn and/or to develop, whether it was their teaching and/or technology repertoires.

It could be that, like the graduate students and faculty who participated in a weeklong workshop that required they assume both teacher and learner roles (Saroyan, Amundsen, & Li, 1997), the participants in this faculty development initiative had a more sophisticated view of teaching and learning by the end of the workshop week. Pilch, who actively pursues professional development on this campus and through other institutions, stated that the workshop helped him synthesize his prior learning and create a "plan for teaching." Lennon credits the workshop with helping him develop a more playful attitude toward experimentation with technology-enabled teacher; now that he is "willing to try," he's found that new possibilities for creativity in his teaching. Holmes and Trotsky also credit the workshop with unleashing and supporting their creativity in teaching.

Conclusion

With this chapter, we have added to the perspectives on the workshop. I began this research report with the facilitators' perspectives, added one field study participant's experience, and then the perspectives of these seven workshop alumni. Thus far, the participants in this study represent a carefully chosen, purposeful sample. In the next
chapter, however, I have broadened the scope of this study to include as many of the workshop participants as possible. The beginning and ending workshop surveys that follow in the next chapter were designed to give a sense of the immediate impact of the workshop experience. A population questionnaire was one way to give every workshop participant the opportunity to inform this study with his or her feedback regarding the impact of the workshop. The data collected from this self-selected online questionnaire respondent group may confirm the data explored in Chapters 4, 5, and 6, or it may provide disconfirming evidence as to the impact of this faculty development initiative.
CHAPTER 7

SURVEYS AND QUESTIONNAIRE RESPONDENTS' PERSPECTIVES

My goal in selecting an integrated approach that utilizes both quantitative and qualitative measures was to invite as many perspectives as was reasonable into this case study. The survey and questionnaire data serve to enhance the descriptive nature of the qualitative interview and observational data. One possible use for the following quantitative data and discussion was to influence faculty development policy and decision-makers and providers. I shared an early draft of this chapter with the University's Vice Provost for Faculty Development, an administrator who is responsible for recommendations related to faculty development, and with the workshop facilitators.

I administered the beginning and ending workshop surveys to all 2001 workshop participants (26 people) and an online population questionnaire to 150 workshop alumni. The beginning and ending workshop surveys provided before and after snapshots of participants' motivations, prior knowledge, and goals for attending the workshop and their immediate impressions of the impact of the workshop experience. The online population questionnaire provided a broader perspective on the results of the workshop.

In September 2002 when the questionnaire was first posted online, some respondents had had a little more than three years to integrate their workshop learning into their teaching. For others just three summer months had past since their workshop experience. Few of these people would have had the opportunity to integrate their workshop learning in their teaching practices at the time they were asked to respond to the questionnaire. These
more quantitative data sets were used to triangulate the qualitative field study, faculty, and facilitator interview data.

Figure 7.1 shows the respondents to the beginning and ending surveys and the online questionnaire as a sample of the workshop population. Their perspectives are the last of the four to be discussed in depth in this research report. Like the others, their perspectives were influenced by the context and content of the workshop as well as by the perspectives of the facilitators and other participants in their workshop week. Their behaviors also emanated out from this instructional intervention.
Beginning and Ending Workshop Surveys

I first administered pilot beginning and ending workshop surveys in the January 2001 workshop; I was a participant in this workshop. The other seven participants were from a wide variety of departments and were currently teaching, had taught, or would be teaching Gen Ed courses. As I was physically present to administer the surveys, I was able to clarify questions for the respondents. (One person asked for the meaning of "cooperative learning strategies" on the beginning workshop survey.) The participants asked if I would share the results, which I did by posting the responses on the Web after the workshop week. After coding the responses, I made one change to the open-ended questions giving respondents the opportunity to answer what helped or hindered them in accomplishing their workshop goals in two separate questions rather than in one. I also moved the question about goals for the week, which was originally on the ending workshop instrument, to the beginning workshop survey.

With these modifications, May and June 2001 participants also completed the beginning and ending workshop surveys (Appendixes D and E). Of these 26 workshop participants who participated in the final workshops, three were from the Media Arts Department. American Indian Studies, East Asian Studies, Near East Studies, and Russian and Slavic Studies each supported two participants in 2001. The others were single representatives from a wide-variety of departments from art to electrical and computer engineering. The participants in the last two workshops were not only from the Gen Ed track but also from other teaching units across the University including law and nursing.
Methodology: Surveys

The beginning workshop survey was designed to gather data about the participants' motivations for attending the workshop, their previous technology and teaching practices, and their beliefs about technology tools integration. It consisted of twenty-eight Likert scale questions about those topics and one open-ended question about the participants' goals for the workshop (Appendix C). The ending workshop survey was designed to gather data about participants' learning experiences and whether or not, as a direct result of the workshop experience, there were self-reported changes in their beliefs about teaching and/or technology tools integration. It consisted of twenty-three Likert scale questions on those topics and seven open-ended questions (Appendix D).

The beginning workshop survey also included two biographical questions, namely length of post-secondary teaching experience and computer platform background. Thirty-one percent, or eight of these 26 participants, had taught five years or less; another 31% had taught more than twenty years. Five people, or 19%, had taught six to ten years, 3, or 12%, had taught eleven to fifteen, and 2.8% had taught sixteen to twenty years.

I was unable to determine the length of post-secondary teaching experience for the entire workshop population. It is interesting to note, however, that 31% of the 2001 workshop participants, and therefore survey participants, and 36% of the respondents to the online population questionnaire had been teaching at the university level more than twenty years. It is significant that such a large number of seasoned faculty, many of whom one might suspect were firmly entrenched in their teaching methodologies, have taken advantage of this faculty development initiative.
Data Analysis: Surveys

I compiled each of the three beginning and ending workshop surveys by tabulating the responses to each Likert scale question and aggregating the open-ended question responses. I compiled the data from the surveys from all three workshops after the final one was held in June of 2001. I used a color-coding system to note responses that related to the broad themes of teaching, technology tools, place, people, and technology support. These themes emerged directly from the question topics and were reinforced in the participants' responses.

The survey data suggested that the workshop had a positive impact on participants. Seventy-six percent of the participants in the 2001 workshops reported that “compared with other professional development experiences,” they rated this one as the best. (The one participant who didn’t respond to this question confided to me that this was the first and only professional development experience he’d had in his 14-year career as a graduate teaching assistant and as an assistant professor. He didn’t answer this question because he couldn’t compare this workshop to any other experience, as it was his first and only!) In the ending workshop surveys, 62% of the participants reported a comfortable pace while 35% felt that, at least on some days, the pace stretched their ability to keep up and/or absorb or integrate the learning.

Adults seek information that is relevant and useful to their lives (Knowles, 1978). In an open-ended question regarding their goals for the week, 68% of the respondents identified issues related to both teaching and technology; 27% identified technology goals as being foremost in their minds. Four percent identified teaching goals and one respondent left this question blank. Thirty-eight percent of the participants reported that
they always “found that formal discussions about teaching during the workshop sessions to be meaningful;” an additional 38% checked most of the time. The same percentage, 38%, found the formal discussions about technology "always" meaningful; an additional 50% checked most of the time. Ninety-two percent of the participants completely agreed with the statement: “I am confident I will utilize what I have learned in this workshop in my teaching.” The other 8% mostly agreed.

A comparison between the beginning and ending workshop surveys suggests some changes in beliefs about teaching and technology integration. Although most of the participants reported rare or infrequent use of technology tools in their teaching prior to the workshop, at the end of the week, 73% of the respondents completely agreed that the workshop strengthened their belief that it is important to integrate technology into their teaching. Sixty-five percent completely agreed that technology tools might change the ways in which they teach; another 31% mostly agreed with this statement.

The impact of the workshop on participants' teaching theories and/or methodologies was not as great. Although only 31% marked "completely agree" that they learned ways in which technology tools can help address students' various learning styles,” another 60% checked "mostly agree." Only 15% marked "completely agree" that they learned ways in which technology tools could be useful in helping students improve their writing; an additional 42% checked "mostly agree." (It should be noted that the content of every presentation was not identical across workshops. The workshop I attended as a participant included more experiences of writing and technology tools integration than the workshop during which I conducted a field study.)
The ending workshop surveys confirm the importance of the faculty perception that there is sufficient technological support throughout the workshop. On the ending workshop pilot surveys, 54% of the respondents reported that during the workshop they always had sufficient support; another 42% checked most of the time. Fifty percent of the respondents said that technology support was "what would help them the most" in continuing their professional development experience. In an open-ended question about what helped them achieve their learning goals, 58% of the participants noted the support of the workshop facilitators as the most important factor. It is also important that faculty perceive that the University will continue to support them with a campus-wide infrastructure for new technologies beyond the workshop week (Groves and Zemel, 2000).

In addition to these beginning and ending workshop surveys, participants were asked by the workshop facilitators to respond to an online workshop evaluation. The final evaluation item was: "Write a statement about your overall experience in this workshop and the ways in which you think it will affect your teaching." These are quotes from the June 2001 responses. "The combination of experienced facilitators, a good mix of learning and doing with regard to technology and teaching, and the mix of working with new faculty and staff, each with different skills and outlooks was great. I leave here quite tired but energized to apply what I have learned." "I found the workshop to be an experience that 'recharged my batteries.' In addition to providing me with new skills and equipment, it allowed me to revisit my vision of teaching." "This was the most positive experience I have had in terms of nurturing and motivating me to be a better teacher and
researcher.” For these participants, the workshop brought together technology and teaching components that made an impact on their thoughts about teaching.

Online Population Questionnaire

Harrison and I developed the online questionnaire collaboratively (Appendix E). Her goal was to collect data in preparation for future grant writing for faculty development proposals. Along with a letter of introduction, Harrison emailed the URL for the online questionnaire to 150 workshop alumni in September 2001. (Fifteen of the original 165 participants were no longer working at the University at the time of the questionnaire posting in September 2001.) Since Harrison was known by all of the workshop alumni, I believed that having her name on the questionnaire cover letter email would lend credibility to the invitation and would increase participation (Fowler, 1993). Both of our names appeared on the introductory page of the online instrument.

I emailed second invitations to participate in April 2002. By May 2002 when the questionnaire was removed from the Web, a total of 53 workshop alumni, or 35%, responded; 43 responded in September, ten responded in April. The invitation to participate in the April posting was sent to faculty who had not included their email addresses in their September responses. Although it was conducted anonymously, some participants voluntarily included their names and/or email addresses on their questionnaires. With a 35% return rate, the reliability of this questionnaire data is strong.
Methodology: Online Questionnaire

The decision to put the questionnaire online was made jointly by Harrison and myself. We reasoned that all of the possible respondents had email addresses and access to computers as a result of participating in the workshop; posting the questionnaire online was in keeping with the goal of increased technology use by faculty. Including our email addresses in the invitation to participate gave prospective respondents the opportunity to seek clarification on any aspect of the questionnaire that was unclear. Several faculty took advantage of this opportunity. A small number of emails were returned to Harrison. If she was unable to find an updated email account for that person, we assumed that he or she was no longer employed by the University, and he or she was eliminated from the total number of possible respondents. In all, fifteen people were eliminated from the possible population.

The advantages of a self-administered questionnaire for us included the ease of presenting questions, particularly questions with complex response categories such as those that asked for changes in technology tools and teaching methodologies use, and the assurance of asking the same questions to all the participants. For the respondents, the anonymity provided by the questionnaire may have increased their comfort and positively impacted the level of honesty in their responses. According to Fowler (1993), the most useful parts of the online questionnaire were the prefigured questions. These questions with their radio button responses allowed respondents to answer simply. Their task in replying to these questions was straightforward and clear. Computer software was used to compile the prefigured question totals. The percentages were calculated based on the number of respondents who replied to that particular question.
Data Analysis: Online Questionnaire

Although some experts believe that open-ended questions are best implemented in an interview situation (Fowler, 1993), I believe the open-ended questions were effective in inviting respondents to elaborate on their workshop experience. For the open-ended questions, I used a color-coding system to note subcategories within the responses. I was able to cluster the responses within each subcategory in order to give a more precise picture of the respondents' workshop experiences. I have noted these categories for each question within the data analysis section for the open-ended questions that follows the prefigured questions analysis.

Data Analysis: Prefigured Questions

The prefigured questionnaire questions provided biographical information about the participants, about their use of laptop itself, and about their integration of this tool, the software, and the teaching methodologies shared in the workshop. The biographical information included the person's department, date of workshop participation, and length of time teaching at the post-secondary level. The invitation to participate in a face-to-face interview was included in this section of the questionnaire.

Questionnaire respondents had been teaching at the University for varying lengths of time. Under the assumption that most people who would take the time to respond to the survey were people who had had a positive experience, I wondered if there was any relationship between the length of service at the University and positive reactions to the workshop. It was interesting to note that 19 of the 53 respondents, or 36%, had been
teaching longer than twenty years. Between seven and ten participants responded from each of the other length of service categories: one to five years, six to ten years, eleven to fifteen years, and sixteen to twenty years.

Table 7.1 shows how participants utilized their laptops at the time they completed the questionnaire. The Integrated Learning Center (ILC) had opened in January of 2002 so it could be that some of the spring 2002 respondents were working in the new high-tech classrooms in that center, which may have somewhat altered their use of the laptop in the classroom.

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>To prepare for class</td>
<td>49</td>
<td>92%</td>
</tr>
<tr>
<td>To present material in class</td>
<td>43</td>
<td>81%</td>
</tr>
<tr>
<td>To take notes in class</td>
<td>4</td>
<td>8%</td>
</tr>
<tr>
<td>To display activities/assignments in class</td>
<td>26</td>
<td>49%</td>
</tr>
<tr>
<td>To demonstrate technology tools</td>
<td>18</td>
<td>34%</td>
</tr>
<tr>
<td>To present at conferences</td>
<td>26</td>
<td>49%</td>
</tr>
<tr>
<td>To conduct research</td>
<td>46</td>
<td>87%</td>
</tr>
<tr>
<td>Other:</td>
<td>15</td>
<td>28%</td>
</tr>
</tbody>
</table>

Table 7.1
The data showed that for an overwhelming majority of respondents, the laptop was a useful tool in preparing for class (92%), for presenting materials in class (81%), and for conducting research (87%). Nearly half of the respondents also utilized their laptops to display activities and assignments in class (49%) or to present at conferences (49%). The other uses mentioned for the laptop included: writing up supervisory course observations of colleagues and of teaching assistants, recording grades, communicating with students and colleagues via email and listservs, authoring research articles, and continuing teaching and research responsibilities while traveling, and student uses.

Table 7.2

Where Participants Utilize Their Laptops (N = 53 with multiple responses)

<table>
<thead>
<tr>
<th>Place</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>50</td>
<td>94%</td>
</tr>
<tr>
<td>Office</td>
<td>46</td>
<td>87%</td>
</tr>
<tr>
<td>Classroom</td>
<td>42</td>
<td>79%</td>
</tr>
<tr>
<td>Meetings</td>
<td>24</td>
<td>45%</td>
</tr>
<tr>
<td>Professional Travel</td>
<td>39</td>
<td>74%</td>
</tr>
<tr>
<td>Other:</td>
<td>5</td>
<td>9%</td>
</tr>
</tbody>
</table>

As shown in Table 7.2, most respondents utilized their laptops at the home (94%), at the office (87%), and in the classroom (79%). Other locations mentioned included: libraries, labs, and at fieldwork locations. A study by Topp and Mortensen (2000) found
that faculty must have access to equipment in both their offices and their classrooms and that
trainings must address both personal and professional uses of technology tools.

In the future, as more classrooms across the campus are wired for technology
tools and more faculty become confident about storing their work on the Web, taking a
laptop computer to class may no longer be necessary. However, many respondents to this
survey specifically mentioned the acquisition of the necessary tools, including the laptop,
as critical to their motivation to attend the workshop and integral to the success of this
workshop and their success in teaching and/or conducting research. A flexible, portable
tool like a laptop computer helps faculty address the issue of multiple demands on their
time. Time, access to technology and tangible rewards are critical aspects of faculty
development (Frayer, 1999; Signer, Hall & Upton, 2000; Smith, 1997).

Table 7.3

<table>
<thead>
<tr>
<th>How Often Do Participants Move Their Laptops (N =52)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Moves</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Everyday</td>
</tr>
<tr>
<td>Several times a week</td>
</tr>
<tr>
<td>Once a week</td>
</tr>
<tr>
<td>A couple times a month</td>
</tr>
<tr>
<td>Fewer than a couple times a month</td>
</tr>
<tr>
<td>I always use my laptop in the same place.</td>
</tr>
<tr>
<td>I don't really use my laptop.</td>
</tr>
</tbody>
</table>
Table 7.3 shows that a majority of the respondents (60%) move their laptops several times a week. With an additional 15% of the respondents moving their laptops every day, 75% of these participants affirm their need for portable technology tools. Only one of fifty-two respondents shared that he does not use laptop. Unfortunately, his laptop is a PC, and he is a dedicated Macintosh user. (This question could have been clearer had it included the words "during a normal teaching semester." A number of interview participants asked for clarification of this question and/or qualified their responses based on their teaching schedules.)

Twenty respondents reported that they had upgraded the software or hardware on their laptop computers. Of those, six upgrades were supported by the FCII, eight participants funded their own upgrades, departments funded four, one participant reported that both he and his department had paid for upgrades, and one person used a teaching grant to upgrade. One respondent reported that she has purchased two laptops with her own funds since her 1998 workshop; the laptop she received in the workshop is "way too outdated."

Table 7.4 shows the data collected about the participants' use of the specific technology tools or teaching strategies to which they were exposed in the workshop. Responses were divided into three categories: "don’t use," "same as before the workshop," and "differently because of the workshop." From forty-eight to fifty-two respondents replied to each question. The number of responses for each question is shown in parentheses after the question. The percentage is based on the number of responses for each question.
Table 7.4

**Impact on Technology Tool Use and on Teaching Strategies (N = various)**

<table>
<thead>
<tr>
<th>Technology Tool or Teaching Strategies</th>
<th>Don't Use</th>
<th>Same as before the Workshop</th>
<th>Differently because of Workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>I utilize email and/or listservs in my teaching. (52)</td>
<td>5</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td>42%</td>
<td>48%</td>
</tr>
<tr>
<td>I utilize an online syllabus in my teaching. (51)</td>
<td>4</td>
<td>9</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>8%</td>
<td>18%</td>
<td>74%</td>
</tr>
<tr>
<td>I have created and used PowerPoint presentations to support my teaching. (52)</td>
<td>9</td>
<td>5</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>17%</td>
<td>10%</td>
<td>73%</td>
</tr>
<tr>
<td>I have built Web pages for use in my teaching. (52)</td>
<td>5</td>
<td>3</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td>6%</td>
<td>84%</td>
</tr>
<tr>
<td>I have scanned images and/or documents to include in online learning resources for students. (52)</td>
<td>7</td>
<td>8</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>14%</td>
<td>15%</td>
<td>71%</td>
</tr>
<tr>
<td>I have facilitated online discussions for students in the course(s) I teach. (49)</td>
<td>22</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>45%</td>
<td>16%</td>
<td>39%</td>
</tr>
<tr>
<td>I have used POLIS, Caucus, WebCT, and/or the OldPueblo MOO in my teaching. (49)</td>
<td>23</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>47%</td>
<td>6%</td>
<td>47%</td>
</tr>
<tr>
<td>I have posted students' grades online. (49)</td>
<td>34</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>69%</td>
<td>6%</td>
<td>25%</td>
</tr>
<tr>
<td>I locate and utilize Web resources for teaching and/or to conduct research. (51)</td>
<td>4</td>
<td>11</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>8%</td>
<td>22%</td>
<td>70%</td>
</tr>
<tr>
<td>I require students to use the Web for research and/or to build Web pages. (48)</td>
<td>14</td>
<td>7</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>29%</td>
<td>15%</td>
<td>56%</td>
</tr>
<tr>
<td>I employ cooperative learning strategies in my course(s). (51)</td>
<td>13</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>26%</td>
<td>31%</td>
<td>43%</td>
</tr>
<tr>
<td>I have made changes in course materials with accessibility in mind. (52)</td>
<td>4</td>
<td>10</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>8%</td>
<td>19%</td>
<td>73%</td>
</tr>
<tr>
<td>I have made changes in the writing component of my course. (52)</td>
<td>6</td>
<td>18</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>11%</td>
<td>35%</td>
<td>54%</td>
</tr>
</tbody>
</table>
According to the data in Table 7.4, the workshop spawned significant changes in participants' use of technology tools. Apparently, it had less of an impact on faculty use of the specific teaching methodologies highlighted in the workshop. Building Web pages for use in teaching was the most frequently mentioned change in participants' tool use, 84%. Online syllabi, PowerPoint presentations, and universal accessibility were mentioned 73% or 74% on the time. Scanning images to enhance visual representation, 71%, and using Web resources for teaching and/or to conduct research, 70%, were also noted by a majority of respondents.

Most studies that focus on technology tool faculty development and tool use do not address changes in teaching philosophies (Haneline, 2000; Holden, 1999; Robinson & Borkowski, 2000, Saad et. al., 1999). Accessing the impact of technology tools on faculty members' beliefs about teaching and learning and how those beliefs interact with their usage of particular tools is difficult. A tool such as PowerPoint can be used to maintain a transmission model of teaching (one-way communication from teacher to student), or it can be used to support a multi-sensory, interactive student-centered learning environment. In the open-ended questions on this questionnaire and in the field study and faculty interviews, Harrison and I attempted to delve deeper into these issues. The difficulty of utilizing instructional technology to achieve educational change, however, has been well documented in the literature (Ehrmann, 2000).

These participants did, however, report significant changes in teaching methodologies in the areas of writing (54%) and in students using the Web to conduct research or to build Web pages (56%). Fewer participants have integrated cooperative learning strategies (43%) and online discussions (39%). For some faculty members, a
lack of a belief in the effectiveness of these strategies may contribute to this fact. For
other faculty members, the large number of students in a course and/or the large lecture
hall teaching environment may be perceived barriers to implementing these
methodologies. Characteristics of the educational environment can compromise
innovation (Robinson & Borkowski, 2000; Willis, 1994).

Data Analysis: Open-ended Questions

The last five questions on the online questionnaire were open-ended. The purpose
of these questions was to give the respondents an opportunity to express their opinions
and feelings in their own words and to provide us with a more meaningful snapshot of
their workshop experiences. Although self-administered open-ended answers often do not
produce useful data (Fowler, 1993), I found the responses relatively easy to code and
interpret. When added to the perspectives provided by the previously analyzed data sets
(that of the facilitators, field study participant, and interview participants), I believe the
anecdotal material accessed through the questionnaire data adds to a more fully
developed picture of the impact of the workshop on participants' beliefs and behaviors
related to teaching and technology tools integration, their assessment of workshop
components, and the meanings they ascribed to this faculty development initiative.

Question #1: Data Analysis – The Overarching Research Question for this Study

The first open-ended question on the online questionnaire was: "Do you think
faculty development constructed around technology tools is an effective model for
helping faculty to reconsider their teaching practices? If so, why? If not, why not?" Fifty
respondents, or 94%, answered this question affirmatively. One respondent did not answer this question, or any of the open-ended questions. One person answered "yes and no," and one person answered "no."

The person who answered both "yes and no" wrote, "to the extent that we already are paid performers, yes. To the extent that this is a good or welcome development for teaching in general, no. Technology is dependence inducing and on the occasions that technology breaks down, or does not perform adequately, this can create problems. In addition, I'm not sure that technology presentations in the classroom are substantially more effective at holding a student's attention than in the beginning technology days." In other open-ended questions, this participant noted that his "pedagogical methodology has remained the same" and that the workshop "may have contributed to being awarded an outstanding teaching award from [his] college in the spring 2001." This person's response shows some of the limitations of questionnaire data and provides an example of the difficulty of establishing cause and effect relationships particularly with data collected in this way.

The workshop alumna who responded "no" was one of the participants in the face-to-face faculty interviews. She wrote: "Technology (infrastructure/hardware and software) changes too often, and with great cost, but general principles of effective instruction do not." In her interview, Renault expressed the opinion that the workshop devoted a great deal more time to technology applications than teaching methodologies. If the impact on participants' behavior is any indication of the emphasis of the workshop, then these data confirm Renault's opinion; the technology components of this workshop had more impact than the teaching methodology components. (It may be worth noting
that Renault participated in one of two workshops in May 2000, which Harrison did not facilitate.)

The elaborations within the affirmative responses covered a wide-range of specifics. I clustered these into categories and selected a range of comments to quote from each category. A large number of responses described the impact of the workshop on teaching practices. Some of the responses focused on the organization of the workshop itself and on the laptop as an incentive to participate. Several mentioned the impact of the workshop on students, but most of these comments were imbedded in broader responses. There were two comments that although attached to affirmative comments suggested that the participants questioned the workshop's impact on changing teacher behaviors. The following paragraphs contain sample responses in each of these categories.

These were some of the general comments about changes in teaching practices. "I was skeptical. However, an intensive training session made me a believer and allowed me to utilize technology in my teaching." "Strategies gained from the workshop and implemented on the laptop have increased my impact as an educator." "The laptop workshops connect faculty with skilled educators who are immersed in the technology, create faculty community across disciplinary boundaries, and give faculty a few days of time out to learn new skills - to learn to think in new ways."

Although there was no limit as to the length of the response, the on-screen size of the dialog box may have unnecessarily constrained some of the participants' responses. Most participants responded generally to the impact of the workshop on teaching practices; some, however, were quite specific. "My laptop workshop transformed the way I teach. I have moved from 'notes and transparencies' to a fully integrated technology-
supported computer-based teaching environment in the four years since I took the laptop workshop." "The laptop in the classroom has freed me from my notes, facilitated integrating visual material into the classroom, and enabled me to launch students onto the web."

These are some of the comments related to the particular features of the workshop such as immersion, a collegial environment, modeling teaching practices, and technology as the organizing theme. "The total immersion of the workshop experience was uniquely effective." "The collegial, cooperative learning environment we created together during the workshop which has served as a model for me of the type of environment I desire to create for my students." "The practical element of the course gave us a chance to review critically our own methods, and see new uses by others." "The workshop enabled me to draw on experience of committed teachers from all over campus." "It helps us consider all aspects of the learning experience, but with technology as the organizing theme."

Being exposed to models for teaching and technology integration in a supportive community made a positive impact of these workshop participants' learning (Carothers et al., 1997; Gilbert, 1996; Sandholtz, Ringstaff, & Dwyer, 1997).

The laptop computer was a powerful incentive for many of the respondents. Some shared the fact that without it they would have never participated in the workshop. "I would have never participated in the workshop if they hadn't provided me with the laptop." "The Laptop Workshops provide tools that increase the productivity and effectiveness of our work. Neither I or most of my colleagues would attend a summer program on improving teaching without such incentives." Others shared a perspective that owning the laptop was important to reaching the larger goal – impacting teaching
practices. "Receiving the technology is an incentive for faculty to come to a workshop that is designed around more effective teaching techniques." "It's not enough to be given a fishing pole – you need to learn how to use it effectively and have the opportunity to expand and refine your skills." Access to tools and technical support are essential to successful faculty development initiatives (Ely, 1995; Groves & Zemel, 2000).

One of the specific comments related to student impact focused on students' enthusiasm and motivation. "My teaching is more effective and students have started being more interested. They have become more enthusiastic and motivated. They are now more willing to spend more time because of the new tools I employ in my teaching."

Similar to participants in several studies, this participant believed the instructional technology tools provide motivational benefits to students (Anandam, 1998; Karlin, 1994; Peterson, 1998).

There were two responses to this question that qualified the respondents' praise for the workshop. One person admitted: "While it has caused me to RECONSIDER my teaching practices, it has not always CAUSED me to change them." Another respondent was concerned about his or her colleagues using technology tools to do business as usual. "It may be that some faculty see the tools as a means to stick entirely with their old paradigms (e.g. one-way flow of information from teacher to students) and do so more efficiently than as an opportunity to reconsider and reconstruct their own teaching and learning subjective theories." A significant body of literature supports this respondent's concerns for the difficulty of changing participants' basic beliefs about teaching and learning (Ehrmann, 2000).
Question #2: Data Analysis – Changes in the Methods or Content of Teaching

The second open-ended question on the questionnaire asked respondents to describe the most important way the workshop has changed the way they teach or the content of their teaching. Fifty-one people responded to this question; two left it blank. Although asked to share "the most important" way, many respondents gave more than one answer. I utilized all of the data and included multiple responses for this question.

The responses covered a wide range of changes from integrating online components into courses to introducing participants to "a community of practice." Twenty-five respondents, 49%, mentioned online components have been added to their courses as a result of the workshop. Twelve respondents, 24%, noted that PowerPoint made the most significant change in their teaching; and nine people, 18%, mentioned more effective presentation of content, which may or may not be related to using PowerPoint. Sixteen respondents, 35%, mentioned the positive impact of the laptop itself, including their use of the laptop as a repository of ideas, concepts, and research.
Table 7.5
Changes in Teaching Behaviors or Course Content (N = 51 with multiple responses)

<table>
<thead>
<tr>
<th>Teaching Behaviors or Content</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online course components (syllabi, Web sites, course management tools, online tutorials, etc.)</td>
<td>25</td>
<td>49%</td>
</tr>
<tr>
<td>Laptop as a teaching tool</td>
<td>18</td>
<td>35%</td>
</tr>
<tr>
<td>PowerPoint presentations</td>
<td>12</td>
<td>24%</td>
</tr>
<tr>
<td>Effective presentation of content</td>
<td>9</td>
<td>18%</td>
</tr>
<tr>
<td>Addition of visual images</td>
<td>6</td>
<td>12%</td>
</tr>
<tr>
<td>Student access to course materials</td>
<td>5</td>
<td>10%</td>
</tr>
<tr>
<td>Communication with students, Addition of animations/videos</td>
<td>4</td>
<td>8%</td>
</tr>
<tr>
<td>Group work, Efficient/organized, Improved student response to course/content, Alternative strategies for communicating information</td>
<td>3</td>
<td>6%</td>
</tr>
<tr>
<td>Confidence, Pedagogical concepts, Demonstrate relevant use of technology, Sound files, Online discussions, Learning styles, Improved writing assignments</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>Increased productivity, Expanded content, Influence/mentor required of students</td>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>
As shown in Table 7.5, the majority of responses to this question centered on changes in behaviors related to specific technology tools or features rather than on different teaching methodologies. This finding suggests the difficulty of utilizing instructional technology to achieve pedagogical change (Ehrmann, 2000; Gilbert, 1996). Although some of these tools may be applied in student-centered ways, unless the respondent elaborated there was no way to determine a transmission or constructivist application from these responses. These are the specific comments that fall within the teaching strategies category and the number of people who mentioned them in their responses: communication with students (4), alternative strategies for communicating information (3), group work (3), pedagogical concepts (2), online discussions (2), learning styles (2), and online research by students (1).

Some of the respondents elaborated on these categories in their comments. One comment about the impact of Web-facilitated instruction was particularly sweeping. "I now try to put a lot of materials for the students on WebCT so they can take charge of their learning outside the classroom, and this frees up the classroom for hands-on learning activities, group work, and discussions." With or without awareness or intention, this workshop alumna has begun implementing some of Chickering's principles of undergraduate education (Chickering & Gamson, 1991). Another respondent who elaborated on the use of Web-based course components said, "[The workshop] has literally revolutionized the way I view myself as a teacher and expanded the academic dialogue beyond the boundaries of the classroom." This workshop alumnus seems to have changed some basic assumptions about the role of the teacher or facilitator in guiding learning and the goal of education in general (Mezirow, 1991).
Some of the comments participants made about owning and using their laptops were anthropomorphic or made pedagogical connections. "I now use the Internet as a pedagogical partner in classes." "The laptop is my companion!" "The laptop, while requiring more work upfront, streamlines my teaching, making me more productive." "Computers and laptops permit the delivery of curriculum and enhance the ability of students to respond to curriculum." These comments spotlight the necessity of having access to the basic tools of 21st-century teaching (Ely, 1995; Groves & Zemel, 2000).

These are some samples of unique responses to this question. One participant credited the workshop with giving him the confidence to propose a Tier I, Gen Ed course. Another talked about the impact his or her learning has had on departmental colleagues. "I've become the tech maven in my department, and I share my experience and knowledge there. So the impact of the original workshop has been huge and widespread." Another talked about a positive consequence of using PowerPoint presentations. "I have begun to use PowerPoint in my lectures. It forces me to be concise, and it gives the students a 'roadmap.'"

One participant admitted, "My pedagogical methodology has remained the same. The content of my teaching has been enhanced substantially by the addition of audiovisual stimuli." Although it is unclear what the participant's pedagogical methodology is, the fact that he or she reports it was unchanged by this professional development experience runs counter to one of the goals of the workshop. Another participant expressed a negative impact of the technology tools, she learned to use in the workshop. "After trying e-components for a year, which I would not have done without the workshop, I have found technology-intensive teaching too cumbersome and not more
effective." Certainly, there are many factors that interact when faculty are integrating technology tools for instructional outcomes. Without an explicit theoretical base, however, it is difficult for these workshop participants to inquiry more deeply into the reasons for the success or failure of their experimentation with the tools.

As in question #1, the overwhelming majority of responses to question #2 were positive. The responses, however, also indicated the tendency of participants to change their behaviors with relationship to using technology tools rather than or before changing their teaching methodologies, such as facilitating more active learning methodologies like online discussions or cooperative learning experiences. This seems to confirm the findings of educational reform theories that attest that changes in behaviors, preceded changes in new teaching strategies, that may finally lead to possible alterations in beliefs (Fullan, 2001). Again, it may be a question of sufficient theoretical understanding on the part of participants to connect the tools with student-centered, active learning teaching strategies.

Question #3: Data Analysis – Student Feedback

Question #3 on the questionnaire was an attempt to access another perspective on the impact of the workshop – that of students, particularly undergraduates participating in Gen Ed course work. "Since you participated in the workshop, what comments have you received from students that reflect a change in your teaching practices and/or your integration of technology tools into your course(s)? These comments could be from (University) course evaluations, from your own course evaluation tools or instruments, email exchanges, other documents, and/or verbal comments."
For the most part, the responses to this question, then, are highly anecdotal. In many ways, most of these responses reflect a faculty perspective on what students think is effective about a course. Although reaching for authentic student feedback regarding the impact of the workshop was outside the bounds of this study, two responses, however, offer a glimpse into what that data set might have added to the study. Two respondents provided actual quotes from student evaluations. One person did so by quoting students comments into the questionnaire dialog box; the other provided a link to an entire class section's comments on one of the courses she teaches in which technology tools are a prominent feature.

Fourteen respondents, 26%, left this question blank or reported that they had not yet had sufficient time to integrate what they had learned in the workshop. Two respondents, 4%, said they had no comparisons to offer; one had only taught the course once, and one noted that students don't take a Gen Ed course twice. One person reported that the workshop has made no difference in students' feedback. Table 7.6 shows the frequency of particular comments from the remaining thirty-six respondents; multiple responses were included.
Table 7.6

Reported Student Comments on Changed Teaching and/or Technology Tools Practices

(N = 36 with multiple responses)

<table>
<thead>
<tr>
<th>Practices</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to course materials and updates online</td>
<td>15</td>
<td>42%</td>
</tr>
<tr>
<td>PowerPoint – visuals</td>
<td>8</td>
<td>22%</td>
</tr>
<tr>
<td>Online/in-class discussions</td>
<td>5</td>
<td>14%</td>
</tr>
<tr>
<td>Email communication</td>
<td>4</td>
<td>11%</td>
</tr>
<tr>
<td>Clarity or organization, Student engagement with content</td>
<td>3</td>
<td>8%</td>
</tr>
<tr>
<td>Group work, Increased attendance, Online mentors/guests,</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Student projects on Web</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These are a sample of the comments related to online accessibility to course materials and to the professor via email. "[Students] have appreciated access to materials online, especially when they lose something like a syllabus or assignment sheet."

"Students in large classes very much appreciate the availability of course notes, assignments, model essays, and exam study guides on the course web pages. They felt these tools really increased their ability to learn." "Students have mentioned in their evaluations that they have appreciated how accessible I’ve become as a result of e-mail."
Increased student-faculty communication is one of Chickering's principles of good practice for undergraduate education (Chickering & Gamson, 1991).

Comments about the impact of PowerPoint on instruction show that faculty and students may share the belief that this tool can make a positive difference in the classroom. "I think the many comments I receive about my clarity and thoroughness are directly related to my use of technology to improve my teaching." "I have noticed a marked increase in classroom discussion this year. I believe the use of the laptop and PowerPoint have enabled me to be better prepared and better focused, and thus able to facilitate discussions better." "I have received comments from numerous students regarding the motivating and stimulating aspect of using the laptop and PowerPoint in the classroom. Attendance in these classes has risen dramatically." "When the PowerPoint slideshow goes up, note taking begins." This comment, in particular, supports the idea that 21st-century tools make learning more relevant for 21st-century students (Negroponte, 1995; Tapscott, 1998).

Several outlying comments show the impact of some workshop alumni's changes in instructional practices. "Students like being able to see student projects on the web and get inspired about what they can do later in the course." "Many tell me how glad they are that I 'made' them learn how to navigate the web or make a web page." "I have online guests on my WebCT sites who are nationally known and many students get excited that they got to talk to these people who wrote their [text]books." These comments suggest more engaged and active student learning and demonstrate some of the principles of constructivist learning (Briner, 1999).
The following comments are a selection of quoted student course evaluation comments. "The professor was excellent in finding different ways, WebCT, movies, slides, programs, homework to learn the material. Very positive, credible teaching." "I really appreciated your tour of next week's realm in WebCT. Knowing what to look for makes things much easier when trying to navigate from home." "It was nice to combine person-to-person conversation with written postings. I was glad to get to know some of our classmates from other departments." "I felt totally comfortable in class, which I attribute to being able to hide behind the computer screen and post away..." "I do see an advantage in WebCT, however, namely that all students must post something. As a result, our discussions may be richer because of the many perspectives." These students recognize the potential of online learning communities to support diversity and multiple perspectives (Cummins & Sayers, 1995).

Question #4: Data Analysis – Rewards, Recognition, or Compensation for Participation

The fourth question asked: "Have you received any reward, recognition, or compensation from your department or college as a result of your participation in the Laptop Workshop?" Forty-two people, 79%, responded in the negative to this question or left it blank. Four respondents, or 8%, reported that they have received recognition, rewards, or compensation for their participation in the workshop. These examples show some different ways "rewards" can be awarded.

Three respondents reported receiving grants and other funds as a result of their workshop participation. One participant believed he and his colleagues received a grant because of the workshop's impact on his teaching methodologies. "We received a grant
for 2000-2001, Interactive Learning Environment for Individuals and Society, direct costs $20,800. Another who credits the workshop with introducing her to synchronous online communication technology that has had an enormous impact on her research agenda reported, "I received a faculty small grant in the spring of 2001 for the innovative adaptation of the MOO to a research project involving the translation of Native American languages." Another participant noted: "My department head has, whenever possible, provided funding for some of the upgrades I've made to my laptop."

One participant reported that both the workshop and the out-of-state writing workshop she was invited to attend as a direct result of interests and skills she developed in the workshop have influenced the teaching practices of her colleagues:

My interest in teaching students with disabilities and learning differences was increased through the Laptop Workshop. As a result of that increase in interest and involvement, the director of my program recommended that I be sent to Vermont this past summer for a thirty-two hour workshop on teaching writing to students with learning differences. That isn't officially an award, but it certainly is a form of recognition. As a result of that summer workshop, I am making two significant changes in my syllabus for English 100. Since I also direct this course, any changes I make will become models for other teachers. The ripple effect is enormous.

Five respondents, or 9%, mentioned the fact that their departments and/or deans partially funded their participation in the workshop. "My department did pay for half of the workshop. I believe this is compensation for my participation in the workshop."

(Note: For the first two years of this faculty development initiative, the University bore
the total cost; in the final year of the program, participants were required to seek partial funding to support their participation. In most cases, it was the participant's department that partially funded his or her workshop experience.) Two respondents, or 4%, said it was too early to tell.

However, forty-two respondents, or 79%, left this question about rewards, recognition, or compensation blank, or responded negatively or with uncertainty. Several respondents input the word "NO" in capital letters. These are a few of the more positive comments related to the lack of rewards, recognition, or compensation. "Nothing specific, but I didn't expect anything. I feel grateful to have been able to participate and learn."

"No, but my colleagues appreciate the expertise I'm able to share on many topics." "The facility that I have acquired using PowerPoint, a direct result of the workshop, may have contributed to my being awarded an outstanding teaching award from my college in Spring 2001." "I do this because I care about my teaching and want to help my students learn better but there is absolutely no reward structure in this university to indicate the hours and hours and hours I've put into this are valued by anyone but me – and hopefully my students. However, I should add that I have received some 'truly exceptional' ratings in teaching on my post-tenure annual review."

These are a few samples of the negative responses to the lack of reward structure. "No. I had not expectations." "Yeah, right... I wish." "No, there is little interest. I have not been nominated for any awards, while those who have been are individuals using 'traditional' teaching methods. I should also add, however, that at department meetings and in other P.R. settings, my involvement with instructional technologies has been noted and used as evidence that the department is moving forward with more technologically
sophisticated approaches." "None. In fact, I did not get tenure because of my efforts to upgrade my own teaching." "Unfortunately not. I feel that this is part of a larger problem, namely, a failure on the behalf of departments to recognize/reward faculty who are in charge of large (usually general education) courses that require much more work, including the use of technology, than an average course."

For the most part, the respondents expressed concern for the lack of reward structure related to teaching at this university. Administrative attitudes affect faculty adoption of technologies as much as faculty development, access, and infrastructure (Heuth, 1998). Although faculty members sense an expectation from the institution or from their departments that technology tools will be effectively integrated into their teaching, they do not perceive a reward structure to support that expectation. Some higher education faculty development researchers suggest that this expectation should be reflected in the merit, promotion, and tenure process (Nnazor, 1998; Topp & Mortensen, 2000). All units within the University may not have applied recent revisions to the University's tenure and promotion and post-tenure review guidelines as yet.

Question #5: Data Analysis – Communication with University Upper Administration

The final open-ended questionnaire question was: "Now that you have had your laptop for some time, what would you tell the upper administration at the University with regard to the impact of this tool and the workshop on your professional work in the areas of teaching, research, and service?" Three people left this question blank; one input "nothing." I included multiple responses from forty-nine respondents in the totals in calculating the percentage in each area.
Only five people, 10%, noted the impact of the workshop in all three areas of responsibility. "Although I have had my laptop less than three months, I have become totally reliant on it in teaching, research, and service." Twenty respondents, 41%, mentioned the workshop's impact on research and five, 10%, noted the workshop's impact in the area of service. The greatest impact of the workshop, however, was on its stated target – teaching.

Forty-one participants, 84%, noted the workshop's impact on his or her teaching. These were some of the elaborations related to teaching. "This program has done more to improve [my teaching] than anything else I have done or been exposed to." "Simple questions posed during the workshop: how can we use technology in our teaching and when do we choose not to use it? From these interlinked questions, one is offered the chance to step back and really consider what it means to teach, not only in terms of what we are teaching but how." "If the University wants to engage students, promote dialogue, raise retention, it must promote the superior means to deliver curriculum that technology increasingly provides." "It has improved the caliber of my teaching and made me more accessible to students." "It is an excellent way to motivate faculty to do good teaching. The training really motivated me to look for innovative ways in presenting course content." One respondent expressed a feeling of having been manipulated in the workshop: "I feel there was a bit of unnecessary manipulation in discussions for the sake of drawing out participants' views of technology and teaching. It would have been more enjoyable to ask about what was wanted straightaway, without all the game playing and manipulation." Although his was the only such comment, this remark underscores the
importance of sensitivity on the part of facilitators when asking faculty to assume a learner role (Gilbert, 1996).

Nineteen respondents, 39%, wanted to tell upper administration that the program should continue. "I have used the laptop daily and it has improved my teaching. I think the laptop program should be continued and expanded." The importance of the laptop itself as a tool was one sub-category in the responses that suggested the program continue. "In this day and age, it seems to me hardly justifiable to require faculty to engage in 'innovative' teaching if the basic tools are not provided. A laptop is not longer an 'extra' facility but rather a basic tool." 'If I had not had this laptop and the training that went with it, I would have been pressed to accomplish my duties at the [University]. I use many of the tools that I learned in the workshop every day."

Some of the comments related to the continuation of the workshop pointed to the need for the University to utilize its resources to support undergraduate education. "The workshop improves undergraduate instruction, and thus contributes in vital ways to one of the university's core missions." "I count the Laptop Workshop as the single most important demonstration of the administration's support for teaching faculty, and the imposed Tier I and Tier II curriculum. Beyond all the rhetoric stating the administration's enthusiasm for undergraduate education, the Laptop Workshop represents the only material demonstration of that support." "I can hardly imagine a better way to spend UA funds." "Supplying the training and the computer to all faculty would demonstrate the University's commitment to upgrading the teaching standards of the institution." "The combination of a well-equipped laptop and first-rate instruction make it worth our while to upgrade our skills."
Adequate support for faculty development was yet another subcategory. "The University has to be willing to provide not only training and support but also enough time to allow faculty to explore the technology and its possibilities. Trying to master the technology and keep up with new technologies while teaching a full load is difficult. Occasional release time to become proficient following instruction – which might include tutorials or follow-up workshops – would help us better incorporate what we are learning into our curricula." "I now feel I have a support system that I would never use if it had not been for the workshop. The benefit of this program has many facets. It made me feel part of the larger University family; it made me feel valued as a faculty member; it encouraged me to use many levels of technology in my teaching; it gave me confidence to volunteer to assist others with my increased knowledge; and it gave me a different direction for my teaching."

In short, said one person, "The impact of this tool [the laptop computer] and the workshop has been profound." With fifty-three responses from a population of one hundred and fifty, or a 35% return rate, the reliability of this questionnaire data is strong. The online questionnaire data combined with the survey and qualitative data confirm the positive response to the workshop and its significant impact on faculty development.

Discussion: Survey and Questionnaire Data

The overwhelmingly positive response to the first open-ended questionnaire question about the effectiveness of technology tools-centered faculty development, 94%, supports the program assessment of the 2001 workshop participants, 76% of whom rated this as one of the most effective professional development experiences of their careers (as
expressed by 26 participants on the ending surveys administered on the last day of the
workshop). The data show there are many factors that could contribute to this perception;
I have presented these findings based on the four sub-questions of this research study.
Within the discussion of each question, I also have sought to include disconfirming as
well as confirming support for the impressively positive response to this faculty
development initiative. It is my belief that keys to improving the impact of the workshop
can more readily be discovered in the disconfirming comments. As nearly one hundred
participants did not respond to the questionnaire, it is not possible to estimate the
relationship between the sample statistics and the entire population (Fowler, 1993). The
disconfirming responses, then, are particularly important in constructing a global picture
of the workshop results.

**Technology Tools Behaviors**

What are the perceptions of these workshop participants about their behaviors
with regard to technology tools integration during and/or after this faculty development
experience? This data is particularly strong in showing many changes in faculty
behaviors as the direct result of the workshop experience. As Knowles (1978) suggests,
adults seek information that they perceive is relevant and useful to their lives. Ninety-two
percent of the survey participants completely agreed that they were confident that they
would use what they learned in the workshop in their teaching, and the technology tools
taught were the centerpiece of this faculty development experience.

Seventy-four percent of the respondents utilized an online syllabus in their
teaching differently because of their workshop learning; seventy-three percent utilized
PowerPoint presentations differently after the workshop experience. Eighty-four percent built Web pages or built different Web pages as a result of the workshop, and seventy percent used the Web to locate resources for teaching and/or to conduct research differently because of the workshop. Seventy-three percent made changes in course materials with universal accessibility in mind. As the greatest number of behavior changes were reported in questions related to changes in technology tool use, it would follow, then, that most of the workshop participants perceived the technology tools to be a highly relevant and useful component of this workshop. It could also be that the technology components, more than the teaching methodology components, were the most highly visible and, therefore, readily learned components of the workshop.

One of the limitations of this study is the lack of a systematic way to gather data about students' perspectives on the impact of the workshop. One of the features of Gen Ed courses, however, is that students who take these courses tend to experience a particular professor's teaching just that one time. (For students, there would be no point of comparison — before and after the workshop.) In question #3 about students' responses to the impact of the workshop, 42% of the faculty respondents reported that students have commented favorably upon improved access to their teachers, the course materials, and to course updates via the Web. Although Chickering's seven principles were not part of the workshop facilitators' theoretical frame, this finding confirms the importance of two of these principles: good practice encourages contact between students and faculty and supports time on task. These data provide anecdotal evidence to support the notion that students respond positively to the use of technology tools in the learning environment.
(Heuth, 1998) and that faculty believe that teaching and learning is improved through the use of these tools (Karlin, 1994).

Beliefs Related to Technology Tools and Teaching

What are the perceptions of these workshop participants about their beliefs related to technology tools integration and/or teaching philosophies during and/or after this professional development experience? On the ending surveys administered to twenty-six 2001 workshop participants, seventy-three percent of the respondents completely agreed that the workshop strengthened their belief that it is important to integrate technology into their teaching. This belief is shared by the workshop facilitators and necessarily framed the participants' workshop learning experience (Robertson, 1996).

Due to the complexity of accessing and assessing people's beliefs, Harrison and I did not include on the population questionnaire a specific question related to changed beliefs regarding teaching and teaching with technology tools. In the open-ended questions, however, several faculty made comments related to their beliefs about technology tools integration and its impact on student learning. One believed technology "enhances the ability of students to respond to curriculum." One believed that PowerPoint gives students "a road map" that helps them learn. Another credited PowerPoint with improving students' motivation and increasing class attendance. These faculty members seem to understand the importance of utilizing students' preferred tools (Negroponte, 1995; Tapscott, 1998) in the service of instructional goals. Access to the research in this area may have strengthened the impact of these beliefs for these and other workshop participants.
It is true that it is easier to gather data to confirm a change in behavior than it is to confirm a change in beliefs. The field study and the faculty interviews in this research study were designed to probe more deeply into the impact of the workshop on participants' teaching strategies and underlying pedagogical beliefs. If changes in behavior most often precede changes in methodologies and beliefs (Fullan, 1993), it would also seem that the passage of a significant amount of time and accumulating sufficient experience are important factors in changing beliefs. It could be that a significant number of respondents to this questionnaire have not yet had enough time or experience to affect those deeper changes. The survey and questionnaire instruments and data reinforce the difficulties related to utilizing technology tools for educational change (Ehrmann, 2000) and for gathering this type of data with quantitative instruments (Fowler, 1993).

**Workshop Components**

What are the perceptions of these participants about the components of the workshop that invite educators to reflect on their teaching roles and practices? One contributing factor that is implicit in the open-ended survey and questionnaire responses is that the workshop succeeds in the area of individualizing learning experiences. The high ratio of facilitators to participants, one to two or three, made it possible to support each faculty member as he or she negotiated the workshop. The workshop was designed to support individualized learning, a critical component of faculty development (Sorcinelli, 1999). Enabling the learner to begin at a comfortable level and proceed in a
self-paced manner is another critical component of faculty development (Fosnot, 1989), one workshop feature that was facilitated by the high facilitator-participant ratio.

On the surveys and questionnaire, respondents affirmed and reaffirmed that laptop computer ownership (Dusick & Yildirim, 2000; Topp & Mortensen, 2000), technology support during the workshop and on-going support (Gilbert, 1996; Kershaw, 1996; Rogers, 1995), and the intense focus on technology and teaching during the one-week experience made critical contributions to the workshop's success. On the surveys, 77% said they somewhat or mostly agree that the laptop computer was a prime motivator in enrolling them in the workshop; on the questionnaire respondents reaffirmed the laptop as an incentive. Technology support was also critical. Ninety-six percent of the 2001 workshop participants noted that they always or most of the time had sufficient technology support during the week; fifty-eight percent credited technology support with assisting them to reach their workshop goals.

"Faculty, too often, are poorly trained in educational methods and the newer technologies of instruction. Instructional technologies by their nature and training are often proactive and tend to take a lead in programs aimed at change – especially in the area of instruction" (Stephens, 1992, p. 2). It is important, then, that faculty found workshop discussions on teaching and technology useful. Seventy-six percent of the survey participants found teaching discussions were "most of the time" or "always" useful; eighty-eight percent felt that way about technology discussions. The interview data in the previous chapters confirm the fact that, particularly in large, research universities, pedagogy is rarely discussed (Middendorf, 1991). Even though a significant number of surveys indicated the usefulness of the teaching discussions, there were
participants who felt the workshop discussions focused more on technology rather than on integrating technology into teaching and/or into specific teaching strategies, such as improving student writing. It was the purpose of this workshop to promote change in undergraduate teaching practices. There should have been little or no ambiguity that the technology tool components of the workshop were in service of its larger goal, namely to improve student learning.

Meaning Ascribed to the Workshop

What meaning do these workshop participants ascribe to this learning experience? The meaning ascribed to this workshop was not represented by a question on the surveys nor was one included on the online questionnaire. It is, however, possible to speculate on meaning of the workshop beyond the influences suggested by the other three research sub-questions. Reward structures are one area of the literature that is not clearly addressed in the other three sub-questions of this study. Neither was the diffusion of innovations research, which is particularly important to meaning/impact of this program, directly addressed on the surveys or on the population questionnaire. Both of these areas have implications for the meaning of the workshop and this research study.

Studies show that faculty follow reward structures (Frayer, 1999; Robinson & Borkowski, 2000; Signer, Hall, & Upton, 2000, Smith, 1997; Willis, 1994). The lack of reward structure for engaging in professional development and/or innovative teaching practices can be considered an institutional barrier that undermines the stated goals of the University. The relationship between goals and rewards should be clear and consistent. This ambiguity acts as an inhibitor to change and innovation (Robinson & Borkowski,
The fact that 79% of the questionnaire respondents reported receiving no rewards, recognition, or compensation for their participation in the workshop may indicate the need for reform in this area at the institutional level. The participants' feelings and opinions about the impact of the workshop, as indicated in the final open-ended questionnaire question discussed above, may give University administrators suggestions for the nature of reform not only in the reward structure but also in the basic need for tools and professional development in support of improving undergraduate education.

The survey and questionnaire data also show the strength of the workshop in impacting the larger University community through creating a supportive learning environment for faculty within the workshop and then sending them out into the institution as "advocates for innovation" after the workshop week (Rowe, 1999). The diffusion of innovations is certainly a positive consequence of the workshop. Whether innovators or early adopters of technology tools, workshop alumni have the potential to positively influence the larger learning community (Rogers, 1995). The diffusion of teaching with technology innovations that sprang from this faculty development initiative contributed to the meaning this workshop has for individuals, for departments and colleges, and for the University as a whole. Statistics available for the fall semester 2001 from the University's online Fact Book (http://daps.arizona.edu/daps/factbook/pdf/employees.pdf) show there were 110 department heads, 1,535 instructional faculty, and 815 other faculty, including adjuncts, for a total of 2,460 faculty, the majority of whom teach students. The 165 participants in this workshop, then, represent just fewer than 7% of the possible participants in such a
faculty development experience. If we are to use Rogers' (1995) percentages for innovators (2-3%) and early adopters (13-14%) and assume, for the moment, that all the workshop participants fit into these two groups, this workshop directly impacted between one third and one half of the possible faculty in these two critical diffusion groups. One might speculate that a greater impact on the organization may have been made had the workshop continued or broadened to directly influence more faculty.

Insights from the Beginning and Ending Surveys and Online Questionnaire

There are many aspects of the workshop that seem to contribute to the overwhelmingly positive response to this faculty development initiative. From 76% of the 2001 workshop participants' perspectives "compared with other professional development experiences," this was one of the best. Even more overwhelmingly positive, 94% of the population questionnaire respondents responded affirmatively to the question: "Do you think university faculty development constructed around technology tools is an effective model for helping faculty to reconsider their teaching practices?" As reflected in the workshop surveys and population questionnaire, the individualization of instruction made possible by the small class size and high ratio of facilitators to participants, a non-threatening, collegial learning environment, the self-paced agenda, and the laptop itself coupled with sufficient technology support for its effective use all contributed to the effectiveness of the workshop. It is not surprising, however, that these features of the workshop resulted in a productive learning experience. The support in the literature for these faculty development features is abundant.
There may be more notable aspects of this data that contribute other perspectives on post-secondary faculty development. All of the participants in the workshop were self-selected. A few may have had encouragement from colleagues or department heads, but a full 92% of the survey respondents reported complete confidence that they would utilize what they learned in their teaching. Seventy-three percent of the 2001 workshop participants completely agreed that the workshop strengthened their belief that it is important to integrate technology tools into their teaching; 65% completely agreed that technology tools might change the ways in which they teach.

The online population questionnaire shows that the most significant changes resulting from workshop participation were in the area of technology tool use. As a result of the workshop, 84% percent of the respondents had posted Web pages for use in their teaching, 73% to 74% began using online syllabi, PowerPoint, or universal accessibility features, 71% scanned images to include in their teaching materials, and 70% had begun using Web resources for teaching or to conduct research. One might assume that participants in this faculty development found the technology tools instruction relevant to their teaching needs and applied it readily in their teaching.

In the cross-perspectives chapter that follows this one, I will address the impact of this workshop on the diffusion of innovations at this university. According to Rogers (1995), change agents and opinion leaders are key players in the diffusion of innovations. Faculty development administrators and decision-makers function as change agents in university settings. Rogers offers four methods for measuring opinion leadership: sociometric, informants' ratings, self-designation techniques, and observation. None of these methods is foolproof or easily applied in a large institutional setting like a
Research I university. It is important to note the high rate of adoption of the technology tools as a result of this workshop. These large percentages suggest that self-selection may have been an effective way to fill the workshop sessions and realize significant results in the area of technology tools adoption.

If one adopts the belief that tools alone do not improve learning, then the data showed the connection between the technology tools and improving student outcomes was not as strong. The workshop participants' responses to the questions related to specific teaching methodologies indicate that these workshop components were not whole-heartedly embraced. Only 31% completely agreed that they learned ways in which technology tools can help address students' various learning styles; only 15% marked completely agree that they learned ways in which technology tools could be useful in helping students improve their writing skills. Forty-three percent had integrated cooperative learning strategies into their course work and just 39% had facilitated online discussions for students. This finding confirms Ehrmann's (2000) assertion regarding the difficulty of using instructional technology to achieve educational change.

The open-ended question responses, however, indicate that some participants were making connections between technology tool use and positive student learning outcomes. One participant expressed a belief that using technology tools increased students' enthusiasm and motivation for learning. Another talked of the tools in terms of helping students take charge of their learning outside of the classroom; "thereby freeing up class time for hands-on learning, group work, and discussions." Another respondent who elaborated on the use of Web-based course components said, "It [the workshop] has literally revolutionized the way I view myself as a teacher and expanded the academic
dialogue beyond the boundaries of the classroom." Four respondents specifically mentioned increased communication with students, three mentioned small group work, and another three mentioned alternative strategies for communicating information while two others mentioned learning styles, which are related to the feature just mentioned. All of these pedagogical responses to the use of the tools could be described in terms of Chickering's seven principles for undergraduate education. It could be that had the workshop participants developed an understanding of these seven principles they may have had a research base that could have strengthened the connections between technology tools and learning outcomes for students. In addition, the seven principles may have planted the seeds for participants whose responses did not indicate that they made connections among tools, teaching strategies, and learning outcomes.

Conclusion

The data gathered from the beginning and ending surveys and the online questionnaire provided a broad view of the impact of the workshop. Unlike the fine focus of the field study and seven interviewed-faculty and facilitators' interviews, the self-reporting surveys and questionnaire data could be described as simple snapshots of these participants' workshop experiences. Within these snapshots, however, I found significant support for the more thorough perspectives provided by the primary data sources for this research report. In the next chapter, I will bring together all of the primary and secondary data sources in order to discuss the four research sub-questions for this study. This cross-perspectives analysis will provide a holistic interpretation of the impact of this faculty
development initiative. It will bring together the components of people, place, and process and show how this convergence created a unique opportunity for learning.
In this chapter, I will bring together both the primary and secondary source perspectives on the workshop in order to compare and contrast the facilitators' and participants' experiences of this faculty development initiative. In previous data chapters, except for the surveys and questionnaire chapter, I presented the participants' profiles and vignettes holistically in order to preserve the narrative structure of the qualitative data. In this chapter, I depart from that format and organize the cross-perspectives comparison around the four research sub-questions for this study.

Learning takes place in a participation framework, which is mediated by differences in perspectives among the co-participants (Lave & Wenger, 1991). My goal in gathering and interpreting the multiple perspectives was to emphasize and explicate the multiple meanings of this learning event. These meanings, those held by workshop facilitators and participants, have helped me as I have sought to understand the context and content of this particular faculty development program and its impact on teaching and learning at this university. Rather than offering prescriptive or definitive findings applicable to other instances of technology-centered faculty development, the insights from each research sub-question analyzed in this chapter will be suggestive of what has been effective, or what has not worked as well, in this unique case.

Figure 8.1 shows all of the perspectives contributing as a whole to illuminate the impact and meaning of the workshop. In the discussion section of this chapter, I nest these cross-perspectives within the context of the literature that framed the research questions, namely faculty development, technology-centered faculty development,
diffusion of innovations, and educational reform. The behaviors of all of the workshop participants emanated out from this instance of faculty development to diffuse innovations and created an opportunity for educational reform.

![Diagram](image)

**Figure 8.1. Cross Perspectives Nested in the Context of This Study**

Methodology and Data Analysis

In order to make meaning from the multiple perspectives presented thus far in this study, I first color coded the data from each of the four perspectives, namely those of the facilitators, the field study participant, the faculty participants, and workshop population represented by the survey and questionnaire data. I organized the data by gathering together discrete sections from each chapter: explications from the profiles and vignettes,
insights sections, and discussion sections organized around the four sub-questions for this study. This allowed me to compare and contrast the data through examining similar categories of responses. The discussions and implications sections from each chapter were most helpful in organizing the data analysis. I frequently referred back to the profiles and vignettes for clarification and confirmation.

I read over each section several times looking for patterns within the data. I employed a constant comparative methodology (Glaser & Strauss, 1967) as I searched the data for connections between the intentions of the workshop facilitators and the experiences of the participants. As categories emerged, I noted when they repeated or were disconfirmed within each of the data sets. The patterns found within the data gave me a way to select the most salient features to share in this research study.

I also conducted explicit cross-checking among the various participants’ stories or perspectives and the data from the more quantitative instruments for the meanings contained within these categories. My discussion of the data and the subsequent insights are based on my interpretation of these categories, or "correlative thematic topics" (Nelson, 1989). This helped me as I built a framework in which to interpret this data. (I will share the categories for each research sub-question at the beginning of that discussion).

In the discussions, I identify the facilitators and participants by their names or pseudonyms. Harrison, Austin, Snitzer, and Williams are the workshop facilitators. Waits is the field study participant. The "seven interviewed faculty," Holmes, Pilch, Lennon, Trotsky, McCort, Bernstein, and Renault, are the workshop alumni who participated in face-to-face interviews. Quotations from respondents to the beginning and ending
surveys or the online population questionnaire are referenced according to the instrument to which the response was given.

At the end of each of the four sub-question discussions, I have included an insights section. In these sections, I have highlighted the most confirming, disconfirming, and/or surprising findings from the previous discussion. I close this chapter with a brief conclusion in order to create a bridge between the cross-perspectives analysis and the final chapter of this research report, which addresses the overarching research question for this case study.

**Discussion: Sub-Question #1**

What are the perceptions of the program facilitators and participants about their behaviors with regard to technology tools integration during and/or after this faculty development experience?

I have divided this discussion of the responses related to sub-question one into two distinct time frames, namely during the workshop and after the workshop. The facilitators and participants offered equal input in describing their experiences during the workshop; after-the-workshop data comes mainly from the participants’ perspective. This discussion reflects both qualitative and quantitative measures with the after-the-workshop section being most heavily influenced by the quantitative data from the beginning and ending workshop surveys and the online questionnaire.
Technology Tools Behaviors During the Workshop

The invitation to participate in the workshop came with the gift of a laptop computer and the opportunity to learn technology tools. On the beginning workshop surveys, 92% of the 2001 workshop participants completely agreed that they were confident they would use what they learned in the workshop in their teaching. The laptop computer itself was a powerful incentive for many of the respondents to the online questionnaire. Said one respondent: "The Laptop Workshops provide tools that increase the productivity and effectiveness of our work. Neither I or most of my colleagues would attend a summer program on improving teaching without such incentives." Access to tools and technical support are essential to successful faculty development initiatives (Ely, 1995; Groves & Zemel, 2000).

Waits and the seven interviewed faculty noted that the workshop facilitators modeled multiple strategies for learning the technology tools presented in the workshop. During the field study, I noted that the facilitators sat alongside participants and worked through problems as participants looked on or made suggestions; they demonstrated many different ways to solve technology questions. The facilitators were co-learners with the participants and exhibited some of the characteristics of constructivist teachers (Briner, 1999). Holmes noted, "I saw that they [the facilitators] did it differently, that they used different examples, that they had different styles. And one wasn't right and one wasn't wrong. The rotating staff was good. I got to learn different ways to do the same thing from different people." The fact that the four (or more) facilitators supported the participants and that the facilitators had different strategies to accomplish the same technology goals had a positive impact on the confidence and exploratory attitude of the
participants. The facilitators themselves modeled and promoted respect for diverse talents and ways of learning (Chickering & Gamson, 1991).

The facilitators stated that they presented technology tools as instructional choices, one of many choices. Choice is a critical component in andragogy (Knowles, 1978). Participants were free to adopt or not to adopt the tools depending on their self-perceived needs. Said Austin, "We take [faculty] from where they are – and don’t take them where we want them to go – but where they think they need to go." Choice and its corollary, "taking responsibility," are important aspects of constructivist learning (Briner, 1999). The importance of choice was reflected in the workshop facilitators' and participants' data.

Harrison felt strongly that adult learners need to be given lots of choice and a great deal of opportunity to work independently as they learn new technology tools and teaching strategies. Waits' experience of the workshop was that of an "autonomous learner." He was clearly a self-directed adult learner (Knowles, 1978) who resisted the assumption that learners are dependent (Knowles, Holton, & Swanson, 1998). As often as possible, Waits utilized the wide variety of resources offered, such as published manuals and online help, his prior knowledge, and trial-and-error, before seeking support from the workshop facilitators. He always applied what he learned to his own discipline and his individual needs. Waits' experience confirmed what Harrison said in her profile: "Adult learners in general – faculty in particular – are perfectly capable of taking and running [with their learning] as long as we can put their feet on the ground or help them get their feet on the ground."
One online questionnaire respondent said this about the power of choice: "Simple questions posed during the workshop: how can we use technology in our teaching and when do we choose not to use it? From these interlinked questions, one is offered the chance to step back and really consider what it means to teach, not only in terms of what we are teaching but how." Lennon talked about the fact that he values his autonomy as an educator; having choice about whether or not to utilize particular tools and individualized instruction that supported his self-selected learning goals were critical workshop components. The constructivist workshop design encouraged Waits, Lennon, and other participants in their independence, and they took responsibility for their own learning (Briner, 1999).

At the same time they encouraged independence, the workshop facilitators noted and participants' comments indicated that they were sensitive to the faculty as they negotiated the "learner" role in the workshop (Gilbert, 1996). In his profile, Austin paraphrases a workshop alumnus and frequent FCII user as describing this facility as a place where he can get help without being threatened or belittled or made to feel dumb. This was critical for Waits who came to the workshop with a significant amount of technology tools knowledge and who was often reluctant to ask for help. When help was offered, Waits accepted it within a non-judgmental, non-competitive learning environment.

The facilitators stated that they encouraged the participants to utilize technology tools to solve "problems" related to teaching concepts and curricular goals related to their individual disciplines; the "problem solving" orientation of adult learners is one of the principles of andragogy (Knowles, 1978). The self-selected, independent projects were
designed to promote "on-the-job" applications of using technology tools to solve teaching "problems" (Stouch, 1993). Waits definitely displayed a problem solving orientation (Knowles, 1978) to learning technology tools. He came to the workshop with technology problems that he hoped to solve during the course of the workshop week. His motivation to learn seemed to come from his "need to know" easier and more efficient and effective methods to utilize technology tools in his teaching, research, and personal life.

The facilitators talked about technology tools in terms of experimentation. They adopted the attitude of co-learners of technology and did not present themselves as experts who had all the answers. Williams and Harrison, in particular, stressed that they did not consider themselves experts in technology tools but rather co-learners alongside participants in an ever-changing technological world. This attitude was evident to participants, particularly to Waits. He called the facilitators "good sports" for acknowledging they didn't have all the answers and noted that they worked together as a team to provide technology support to the workshop participants.

The facilitators perceived one of their important roles as helping people through the change process. Their goal was for participants to utilize technology tools to change the way they teach. Similar to Kershaw (1996), these faculty development facilitators hoped the participants would think as much or more about teaching rather than focusing on the tools per se. Although this was their goal, the facilitators did not make the participants feel like they were in some way deficient or lacking if they did not share this attitude or possess the necessary technology or teaching skills. According to Renault, the workshop facilitators presented the contents of the workshop as enhancements, as benefits; they did not convey the "we know you can research good but you can't teach"
attitude that Renault (and certainly other faculty) had experienced in other faculty development programs.

Ultimately, the facilitators intended to reinforce the use of technology tools in achieving instructional goals. The facilitators also talked about technology tools in terms of improving student learning and motivation. From the online questionnaire, it is equally clear that access to the tools and learning their applications was also motivating to the faculty participants. Although these different goals, changing teaching methodologies and utilizing technology tools, were intended to be compatible, they did create a tension for some workshop participants who came to the workshop to gain a laptop computer and to increase their skills at using technology tools. This is evidenced in McCort's describing the workshop as a case of the "bait and switch," and Waits' insistence that there is "nothing wrong with [his] teaching."

Technology Tools Behaviors After the Workshop

Respondents to the online questionnaire reported significant changes in technology tool use as a result of participating in the workshop. Seventy-four percent of the respondents utilized an online syllabus in their teaching differently because of their workshop learning; 73% utilized PowerPoint presentations differently after the workshop experience. Eighty-four percent built Web pages or built different Web pages as a result of the workshop, and 70% used the Web to locate resources for teaching and/or to conduct research differently because of the workshop. Seventy-three percent made changes in course materials with universal accessibility in mind. In addition, all seven of
the interviewed faculty participants reported that they utilized technology tools to a greater extent in their teaching as the result of the workshop.

From this data, one can conclude that most of the workshop participants perceived the technology tools components of the workshop as highly relevant to their teaching and research needs; the perceived relevance of the learning content is one of the components of constructivist learning (Briner, 1999). It is unlikely that faculty made these technological changes simply for the sake of making change. Rather one might speculate that these tools helped faculty address and/or solve instructional problems, reflecting the problem-solving orientation of adult learners (Knowles, 1978).

Online syllabi and other Web pages and PowerPoint were the most frequently mentioned on the online questionnaire. For the seven interviewed faculty, PowerPoint, in particular, was frequently mentioned for its application to teaching situations. The concern that PowerPoint was merely used to "automate" transmission-style lectures rather than "informate" the learning experience (November, 2001) was expressed by Trotsky and Renault and was a concern for the facilitators themselves. It is not possible to tell from the online questionnaire data the quality of use of particular tools. However, the participants' descriptions of their PowerPoint use in the face-to-face interviews and the samples shared with me during those interviews indicated a more "informated" use of this particular tool.

Six of the seven interviewed faculty participants described experimenting with PowerPoint and engaging in its "reinvention" (Rogers, 1983) in order to adapt it to his or her instructional needs. Experimentation with the tools was one of the objectives set out for the participants by the workshop facilitators. McCort, Holmes, and Bernstein, in
particular, discussed the impact of adding images, and in Bernstein's case digital video clips as well, to PowerPoint to better convey concepts critical to the learning content in their courses. Pilch invited students to use PowerPoint to present their learning to the class. Trotsky and Bernstein posted PowerPoint presentations to the Web for student access to facilitate their learning and review of material. Since their participation in the workshop, these educators used PowerPoint to share new information, more information, and made information more accessible. From the examples they shared with me, it was clear that all six of these PowerPoint users went beyond automation as they incorporated this tool into their teaching.

It is not possible to know if Renault's negative experience with using PowerPoint in her teaching could be described in terms of "automating" or "informating." She shared that students expected a one-to-one correspondence between her lectures and her PowerPoint presentations. Students' responses to technological tools, like faculty responses, are not uniformly positive. (The minimal access to the student perspective is an obvious limitation in this case study.) Course content, sophistication of the students, and their prior experiences with technology tools are some of the factors that impact students' responses. Teacher research conducted by individuals or faculty teams can better access students' perspectives in light of factors unique to particular courses and groups of students. As Austin and Snitzer noted, experimentation with new technologies can result in lower student evaluations. Renault's experience was that integrating PowerPoint, in particular, into her TRAD course did not reduce the number of failing students.
Several interviewed faculty talked about technology tools in terms of unleashing their creativity. Lennon described his use of visual images as metaphors for key course concepts. Trotsky discussed the wonder of having technology support to facilitate responding spontaneously to individual student's questions; as a result, she will no longer teach in a classroom that is not wired for Internet connectivity. Holmes said, "The workshop raised my consciousness. It made me think about teaching and creativity. It increased my confidence."

Universal accessibility was one of the technology components of the workshop that had a major impact on the technology behaviors of two of the interviewed faculty and on the field study participant. Bernstein, who teaches visually impaired students and classroom teachers who are preparing to work with visually impaired students, reports that she became more diligent about the accessibility of her course materials to all students. Trotsky has become a national trainer who teaches colleagues in her field about issues related to universal accessibility. These two workshop participants have diffused this innovation on campus, in the community, and across the nation (Rogers, 1995) and have, in effect, raised the status of the workshop within their professional communities (Caffarella et al., 1982).

As a direct result of learning about universal accessibility in the workshop, Waits made changes to his lectures that reflect his consideration for students' perspectives; focusing on "the student interface" and "thinking about where students are coming from" are two expressions of a paradigm shift for Waits. He considered ways to make course materials more accessible to students and revisions to the content of his lectures that would make learning more relevant for students. Waits began to shift from an
"instructional paradigm" to a "learning paradigm" (Barr & Tagg, 1995). The fact that this shift was spawned by a discussion of the application of a seemingly marginally unrelated technology technique is noteworthy.

It was interesting to notice a pattern among the seven interviewed faculty that showed a nascent, if unconscious, connection between their use of technology tools and Chickering's seven principles (Chickering & Gamson, 1991). These participants were particularly strong in utilizing electronic tools for cooperative and active learning, to give prompt feedback, to communicate high expectations, and to honor diverse ways of knowing. It is likely these patterns and connections would have been stronger for the workshop participants had the seven principles been an explicit component of the workshop.

Trotsky's students worked cooperatively to make class notes and post them to the Web; Holmes' students collaborated to build electronic bibliographies related to course topics. Pilch experimented with online small group project portfolios, and although he has abandoned this format for the moment, he is open to trying again when the technology tools become student-friendly. Pilch has had great success with online quizzes that give students prompt feedback while they help him assess students' understanding of homework readings. McCort has posted students' digital projects to the Web thereby giving examples to students and communicating high expectations for their work. Lennon has integrated music and visuals into his composition courses as ways to stimulate thinking and creativity and to honor diverse ways of knowing. Holmes noted that she made a connection between her experiences with the facilitators and guest speakers'
different teaching styles and different teaching strategies and her increased comfort level with multiple perspectives in her own classroom.

The seven interviewed faculty profiles show that the participants have experimented and reflected upon the use of the technology tools they learned in the workshop. They have accepted or rejected specific applications based on their opinion of the tools' value in reaching specific learning objectives. They have demonstrated a critical aspect of pedagogical content knowledge, namely how to transform content into learning experiences for students (Wilson, Shulman, & Richert, 1987).

**Insights from Sub-Question #1**

Respect for the learners, individualization of hands-on instruction, promotion of independence, and permission to explore self-selected projects were behaviors applied to learning technology tools that were utilized by the facilitators and experienced by participants during the workshop. Along with these factors, the flexibility of the tools and the flexible attitudes of the facilitators with regard to choice and multiple ways of learning and knowing also contributed to the participants' high rate of tool adoption. The use of andragogy (Knowles, 1978) and constructivist teaching and learning principles (Briner, 1999) helped frame an effective adult learning environment.

The data shows this workshop was successful in the area of integrating technology tools into teaching from the perspectives of everyone involved in this study. Even Renault, who was concerned that the focus on integrating technology tools into teaching overshadowed or even thwarted other teaching innovations, believed that the workshop was successful in creating a learning community focused on discussing technology tools and their application to teaching. It is likely that high percentage of
technology tools adoption after the workshop was, in part, the result of the positive behaviors of the facilitators toward the benefits of the tools. The facilitators were clearly advocates for computer ownership and technology tools integration.

Discussion: Sub-Question #2

What are the perceptions of the program facilitators and participants about their beliefs related to technology tools integration and or teaching philosophies during and/or after this faculty development experience?

I have divided the discussion of research sub-question #2 into three parts. The question asks about beliefs related to technology tools integration and about teaching philosophies both during and after. It was fairly easy to sort out the responses related to beliefs about technology tools integration during and after the workshop. Changes in teaching philosophies were much less easily delineated so I will discuss both these responses without consideration for their occurrence during or after the workshop. The survey and questionnaire data made a limited contribution to this discussion. Unlike the behavior changes studied in sub-question #1, the belief changes addressed in this question present greater complexity. This section reinforces the difficulties related to utilizing technology tools for educational change (Ehrmann, 2000).

Beliefs Related to Technology Tools Integration During the Workshop

Before, during, and after this faculty development initiative, the workshop facilitators expressed the beliefs that technology tools can be appropriated by effective
teachers to meet students' various learning styles and needs, to improve student motivation, and to address the students' present and future realities and to prepare them for living and working in a technologically-rich world (Negroponte, 1995; November, 2001; Tapscott, 1998). Williams believed that faculty are motivated to learn to use new tools and called this their effort at "stepping into the next generation."

The fact that laptop computer ownership was a critical component of this workshop set the expectation and signaled a value for using and integrating technology tools into teaching. Waits, Bernstein, Renault, and McCort attended the workshop in order to own a laptop. Some online questionnaire respondents shared a perspective that owning the laptop was important to reaching the larger goal – impacting teaching practices. "Receiving the technology is an incentive for faculty to come to a workshop that is designed around more effective teaching techniques." "It's not enough to be given a fishing pole – you need to learn how to use it effectively and have the opportunity to expand and refine your skills."

The strong beliefs of the facilitators with regard to technology tools created a frame in which the participants were introduced to tools (Robertson, 1996). The facilitators believed that technology tools can meet 21st-century students' expectations for a stimulating learning environment (Negroponte, 1995; Tapscott, 1998). In addition, Snitzer believed technology tools can be used to support a student-centered teaching model that empowers students (November, 2001). Harrison and Austin believed that faculty can use these tools to "rethink" the way they teach. Harrison also thought technology tools can rejuvenate faculty interest in teaching and can make teaching challenging and interesting for them. Austin is convinced that using technology tools in
their teaching can be "a different path of success" for faculty. It's not surprising then that Holmes, Lennon, Trotsky, McCort, Riley, Bernstein, and Waits reported that their beliefs about using technology tools for instruction were born or strengthened during the workshop.

Harrison shared examples during the workshop of the ways she integrated technology tools into the Tier I courses she teaches. Exercising two of Rogers' (1969) principles of facilitation, namely expressing her own views as a participant learner and sharing her self with the group, Harrison provided models and the rationale behind their use for technology tool integration. Researchers report that seeing models is critical to faculty adoption of both technology tools and teaching methodologies (Carothers et al., 1997; Gilbert, 1996; Harris, 1998). Although Harrison's models were important, the workshop facilitators simultaneously stressed the role of participants themselves in tailoring the tools to meet their unique instructional and personal needs (Rogers, 1995).

It is likely that many of the workshop participants shared the facilitators' beliefs in the value of integrating technology tools into teaching before they attended the workshop. In her profile, Bernstein noted that access to technology tools is one of the necessary conditions for 21st-century innovation. She said, "I think every faculty person, whether a tenure track person or a non-tenure track person (.50) should have access to updated technology. There are no resources in this college to get updated computers unless we're a tenure-line faculty person. I think that's appalling."

It is also likely that some of the participants came to the workshop with questions or deep reservations about technology-enabled teaching. Renaul more than likely already ascribed to the belief that too much emphasis is placed on technology tools in innovation
and that there are other, non-technological methods to achieve innovation in teaching. Her perception was that a great deal of technology integration addresses the "dog-and-pony-show" aspects of teaching rather than meeting students' real learning needs; she called this "aiding and abetting" popular culture.

Harrison and Austin, as the workshop's designers and directors, fulfilled the roles of change aides (Rogers, 1995) in the service of integrating technology tools into sound instructional practices. Harrison believed there was a general evolution among the workshop participants, with innovators and early adopters participating in the early iterations and majority adopters participating in later workshops. She believed the role of the facilitators changed based on the diffusion roles of the participants (Rogers, 1995).

Harrison expressed the belief that many of the intuitive decisions she made as workshop co-designer and facilitator were in alignment with andragogy. As the principles of andragogy and constructivist teaching are in close alignment (See Table 2.1.), it is not surprising that co-designer and frequent co-facilitator Austin's constructivist beliefs might have influenced Harrison's philosophy and behaviors.

**Beliefs Related to Technology Tools Integration After the Workshop**

On the ending workshop surveys, seventy-three percent of the respondents completely agreed that the workshop strengthened their belief that it is important to integrate technology tools into their teaching; this belief framed the workshop experience because it is one espoused by the facilitators (Robertson, 1996). All of the interviewed faculty participants reported changes or reinforcements to their beliefs about integrating technology tools into their teaching. Bernstein, Lennon, Pilch, McCort, Trotsky, and
Holmes believe that students respond more enthusiastically to course content presented with technology tools. They believe that utilizing these tools to deliver content increases the relevance for students. Pilch, in particular, connected the use of 21st-century tools to helping students think critically about real-world environmental science issues. This attitude was reinforced by the facilitators but was especially evident in Snitzer's strong statements about the necessity of integrating technology tools into the curriculum (Negroponte, 1995; November, 2001; Tapscott, 1998).

The respondents to the online questionnaire also shared comments in the open-ended questions related to their beliefs about integrating technology tools. One said technology "enhances the ability of students to respond to curriculum." Another credited his or her use of PowerPoint with improving student motivation and class attendance. Another said PowerPoint gives students a "road map" that scaffolds their learning and helps their success. Yet another said, "If the University wants to engage students, promote dialogue, raise retention, it must promote the superior means to deliver curriculum that technology increasingly provides."

These beliefs may indicate that these workshop participants suspected that the tools themselves might have an impact in addition to the instructional methodologies in which they are used (Jacobson, Angula, & Kozma, 2000). After the workshop experience, however, faculty participant Renault had a different experience. She began to question her beliefs about using technology tools in her teaching. She determined that the tools she utilized, particularly PowerPoint, didn't reduce the percentage of students who failed the course. Renault and Trotsky expressed a concern for the primacy of
instructional methods over technology tools, a frequently expressed concern in the literature (Carothers et al., 1997; Ehrmann, 2000; Gilbert, 2000).

Ironically, the introduction of a technology technique, universal accessibility, prompted Waits to "see" his course through his students' eyes. He printed out the pages of his online syllabus in order to look at what students see; he made changes to make course materials more accessible to students. Behind this change in behavior is the inkling of a change in belief. Waits began to make a shift from the "instructional paradigm" to the "learning paradigm" (Barr & Tagg, 1995), but within the context of the workshop, he did not seem to have a theory or research base onto which he could connect or more deeply understand his paradigm shift.

Trotsky's changes in behaviors since learning about universal accessibility were another example of how this technology technique had dramatic results. Since the workshop, she has developed her knowledge and skills in this area and has become a nationally known expert and mentor to colleagues in her field. Trotsky dedicated a great deal of time to using technology to improving classroom assignments as well as to prepare for professional presentations. Trotsky was the only participant who experienced the workshop twice. Her behaviors suggested she believed strongly in the integration of technology tools into her teaching, research, and service roles.

Holmes said that she "let [the workshop] prove to her the value of using and expanding [her] use of technology in teaching." She noted that when faculty model the use of technology tools, students become more comfortable with using technology and then advocate for its use in other classrooms. In her interview, Holmes reported that students in her classes had asked that she facilitate an online journal club. She was
encouraged by the request because it had come from the students, and she had agreed to
learn about listservs and facilitate one for students for this purpose.

It was also true that participants used their increased knowledge and
understanding of technology tools to make decisions not to utilize these tools. Renault,
Holmes, Trotsky, and Lennon expressed greater confidence in knowing whether or not
the tools fit their instructional goals. Lennon noted that, since the workshop, he is both
"more open and more guarded" about the use of technology. He expressed apprehension
about technology being applied in order to reduce costs or for other non-humanistic
goals. He noted, "It's imperative that the academic institutions be forerunners in making
use of [technology] so that the dangers don't get expounded." Trotsky expressed her
concerns for technology in large lecture hall classes where "it can be used to dump
enormous amounts of information that can't be assimilated [by students]." According to
Trotsky, technology-enabled education without firm grounding in student-centered
instructional methodology is "very dangerous;" researchers in the field would agree
(Carothers et al., 1997; Clark, 1990; Ehrmann, 2000; Gilbert, 2000).

Beliefs Related to Teaching Philosophies

The workshop facilitators believed they not only modeled technology tool
applications and integration but also modeled their beliefs about lifelong learning (Fullan,
1993; Hughes, 2001; Sarason, 1990). In their descriptions of themselves as co-learners
along with participants, the facilitators believed they provided a model for continuous
learning. During the workshop week, the facilitators focused critical discussions on
whether and when to utilize particular technology tools and teaching strategies. Harrison,
in particular, noted that she did not claim to have all the answers. The facilitators believed they made a sincere attempt to focus the workshop on the teaching and learning process rather than on the technology tools themselves (Carothers et al., 1997; Ehrmann, 2000; Gilbert, 2000).

Some of the interviewed faculty reported that their beliefs about integrating technology tools into their teaching were spawned during the workshop week. Others reported that knowing how to utilize the tools helped them actualize their ideal or previously held teaching philosophies. McCort credited the workshop with giving him time and examples to consider as he developed a philosophy of what it means to be a good teacher. Holmes now uses technology tools to support her approach to teaching as "sharing experiences" and posing problems to solve.

During the workshop, Waits questioned Harrison about the feasibility of utilizing active learning and group work strategies in the large lecture hall setting. Robinson and Borkowski (2000) found that the application of these strategies in the lecture hall environment is difficult for many faculty. Although Waits' questions were not resolved in his own mind, the workshop was a forum for him to explore or build his teaching philosophy. He did make one change in the lecture component of the course when he invited students to present small group work in that setting. This was the first time he "shared the stage" with students during lecture.

Many of the workshop participants demonstrated a more student-centered teaching philosophy (or at least practice) after participating in the workshop experience. After the workshop, Waits had an understanding of the primary role of course materials as resources designed and utilized to serve students' learning needs. He made changes to
the content of his lectures based on his perceptions of what students would find more engaging. Waits instructed the TAs responsible for discussion sections in constructivist practices (Briner, 1999) related to learning to compose a scientific article review. Through modeling, group writing, and peer review, these TAs guided students through a more effective teaching and learning strategy that resulted in improved student writing. I believe that Waits was an excellent example of a workshop participant for whom the workshop was "psychologically a brilliant way" to help veteran teachers. Like McCort, Waits came for the technology tools but he left the workshop with new methods to meet the challenges of teaching and learning.

The impact of this workshop on the participants' beliefs about the value of teaching at this institution are mixed. Trotsky believed that the workshop was one of the University's few investments in faculty development to improve teaching. Waits and Renault as well as many respondents to the online questionnaire did not believe that the University values quality teaching, particularly as a criteria in tenure and promotion. Although the currently published guidelines belie their assertions, their beliefs may reflect a view of reality in this and other research institutions.

**Insights from Sub-Question #2**

In addition to being advocates for andragogist and constructivist learning in the workshop setting, the data indicates that the facilitators were also advocates for student-centered, active learning in the undergraduate classroom. The applications of technology tools as evidenced by the interviewed faculty examples tended to be movements toward this type of learning environment. Even Renault who decided to de-technologize her
course after integrating PowerPoint without significant improvement in student outcomes, said, "The workshop worked for a lot of people to sort of pull together the community working around particular issues like effective instruction."

The facilitators' perceptions were that the participants would grasp their focus on the teaching applications rather than focus on the technology tools, per se. For some of the participants, however, the technology tools were foremost in their minds as they prepared and planned to integrate their workshop learning into their classrooms. Waits understood some of the changes he made to his course as "packaging it in a better way." Although a deeper look at what he actually changed showed more than "packaging," he continued, for the most part, to think about teaching as giving instruction. Several online questionnaire respondents talked about the benefits of using technology tools in terms of the "delivery of curriculum" or describing teaching as being "enhanced by the addition of audio-visual stimuli." Although such comments don't necessarily suggest an adherence to an "instructional paradigm" over a "learning paradigm" (Barr & Tagg, 1995), without further questioning it is difficult to assess these behaviors in terms of teaching philosophies.

Assessing the impact of the workshop on teaching philosophies is difficult. The more complex data derived from the face-to-face interviews suggests that the interviewed faculty reflected on the ways technology tools and instructional strategies could impact student learning and selected to use particular tools based on their assessments of their likelihood of improving student learning. Whether or not these changes signal changes in their core beliefs about learning and teaching is still another question. For McCort who stated he had no teaching philosophy before the workshop and for Waits, who described
teaching as "standing up in front of the class and delivering it," the changes they've described after a weeklong workshop are particularly dramatic. Wait did not realize the significance of these changes in his teaching until we dialogued about them in our one-year-later interview. Changes in beliefs are difficult for researchers, and even for participants themselves, to access and assess.

**Discussion: Sub-Question #3**

What are the perceptions of program facilitators and participants about the components of the workshop that invite educators to reflect on their teaching roles and instructional practices?

After reviewing the various perspectives on the workshop, the major components of the workshop emerged across data sets into the categories of affective and organizational features and workshop content components. I have also subdivided the content components to make that section of the discussion more accessible.

**Affective Features**

The workshop facilitators were successful in creating an effective adult learning environment according to the participants. They designed the workshop to give participants maximum autonomy as they negotiated the content. The facilitators acknowledged and honored the faculty participants' prior knowledge and experience relied on participants' internal motivation and problem-solving orientation to propel them through the workshop week (Knowles, 1978). In addition, they supported additional features of a constructivist learning environment such as providing participants with
multiple perspectives and points of view and serving as coaches who promoted peer-to-peer interaction (Briner, 1999).

The andragogist and constructivist learning environment created a climate in which the critical affective features of the workshop could flourish. The facilitators established a climate that promoted trust; the first principle of facilitation is creating a trusting, supportive learning to learn environment (Rogers, 1969). The facilitators, Harrison in particular, clarified the purpose of the learning event by reinforcing the focus of using the technology tools in service of teaching objectives. The facilitators recognized and accepted their own limitations with regard to the mastery of the technology tools. They participated in the workshops as co-learners, resource people, and coaches (Merriam & Caffarella, 1991). Harrison described this in detail in her profile entitled "The Teacher is a Learner, Too."

Seventy-six percent of the 2001 ending survey respondents completely agreed that this was the best professional development experience of their careers. The facilitators believed they created a non-competitive, non-judgmental workshop collaborative learning environment (Anandam, 1998; Daigle & Jarmon, 1997; Duffrin, Dawes, & Hanson, 1999; Robinson & Borkowski, 2000; Rowe, 1999; Sorcinelli, 1999; Topp & Mortensen, 2000). The facilitators made conscious decisions to work toward relieving the stress and anxiety that can be associated with adults learning something totally new. Austin stressed that participants must feel emotionally safe in order to learn. The facilitators wanted to make this experience one during which faculty could learn "without losing face." Renault noted and commented positively on the non-judgmental nature of faculty sharing through the workshop week. Although he had an individualistic
orientation toward learning, Waits provided assistance for other workshop participants and occasionally sought support from his workshop colleagues. These are just two of many examples that indicate the facilitators were successful in establishing a collaborative environment.

Many faculty development studies have pointed to features of the affective domain as critical adult learning components (Ferro, 1993; Kidd, 1973; Smith, 1982; Wlodkowski, 1985). Harrison and Austin talked about reducing participants' anxiety while learning new skills. Four interviewed faculty placed a significant value on the affective features of the workshop. Holmes, who described herself as resistant to new technologies before the workshop, felt she had the "freedom to fail" in the workshop, which helped her take an experimental approach to learning the tools. Lennon described the workshop attitude as a "let's have fun" learning environment. Trotsky credited Austin specifically with making technology "understandable and transparent." Pilch, who frequently seeks technology-enabled teaching support through the FCII, mentioned the respectful manner with which he was treated during and since the workshop. Waits flourished in the trusting environment created by the workshop facilitators; he freely asked questions throughout the week as well as gave unsolicited suggestions for improving the workshop.

The facilitators placed the attention in this workshop on the people who participated in it, rather than on the technology itself (Kershaw, 1996). In both of his interviews, Waits frequently remarked on the personal attention he received during the workshop as well as after the workshop when called on the FCII staff to troubleshoot a problem with his laptop. Several features of the workshop showed that the facilitators put
people first, namely the small number of faculty involved in each workshop, the low participant to facilitator ratio, and the emphasis on choice and independent projects. Harrison's use of the term "gift" when speaking of the workshop experience authentically reflects the attitudes of the other facilitators as well; they were thankful for the learning provided them by the participants. The facilitators' profiles and the feedback of the participants indicates that people, even more than place and process, were the top priority of this faculty development experience.

Organizational Features

The small participant-to-facilitator ratio helped the facilitators provide individualized instruction (Knowles, 1978; Sorcinelli, 1999). In designing the workshop, Austin and Harrison were adamant about the small number of participants in each workshop. Harrison stressed the importance of individualized learning which is easier to accomplish in small, more intimate teaching and learning settings. Individualization allows the learner to begin at a comfortable level and proceed in a self-paced manner through the content (Fosnot, 1989). Bernstein, Lennon, and Holmes praised the workshop for the focus on individualization. Bernstein, who came to the workshop with a great deal of technology tools experience, was particularly adamant about this feature; because she had a "slightly different learning curve," the facilitators helped her acquire more advanced or sophisticated skills.

This individualization of instruction supported participants as they developed their self-selected, individual projects as well as when they met the challenges of learning new technology skills. More than adequate technology support simulated a mentor relationship during the workshop week. One-on-one mentoring has been found to be a
successful organization for instruction in many technology-centered faculty development programs (Signer, Hall, & Upton, 2000; Sprague, Kopfman, & Sorsey, 1998; Thompson, Hanse, & Reinhart, 1996). Probably not coincidentally, Harrison described Austin's teaching her to utilize technology tools as mentoring. In the majority of the workshops in most of the sessions, the ratio of participants to facilitators was 2:1.

All of the facilitators took responsibility for the participants' learning. As facilitators circulated among the participants supporting their learning and answering their questions, they modeled a wide variety of approaches to solving challenges with technology tools and a wide range of strategies for integrating the tools into curriculum. This method of organization was flexible enough to accommodate different personality types and learning styles and provided participants with a first-hand experience of shared facilitation. From the facilitators' perspectives, this methodology was intended to provide a model for faculty that they could then apply in their own classrooms.

It should be noted that the facilitators elected to design the workshop with heterogeneous groupings. Harrison, who was responsible for filling the workshop rosters, intentionally selected participants from different departments for each session (except in the case of the English Department only workshops). Whenever possible, she populated the workshops with equal numbers of males and females. When she knew the participants' backgrounds, she also balanced the workshop for prior technology tools experience. The fact that participants had various levels of facility with technology tools helped the facilitators work more effectively. With novices and experienced technology users in one workshop, participants could support each other and use the expertise of the facilitators more evenly and more fairly.
Although the workshop included presentations, mini-lessons, and discussions, learning was organized around hands-on experiences, a principle of constructivism (Briner, 1999). Austin's strong preference for a hands-on discovery approach to learning and utilizing technology tools greatly influenced the use of this constructivist strategy. Lennon and Pilch mentioned the facilitators' approach to helping faculty "do" something rather than having it done for them (Rowe, 1999). During the field study, I witnessed a dramatic example of that organizational decision when Waits was learning to utilize Photoshop to manipulate images. The facilitators in this workshop were expert at knowing when to intervene and when to passively support participants as they explored, experimented, and learned to use the tools.

Although not an organizational feature per say, the fact that participants in the workshop assumed the role of "student" during the workshop week made a significant impression on several faculty. McCort and Waits both commented on the importance of experiencing the ups and downs of being a student. McCort acknowledged that the experience of frustration while learning new skills was an important reminder to him. He believed teachers need to regularly revisit the emotional side of learning. Said Waits, "It was probably good to be in that [learning] situation. Every once in a while, it's good to be a student." The facilitators' believe that after experiencing a positive student-centered, active learning environment as learners, as Merriam and Caffarella (1991) suggest, faculty can choose to shift their own teaching role to that of a co-learner, resource person, and coach.
Content Components

From the data, I identified the most significant content components of the workshop. I included the laptop computer itself as a component because of the high value the facilitators and all the participants placed upon owning it. The other content areas include learning from models, three specific sessions, namely improving students' writing, the use of visuals in teaching, and universal accessibility, discussions about teaching and technology tools, and learning goals.

Laptop Computer. The beginning and ending surveys and the online questionnaire confirmed that computer ownership was a critical component of the workshop (Dusick & Yildirim, 2000; Topp & Mortensen, 2000). Seventy-seven percent of the survey respondents somewhat or mostly agreed that the laptop computer was the prime motivator in their participation in the workshop; online questionnaire respondents confirmed the importance of the laptop as an incentive. Renault, Bernstein, McCort, and Waits all reported that the computer was the prime motivator in enrolling them in the workshop. Renault believed that the concrete benefit, the laptop, is part of what worked in the workshop.

The online questionnaire data showed that the ownership of a flexible, portable laptop computer assists faculty in their multiple roles. Access to equipment in both offices and classrooms is critical (Topp & Mortensen, 2000). Seventy-five percent of respondents moved their laptops every day or several times a week. According to the online questionnaire, 92% of respondents utilized the laptop in preparing for class, 81% used it for presenting course materials in class, 87% use it for conducting research, 49%
utilized it to display activities and assignments in class, and 49% used it to present at conferences.

The tool alone, however, without sufficient technology support during and after the workshop week would not have created a sufficient condition for learning. One of the respondents to the online survey said, "The combination of a well-equipped laptop and first-rate instruction make it worth our while to upgrade our skills." Ninety-six percent of the workshop survey participants reported they always or most of the time had sufficient technology support during the workshop week. In an open-ended question, fifty-eight percent of the survey respondents credited the technology support with assisting them in reaching their workshop goals. Access to tools and sufficient technology support are basic to the success of technology-enabled faculty development (Gilbert, 1996; Kershaw, 1996; Rogers, 1995).

The workshop addressed the participants' personal and professional technological needs (Topp & Mortensen, 2000). Waits enumerated on the various ways he has employed the tools he learned in the workshop in his teaching, in presenting and publishing his work for his professional colleagues, and in organizing and managing his career and personal life. Trotsky and McCort have used their laptops and their workshop learning in all three areas of faculty responsibility, namely teaching, research, and service.

Learning from Models. Faculty learn from models (Gilbert, 1996). Modeling the use of technology tools and integrating those tools into instruction was an important component of the workshop. Bernstein, Lennon, Renault, Holmes, and McCort all remarked on the
importance of experiencing the various teaching styles of the workshop facilitators, guest presenters, and their colleagues and the wide-range of teaching methodologies that were shared in the workshop week. McCort, who came to the workshop with, in his words, "no teaching approach," said, "As part of the structure of the workshop, I saw ten or twelve different people use ten or twelve different teaching styles. Simply being exposed to them was interesting." For these participants, the workshop helped relieve the isolation that can be a barrier to professional development (Fullan, 1993; Lieberman, 1995; Sarason, 1990). Renault, in particular, commented on the value of watching her workshop cohorts share their projects on the final day of the workshop. Renault would agree with researchers who have identified peer teaching as one of the benefits of technology-centered faculty development (Carothers et al., 1997; Rowe, 1999). Peer teaching or coaching may also be key in educational reform efforts (Gilbert, 1996; Sandholtz, Ringstaff, & Dwyer, 1997).

Waits, on the other hand, did not choose to present his final project as though he were actually teaching the content to students. He insisted, "I'm not here to practice my teaching." (It is noteworthy that while others in his workshop cohort received feedback from their peers, Waits received none.) Still, Waits expressed and stressed the need to see more "out of the box" demonstrations of how technology tools can be integrated into courses (Gilbert, 1996). Said Waits, "Nobody would use technology tools like real time surveys if it took them a week to figure out how to incorporate them into their classrooms."

**Specific Sessions.** One of the specific teaching session mentioned by participants was the session on improving students' writing. After the workshop, Holmes reassessed her
writing assignments, and developed a cooperative, technology-enabled bibliography assignment; she reported that she now assigns fewer but more meaningful writing assignments. Waits gleaned the processes of modeling and peer review from this session, shared these instructional strategies with NATS TAs, effectively diffused these innovations, and improved students' performance on writing assignments. (He also noted that the TAs earned higher ratings on their student evaluations, which may have been due to their improved instructional methods.) Students in this course offering were more actively engaged in constructing their learning than students who had previously participated in this course as taught by Waits. Although Waits described this saying, "I packaged it in a better way," he did much more than that. He changed some of the basic processes students engaged in while learning; these changes were not merely "packaging." Still, only 15% of the online questionnaire respondents completely agreed that they learned ways in which technology tools could be useful in helping students improve their writing skills. This seems to be a component of the workshop that was more effective in prompting non-technological strategies for improving students' writing.

The session on manipulating and using visual images in teaching had a strong impact on several participants. Waits, Holmes, Lennon, McCort, and Bernstein all praised the workshop for what they learned about integrating visual images into their teaching and in Waits' case, into his scholarly work. While teaching in the Integrated Learning Center (ILC), Lennon has accelerated his use of visual images, often accompanied by music, to encourage students to think and write critically. Bernstein, in particular, utilized the learning from this session to adopt the motto: "a picture is worth a thousand words." Although she already knew how to scan images, she increased her expertise in this area
and additionally learned to scan slides and to digitize video clips. Bernstein believed that images enhance students' understanding of key course concepts and combined with the attention to issues of universal accessibility, this learning made a significant impact on her teaching and her students' learning.

Another workshop session that had a strong impact, particularly on Bernstein, Trotsky, and Waits, was the information about universal accessibility. For Bernstein, who teaches visually impaired preservice teachers and teachers who work or will work with visually impaired students, this was a critical learning. Bernstein, who has diffused the technology tools learning from the workshop to her departmental colleagues, has also diffused universal accessibility concepts to her students who will take this learning out into the larger education community. Likewise, Trotsky has diffused this technique into her professional community at a national level. The significance of this diffusion cannot be overstated. More than physical access to electronic information, Waits was deeply influenced by the philosophy behind this technique, and he extended the concept to include students' intellectual access to information. This was a significant leap. An impressive 73% of the online questionnaire respondents report using the principles of universal accessibility in their course materials since participating in the workshop.

**Discussions about Teaching and Technology Tools.** Discussions about teaching and technology tools were another critical component of the workshop. Seventy-six percent of the survey respondents found the workshop's teaching discussions most of the time or always useful; eighty-eight percent felt that way about technology discussions. This may indicate that the technology-centered discussions were more prevalent, less threatening,
or simply perceived as more useful to the participants; the field study observation and initial interview held two weeks after his workshop participation indicated that all three of these were true for this participant. Renault, who expected more critical discussions, valued the conversations that centered on teaching practices and potential solutions to the challenges posed by students' lack of skills or motivation. Although not unique to this research institution, Renault found the dearth of discussions related to best practices in teaching troubling (Middendorf, 1991).

Waits shared one of the most illuminating testimonies to the significance of conversations about teaching and technology tools when he said, "It was the environment that we were put in to [as well]. We were just thinking about [technology tools]; we were thinking about writing html for handicapped people. Who ever thought of that before? I didn't think much about integrating technology tools before [the workshop]. I didn't think about it in a structured way. I only did what I had to do as I thought about it. I didn't realize this was a subject." Spawned in this technology technique discussion, Waits made significant changes in this course materials and content.

Learning Goals. As shown on the beginning and ending workshop surveys, many participants came to the workshop with specific learning goals, many of which centered on the use of specific computer software applications. In her facilitator role, Harrison guided participants with regard to the purpose of the workshop (Rogers, 1969), changing teaching practices, and struggled to guide participants away from a preoccupation with the tools themselves. Using current research and reform efforts, such as Chickering's seven principles or the scholarship of teaching, to frame this direction may have
supported her efforts and may have reduced the tension for some technology-focused participants.

Self-selected projects have been identified as important components of technology-centered faculty development programs (Milligan & Robinson, 2000; Rowe, 1999). During the workshop week, participants had abundant "free" time to work on their projects. Waits, Trotsky, Pilch, and Bernstein commented on the impact and importance of their workshop projects on their teaching and professional activities. Waits presented his project at a professional conference the week following the workshop. Trotsky began developing her project, a Web-based critical thinking assignment, in the first workshop she attended, and continued to refine the assignment in the second workshop. Pilch began to develop his "plan for teaching" that included extensive Web support for his course. Bernstein utilized her project in her department's next student orientation. These participants applied the skills and strategies they learned in the workshop and applied them immediately in their workshop projects. They used the tools to solve a problem or fulfill a need (Cullen, 1999).

**Insights from Sub-Question #3**

Wlodowski (1985) identifies four factors that are involved in motivating adult learners: success, volition, value, and enjoyment. I believe that through the affective features, the organizational features, and the content components described above, the facilitators succeeded in these four areas. Individualized instruction helped ensure participants' success in the workshop. Nearly all of the participants had chosen to attend the workshop, and they had numerous opportunities to choose in the workshop. Value
was added to the experience through the ownership of a laptop computer and the time and support to work on self-selected projects. The low-threat, non-competitive, collaborative environment created an emotional space in which adult learners could find enjoyment while learning something new.

Several of the participants noticed that the affective features, organizational decisions, and/or components of the workshop could serve as models for their own teaching practices. Holmes made a one-to-one correspondence between some of the organizational features, most notably a "tolerance" for accomplishing tasks in different ways and looking at concepts and tools from different perspectives. For Waits, the workshop was a "catalyst" that invited him to reconsider Web-based teaching materials, course lecture content, and teaching methodologies from the students' perspective.

The facilitators of this technology-centered workshop unconsciously introduced and reinforced Chickering's seven principles (Chickering & Gamson, 1991). There is evidence to suggest that Holmes, Pilch, Lennon, Trotsky, McCort, Bernstein, and Waits unconsciously applied these principles as they integrated technology tools into their teaching practices. The fact that the facilitators and many of the participants naturally integrated Chickering's seven principles of good practice in undergraduate education (Chickering & Gamson, 1991) means to me that these principles can easily be promoted through the use of technology tools. I believe that if the facilitators had been aware of these principles and had utilized a metacognitive approach to connecting the principles with the capabilities and applications of technology tools, all the participants in this study could have made direct and perhaps more lasting connections to research and theory behind these instructional strategies and their intersection with technology tools.
Discussion: Sub-Question #4

What meaning do the program facilitators and participants ascribe to this learning experience?

"Learning means using a meaning that we have already made to guide the way we think, act, or feel about what we are currently experiencing. . . . Making meaning is central to what learning is all about" (Mezirow, 1991, p. 11). In a very real sense, as Austin wisely said, "For the participants, I think every one of them has walked away with something different. . . . I think the meaning has been just as varied for the 150 participants as it has been for me." With an acknowledgement of the validity of this point of view, I have grouped individual meanings gleaned from the multiple perspectives into categories. The categories in this section include a sense of community and shared mission, a unique learning opportunity, changes in teaching philosophies and practices, diffusion of teaching and technology-enabled teaching innovations, reward structures, and educational reform. From these categories, I hope to construct an overarching sense of the meaning of this workshop.

A Sense of Community and Shared Mission

The meaning ascribed by the facilitators to this faculty development initiative created a context for this learning experience. For the facilitators, a great deal of the meaning of the workshop comes from their experience as members of a community of learners in the effort to support the mission of the University. Each of the facilitators
described the workshop's meaning in terms of who they themselves are as learners. They are learners who have a strong sense of connection with the University's Learning Technology Partnership mission, namely to promote "the employment of successful teaching models facilitated and strengthened by new learning technologies" (http://www.facpartner.arizona.edu/). The facilitators perceive that many participants in the workshop also found a sense of community with others who were actively exploring new teaching and teaching with technology tools and methodologies. While participating in the workshop, McCort said he had the experience of being part of "something larger," of being part of the University community, and of actively contributing to its teaching mission.

Similar to their own facilitator experience, Austin and Harrison believed that the participants experience the workshop as a community of learners – learners who are actively supported and engaged in the learning process. One of the most dramatic stories told in the facilitator interviews was about an emeritus faculty member who participated in one of the first workshops. (Both Austin and Harrison shared this story independently of one another.) At the end of that workshop week when it was this faculty member's turn to share his project, he wept as he told how this workshop was the first time in his thirty-plus year career that he had received an invitation to grow and learn as a teacher. Harrison paraphrased his remarks in her profile: "This is the first time that anything like this has been done for me as a faculty member at this institution."

The facilitators share the belief that technology tools, used effectively for instructional goals, can make a positive impact on student learning and motivation. They share the belief in the importance of technology tools in 21st-century technology-rich
U. S. society. As such, this workshop means being part of a collaborative effort to improve learning and teaching at this university and to improve the lives of both students and teachers in relationship to sociopolitical realities.

McCort, Holmes, Bernstein, Trotsky, and Lennon felt that the University's investment in this faculty development initiative signaled its value on improved teaching practices. The relationship between the workshop's goals and the University's mission—to improve undergraduate education—was meaningful and affirming (Daigle & Jarmon, 1997). Holmes reported that as a result of her increased use of technology in the classroom, students in her courses are requesting more technology tool integration from their other instructors. Holmes believed that her departmental colleagues would like to learn what she has learned; she claimed that at the time of her interview there would have been twenty applications to the workshop from the School of Nursing alone.

The fact that the workshop no longer exists, however, has necessarily sent a signal that this faculty development initiative no longer meets the perceived needs of the University or that the potential impact of the workshop is not considered equal to the funding commitment required to continue its practice. In an open-ended question, 39% of the respondents to the online questionnaire wanted to tell upper administration that the program should continue. One respondent wrote: "I count the Laptop Workshop as the single most important demonstration of the administration's support for teaching faculty, and the imposed Tier I and Tier II curriculum. Beyond all the rhetoric stating the administration's enthusiasm for undergraduate education, the Laptop Workshop represents the only material demonstration of that support."
A Unique Learning Opportunity

For many faculty participants, the workshop was a unique learning opportunity. As Trotsky said, "It was a great way to learn without losing face." For Trotsky, the facilitators removed the barriers that kept her from experimenting with technology-enabled teaching and learning. For Lennon and Holmes, the workshop meant a reduction in their fears and anxiety that allowed them to open up to the possibilities offered through teaching with technology. Lennon volunteered to teach in the high-tech ILC when it first opened for classes and credited the workshop with giving him the "courage" and the willingness "to try" new instructional uses of technology. For Waits and McCort, the workshop gave them a context in which they could re-experience the learning event from the student's perspective. For Pilch, the workshop helped him make connections for ongoing technology support for his teaching innovations. For Bernstein, the workshop gave her the tools she needed and helped her learn more sophisticated software applications. For Renault, the workshop was a place where she could continue conversations with faculty from all over campus regarding the challenges of teaching undergraduate students. This was indeed a unique learning opportunity for a majority of the participants.

For Waits, who had been teaching at the post-secondary level for fourteen years prior to his participation in the workshop, this was his first and to-date only professional development experience in teaching or in technology tools. Like many post-secondary faculty, he had assumed that he would learn about teaching through his personal teaching experience as had his mentors (Boice, 1992; Weimer, 1992). By example and through personal experience, Waits had learned a transmission model of teaching in which the
teacher controls what, how, when, and if content is to be learned; Knowles (1978) describes this as the pedagogical model. Waits' frame of reference for teaching is from the teacher's perspective. The fact that participation in this workshop shifted his perspective, even temporarily, to include the students' perspectives is notable.

Austin described the satisfaction he receives when a learner achieves the "aha!" experience, particularly when that experience involves teaching and technology tools, two things about which he is passionate. Trotsky might echo Austin's assessment about the power of the workshop to move faculty. She believed that integrating technology tools is "one way to foster or to revitalize a professor's love for teaching and learning."

The online questionnaire clearly shows that the most significant changes resulting from the workshop were in the area of technology tool use. Perhaps this is why this unique faculty development initiative gave Austin many opportunities to experience the "aha!" phenomenon with workshop participants.

Changes in Teaching Philosophies and Practices

From the workshop facilitators' perspectives, one goal of the workshop was to help participants realize that teaching and learning are inseparable (Barr & Tagg, 1995; Saroyan, Amundsen, & Li, 1997). The intended direction of these changes was toward a more student-centered teaching and learning paradigm. Pilch said the failure of university faculty to understand the importance of teaching and learning was "like sitting at the edge of the Grand Canyon and missing it."

For Pilch, McCort, and Waits, teaching and learning, rather than the technology itself, provided the meaning for this workshop. Pilch, who came to the workshop having
previously participated in many faculty development experiences related to teaching, found a place to develop a "plan for teaching" that included online access to course materials, group work, technology-enabled formative assessments, and Web-based assignments. McCort found a place where he could ponder and collect his thoughts about what it means to teach. McCort admitted to coming to the workshop in order to gain a laptop, but recognized that the teaching and teaching with technology strategies were the most significant learnings of his workshop week. He greatly benefited from what he termed "the bait and switch." When reflecting on course materials and content after the workshop week, Waits made a dramatic shift in his perspective about teaching to include the perspectives of students. He began to move from an "instructional" paradigm to a "learning" paradigm for teaching and reported an improvement in student outcomes for the course. At least for these participants, the facilitators were successful in stressing the teaching and learning process over the technology tools themselves (Carothers et al., 1997; Ehrmann, 2000; Gilbert, 2000).

Although his teaching philosophy did not change as a result of the workshop, Lennon believed that the technology tools and teaching methodologies he was exposed to in the workshop, and in subsequent faculty development experiences sponsored through the FCII, enabled him to actualize the unique, individual student-teacher interactions he values. He termed one of these dialogues as "a conversation on the Athenian steps." For Lennon, these dialogues signal spontaneous, critical thinking exchanges between student and teacher that can significantly impact learning. In this way, Lennon believed the ILC can reach one of its main goals, to be a "hub" of learning that creates a sense of community for first-year undergraduate students at this large research institution.
Increased one-on-one student-teacher interaction is one of Chickering's seven principles (Chickering & Gamson, 1991).

Although he changed key behaviors, there is insufficient data to suggest that Waits changed his philosophy of teaching as a result of the workshop. His underlying beliefs about teaching as a process of transmitting information from the teacher to the student may not have been sufficiently challenged by the workshop experience. He did, however, credit the workshop experience with getting him "excited" about teaching with technology. He also reported he is more "comfortable" about using technology tools and has a positive "mindset" about the possibilities of technology-enabled teaching. For someone who reiterated "there is nothing wrong with my teaching," Waits seemed to have a more open attitude about the possibility that he could develop in the area of teaching.

Snitzer noted that the University is marketing itself as a student-centered, technology tools enabled learning environment. She believed that this workshop is one possible way for the University to follow through on its intentions. Clearly, the participants increased their use of technology tools as a result of participation in this workshop. For example, 84% of the online questionnaire respondents reported posting Web pages for use in teaching, 73% to 74% began using online syllabi, PowerPoint, or universal accessibility features — all applications were reportedly used "differently because of the workshop." Snitzer, however, also noted that the University and faculty have a long way to go to actualize these characteristics and philosophies to support a 21st-century learning environment.

Williams, who worked full-time in the FCII, supported many of the workshop alumni who returned to that facility for technology tools troubleshooting. Williams
noticed that although faculty sought his support as a technician they often talked with him about the content of their teaching as much or more than the technology tools they employed. Williams believed that the workshop meant participants continued to think about teaching and learning long after the workshop week. He believed the workshop has had a positive impact on faculty members' outlook on teaching.

Diffusion of Teaching and Technology-Enabled Teaching Innovations

The diffusion of innovations (Rogers, 1995) was a critical aspect of this faculty development initiative. Whether innovators, early adopters, or early majority diffusers, the workshop alumni have the potential to positively influence the larger learning community.

Four participants in this study, in particular, made significant efforts toward diffusion. Waits successfully diffused effective constructivist teaching practices applied to student writing to the TAs who facilitate the discussion sections for his Tier I course. Holmes diffused technology-tool use to nursing students who then took their attitudes toward technology and their use of the tools out into the community as they began their clinical placement work and eventually their employment in health care. Bernstein diffused the integration of technology tools into her departmental colleagues' teaching repertoires. She also diffused the concept of universal accessibility beyond her own classroom by influencing preservice teachers, and particularly preservice teachers who will be working with visually impaired students, who will carry this work into their future classrooms. Trotsky diffused this concept at a national level by using the materials and information she learned in the workshop to influence her professional colleagues about
the use of universal design in their course materials and teaching practices. As Holmes said, "It's like the bubbles when you throw a rock into the river." This workshop has meant a diffusion of innovations for individuals, for departments and colleges, for the campus community, and the larger education community as well.

On the other hand, for Renault, the workshop meant a "over investment and dependence of technology" in teaching innovations. Renault's negative experience of utilizing in a large lecture hall setting the tools she learned in the workshop resulted in increased reservations about "techno-glitz" (Kerr, 1996) and "electrifying the lecture hall" (Clark, http://www.educause.edu/nlli/clark.html). She came to feel that the use of technology in teaching could simply be "aiding and abetting popular culture."

Still, this workshop impacted less than 7% of the possible faculty participants on this campus. If innovators and early adopters, who make up 15 to 18% of the learning community (Rogers, 1995), are critical diffusion groups then this faculty development initiative reached only one third to one half of this important group. With the overwhelmingly high approval rating for this workshop, the vast majority of the workshop alumni may be proactive in assuming the roles of "advocates for innovation" (Rowe, 1999). A larger number of workshop participants may have significantly increased the likelihood of the institutionalization of these innovative teaching with technology practices (Rogers, 1995).

**Reward Structures**

Reward structures, or lack there of, for faculty development have been identified as an institutional support or barrier (Frayer, 1999; Robinson & Borkowski, 2000; Signer,
Hall, & Upton, 2000, Smith, 1997; Willis, 1994). Seventy-nine percent of the online questionnaire respondents reported receiving no rewards, recognition, or compensation for their participation in the workshop. Renault, McCort, and Waits all identified ownership of the laptop computer as their motivation for attending the workshop. Renault, whose scholarly activities include a study of universities in the information age, and her research team found that "faculty follow reward structures just like everybody else." (One could perceive the laptop computer as the reward or compensation for participation; however, since few questionnaire respondents mentioned it as such, one could also speculate that most faculty perceived the laptop as a basic and necessary tool, and not as a reward for attending the workshop.)

Whether or not participants received rewards for their participation was one of the open-ended questions on the questionnaire. Seventy-nine percent responded in the negative to this question or left it blank while eight percent reported that they have received recognition, rewards, or compensation for their participation in the workshop. Respondents had the opportunity to elaborate on their feelings and beliefs about the rewards or the lack of reward associated with the workshop.

Participants mentioned grant and travel awards, a teaching award, funding for technology upgrades, and partial funding by their departments of the workshop as rewards or compensation for the workshop. Some less positive comments indicated that participants did not expect to receive rewards or compensation for their attendance. Some of the negative comments reflected the perception by faculty that departments and the University itself don't value teaching as much as they say they do. This was one of the
dilemmas addressed by University administrator Jackson in our interview. I will share her perspective later in this chapter.

**Educational Reform**

As has been noted many times in the literature and in this research study, integrating technology tools is not a certain nor the only path to educational reform (Ehrmann, 2000; Gilbert, 1996). As this program set out to support reform through technology-enabled faculty development, it does seem important to note the increased used of the tools themselves; whether or not increased tools use signals reform remains a question open for discussion. Nonetheless, 73% of the respondents to the 2001 workshop surveys completely agreed that the workshop strengthened their belief that it is important to integrate technology tools into their teaching. Sixty-five percent completely agreed that technology tools might change the ways in which they teach.

The online questionnaire results seem to indicate that the impact of the workshop was more strongly focused on technology tools than on teaching methodologies per say. Only 31% of the respondents completely agreed that they learned ways in which technology tools can help address students' various learning styles. Forty-three percent had integrated cooperative learning strategies into their coursework, and 39% had facilitated online discussions as a result of their participation in the workshop. Along with student writing, these were the three main teaching or technology-enabled teaching methodologies addressed in the workshop.

Still, the open-ended responses on the online questionnaire indicated that many of the technology tool uses were positively impacting students' learning outcomes – the goal
of educational reform. One participant noted that students were more enthusiastic and motivated to learn the course content since he or she had integrated technology tools. Another elaborated on the role of technology in helping students take charge of their own learning, coming to class prepared, and therefore, allowing class time to be used for "hands-on learning, group work, and discussion." Another credited Web-based components with having "revolutionized the way I view myself as a teacher and expanded the academic dialogue beyond the boundaries of the classroom." Another said, "It is an excellent way to motivate faculty to do good teaching. The training really motivated me to look for innovative ways in presenting course content."

McCort and Trotsky noted that the workshop positively impacted all three areas of their professional responsibility: teaching, research, and service; they were part of the 10% of online questionnaire respondents who noted impacts in all three areas. Forty-one percent of questionnaire respondents noted the workshop's impact on their research and 10%, said it impacted their service role. The greatest impact of the workshop, however, was on its stated goal – teaching. Eighty-four percent of the online questionnaire respondents noted the workshop's impact on their teaching. One respondent to the online questionnaire said, "This program has done more to improve [my teaching] than anything else I have done or been exposed to."

Insights from Sub-Question #4

In his interview, McCort said, "Just the existence of any effort of reform in education, to me, that literally comes as a welcome surprise." His comment highlights one of the challenges in the diffusion of innovations, namely communication. In a large
institutions, such as this university, it is difficult to disseminate information or build consensus around institutional goals, particularly goals that address learning and teaching. The General Education Curriculum Reform effort at this university and the Carnegie Conversations centered on the practice of the "Scholarship of Teaching and Learning" were genuine attempts to practice educational reform and develop a shared mission and practice for learning and teaching.

The meanings ascribed to this faculty development initiative are powerful. A sense of community and shared mission, a unique learning opportunity, changes in teaching philosophies and practices, diffusion of teaching and technology-enabled teaching innovations, reward structures, and educational reform are timely, critical topics in institutions of higher learning. The facilitators and participants in this initiative have acknowledged the significance of the workshop in their personal and professional development.

This instance of faculty development could have contributed even more to the educational reform efforts at this university had it utilized the sense of community and shared mission and the unique learning opportunity to make connections between the changes in teaching philosophies and practices with other reforms underway at this institution. Strengthening the impact of the workshop by promoting strategies such as Chickering's seven principles of undergraduate teaching might have served to revisit and to enhance the Gen Ed curriculum. A look at how integrating technology tools into a course provides a golden opportunity to engage in systematic inquiry about the tools' effectiveness in improving student outcomes is an entée into the practice of the scholarship of teaching and learning. The opportunity to diffuse these reform efforts
along with technology tools and teaching innovations could have made an even more powerful impact on this learning community.

**Other Stakeholders' Perspectives**

There are two stakeholder groups' perspectives on this faculty development initiative that are missing from the research report, those of students and those of administrators. Although the research questions for this study did not address their perspectives, I acknowledge that their input and feedback is valuable to a complete understanding of the workshop. The following is an attempt, however limited, to give voice to students, via the student responses to the workshop shared by faculty, and to administrators, through a summary of an interview with one University faculty development administrator. Although I did not include them in this study, department heads, particularly those who encouraged or sponsored participants, could have provided added and valuable perspectives.

**Students' Perspectives**

The student perspective on the workshop is an obvious weakness of this study. The workshop was designed and for two years it was promoted exclusively to faculty who teach Tier One, Tier Two, and courses focused on issues related to gender, race, class, ethnicity, or non-Western area studies for freshman and sophomore students. (The Tier One and Tier Two courses include traditions and cultures, individuals and societies, natural sciences, arts, and humanities.) The students who participate in these courses rarely take more than just one course with a particular teacher. There was, then, no way
for a student to clearly note a before and after workshop comparison of a particular instructor's teaching methodology or use of technology tools.

Question #3 on the online questionnaire was an attempt to collect anecdotal information regarding the impact of the workshop on students. "Since you participated in the workshop, what comments have you received from students that reflect a change in your teaching practices and/or your integration of technology tools?" These comments could have come from University course evaluations, from an instructor's own course evaluations, email exchanges or other documents, or from verbal comments. Thirty-six of the 56 respondents to the online questionnaire answered this question. The results are in Table 7.6. Combined with comments from Waits and the seven interviewed faculty, this section is an attempt to get a snapshot of the ways technology tools integration is making a difference for students at this university.

According to the respondents to the online questionnaire, the most common change or benefit mentioned by students was access to course materials and updates online. One of Chickering's seven principles is "time of task." Online materials may increase the amount of time students spend engaged in learning. One questionnaire respondent said, "Students in large classes very much appreciate the availability of course notes, assignments, model essays, and exam study guides on the course web pages. They felt these tools increased their ability to learn." Electronic access can improve students' use of their time by making course schedules and assignments available twenty-four hours a day, seven days a week. The multiple demands on students' time often results in challenges to their ability to manage their time. Although online syllabi and Web-based
course materials aren't the total answer to this challenge, they can facilitate student learning.

Online course support was prominently featured in the interviews of two of the primary sources in this study. Waits mentioned the fact that, after hearing positive feedback from students, he decided to keep and enhance the online support for his NATS course. He quoted a special needs who made the following comments about online access to class notes, "You made this the best learning experience of my life since I've gone to school because you took away the need for me to record what I was learning." For this student and others in Waits' class, electronic access to course materials has improved student learning. Pilch, who also has an extensive Web site to support his NATS course, shared with me the careful attention he has given to color-coding course class meetings, concepts, and assignments. He has utilized a technological feature to make the online support for his class especially student-friendly.

Holmes believed that when faculty utilize technology tools in their teaching, students will begin to want to use them as well. In her profile, Holmes gave an account of an obvious use of online tools to achieve active student learning. Students have asked her to establish an electronic listserv that will allow them to collaboratively discuss scientific literature. In this case, students recognized an area in which they needed support for learning, namely understanding scientific research and applying it to practice, and with Holmes' help, students themselves have identified an interactive technology-enabled strategy to meet that need.

According to workshop alumni, PowerPoint or added visuals were the second most frequent change or feature of course materials mentioned by students. Holmes,
Lennon, McCort, and Bernstein all mentioned the positive impact of visuals on their teaching. McCort said this about students' behaviors, "When the PowerPoint slideshow goes up, note taking begins." One respondent to the online questionnaire said, "I have received comments from numerous students regarding the motivating and stimulating aspect of using the laptop and PowerPoint in the classroom. Attendance in these classes has risen dramatically." These anecdotes suggest that adding visual support to learning may increase students' motivation and ability to learn.

Certainly, this is not a definitive picture of the impact of the workshop on student learning. I believe assessing the student perspective is an important endeavor and yet, an extremely challenging one. One option could have been to seek the impressions of students who are trained for the Student Technology Preceptor Program (http://www.fcii.arizona.edu/stp/new/contactus.asp). This is a relatively new program, in which students are trained in interpersonal skills, teaching strategies, and in the use of technology tools. Not all of the faculty members interviewed for this study have had access to the support and services of preceptors; at the time they were interviewed, McCort, Bernstein, Trotsky, and Lennon had utilized technology preceptors. (In Pilch's department, preceptors are "grown" from within the department and serve a slightly different function.) Bernstein has had both a positive and a negative experience with preceptors, and McCort shared a less than effective experience with preceptor. In the case of these two faculty members, the preceptors were given a technological task to accomplish for the faculty member. This is strikingly different from the strategy used in the workshop in which faculty learn to utilize the tools themselves in order to reach their own learning goals.
Even when faculty had used the preceptor program, not all of those preceptors knew of the faculty member's work before and after the workshop. Trotsky utilized technology preceptors in a mini-language lab situation to support Russian language students; these preceptors were utilizing the PC laptop Trotsky received during the first workshop she attended. In his profile, Lennon, who worked in the ILC with technology preceptors in the spring 2002, noted that a technology preceptor told him that his course was one of "the most technologically advanced." This was perceived as positive and welcome feedback for Lennon who went on to say, "I no longer feel I'm at the bottom of the pole here. In the University, I'm discovering I'm probably on the upper end, not just moving up." For Lennon, this comment suggests that the amount of time and effort he has invested in learning to integrate technology tools into his course is being noticed in a positive and affirming way. This comment implies that this preceptor perceives the tools as enhancements to the course. The question remains as to how the students themselves perceive the tool use.

Although students' perspectives and outcomes were not the focus of this study, the anecdotal evidence is positive. Certainly more research needs to be conducted in the areas of student satisfaction and student outcomes. Heuth (1998) found that students expressed a high degree of satisfaction with technology-infused courses and that students exhibited higher order reasoning and thinking skills when utilizing technology tools. From this anecdotal evidence, the high degree of satisfaction may be true for the courses impacted by this workshop. Whether or not workshop alumni have utilized the tools in such a way as to increase students' higher order reasoning and thinking skills is an unanswered question. Accessing and assessing these types of specific student outcomes is a timely
and appropriate topic, particularly for teacher research or for scholarship of teaching inquiries.

**Administrator's Perspective**

Although the research questions for this study did not seek to explore the University administrator perspective on the workshop, I was fortunate that Jackson, Professor of Communication and Vice Provost for Faculty Development and Educational Technology was willing to meet informally with me. I shared an early draft of the quantitative data found in Chapter 7 with Jackson because I was curious about her perspective on this overwhelmingly positive response to the workshop. I gave her a copy of the chapter, and we met one week later to discuss her impressions of the data and to explore a few questions related to faculty development in general.

Jackson was one of the original sponsors of the workshop; although not a designer, facilitator, or participant, Jackson secured the initial financial commitment and later supported the workshop through the faculty development budget. Jackson observed the workshop from a distance and received regular reports on the activities of the workshop. The first funding for the workshop came from a pool of money set aside for General Education; when those funds were depleted the workshop was funded from the University's faculty development budget. In the third year of the workshop, departments sponsored faculty participants by sharing some of the financial cost of the workshop.

According to Jackson, the workshop was not designed to discuss the Gen Ed curriculum, per se, but rather to facilitate discussions about teaching and to help people "generate energy and enthusiasm." The idea was that the commitment to the Gen Ed
curriculum revision would be "from the heart." In Jackson's opinion, the goals behind the workshop were met. Jackson did, however, express what she felt can be one danger of focusing on teaching in a research institution. Said Jackson, "I do worry that sometimes the things we do to heighten interest in teaching either look like encouragement to devalue research or actually in practical fact draw faculty members away from their disciplinary communities into other communities where they can easily become alienated from their field and from their disciplinary colleagues." She expressed the hope that that doesn't happen very often, but she also noted, "Social networks in teaching within disciplines tend to be very weak." She asked an extremely good question: "How can we strengthen the teaching culture within the disciplines?"

Like many colleges and universities, this campus has been through many instructional intervention faculty development designs. Before this workshop, there was a technology-centered program that was based on departmental incentives. Austin was a facilitator of this program; Harrison took part in one of these offerings. There have been symposia and retreats at which faculty have taught each other. Jackson described a series of retreats that were offered when the whole campus was trying to focus attention on the problems of undergraduate education. At these retreats, faculty informally shared lessons and projects; a lot - but not all - of the projects included technology components. There were several one- or two-day events on campus where faculty conducted demonstrations and workshops. For these events, it was the faculty themselves who came and presented. Jackson reported that a number of the people who were prominent in those efforts fell out of the network as faculty development became more institutionalized and routinized.
Now that there are people appointed to positions to do faculty development as full time work, "it hasn't been common to tap the faculty for that kind of service."

The workshop was certainly not the only technology-centered faculty development initiative on this campus. There is an annual "Learning with Technology Showcase" sponsored by the Learning Technologies Partnership (http://www.fcii.arizona.edu/lts/) at which faculty share their innovative teaching activities. Faculty who present at the Showcase receive feedback and accolades from their peers. The University also has grant programs that fund innovative teaching projects and the technology preceptor program that simultaneously advances the skills of students while providing mentoring support for faculty.

In the area of education technology, Jackson noted there are sometimes competing goals in faculty development. More "adventurous, experimental, and engaged teaching" is one of those goals. In that area, according to Jackson, the workshop has been an "unqualified, smashing success." Some of the other goals, from this administrator's point of view, however, were not met. At this university, and others across the country, technology overhead is a recurring problem. Individual units and departments across campus do not have funds to maintain or support the computers and software tools faculty acquired through this workshop. The question is how to increase departments' "buy-in" so that maintenance and support for technology innovation can become part of their budget schemes.

Perhaps Jackson is suggesting that at some point the funding that supports the diffusion of innovations must become de-centralized. Diffusion must extend beyond the use of new tools and methodologies to include philosophical and financial support for
these innovations from units across the campus. This aspect of diffusion is subtle but suggests both broader educational goals and improved business practices.

Jackson's comments also mirrored the tension suggested by the reward structure discussion earlier in this chapter. Said Jackson, "There is an enduring sense of conflict between valuing teaching and valuing research." In a research institution, faculty are rewarded in promotion and tenure for their accomplishments not for their efforts. Certainly, participants in the workshop program put forth significant effort as they learned and adopted new technologies and teaching methodologies. Jackson noted that she does not subscribe to the myth that teaching is not rewarded at this university. "Our big problem is we have no rhetoric of accomplishment in teaching and no way of discriminating between effort and achievement. It's effort that everyone seems to want rewarded, and that's not realistic in a research university."

In conclusion, Jackson said this about the workshop, "The level of faculty satisfaction is very impressive. Even if [faculty] don't change [as a result of their participation], they get benefits from reflecting on teaching." Since the opening of the high-tech classrooms and facilities at the Integrated Learning Center (ILC), faculty development funds have been used for that effort, but said Jackson, "There's no active recruitment [for the workshop] but neither have we abandoned this concept that works and we will do it whenever we have the resources, the interest, and the time. There are a lot of human resources wrapped into one of those workshops; they are costly in that sense."
Conclusion

Naturalistic inquiry "focuses upon the multiple realities that, like layers of an onion, nest within or complement one another. Each layer provides a different perspective on reality, and none can be considered more 'true' than any other" (Guba & Lincoln, 1981, p. 57). The cross-perspectives analysis shows that the responses to this instance of faculty development were not uniform. Fortunately, that was the expectation of the workshop facilitators, who took a constructivist approach to the outcomes of the workshop in their belief that everyone would take from the workshop what they needed and could use. This cross-perspective chapter provides a foundation for the discussion of the overarching question of this research study that follows. How does university faculty development constructed around technology tools integration influence faculty movement toward a student-centered classroom environment?
"Helping adults elaborate, create, and transform their meaning schemes (beliefs, feelings, interpretations, decisions) through reflection on their content, the process by which they learned it, and their premises (social context, history, and consequences) is what andragogy is about" (Mezirow, 1991, p. 201).

"If technology is to enable a revolution to make education more creative, or equitable, or collaborative, or multicultural, everyone . . . will need to share what they know and pull together . . . It takes a coalition to create a revolution" (Ehrmann, 2000, p. 40).

These two quotes give faculty development facilitators and decision-makers both a method and a goal, a plan and a vision, to bring together the understandings about how faculty can best be supported in learning new tools and teaching strategies that will lead post-secondary education toward the promises of student-centered technological innovation. In this study, I accessed the perspectives of the stakeholders in one instance of technology-centered faculty development. From these multiple perspectives, this workshop has been successful in diffusing innovations related to technology-enabled teaching in a large, Research I institution. It has made an impact on student-centered, active learning teaching practices as well.
Overview of the Study

The purpose of this study was to describe the professional development experiences of the participants and facilitators in the Laptop Workshop, a program designed to reform undergraduate teaching and learning, at a Research I institution. A review of the literature confirmed the facilitators' beliefs that several features of this workshop made it unique in the academe.

For the most part, the workshop involved heterogeneous groupings of participants. The workshop brought together faculty from a wide variety of teaching units with the full range of prior technology knowledge and tool use for one week of intensive learning. This feature reinforced the University's goal of building a broad base of support for the General Education curriculum reform effort from which the workshop sprang; this heterogeneity energized cross-disciplinary conversations about the challenges related to undergraduate education. With its low learner-to-facilitator ratio, the workshop was designed to provide maximum support for individualized learning. Participants' varied levels of technological and instructional expertise, coupled with a low-threat learning environment, created a zone of proximal development (Vygotsky, 1978) in which faculty could experience the workshop content at a comfortable pace and stretch their understandings as they learned from one another and from the facilitators and guest speakers. This collaborative environment also supported the effective use of the facilitators' instructional interventions. The workshop was not focused on teaching one particular technology tool but rather on an array of tools from which participants could pick and choose. The student-centered, active learning teaching methodologies modeled
and supported through the workshop materials were also offered as choices, when and/or if they were directly addressed.

The research questions for this study developed from this perspective of the workshop as a unique phenomenon and were refined through a thorough review of the literature. The research questions focused on accessing the perspectives of the facilitators and participants. The questions involved the teaching and technology tool behaviors of these stakeholders in relationship to the components of the workshop that invited participants to reflect, reconsider, and perhaps to change those behaviors. Through the research questions, I also sought to explore beyond behaviors to inquire into the beliefs of the stakeholders with regard to teaching and technology tool use practices and philosophies. Ultimately, I developed the research questions to help me discover the underlying meaning of this workshop for each of the individuals involved in this study.

In the literature review, I focused on four broad areas, namely faculty development practices, technology-centered faculty development initiatives and practices, the diffusion of innovations, and educational reform. I focused the faculty development research on the practices of andragogy, constructivism, and facilitation applied in adult learning contexts. These theories and practices were utilized in faculty development that centered on instructional intervention. In the review of the technology-centered faculty development literature, I searched for studies of initiatives that offered similar features and those that offered vastly different features. In both cases, I reviewed this area of the literature searching for studies that described programs in depth and documented apparently positive results. I examined the literature on the diffusion of innovations theory as it related to teaching innovations and even more particularly to
technological innovations. This provided me with a means to describe some aspects of the impact of the workshop on the campus learning community as well as on the larger educational community. Finally, I reviewed the literature on educational reform in higher education. I closely examined two major movements, namely the seven principles of undergraduate education and the scholarship of teaching. I also searched the technology-centered faculty development studies for evidence of the use of these two movements as philosophical themes applied to instructional intervention. I met with very little success in this area. These four broad areas plus the research centered on using narratives as both a source and method for data collection provided a framework for refining the research questions that guided this study.

I accessed the data collected in this study from many sources. When the pilot beginning survey was administered, I was a participant in the workshop. Full participation gave me the opportunity to experience the workshop as a learner. This experience provided me with knowledge and understanding that supported me as I built trust and conducted interviews with the facilitators and with participants in the workshop. First-hand experience also helped me as I collaborated with Harrison to refine and develop the quantitative instruments utilized to collect data for this study.

I employed a case study design that resulted in a case study report. I utilized a qualitative research paradigm and adopted an interpretative approach as I analyzed the data. All of the interviews were conducted in face-to-face situations and were transcribed verbatim. I utilized a constant comparative methodology for searching the data for patterns and themes. I began to consider various hypotheses for why this workshop was popular and apparently successful. I refined the emergent categories and sub-categories
through a cross-perspectives analysis of the data that included both primary and secondary sources. At this point, I was able to build theory regarding the impact of this faculty development initiative on individual participants and on the campus learning community as a whole.

In my search for understanding, I defined educational reform as how participants integrated technology tools into their teaching practices and how the integration of technology tools impacted their behaviors and beliefs about teaching and learning. I found this workshop made a significant impact on the instructional use of technology tools among the participants. For many, the workshop experience invited them to reconsider their teaching practices and make changes that suggest a more student-centered, active learning teaching methodology. For some of the participants, the workshop was a "catalyst" that helped them actualize previously held teaching philosophies, modified their currently held philosophies, or helped them begin to practice and/or articulate a student-centered, active learning philosophy. For many participants, the workshop results indicated a movement toward significant educational reform.

In the final chapter of this dissertation, I summarize the findings of this study and suggest implications for future iterations of this or other initiatives on this or other college campuses. The first part of this chapter is devoted to reviewing the various perspectives on the workshop as represented by the profiles of the facilitators, the field study participant, and the seven interviewed faculty as well as the surveys and questionnaire data, which reflect a sample of perspectives on this program from the workshop population. Next, I summarize the findings related to the four research sub-questions and provide an interpretation of all of the data collected for this study as it
relates to the overarching research question for this study: How does university faculty development constructed around technology tools integration influence faculty movement toward a student-centered classroom environment?

After this summary, I offer implications that may be useful to the audiences for this study, namely faculty development decision-makers, designers, and facilitators and technology innovation and educational reform change agents. I also discuss the implications of the research methodology applied in this study. After summarizing the implications of this study and proposing suggestions for further research, I conclude the chapter.

Review of the Workshop Stakeholders' Perspectives

Facilitators' Perspectives

From the workshop facilitators' perspectives this faculty development initiative has been an overwhelming success. Of the three, people, place, and process, the facilitators placed the greatest emphasis on people, the workshop participants. I believe this research study confirms their perspectives on their facilitation roles in three main areas, namely learning environment, content, and process. All four of these facilitators perceived that the affective features of this workshop were critical to its success. They believed they were successful in creating a non-threatening, supportive environment. Like Merriam and Caffarella (1991), the facilitators believed that after experiencing this learning environment, a workshop participant could and would choose to shift his or her role from that of content expert and knowledge source to that of co-learner, resource
person, and coach. The facilitators' perceptions were that they modeled these roles in the workshop.

The facilitators believed that hands-on learning with technology tools gives adult learners the license to experiment. They also perceived technology tools as support for meeting the expectations of 21st-century students for a stimulating learning environment. The tools then can be utilized to meet both the needs and desires of students and of faculty. The facilitators believed that the workshop encouraged participants to think about teaching and that it had a positive impact on faculty members' outlook on teaching. As far as the facilitators were concerned, the focus of this faculty development initiative was on teaching strategies to improve undergraduate education, strategies that can be enabled by the thoughtful and innovative use of technology tools. Unconsciously, the facilitators also utilized teaching strategies and technology tools to support Chickering's principles of undergraduate education. The facilitators believed in the theories and practices of andragogy and, although they practiced these principles intuitively during most of the workshops, they had strong beliefs that these practices work well as faculty development practices.

Field Study Participant's Perspective

Waits described the workshop as a "catalyst." As a result of the workshop experience, he reconsidered the Web-based teaching materials, course lecture content, and teaching methodologies used in NATS discussion sections from the students' perspective. The changes that resulted from this reconsideration reflected a more student-centered, active learning, and even constructivist-learning orientation. Although Waits may still believe in a transmission of model of teaching and learning, the changes he
made in his teaching behaviors are deviations from that philosophy.

Throughout the workshop, the facilitators responded to both his personal and professional software needs, and Waits immediately applied his workshop learning to those needs, as he perceived them. Waits clearly exhibited all six of the traits of an adult learner as characterized by Knowles (1978). Waits valued the independence and freedom of choice provided by the facilitators; he made the most of the opportunity to experiment. His prior knowledge of some technology tools allowed him to progress rapidly when learning new tools, and he benefited from the support and interventions of the facilitators. The independent learning project, choice, and a variety of resources helped Waits succeed in the workshop.

Interviewed Faculty Perspectives

The results of the workshop from the perspectives of the seven interviewed faculty were varied, but like the field study participant, all of these faculty responded positively to at least some of the features of the workshop, namely the learning environment, the process, and the content. From their profiles and perspectives, it is clear that the overall impact of the workshop on participants' behaviors and beliefs about teaching, learning, and technology-enabled teaching was significant.

Like Waits, all of these participants responded positively to the affective and organizational features of the workshop environment. They recognized the low-threat, non-competitive tone of the workshop as an aid to their learning. They appreciated the hands-on, active learning methodology, choice, and the individualization of instruction. The interviewed faculty noted that they benefited from the low learner-to-facilitator ratio
and felt that they were supported in learning what they wanted to learn at a pace that was comfortable and successful for them.

For three out of seven of these participants, the ownership of the laptop computer was a significant incentive in enrolling them in the workshop. The workshop appeared to be a "psychologically a brilliant way" to invite faculty into an instructional intervention program. Even Renault, who was specific in her criticism of the workshop and the dangers of technology-enabled instruction, believed the workshop was a good way for many faculty to learn about technology tools.

The interviewed faculty perceived that they learned from observing the facilitators, guest speakers, and each other's teaching styles and methodologies. These models helped relieve the isolation that can be a barrier to educators' professional development. Six out of seven of these participants reported that the teaching components of the workshop were as important or more important to them than learning the technology applications, per se. Faculty noted that the workshop did invite them to question their use of technological tools in terms of meeting learning goals, and some participants chose not to use some of the tools. Although they didn't implement the same tools or strategies in the same ways, the interviewed faculty increased their teaching and technology-enabled teaching repertoires and developed understandings that helped them critically evaluate the usefulness of particular tools and strategies to their individual teaching styles in their specific teaching situations.
Sample of Workshop Population’s Perspectives

The responses to the workshop by the respondents to the workshop surveys and online questionnaire were overwhelmingly positive. Seventy-six percent of the 2001 workshop participants reported that “compared with other professional development experiences,” this was one of the best. Ninety-four percent of the population questionnaire respondents responded affirmatively to the question: "Do you think university faculty development constructed around technology tools is an effective model for helping faculty to reconsider their teaching practices?" Like the field study participant and the interviewed faculty, this sample of the workshop population noted that the effectiveness of the workshop was supported by the individualization of instruction, the small class size and high ratio of facilitators to participants, a non-threatening, collegial learning environment, the self-paced agenda, and the laptop itself coupled with sufficient technology support.

On the ending surveys, 73% of the 2001 workshop participants completely agreed that the workshop strengthened their belief that it is important to integrate technology tools into their teaching; 65% completely agreed that technology tools might change the ways in which they teach. The online population questionnaire showed that the most significant changes resulting from workshop participation were in the area of technology tool use. The workshop made an impact on the diffusion of technology tools innovations at this university.
Review of the Findings of the Four Research Sub-Questions

In this section, I review each of the four sub-questions for this research study. This review includes the perspectives of all of the participants in this study. At the end of this section, I address the overarching research question for this study.

Findings: Question #1

*What are the perceptions of the program facilitators and participants about their behaviors with regard to technology tools integration during and/or after this faculty development experience?*

The overwhelming majority of the data collected in this research study suggested that participation in this workshop was an effective means to learn and practice various technology tools and that this faculty development initiative resulted in an increased integration of those tools into courses taught by the workshop participants. This research question clearly has two time frames in mind, namely during the weeklong program and after the workshop week. I will summarize the during-the-week findings first. The three main themes during the workshop were computer ownership and access to technical support, choice, and performance-based products.

The facilitators' perceptions were that access to technology tools, in this case a laptop computer and software, and technical support were essential for faculty who are learning to use new tools and to think about teaching in different ways. Many participants commented on the value of the laptop computer itself; as many also commented on the level of support for learning the tools during (and after) the workshop week. By the fact
of their presence in the workshop, the participants were exploring the idea that technology tools could make a difference in how and perhaps in what they teach.

The perception of the facilitators was that the technology tools shared in this workshop were presented as choices. Although the facilitators firmly subscribed to beliefs and values related to student-centered uses of technology tools, they appeared to honor and repeatedly expressed the workshop participant's right and responsibility to choose tools that he or she believed appropriate for his or her instructional purposes.

In faculty development initiatives that focus on one tool, such as a course management tool like WebCT, there is an implicit expectation that participants will adopt that tool. By building this workshop on a wide variety of technology tools and giving participants free choice, the workshop succeeded in diffusing many different technology tool applications in many different disciplines. The end-of-the-week sharing of self-selected projects, during which interviewed faculty reported they learned from one another, was a performance-based assessment of the participants' learning, a common assessment tool in constructivist learning (Briner, 1999). Again, this instructional strategy was presented in the context of choice; participants made choices about which tools and strategies were most compatible with their teaching styles and their disciplinary content within their conceptions of the freedoms or the restraints of their teaching situations.

The results from a prefigured question on the online population questionnaire showed that workshop alumni were indeed utilizing more technology applications in their teaching. The top four technology tools changes due to the influence of the workshop were Web pages (84%), online syllabi (74%), PowerPoint (73%), and changes in course materials with universal accessibility in mind (73%). (See Table 7.4.) Forty-eight percent
of respondents to the questionnaire reported that they used email or listservs differently in their teaching since taking part in the workshop; 42% said they were using these tools the same as they did before the workshop. So, at the time of the online questionnaire, a full 90% of the workshop participants were using email or listservs in their teaching. The workshop apparently succeeded in diffusing the use of technology tools.

Findings: Question #2

What are the perceptions of the program facilitators and participants about their beliefs related to technology tools integration and/or teaching philosophies during and/or after this faculty development experience?

Unlike the visible and easily verifiable behavior changes addressed in Question #1, the perceptions about beliefs were much more difficult to access and assess. Beliefs are not always apparent in behaviors. As it was not possible to analyze the survey or questionnaire data for beliefs, the findings for this question were derived from the perspectives of the facilitators, the field study participant, and the seven interviewed faculty. I have made every effort to be as specific as possible in differentiating beliefs from behaviors. This section is organized by facilitators' beliefs related to technology tools integration before, during, and after the workshop, the participants' beliefs after the workshop, and both perspectives in regard to teaching philosophies.

Before, during, and after the workshop, the facilitators expressed strong beliefs in the importance of integrating technology tools into the curriculum. They believed these tools can help faculty address students' preferences and learning styles, improve students' motivation, and meet students' needs for technological literacy, skills and strategies they
will apply in their college careers, in their present and future work environments, and in their personal lives. During the workshop week, Harrison shared examples of how she had integrated various technology tools and teaching strategies into a large lecture hall course. These and other samples shared during the workshop were intended to be descriptive rather than prescriptive. If their subsequent use of technology tools is any indication, then the vast majority of participants in the workshop, if they didn't already, left the workshop believing in the importance of integrating technology tools into their teaching. Along with their beliefs in technology tools integration, the facilitators had strong beliefs in the principles of andragogy, utilized the tenets of constructivist learning, and facilitated a learning to learn environment.

After the workshop, the field study participant and most of the interviewed faculty utilized technology tools in student-centered ways. Although the facilitators modeled these student-centered, active learning strategies, they did not "teach" them, per se. The binder of workshop materials presented to the participants included articles related to technology integration, electronic writing, information literacy, and evaluating Web-based information, and teaching strategies, including Bloom's taxonomy, cooperative learning, learning styles, and multiple intelligences. Readings were assigned as homework; not all of the participants did the homework. (The field study participant did not do homework all week.)

It is especially noteworthy, then, that most of the interviewed faculty utilized the tools in active learning, student-centered ways. The challenge was to discover if these faculty members' underlying teaching philosophies were impacted by the workshop. In the interviews, faculty were asked if the workshop invited them to modify or change their
teaching philosophies in any way. Most of the interviewed faculty data reflected changes or modifications, especially enhancements, to the participants' teaching philosophy. (Thinking in terms of teaching philosophy and articulating it, however, was not automatic or easy for all the participants. At a conscious level, the participants themselves did not realize some of their original beliefs and their post-workshop changes in beliefs that seemed apparent to me.)

In the workshop, Pilch developed a "plan for teaching" that included technology tools. He utilized some of those tools to foster a student-centered active learning environment. For Holmes, the workshop made a "big impact" on her ability to provide technology-facilitated learning. Communication was key to Holmes' philosophy; the workshop tools enhanced her ability to communicate with students and promote communication among her students as well. Trotsky credited this workshop with giving her the ability to use technology in the classroom and with encouraging her creative side. She was also able to utilize technology-enabled teaching methods to actualize her philosophy of discovery learning. She found that she shared the values of the people in the workshop and was exposed to their great ideas for implementing this philosophy in the classroom.

McCort credited the workshop with helping him realize that he is teaching students how to learn or maybe how to teach themselves. Since the workshop, he has wanted to model leadership as an important characteristic of a teacher. Lennon, who didn't modify his teaching philosophy as a result of participating in the workshop, reported he has been able to employ technology tools to be more spontaneous and experimental in his teaching, two characteristics he values. These tools have also helped
him reach students who have less developed aural learning abilities. Bernstein believed that technology tools have helped her actualize an interactive teaching philosophy and provide more hands-on student learning in her courses. Post workshop, she was able to enhance the visual representations of course concepts as well.

After utilizing the tools she learned in the workshop, Renault decided to "de-technologize" her course since use of these tools didn't result in improved student outcomes. Instead, she decided to return to non-technological methods that take less effort on her part. She continued to actively seek solutions to issues related to undergraduate learning and teaching. Although he did not change his transmission model teaching philosophy as a result of participating in the workshop, Waits significantly changed his teaching practices and those of the NATS TAs toward a more student-centered, constructivist approach.

Some of these faculty had begun to move toward more student-centered philosophies of teaching and learning before attending the workshop. Some credited the workshop with helping them develop a philosophy or a "plan for teaching." Others described the tools as vehicles that helped them actualize or enhance their teaching methodologies and creativity. I believe there was potential for transformation in teaching philosophies as a result of this workshop. Some of these changes will only be realized as workshop alumni continue to use and re-invent these and new tools in response to students' needs and to curricular needs. Some of these changes would need more support to reach their full potential as philosophical changes that have the potential to positively impact student achievement.
Findings: Question #3

What are the perceptions of program facilitators and participants about the components of the workshop that invite educators to reflect on their teaching roles and instructional practices?

If one adopted the attitude that all of the facilitators' behaviors and all of the workshop's components were intended to provide teaching models for the participants, then the affective features, the organizational features, and the content components of the workshop all had the potential to invite reflection on the part of the participants. Most of the salient affective and organizational features can be described in terms of andragogy, constructivism, and facilitation of a learning to learn environment. The facilitators' profiles suggested that they had strong perceptions that these were the most influential features of the workshop. These findings have been thoroughly discussed in Chapters 4 and 8 of this research report. The findings I would like to review here are the ones related to the content components of the workshop that seemed to have had the most significant impact on the interviewed faculty, namely the laptop itself, learning from models, three specific sessions, discussions about teaching and technology tools, and learning goals.

At least in the examples of the interviewed faculty, these participants did rethink their teaching roles and instructional practices. Demonstrations of how technology tools can be integrated into courses are key to effective technology-centered faculty development. Interviewed faculty and the field study participant found the contents of three specific sessions particularly critical. The writing session prompted several of these participants to make significant changes in the student writing assignments in their courses. Six out of seven of the interviewed faculty praised the session on manipulating...
images because they believed that adding visuals to course materials was one way to meet students' visual learning styles and/or preferences. Last, but certainly not least, the session on issues of universal accessibility, which put student access to course materials on the table for discussion, had an enormous impact on three of these participants. These three sessions, in particular, were vital components in the workshop; they facilitated participants' reflection on teaching practices and instructional roles.

Formal and informal discussions on teaching and technology tools were a feature of the workshop. One of the goals of the facilitators was to create a community of learners in which these topics could be freely and openly discussed. A larger percentage of the 2001 workshop survey respondents, 88%, reportedly benefited more often from the technology tools discussions than they did from the teaching discussions, 76%. The difference between those two figures could reflect that technology tools discussions were less threatening than teaching methodologies discussions. The fact that these percentages were significantly high may reflect the fact that post-secondary faculty rarely discuss pedagogy. Finally, learning goals played a part in the outcomes of this workshop. Many participants came to this faculty development program with specific teaching and/or technology tools-centered learning goals in mind. They may have found relevance in the discussions that privileged their individual goals.

The perceptions of the facilitators and participants with regard to the workshop components that created opportunities for change could be summarized in the ways participants were motivated to interact with the content. With support from the facilitators, the participants achieved success in the workshop. Participants exercised volition in their decision to attend the workshop and in the choices they made during the
workshop week; the facilitators designed the workshop around choice. Participants experienced the workshop as "value added" to their teaching and technology tools repertoires. The respectful attitudes of the facilitators clearly conveyed this was not a remedial experience. Finally, the low-threat, non-competitive, collaborative learning environment created by the facilitators increased the participants' enjoyment of the workshop week. These four factors, success, volition, value, and enjoyment, motivated these adult learners to participate and to take full advantage of the workshop as a professional development experience (Wlodowski, 1985).

Findings: Question #4

*What meaning do the program facilitators and participants ascribe to this learning environment?*

There were many salient meanings for this workshop as reflected in all the data sets. Meaning is an individual's assignment of significance and impact; many of the workshop's facilitators and participants found multiple meanings in this professional development experience. After I clustered the individual meanings ascribed to the workshop by the facilitators and the participants, definite patterns or themes emerged. These themes are a sense of community and shared mission, a unique learning opportunity, changes in teaching philosophies and practices, diffusion of teaching and technology-enabled teaching innovations, and reward structures.

In a large institution, such as a Research I university, finding a sense of community and shared mission can be a challenge for faculty members. The
workshop facilitators had a strong sense of community and mission. Their emphasis on people helped build the sense of community within the workshop. This sense of community was bolstered by the position of the workshop in this university's educational reform efforts. Faculty with different styles and levels of experience came together from varied disciplines across campus to create a community of learners.

This was indeed a unique experience for the participants. The affective and organizational features and the content of the workshop made this a distinctive learning opportunity. For some of the participants, the workshop was truly unique. For the emeritus faculty, who stated the invitation to attend the workshop was the first time in thirty-plus years this university had asked if he wanted to learn to be a better teacher, and for Waits, for whom this was his one and only professional development experience, the workshop was literally a one-of-a-kind learning event. Perhaps there were other faculty participants who had equally unique experiences in the workshop.

Although many of the workshop participants came to this learning event with technology goals, many expressed a sense of greater meaning or significance in the teaching strategies components of the workshop. For many participants, the facilitators were successful in modeling a student-centered, active learning environment. For participants who experienced, adopted, implemented, and/or reinvented these practices, they have taken diffusion roles in spreading these innovations within the organization. They have assumed the roles of change agents.
In the case of this workshop, a discussion of reward structures can be related to education reform. This workshop provided yet another opportunity to revisit the value of teaching in higher education and in this Research I institution, in particular. There is a connection between faculty making efforts toward exploring and improving teaching practices and the reward structures, created by their peers and supported by administrators, offered within their departments and the university-at-large. The University, in changes to its policies on tenure and promotion that raise the scholarship of teaching on par with scholarship in research and through the Carnegie Conversations, had made an effort to address the role and rewards of teaching at this institution.

Certainly, educational reform is a complicated endeavor requiring, as Ehrmann (2000) states, "a coalition to make a revolution." The positioning of this workshop in concert with multiple student-centered, technology-enabled reform efforts increased its chances for supporting the change process. As represented by the perspectives of the facilitators and participants, this workshop made a significant impact on faculty development, particularly in the area of technology tools integration and diffusion, at this university.

Overarching Research Question

The overarching question for this research study was how does university faculty development constructed around technology tools integration influence faculty movement toward a student-centered classroom environment? I believe the data derived from the various perspectives on this workshop show that many faculty alumni of this program have utilized technology tools to move toward a student-centered model for teaching and
learning. The ways the workshop strived for and often achieved the goal with individual faculty was related to the four areas of literature in which this study was nested, namely an andragogist or constructivist faculty learning environment, the technology-centered context and content, the diffusion of innovations, and connections to educational reform movements.

The first open-ended question on the online questionnaire was "do you think faculty development constructed around technology tools is an effective model for helping faculty to reconsider their teaching practices? If so, why? If not, why not?" Ninety-four percent of the respondents, 50 out of 53 people, answered this question affirmatively. These participants included comments related to teaching practices, the organization of the workshop itself, and on the laptop as an incentive to participate. Respondents' comments about the organization of the workshop and the laptop incentive are thoroughly addressed in Chapters 7 and 8 of this research report.

I believe, however, that in light of the overarching question for this research study, it is especially important to revisit some of the significant questionnaire comments related to changes in teaching practices. One respondent admitted to being a reluctant learner: "I was skeptical. However, an intensive training session made me a believer and allowed me to utilize technology in my teaching." The participant noted the intensive, focused format of the weeklong workshop as a support for learning. The person described him or herself as a "believer," which suggests to me that the beliefs of the workshop facilitators and/or this person's workshop colleagues influenced his or her beliefs. Another respondent said, "The laptop workshops connect faculty with skilled educators who are immersed in technology, create faculty community across disciplinary
boundaries, and give faculty a few days of time out to learn new skills – to learn to think in new ways." Again the focused time, the heterogeneous grouping, and the modeling by skilled educators made a difference for this participant. The fact that technology tools were at the center of this faculty development has been discussed elsewhere in this dissertation.

Six of the seven interviewed faculty responded in the affirmative to this question in our face-to-face interviews. Their teaching beliefs and implementation of the tools and teaching strategies are addressed earlier in this chapter in the answer to research sub-question #2. The fact that, according to the online questionnaire, the majority of the reported changes after this workshop were technology use changes rather than teaching methodology changes may indicate that, for many of the participants, Renault's assessment of the emphasis of the workshop on tools over teaching may be correct. It is important to remember it isn't possible to determine whether or not the online questionnaire respondents utilized these tools in student-centered ways. On the other hand, six of seven of the interviewed faculty and the field study participant did appropriate these tools and teaching strategies in student-centered, active learning ways.

Implications of This Study

I divide this section of this chapter according to the audiences for which the implications may be useful. The first implications I share are centered on the practice of faculty development. I provide these comments for the consideration of faculty development decision-makers, designers, and facilitators. The next section focuses on technology-enabled faculty development. In writing these implications, I focused on their meaning to technology innovators and educational change agents. Next, I share
implications for faculty development research in light of the methodologies I employed in this study. Finally, I share a summary of the implications of this study, which may be of interest to all audiences for this research report.

Implications for Faculty Development

There are three areas of faculty development in which this study makes particularly strong contributions or raises still unanswered questions. One area is the attention given in this study to the beliefs and values of the workshop facilitators. In the absence of concrete and specific discussions of teaching philosophies, the behaviors of these facilitators, activated by their beliefs, served as effective models for student-centered teaching methodologies. Their beliefs were then central to the participants' learning outcomes.

The second area, which is related to the first finding, is a series of questions related to the fact that these particular facilitators lead the participants in few, if any, discussions of teaching philosophies, per se. Why weren't these discussions a larger part of the workshop experience? Why did only one of the seven interviewed faculty mention teaching discussions in his or her interview? Although the facilitators had strong beliefs about learning and teaching, they didn't ascribe to specific theoretical models and therefore didn't articulate explicit teaching philosophies to the participants. Did this have an impact on participants' learning?

The third area of faculty development that this study contributed to is the potential for faculty development initiatives to build learning communities. This was one of strengths of this workshop. The comments made by participants in this study reflect a
basic need of faculty, the need for affiliation, particularly as it relates to teaching, in this case, at a large Research I institution. Learning communities provide safe environments for risk-taking and are essential to implementing and sustaining innovations.

**Facilitators' Beliefs**

Studies that address the beliefs and values of faculty development facilitators are not evident in the literature. If one believes as Robertson (1996) that there is an interplay between a facilitator’s beliefs and the lived experience of learners then it follows that studying these beliefs is important to understanding the dynamics of faculty development activities. Along with their beliefs in technology tools integration, these workshop facilitators had strong beliefs in the principles of andragogy (Knowles, 1978), utilized the tenets of constructivist learning (Briner, 1999), and facilitated a learning to learn environment (Rogers, 1969). Some of these beliefs resulted in conscious decision-making regarding the design and implementation of the workshop; some of these beliefs functioned subconsciously and were expressed in the attitudes of the facilitators toward the participants and the content of the workshop. Together, these beliefs about technology tools and teaching created a learner-centered active learning framework in which workshop participants were exposed to technology tools and teaching strategies.

The workshop facilitators, however, lived and practiced their beliefs during the workshop but they did not teach or preach them. It may be that these facilitators, like Chickering and Gamson (1991), have experienced college faculty as being "notoriously impatient with 'education talk'" (p. 7). Regardless of their reasoning, the practices of
student-centered, active learning philosophies were inferred, modeled, or briefly referred to in the workshop but were not addressed through direct instruction, per se.

One result of this feature of the workshop may be manifested in the fact that some of the participants in this study could not articulate their teaching philosophies. Even if faculty are impatient with "education talk," I believe there is a way to communicate these ideas without turning off participants. Kreber (2001) says that academics who value scholarship may give greater credence to faculty development workshops and seminars based on theory and research; if approached carefully, I believe this might be true. It may be that fear of "education talk" resulted in a missed opportunity to connect the technology tools presented in the workshop with research on their use in post-secondary learning environments (Brown, 1999; Duffrin, Dawes, & Hanson, 1999; Gilbert, 1996; Warschauer, 1999) as well as with educational reform research findings such as the seven principles of undergraduate education (Chickering & Gamson, 1991).

The impact of the workshop facilitators' beliefs and behaviors cannot be overemphasized. Rogers (1969) might describe Austin as a technology innovator, someone who has continuously taken an experimental approach to learning and teaching with technology tools. Rogers, on the other hand, might describe Harrison, as an early adopter who was mentored and influenced by the work of an innovator, Austin. On this campus, Harrison, in particular, has maintained an opinion leader status "as one of us" through continued adaptation of tools and methodologies in the undergraduate classroom.

Both Austin and Harrison were highly motivated to share their beliefs and abilities; a characteristic Rogers ascribes more to early adopters than to innovators. Perhaps there are different kinds of innovators. Certainly one important criterion for
being a successful faculty developer is to possess a strong desire to share knowledge. Harrison's on-going roles in The Teaching Center and in the classroom made her a particularly successful role model for the participants in this workshop. Austin and Harrison's combined effectiveness as change agents resulted in a powerful combination of attitude and expertise. The strength of their own mentor-mentee relationship and their application of mentorship strategies in this faculty development initiative provide a successful model for affecting change with faculty working at all teaching levels, including K-12.

**Teaching-Centered Discussions**

Some researchers and scholars believe that building a community of educators committed to reform based on continuous communication, assessment, and improvement is key to educational reform efforts (Brown & Jackson, 2001; Ehrmann, 2000; Fullan, 1993; Sergiovanni, 1994). Dialogue is one way to build, strengthen, and maintain community. The data in this study seem to indicate there were fewer productive conversations about teaching strategies and challenges than there were useful conversations about technology tools. Reduced attention to these conversations could be symptomatic of a sensitivity to the "impatience" that faculty feel with "education talk." Combined with the myth that faculty do not want or need "formal help" in the form of faculty development (Boice, 1996), these beliefs can create barriers to ensuring enduring outcomes that can be articulated by program participants. Teaching discussions have particular value for Research I faculty, who may rarely discuss pedagogy (Middendorf, 1991). Greater attention to the quantity and quality of these discussions could have
improved the workshop. It is through continuous discussion that faculty arrive at greater understanding of teaching and technology-enabled teaching practices; discussion is also a way to build consensus and value for these practices (Brown & Jackson, 2001).

The question, then, arises as to what types of faculty development offerings can provide opportunities for open, low-risk teaching methodologies discussions. The data in this study indicated that faculty were motivated to learn through technology tools because they perceived them as relevant, believed that students would respond positively to their efforts to integrate these tools, and understood the importance of technology both to students' success and to societal expectations. The data also show that the low-threat, collaborative workshop environment along with choice and sufficient support made this initiative successful for participants. What other topics or tools could be offered in these contexts that would elicit positive responses from faculty to teaching discussions?

Certainly this study showed that the introduction to universal accessibility concepts was a potent technology technique that invited many of these faculty participants to reconsider their teaching practices. Taking the students' point of view is critical for faculty who are considering a shift from the instructional to the learning paradigm (Barr & Tagg, 1995). When faculty developers are aware of the impact of this and similar techniques and tools, they can capitalize on these results and utilize such tools as springboards for deeper and more meaningful discussions about teaching practices.

Many faculty at the university level, and at K-12 as well, have identified plagiarism as a growing challenge for 21st-century teaching and learning. By making plagiarism easier than ever before, electronic databases and the Internet have provided faculty with another topic that could similarly invite evocative teaching discussions.
Students are not universally aware of the rules of copyright nor are they always conscious of the ways the abuse of electronic resources can undermine their learning. Workshops that incorporate the features of the initiative under study could be designed and offered to provide faculty with tools to identify plagiarized work, to strategize ways to discuss this issue with students, to share understandings of the impact of plagiarism on learning, and to reach consensus on the consequences for this form of cheating. Technology tools could be used to help facilitate a plagiarism-centered workshop, and the discussion of students and their learning—rather than faculty and their teaching—would provide a low-risk framework in which to discuss teaching strategies.

Another important skill for faculty development facilitators would be their ability to lead productive discussions. Again, using research-based practice, such as the seven principles of undergraduate education (Chickering & Gamson, 1991), as the foundation for discussion could provide both a focus and a safety net for discussion leaders. Asking questions that connect the topics under consideration with the research on teaching undergraduate students could lend credibility and support for positive, fruitful conversations that could lead to improved practice.

Regardless of the topic, it is critical that faculty development facilitators have access to the successes or failures of instructional intervention initiatives at comparable institutions (Gilbert, 1996). Although field study participant Waits listened to Harrison's ideas and perceptions on her application of teaching strategies such as cooperative learning in a Tier One class, he noted he hadn't yet learned enough, particularly as student-centered teaching applies to large lecture hall situations. Several participants in this study questioned the wisdom or reality of utilizing technology tools and/or particular
teaching strategies in what they perceived as an institutional barrier, large lecture halls. Examining the research findings from the large lecture hall technology-enabled initiative at a comparable research institution such as the one at Stony Brook (Duffrin, Dawes, & Hanson, 1999) could have led to a lively discussion of the application of cooperative group activities and projects and peer and self-assessment in Tier One and Tier Two courses at this university. At Stony Brook, the integration of technology tools was a catalyst for these conversations. The positive experiences of other institutions could have been shared and may have strengthened the outcomes of this workshop.

Like Carothers et al. (1997), I believe that educational reform must focus on increasing professors' knowledge of educational research and learning theories. Making this body of research and these learning theories more evident to the workshop participants may have strengthened the workshop's impact on individual educators and on the larger University community. The connection to other educational reform efforts, such as the scholarship of teaching, could have been made deliberately. Integrating Chickering's seven principles to give form and substance to the idea of a student-centered learning environment may have significantly improved the outcomes of the workshop by helping participants articulate the ways the technology tools they had adopted could support the student-centered goals of the University and the student achievement goals of the Gen Ed curriculum.

This may suggest a barrier at the institutional level, namely the lack of coordination of various reform initiatives (Nnazor, 1998). An institution's culture and its response to the change process are decided factors in the success of institutional change (Cravener, 1998; Mitra, Steffensmeier, Lenzmeier, & Massoni, 1999; Peterson, 1998;
Nnazor, 1998; Signer, Hall, & Upton, 2000). The context of a large Research I institution presents additional challenges for faculty developers. The tension that exists between teaching and research has an undeniable impact on how instructional intervention faculty development initiatives are sponsored, initiated, received, and supported. In the large research university cohort group to which this university belongs, the success of this faculty development workshop may be even more notable than if it is compared with similar programs at smaller, liberal arts institutions.

Learning Community

Risk-taking for faculty is another issue that poses challenges for faculty development facilitators. "No group I can think of puts greater value on expertise, on not making mistakes in public than professors. None other matches their valuing of autonomy, freedom, and self-correction" (Boice, 1996, p. 388). If this is an accurate description, than the very fact of participating in a learning event is a giant leap for many post-secondary faculty. Assuming this is a true statement, then the fact that many of the workshop participants were comfortable enough in the context of this faculty development initiative to reflect upon and/or change some of their basic assumptions about themselves as learners, the role of the teacher or facilitator in guiding learning, and perhaps even the goal of learning itself (Mezirow, 1991) is even more impressive. There is a need, then, for faculty to have a safe community in which to discuss issues related to teaching.

One particularly strong online questionnaire respondent's comment about the learning environment credited the benefits of the affective features of the workshop and
modeling with its impact on him or her. "The collegial, cooperative learning environment we created together during the workshop has served as a model for me for the type of environment I desire to create for my students." The workshop created a safe space and modeled a collaborative environment, which not only supported learning within the workshop week, but also provided a model that could be adapted and adopted by the participants for use in their own classrooms.

This model also suggests another and broader use of learning community concepts and experiences. In her interview, University administrator Jackson asked, "How can we strengthen the teaching culture within the disciplines?" One answer may lie in the application of these learning community concepts within departments across the campus. Creating a context for dialogue related to teaching strategies and breaking down the isolation most educators experience is critical to educational reform efforts (Lieberman, 1995). It is no doubt true that faculty, with the leadership of department heads, can and should be encouraged to construct vital, progressive, and rejuvenating work environments. I do not know the number of workshop participants who were also department heads but professional development activities for these campus leaders can and should provide them with models that improve their ability to foster collegial, collaborative learning communities.

Faculty are not only better able to adopt innovation within supportive environments but these environments are also essential to sustaining innovations as well. Although it wasn't a focus of this study, the Aftercare program that was offered to workshop alumni also contributed to the participants' sense of community as well as their ability to sustain innovation. In the Aftercare sessions that were constructed around
reviewing tools learned in the workshop or adding to participants' tool repertoires, faculty were invited to share their teaching and teaching with technology experiences, questions, and concerns. This program and the technology support services of the Faculty Center for Instructional Innovation provided on-going support to workshop alumni. In this way, the workshop was more than a "one-shot" experience. The workshop facilitators offered post-workshop learning opportunities and provided an on-going forum for this community of learners. Practicing the features of leaning communities at the departmental level could be critical to helping faculty adopt, adapt, and implement innovations. If faculty feel safe and have permission and encouragement to reflect upon their beliefs and behaviors and to change some of those beliefs and behaviors, innovation can and will be nurtured and sustained.

**Implications for Technology-Centered Faculty Development**

In the area of technology-centered faculty development, implications stand out in three areas. Ownership of the laptop itself was, according to the participants in this study, key to their participation and their success. The types of software that participants loaded onto their laptops also made a significant difference in the impact of this program. Choice and the self-selected projects were two features of this workshop that have implications for other technology-centered initiatives. The final area, place, reiterates a theme begun in the faculty development implications described above. Technology-centered faculty development events should take place in environments that are technologically rich and to where faculty can return for technical support to further their learning. As a result, there can be a tension between the technological location and the teaching methodologies
goal of faculty development initiatives such as this workshop. What supports do participants need to keep their focus on the teaching strategies components of the intervention—the workshop's goals—rather than on the technology tools, which were only part of the means to achieve those goals?

Laptop and Software

According to the data, the ownership of the laptop computer itself was a significant component of the workshop (Dusick & Yildirim, 2000; Topp & Mortensen, 2000). Having access to this tool helped faculty as they learned to utilize software applications and strategies and provided a "home" for their work post workshop. On the questionnaire, many participants suggested that without the laptop incentive they would have not considered participating in the workshop at all. The frequent and varied use of this portable tool indicates that access to a computer—loaded with appropriate software—can simulate people's enthusiasm, creativity, and motivation to integrate technology tools into their teaching and perhaps to rethink their teaching practices. The laptop also made hands-on continuous learning possible during and beyond the workshop week.

It should be noted that many of the tools shared in this workshop are what Ehrmann (1995) and others call "Worldware," software that is not discipline-specific, that is widely accessible, can be more easily learned, and can be utilized by students and faculty in their every day as well as professional lives. (Along with email and word processing programs, I consider PowerPoint and Web-authoring tools, such as FrontPage, in this category because they come in office and educational software packages and more
and more students arrive at the university having utilized these tools in their K-12 education.) In the context of a heterogeneous grouping of participants, with varying technology backgrounds from a wide range of disciplinary fields, the use of Worldware is even more critical. It allows for maximum adaptation and reinvention to meet the individual and disciplinary needs of the participants while it supports the diffusion of a wide range of teaching and technology-enabled innovations.

Before leaving the subject of technology tools, I believe it is critical to spotlight the impact the workshop discussion about universal accessibility had on some of the participants. This technology technique that allows students who use screen readers to access computer-based information deeply impacted the work of Bernstein and Trotsky. Their commitment to these practices and the diffusion of this innovation in their classes and in their professional communities was phenomenal. Even less directly but perhaps more extraordinarily, the ethics behind universal accessibility prompted Waits to look at his course materials, including his lectures, from the students' perspective and to make significant changes related to intellectual accessibility as much as physical accessibility. It would behoove technology-centered faculty developers to utilize techniques such as this one to invite faculty to examine their own underlying philosophies and through discussion initiate the types of significant changes in their behaviors and beliefs that are evidenced in the profiles of these three workshop participants.

Choice and the Self-Selected Projects

The facilitators reinforced the freedom to choose in many ways. They initiated discussions centered on the question of whether or not to integrate a particular tool and
talked about tools in relationship to meeting particular learning objectives. The only requirement of the self-selected project was that participants utilize what they learned during the workshop week. Although I suspect that all participants used a technology tool in their final projects, they were free to build a project or lesson around cooperative learning, learning styles, or writing, with or without the use of technology tools.

Participants in this workshop clearly understood and many responded positively to the concept of choice. Waits and Lennon mentioned their needs and requirements for autonomy. In andragogy, this relates to one of the characteristics of adult learners who are self-directed and will take responsibility their own learning. Adults will also "resent and resist situations in which they feel others are imposing their wills on them" (Knowles, Holton, & Swanson, 1998, p. 65). One successful way the facilitators avoided the situation in which a participant might reject ideas presented in the workshop was by not imposing them; all tools and all ideas were presented as choices or as Renault said, "as benefits" rather than remedial necessities.

Harrison exercised her role as facilitator to restate the purpose of the workshop, namely changing teaching practices. The self-selected projects, however, gave participants autonomy in designing, creating, and presenting a product that was significant to their individual teaching situations (Milligan & Robinson, 2000; Rowe, 1999). During the project presentations on the last day of the workshop, facilitators and participants alike had the opportunity to verbally and/or mentally reflect on the workshop content and apply that content to the ways in which they and their workshop colleagues utilized the components of the workshop. These projects acted as performance-based assessments on the participants' learning (Briner, 1999), not only by virtue of what the
participants themselves presented but also as evidenced by comments and understandings generated by experiencing their colleagues' presentations as well. Harrison utilized this component of the workshop to reinforce the connections between the tools and the teaching strategies mentioned during the workshop week. The presentations also helped alleviate teacher isolation, which has been identified as the most powerful impediment to reform (Lieberman, 1995).

Place and the Tension It Creates

The location of the workshop in the FCII, where participants established relationships with technology facilitators, provided the necessary on-going support for the tools learned in the workshop week. The lack of technology support or fragmented support has been cited in the literature as barriers to the successful integration of technology tools into teaching and learning (Carothers et al., 1997; Gilbert, 1996; Rowe, 1999). Many of the interviewed faculty talked about having utilized the resources of the FCII since their workshop experience. They found the FCII staff continued the respectful, professional treatment faculty had experienced during the workshop week.

Technology tools and support for their use are important to getting faculty in the faculty development door. The challenge then becomes how to keep the emphasis on discussions and demonstrations related openly and directly to effective teaching and learning strategies rather than on the tools themselves. Participants in this workshop may have perceived the emphasis on technology tools over teaching methodologies from the way the workshop was advertised, from its location in the FCII, and from the fact that a laptop computer was an incentive for participation. Interestingly enough, since this study
was conducted, the Faculty Center for Instructional Innovation has changed its name. The FCII is now the Learning Technologies Center (LTC). The name change may reflect a shift of emphasis from the "instructional" paradigm to the "learning" paradigm (Barr & Tagg, 1995). Names are significant and communicate a vision or a mission, particularly when they are reinforced through objectives and behaviors.

As the data in this research study shows, it is the people—educators—and the process—the learning paradigm—as much or more than the place or the tools themselves that will make a difference in learning outcomes. For faculty, who may be more willing to explore technology tools because they are new resources rather than teaching methodologies, which they may have never been taught, access to technology-enabled faculty development may be the best answer. Using technology tools for educational reform, however, is indeed a complex activity, but perhaps in its complexity lays the answer to its potential effectiveness.

**Implications for Educational Reform**

This study also contributes to an understanding of the diffusion of innovations as related to educational reform efforts. This study raises questions about identifying the most receptive and critical participants in interventions related to educational reform efforts. What were some of the ramifications of the self-selected characteristic of the participants in this faculty development activity? How would this initiative have been different had the administrators and/or facilitators targeted only opinion leaders for participation? Related to these questions about successful diffusion of innovations, this study reinforces the need for institution-wide coordination of faculty development
initiatives. The initial connection between the workshop and the Gen Ed curriculum reform effort was strong, but the opportunity was missed to link this initiative with the Carnegie Campus Conversations that focused on the scholarship of teaching. Had this link been made both initiatives may have been significantly strengthened.

Criteria for Participation

The participants in this workshop were self-selected. Although some of them attended the workshop at the recommendation of a department head or a colleague, 73% of the 2001 workshop survey respondents completely agreed that attending the workshop was their own idea. Rogers (1995) says that opinion leaders should be the target audience for the diffusion of innovations. He outlines three ways to identify opinion leaders and then notes that these can be very time-consuming processes and may identify people who are opinion leaders in some areas but not in others. Rogers (1971) offers another caution about focusing on opinion leaders for diffusion; they can quickly become innovators and lose their former following. Rogers says it is counterproductive to make opinion leaders too innovative. Once they have deviated too far from organizational norms, people will stop listening to them and stop following them.

Identifying and promoting innovations through opinion leaders is a complex issue. Trotsky and Waits were two participants who attended the workshop based on the recommendations of others. Trotsky's department head recognized her as someone who was ready to enhance her teaching through the use of technology tools and would gain a great deal from participation. I wonder if he could have known that Trotsky's workshop learning would transform her teaching and service as well as her scholarly activities.
Waits was "invited" to attend the workshop by a colleague who felt Waits needed exposure to the teaching methodologies and philosophies modeled in the workshop. I wonder if this colleague could have predicted that Waits' diffusion of his workshop learning to NATS TAs was probably more significant than the less obvious changes Waits made directly to his own teaching.

Other interviewed faculty, who may not have been identified as opinion leaders, made significant efforts to diffuse the innovations presented in the workshop. Bernstein, who is an adjunct in her department, and Holmes, who identified herself as an "incompetent" technology user and "afraid of failure" before the workshop experience, would have not been likely candidates for the workshop if factors other than self-selection had been the criteria.

The self-selection of these workshop participants relates to several principles of andragogy, namely motivation, taking responsibility, and problem solving. Adult learners tend to be internally motivated by self-improvement and personal development (Knowles, 1978). Adults take responsibility for their own learning and have a problem-solving orientation. Self-selection seems to support all three of these characteristics. While faculty development administrators struggling with finite resources are pressured to ensure that every dollar is well spent, finding and focusing on opinion leaders may be counterproductive to the diffusion of innovations associated with their educational reform goals. In the case of this faculty development initiative, self-selection was an effective way to populate the workshops.
Coordination of Educational Reform Initiatives

"Collaborative cultures facilitate commitment to change and improvement" (Fullan & Hargreaves, 1991, p. 49). Creating a collaborative culture focused on teaching innovations is a challenging proposition in a large Research I institution. In an environment in which research has historically been valued above teaching, turning the focus of campus dialogues to ways to ease this tension and to look for links between these two areas of scholarship is critical. Ehrmann's (2000) suggestion that it takes a "coalition to create a revolution" (p. 40) was partially applied, in this case, through linking the workshop to the Gen Ed curriculum reform effort. The workshop could have been strengthened and could have contributed to another campus reform effort had it also been linked to the concept of the scholarship of teaching.

The kinds of teaching methodology changes workshop participants have made as a result of participating in this faculty development experience can lead to scholarly inquiries into the efficacy of these changes. The scholarship of teaching is "inquiry by educators that informs individual teaching while enriching the wisdom of the community" (Ehrmann, 2000, p. 48). Although a number of workshop alumni, including Trotsky, made this connection and were conducting research in areas spawned by applying workshop content to their teaching, this connection and opportunity were not made explicit by the facilitators to the participants.

One of the under-represented perspectives in this study, that of students, can best be addressed through teacher research or scholarship of teaching activities of workshop alumni. It could be powerful for workshop participants to apply in their teaching the tools and strategies they learned in the workshop, study the impact on student learning, and
share their findings with their disciplinary colleagues. Student perspectives could be accessed through these focused inquiries. These research activities would illuminate the impact of the workshop on student outcomes and contribute to pedagogical content knowledge. University administrator Jackson asked the question of how to develop teaching cultures within departments. Scholarship of teaching activities may be one way to help create scholarly communities within disciplines and, in the process, give students voice in issues related to educational change.

Implications of the Research Methodology Utilized in this Study

There are two aspects of the research methodology utilized in this study that have implications for future studies of faculty development initiatives. One is the need for longitudinal qualitative studies that go beyond simple satisfaction or dissatisfaction with the learning event. Studies must be initiated before, during, and after an intervention but must also be conducted longitudinally in order to give participants time to reflect, experiment, modify, and/or reinvent the innovations to which they were exposed in a faculty development activity. A qualitative research paradigm provides a framework for integrating data collected with multiple methods and from multiple perspectives in order to arrive at more significant findings; a case study conducted over a period of months or years provides an appropriate time frame in which to assess the actual impact of an instructional intervention initiative.

The other implication of the narrative methodology utilized in this study relates to the validity of this research and the resulting influence it had on the participants. The stories shared by the facilitators, field study participant, and the interviewed faculty
provided rich details without which the depth of the impact of the workshop and its meaning on each participant could not have been ascertained. One of the consequences of this deeper involvement of the participants in the research process and product was that participants had access to the data they contributed, which provided them an opportunity for further reflection. The fact that a researcher listened to them, recorded, transcribed, analyzed, and shared with them written documentation of their experiences prompted some participants to continue to reflect on the meaning of the workshop far beyond the workshop week and provided support for their consideration of further changes in their teaching practices.

Longitudinal Qualitative Studies

Increasing expertise in teaching requires risk-taking, practice, feedback, reflection, and time (McAlpine & Weston, 1999). The beginning and ending workshop surveys were effective in measuring the workshop participants' immediate responses to their workshop experiences. These instruments, however, could not measure the impact of the workshop on actual teaching behaviors much less the changes in the participants' underlying beliefs about teaching and the integration of technology tools. Although many of the participants in the online questionnaire had sufficient time to practice and modify their teaching behaviors before filling out this instrument, others did not.

More far-reaching than the surveys, the questionnaire provided data about the participants' use of particular tools and strategies. The open-ended question responses appeared to be more fruitful in collecting data beyond behavior changes in order to access changes in teaching beliefs. Many of the respondents gave descriptions compatible with
Chickering's seven principles (Chickering & Gamson, 1991) when they described their uses of technology tools in the classroom. Had they been taught these principles and their applications to technology tools integration, questions on this instrument could have been constructed to ask questions specific to the intersection of tools and principles.

As that was not the case, it was impossible to make definitive statements about the student-centered uses of these technology tools from most of the self-report data from the online questionnaire. Although many of the participants' comments were useful and illuminating in building a case for the success of the workshop in terms of diffusing teaching with technology and teaching innovations, without further probing the responses to these questions would have been insufficient evidence.

The quantitative data from the survey and questionnaire instruments were not as strong in the area of changes related to specific teaching methodologies. This finding seems to confirm Ehrmann's (2000) assertion regarding the difficulty of using instructional technology to achieve educational change. It also suggests the potential need for applying qualitative methods to the study of faculty development. Observational and interview data can be utilized to explore beneath more superficial behavior changes to discover significant changes in teaching and technology-enabled teaching beliefs.

The observational data collected during the field study was critical in creating a context for understanding the impact of the workshop as expressed by Waits in the one-year-later interview. After the workshop and before he taught NATS again, Waits reflected on two components of the workshop, universal accessibility and peer review in writing, and made significant changes to course materials, content, and mentored TAs in constructivist teaching practices. Waits began to develop an integrated paradigm of
teaching and learning, which researchers say is critical to achieving post-secondary educational reform (Saroyan, Amundsen, & Li, 1997). Waits' workshop experience, in particular, shows the importance of reflection and time.

The face-to-face interviews conducted during this study yielded the most significant data. In the semi-structured interview process, I encouraged each participant in this study to elaborate on his or her response to a question or a comment and to "tell" his or her story, to share his or her lived-through experience. Through the dialogic process, I was able to probe more deeply into the significance and meaning of the workshop for the participants and for the facilitators. Each one of them, and even most especially the disconfirming voice of Renault, made connections between their workshop experiences and the resulting behavior and/or belief changes that helped construct evidence that the student-centered, active learning teaching goals of the workshop were met or if they weren't met, why not. Quantitative instruments are necessary but insufficient tools if one is to study the complexity of learning. To delve beyond assessments related to simple satisfaction, longitudinal, qualitative studies are needed in order to understand the phenomena of instructional interventions in faculty development.

Narrative as a Research Methodology

The use of the participants' profiles and vignettes as units of study was one way I sought to understand the meanings ascribed to this incidence of faculty development. It seemed to me that once I had interviewed the facilitators and the participants and had transcribed their interviews verbatim, there was a need to preserve the integrity of their perspectives in this research study by allowing them to speak for themselves in the first
person. My goal was to privilege the participants' narratives thereby allowing me to actualize my belief that research is a "coordinated process of socially constructed meaning" (Carter & Presnell, 1994, p. 1). The study participants told me the stories of their workshop experiences from their own perspectives, I constructed the profiles from their words, and through the process of member checking, together we agreed on the content of those profiles and the metaphors that framed them.

The ethics involved in conducting, interpreting, and reporting qualitative data are not simple matters. Personal ethics form the basis for professional ethics. With a subjective worldview that includes the commandments to "do no harm" and to "aim to benefit" (Rossman & Rallis, 1998), I have continually examined my motives for this study and the methods I employed. I believe the participants' profiles and vignettes and the collaborative process through which these products were created added trustworthiness and authenticity to this research report. I also believe the validity and significance of this study were enhanced through this methodology.

Researchers have made a case for the consideration of relevance as a component of validity in qualitative studies (Creswell & Miller, 2000). Relevance is related to the question of whether or not the study is worth conducting, who will benefit from it, and whether it fills a gap and contributes to body of knowledge. This study was worth conducting because it addressed the timely need for faculty development intervention related to student-centered teaching and the integration of technology tools into the learning environment. The workshop facilitators and University administrators benefited from the data collected and analyzed in this study. They can utilize this information to help guide research-based, data-driven decisions about future faculty development
initiatives at this institution. In addition to having a researcher listen with focused interest to their workshop experiences, the participants in this study received the added benefit of receiving the transcripts from their interviews and the resulting profiles. These written documents provided them with another opportunity to revisit and reflect upon their workshop experiences. Continuous reflection is one behavior of effective teachers (McAlpine & Weston, 1999). In addition to their workshop experiences and the meaning of these experiences, the participants' profiles contained statements related to their intentions to continue the learning begun in the workshop and/or to implement particular tools or methodologies in their teaching. In this way, participants benefited from a combination of reflection and new understandings and ideas that were documented in their transcripts and profiles; they reaped on-going positive effects from being the subject of this study. The interview process and products with the focus on sharing stories in the form of written documents may have extended the impact of the workshop on a number of the participants' learning outcomes.

For me, the narrative nature of this research addressed a gap in all four areas of the literature in which the study was nested. In studies related to post-secondary faculty development and technology-centered faculty development in particular, the actual voices of facilitators and participants are not easily accessible. I believe this study additionally benefited the participants in this way, by giving them voice, and contributed their invaluable perspectives to these two areas of scholarly research as well as to the literature related to the processes of diffusion and educational reform, particularly at the post-secondary level.
Sharing these profiles and vignettes was one "way to find and display coherence in the constitutive events of a participant's experience, to share the coherence the participant has expressed, and to link the individual's experience to the social and organizational context within which he or she operates" (Seidman, 1998, p. 103.) The connections I made to the literature and the interpretations of the data went beyond the stories but could not have occurred had they not been grounded in the stories themselves.

In this research report, I offer these educators' stories as a way to advance knowledge in the fields of readers who are concerned with faculty development, technology innovation, and educational reform. These stories allow the readers of this dissertation research to be closer to this instance of faculty development. I hope to suggest that narratives, that story and metaphor, can be utilized to inform research and to educate people, especially for the teaching profession (Carter, 1993). Applying this methodology to the study of post-secondary faculty development may be a powerful way to access the complexity of instructional interventions.

Implications Summary: A Convergence of People, Place and Process

In summary, this faculty development workshop was successful due to a convergence of people, place and process. The workshop facilitators, who kept their focus on the people involved, created a learning environment that was conducive to faculty risk-taking; the affective features of the workshop were the foundation of the program. The location of the workshop sessions in the FCII, the gift of a laptop computer, and the assurance of on-going technological support formed the "place" of the workshop. Additionally, the placement of the workshop within a larger educational
reform effort and its timing on the continuum of infusions of technology innovations into teaching, learning, and society helped ensure its success. Finally, the organizational features of the workshop and its content provided an effective process through which faculty were invited to reconsider their teaching practices.

The workshop facilitators made conscious decisions that resulted in a non-threatening, non-competitive learning environment. Their intuitive understanding of the principles of andragogy and constructivist learning supported them in their roles as coaches and guides. These learner-centered values and respectful attitudes helped the facilitators create a collaborative, learning to learn context for the participants. With their emphasis on "people," rather than on tools or content, the facilitators excelled in establishing affective features to support adult learners.

The location of the workshop in the FCII sent a clear message from the University to the participants that technology-enabled instruction is an institutional value. By providing participants with the necessary tools, the laptop computer and appropriate software, and models for student-centered teaching methodologies, the University made its mission visible to faculty. The workshop participants during the first two years of the program were also aware of the connection between the workshop and the Gen Ed curriculum reform effort at this institution. Not only did participants have a global sense of the place of the workshop in the life of the University, but they also had the local reassurance of on-going support through the Aftercare program and the FCII. The "place" of the workshop, then, supported faculty in their efforts toward rethinking their instructional practices.
The "process" of the workshop included both organizational features and learning content. The intense weeklong workshops were conducted during semester breaks during which participants could focus their complete attention on learning. The participants were self-selected and placed in interdisciplinary, heterogeneous groupings. People with little technology experience worked alongside people with a great deal of prior knowledge. The low participant-to-facilitator ratio provided opportunities for the individualization of instruction and supported a mentoring relationship between participants and facilitators. The learning was self-paced, active, and hands-on. The most successful teaching sessions were centered on learning the principles of universal accessibility, manipulating images, and investigating the writing process. Participants were free to choose from a wide variety of technology tools and teaching methodologies, and their final workshop projects were self-selected based on their perceived needs.

Like Smith (1989), I believe that all knowledge is local, and that it is framed by the context in which it is located. Still, faculty development decision-makers, designers, facilitators, technology innovators, and educational change agents can learn from the implications of this particular case. Likewise, researchers who study post-secondary faculty development may benefit from learning about the methodology utilized in this study. Through sharing our findings and methods, we can strive for continuous improvement in teaching and learning. We can also become clearer about where future investigations are needed.

Suggestions for Further Research

This study suggests that there are at least three areas for which further research in faculty development could be particularly important. The need to thoroughly explore
students' and administrators' perspectives on the results of instructional intervention initiatives is clear. Developing research questions with these perspectives in mind would yield different findings with regard to the outcomes of this faculty development initiative. There is also a need to study instructional intervention over time. Before investigating the impact of these initiatives, researchers must allow faculty sufficient time to implement their learning. Finally, this study suggests that relevant workshop topics and low-risk teaching strategies should be discovered and studied that invite faculty to explore educational theory and research.

In the literature, there is a dearth of authentic student perspectives on the impact faculty development on students' learning experiences and their learning outcomes. Although I do believe this particular case made accessing those perspectives extremely difficult, I acknowledge and take responsibility for this limitation of this study. I did not have the means to identify students and/or technology preceptors who could speak to a particular workshop alumni's evolution as a teacher who integrates technology-tools for student-centered outcomes. In other faculty learning situations, students' perspectives may be more readily accessible.

The other under-represented voice in this study is that of the administration. I was fortunate to have had a glimpse into an administrator's perspective through an interview with Jackson, but I acknowledge that her responses to the workshop data were an addendum to this study and not an integral part of it. The administrator perspective is critical, but my research questions and goals were directed toward accessing the perspectives of the workshop facilitators and participants.
My perception is that these two groups, students and administrators, are not well represented in the literature, particularly in the meaningful way that can be achieved through the application of a qualitative research paradigm. Considering they are affected by the results of instructional interventions, their voices should be heard. Studies could be designed that engage students and administrators, particularly department heads, in ascertaining the direct impact of faculty development on student learning in specific courses and on non-participating colleagues within teaching units.

Designs for future research should also take into account the importance of the duration of a faculty development study. Increasing expertise in teaching requires risk-taking, practice, feedback, reflection, and time (McAlpine & Weston, 1999). In this case, the field study participant's perspective on the workshop highlighted all of these key components for promoting change through incidents of faculty development. The revisions and additions Waits eventually made to his course as a direct result of his participation in the workshop were not clearly evident in the interview conducted two weeks after the workshop. In the cases of each of the interviewed faculty, they had had more or less time to reflect upon their workshop learning, to make modifications or revisions to their courses, and to ascertain the results on student outcomes. In fact, many of the participants in this study will continue to make changes to the teaching practices that were initiated in the workshop week. Researchers must be sensitive to the fact that learning and change take time.

Discovering particular technology tools or techniques, such as universal accessibility, and specific 21st-century teaching topics, such as plagiarism, that can spawn in-depth, low-threat teaching methodologies discussions is another area in which faculty
development can benefit from focused research studies. Universities confronted with tightening budgets for faculty development activities need to be able to identify topics of relevance to faculty that will lead them to reflect upon the content of what they teach and how they teach it. Applying the successful features of this workshop to other initiatives, particularly to less-expensive, non-technology centered activities, may additionally illuminate the barriers and supports for increasing faculty members' pedagogical and pedagogical content knowledge.

Finally, the inclusion and explicit integration of educational theory and research into faculty development initiatives is another topic for further research. With an assumption that faculty are impatient with "education talk" (Chickering & Gamson, 1991), what are some of the ways faculty development facilitators can integrate research findings and best practices into programs as a way as to inspire and educate rather than turn off faculty participants? Considering the limited attention placed on pedagogical and pedagogical content knowledge in graduate programs and the assumption that faculty will learn to teach through trial and error, it would seem these are critical learnings for university-level teachers. It would also be logical that academics would respond to the inclusion of scholarly research in faculty development initiatives as Kreber (2001) suggests. This seems to contradict a myth that many faculty developers believe, namely that faculty do not perceive a need for improvement nor do they want help (Boice, 1996). Studying the factors involved in the success or limitations of efforts to infuse research, theory, and best practices into instructional interventions would be illuminating and would serve to increase the potential impact of faculty development facilitators and programs on improved learning and teaching.
Conclusion: People, Place, and Process

No single study can provide all the answers to the complexity of post-secondary instructional intervention and educational reform, but it can point the way for the design of effective projects in the future and can provide a starting point for the replication of similar research studies. This case study contributes to the research on university faculty development as it converges with technology tools applied to teaching. This study may influence the decisions of other colleges and universities, particularly Research I institutions, with regard to professional development for faculty. The ultimate goal of this study is to contribute to the critical understandings that will allow students, educators, and institutions to utilize electronic learning environments to transform teaching and learning in order to meet the educational needs of the 21st century.

"Like other institutions, colleges and universities reflect social conditions and trends of their times" (Menges, 1988, p. 370). Institutions of higher learning, particularly research universities, are stable organizations. This is both "a blessing and a curse." The stability of the university is key to its ability to act as a repository of culture and as a vehicle to transmit knowledge. At the same time, the conservatism that characterizes stability makes the university resistant to change (Kerr, 1982, as cited in Menges, 1988). Certainly at the beginning of the 21st century, the constantly changing characteristics of students and faculty and the constantly changing sociopolitical environment in a world defined by change, particularly technological change, will continue to challenge the status quo of these stable organizations.
In this way, educational reform efforts such as this faculty development initiative are positioned between these opposing forces – stability and change. This tension is reflected in faculty reliance on familiar teaching methodologies and tools and faculty willingness to take risks and practice innovations. It is manifested in concerns about the relative value of research and teaching. It is revealed in shifting budgetary priorities that promote a narrowing or broadening of the diffusion of innovations.

Within the academy, this university’s workshop may be unique. Certainly, the people involved in this workshop were unique learners. Many of the features of the learning process in which these facilitators and faculty engaged were also unique in the literature. Among the faculty development activities on this campus, at the time of this study, the workshop was the only or one of very few that could be considered instructional intervention; the other activities were geared toward people who were already accomplished innovators, or who had planned to integrate or experiment with teaching or technology innovations in advance of receiving support.

The multiple perspectives on this faculty development initiative shared in this dissertation are not intended to create one unified response or answer to the challenges of using technology-tools to support teaching and learning innovations. "An aggregate pool of information does not lead to one inevitable conclusion or decision. Instead it leads to understanding and perhaps to more enlightened decisions. The decisions are also likely to be more credible since the parties in the activity being studied will have participated in the process of determining its future" (Menges, 1988, p. 370). By giving voice to the facilitators and participants in this workshop experience, I hope that faculty development decision-makers, designers, and facilitators will learn from these unique experiences, as I
have, and find the study participants' responses to this program useful as they design, develop, implement, and evaluate future faculty development initiatives at this and other institutions.
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APPENDIX D
ENDING WORKSHOP SURVEY INSTRUMENT

APPENDIX E
ONLINE POPULATION QUESTIONNAIRE
APPENDIX A

INTERVIEW PROTOCOL: WORKSHOP DEVELOPERS/FACILITATORS
INTERVIEW PROTOCOL: WORKSHOP DEVELOPERS/FACILITATORS

Although the interviews with the facilitators were unstructured, I did have the following questions in my mind as we talked.

**Focused Life History**
- What was your first technology memory?
- Reconstruct early technology/learning experiences.
- Describe your experience with facilitation/teaching.
- How do you come to be involved in the Workshop Program?
- What values/beliefs form the foundation for your work?
- Tell about any watershed moments and/or stories related to your experiences with teaching and technology.

**Experience in the Workshop**
- What prepared you to facilitate the workshop?
- How many workshops have you facilitated? When was the first?
- Reconstruct your workshop experiences.
- Describe your experience of working with the other facilitators and with the participants.
- Are there stories related to your workshop experiences?
- What stories do you have about your work with individuals after the workshop(s)?

**Meaning of Involvement**
- What has it meant to you, both intellectually and emotionally, to be involved in the Workshop Program?
- What do you think it's meant to the faculty participants?
- What do you think it's meant to their students?
- What do you think it's meant to the University?
APPENDIX B

INTERVIEW PROTOCOL: WORKSHOP PARTICIPANTS
INTERVIEW PROTOCOL: WORKSHOP PARTICIPANTS

Although I will have the following questions in mind, I will follow the interests of the participant during the interview(s). (The * questions are the open-ended questions from the online questionnaire.)

1. How would you describe yourself as a technology user before the Workshop? Since the Workshop?

2. Do you have any documents to share, Web pages, PowerPoint presentations, lesson plans, or exams, which would illuminate the impact of the Workshop on your use of technology or your teaching methods?

3. Since the Laptop Workshop, have you had other professional development workshops or have they been other influences that have affected your integration of technology tools into your classroom teaching?

4. Describe your philosophy of teaching. How did you learn to teach? Did the Laptop Workshop invite you to reflect on your teaching philosophy? Did it encourage you to modify or change your philosophy in any way?

5. *Describe the most important ways the Laptop Workshop has changed the way in which you teach or the content of your teaching.

6. *Since you participated in the Workshop, what comments have you received from students that reflect a change in your teaching practices and/or your integration of technology tools into your course(s)? These comments could be from UA course evaluations, from your own course evaluation tools or instruments, email exchanges, other documents, and/or verbal comments.

7. Have you received any reward, recognition, or compensation from your department or college as a result of your participation in the Laptop Workshop?

8. *Do you think university faculty development constructed around technology tools is an effective model for helping faculty to reconsider their teaching practices? If so, why? If not, why not?

9. *Now that you have had your laptop for some time, what would you tell the upper administration at the University with regard to the impact of this tool and the Workshop on your professional work in the areas of teaching, research, and service?

10. Is there anything else you would like to tell me regarding your participation in the Laptop Workshop or the Aftercare Program?
APPENDIX C

BEGINNING WORKSHOP SURVEY INSTRUMENT
Laptop Program: Pre-Workshop Survey

We are conducting a survey of your experience in the Laptop Program. The pre-workshop survey is designed to gather data about your motivation for participation, your previous technology experience and teaching practices, and your beliefs about technology tools integration. The pre-workshop survey will take approximately fifteen minutes. Your responses will help to evaluate and improve the effectiveness of the program.

Workshop Dates: _______________________

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<thead>
<tr>
<th></th>
<th>Completely disagree</th>
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<tbody>
<tr>
<td>1. My department chair influenced my participation in this workshop.</td>
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<td>2. One or more colleagues in my department, who have participated in this course, have influenced my participation in this workshop.</td>
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<td>3. Students’ needs, desires, and/or demands influenced my participation in this workshop.</td>
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<td>4. Attending this workshop was my own idea.</td>
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<td>5. The &quot;carrot&quot; (the laptop computer) is the prime motivator in enrolling me in this workshop.</td>
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<td>6. I am confident I will utilize what I learn in this workshop in my teaching.</td>
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<td>7. I am confident I will utilize what I learn in this workshop in my research.</td>
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<td>8. I am a confident computer technology user.</td>
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<td>9.</td>
<td>In the past, I have integrated computer technology tools in the course(s) I have taught.</td>
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<td>10.</td>
<td>I utilize email in my teaching.</td>
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<td>11.</td>
<td>I utilize listservs in my teaching.</td>
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<td>12.</td>
<td>I utilize an online syllabus in my teaching.</td>
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<td>13.</td>
<td>I have created and used PowerPoint presentations to support my teaching.</td>
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<td>15.</td>
<td>I have scanned images and/or documents to include in online learning resources for students.</td>
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<td>16.</td>
<td>I have facilitated online discussions for students in the course(s) I teach.</td>
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<td>17.</td>
<td>I have used POLIS, CAUCUS, WebCT, and/or the OldPueblo MOO in my teaching.</td>
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<td>18.</td>
<td>I have posted students' grades online.</td>
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<td>19.</td>
<td>To satisfy course requirements, students in the course(s) I teach utilize the Web for research.</td>
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<td>20.</td>
<td>Students in the courses I teach have had opportunities to build Web pages as part of course assignments.</td>
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<td>21.</td>
<td>I employ cooperative learning strategies in my course(s).</td>
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<td>22.</td>
<td>I facilitate small group discussions in my course(s).</td>
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<td>23. Technology tools can help address students' various learning styles.</td>
<td>Completely disagree</td>
<td>Mostly disagree</td>
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<td>24. I believe technology tools are useful in helping students improve their writing.</td>
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<td>25. I believe it is important to integrate technology tools into my teaching.</td>
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<td>26. I believe that universal accessibility issues are critical and teach with them in mind.</td>
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<td>27. I believe using technology tools may change the ways in which I teach.</td>
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<td>28. I believe using technology tools may change what (content) I teach.</td>
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To put your answers in context, we'd like to gather some personal information from you. All your answers will be held in the strictest confidence.

Department: ____________________________________________

I have been teaching at the post-secondary level for:

- [ ] 1 - 5 years
- [ ] 6 - 10 years
- [ ] 11 - 15 years
- [ ] 16 - 20 years
- [ ] more than 20 years

My strongest computer background is currently on:

- [ ] Macintosh platform
- [ ] Windows platform
- [ ] Mac/Windows platforms equally
- [ ] Other: ____________________
I've come to this workshop with the following goal(s):
APPENDIX D

ENDING WORKSHOP SURVEY INSTRUMENT
Laptop Program: Post-Workshop Survey

The post-workshop survey is designed to gather data about your learning experience and whether or not, as a direct result of your workshop experience, there has been a significant change in your beliefs about teaching and/or technology tools integration. The post-workshop survey will take approximately fifteen minutes. Thank you.

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<tr>
<th>Question</th>
<th>Completely disagree</th>
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<tr>
<td>29. I will share what I learned in this workshop with my colleagues.</td>
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<td>30. Without reservation, I will recommend this workshop to my colleagues.</td>
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<td>31. Compared with other professional development experiences, in which I've participated, I would rate this week as one of the most effective.</td>
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<td>32. I would have participated in this workshop without the “carrot,” the laptop computer.</td>
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<td>33. I am confident I will utilize what I have learned in this workshop in my teaching.</td>
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<td>34. I am confident I will utilize what I have learned in this workshop in my research.</td>
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<td>35. After the one-week workshop, I am a more confident technology user.</td>
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<td>36. For me, the overall ratio of viewing to utilizing the tools was optimal for learning.</td>
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<td>Question</td>
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<td>Rarely</td>
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<td>37. I felt I was given sufficient time to view the technology tools presented during the workshop sessions.</td>
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<td>38. I felt I was given sufficient time to utilize the technology tools taught as part of this workshop.</td>
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<td>39. I felt I had sufficient time to process my learning within the class periods.</td>
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<td>40. I felt I had sufficient technology support throughout the workshop.</td>
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<td>41. During the workshop, I had breakthrough experiences related to using technology tools with students.</td>
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<td>42. I found the formal discussions about teaching during the workshop sessions to be meaningful.</td>
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<td>43. I found the formal discussions about technology integration during the workshop sessions to be meaningful.</td>
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<td>44. I had the opportunity to engage in informal conversations with other participants about teaching within the workshop day.</td>
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<td>45. I had the opportunity to engage in informal conversations with other participants about technology within the workshop day.</td>
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<td>Question</td>
<td>Completely disagree</td>
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<td>46. During the workshop, I learned ways in which technology tools can help address students' various learning styles.</td>
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<td>47. During the workshop, I learned ways in which technology tools could be useful in helping students improve their writing.</td>
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<td>48. This workshop strengthened my belief that it is important to integrate technology tools into my teaching.</td>
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<td>49. This workshop improved my understanding of universal accessibility issues and I will teach with them in mind.</td>
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<td>50. This workshop strengthened my belief that using technology tools may change the ways in which I teach.</td>
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<tr>
<td>51. This workshop strengthened my belief that using technology tools may change what (content) I teach.</td>
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</table>

Please supply a brief answer to the following open-ended questions:

Compared to my preferred learning pace, the pace of this workshop was: __________________________________________________________
Review your goals for the workshop. Were they achieved? Did they change?

What helped me in goal accomplishment was:

What hindered me in goal accomplishment was:

For me, the most critical/inspiring information/discussion/experience was:

The critical learning/inspiration above was the result of:

What will most help me continue my professional development in teaching and technology is:
APPENDIX E

ONLINE POPULATION QUESTIONNAIRE
LAPTOP WORKSHOP - ONLINE QUESTIONNAIRE

Your Department: ____________________________

How long have you been teaching at the post-secondary level?

1 - 5 years □ 6 - 10 years □ 11 - 15 years □ 16 - 20 years □ more than 20 years □

Date of your Laptop Workshop: ____________________________ / ____________________________ (m/yyyy)

Check all that apply below.

I utilize the laptop computer (hardware):

☐ To prepare for class
☐ To present material in class
☐ To take notes in class
☐ To display activities/assignments in class
☐ To demonstrate technology tools
☐ To present at conferences
☐ To conduct research
☐ Other: ____________________________

I utilize the laptop computer at:

☐ Home
☐ Office
☐ Classroom
☐ Meetings
☐ Professional Travel
☐ Other: ____________________________

Check only one below.

During the academic year, how often do you move your laptop to a new location?

☐ Every day
☐ Several times a week
☐ Once a week
☐ A couple times a month
☐ Fewer than a couple times a month
☐ I always use my laptop in the same place
I don't really use my laptop. Please explain:

---

Have you upgraded software and/or the laptop itself? Yes No

Who has paid for the upgrades?

Please check here and skip to the open-ended questions if due to your teaching schedule and/or the recentness of your Laptop Workshop experience you have not had the opportunity to consider integrating these tools and strategies into your teaching.

<table>
<thead>
<tr>
<th>Select one response for each statement below regarding the software/teaching strategies you learned in the Laptop Workshop.</th>
<th>Don't use</th>
<th>Same as before the Workshop</th>
<th>Differently because of the Workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I utilize email and/or listserves in my teaching.</td>
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<tr>
<td>2. I utilize an online syllabus in my teaching.</td>
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<td>3. I have created and used PowerPoint presentations to support my teaching.</td>
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<tr>
<td>4. I have built Web pages for use in my teaching.</td>
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<td>5. I have scanned images and/or documents to include in online learning resources for students.</td>
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<tr>
<td>6. I have facilitated online discussions for students in the course(s) I teach.</td>
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<tr>
<td>7. I have used POLIS, CAUCUS, WebCT, and/or the OldPueblo MOO in my teaching.</td>
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<td>8. I have posted students' grades online.</td>
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<tr>
<td>9. I locate and utilize Web resources for teaching and/or to conduct research.</td>
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<tr>
<td>10. I require students to use the Web for research and/or to build Web pages.</td>
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<tr>
<td>11. I employ cooperative learning strategies in my course(s).</td>
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<tr>
<td>12. I have made changes in course materials with accessibility in mind.</td>
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<tr>
<td>13. I have made changes in the writing component of my course.</td>
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</tr>
</tbody>
</table>
Please answer the following open-ended questions.

1. Do you think university faculty development constructed around technology tools is an effective model for helping faculty to reconsider their teaching practices? If so, why? If not, why not?

2. Describe the most important way the Laptop Workshop has changed the way in which you teach or the content of your teaching.

3. Since you participated in the Workshop, what comments have you received from students that reflect a change in your teaching practices and/or your integration of technology tools into your course(s)? These comments could be from UA course evaluations, from your own course evaluation tools or instruments, email exchanges, other documents, and/or verbal comments.

4. Have you received any reward, recognition, or compensation from your department or college as a result of your participation in the Laptop Workshop?
5. Now that you have had your laptop for some time, what would you tell the upper administration at the University with regard to the impact of this tool and the Workshop on your professional work in the areas of teaching, research, and service?

Judi Moreillon, doctoral student, is seeking interview volunteers. Your anonymity will be protected throughout the process and publication of her research. Are you willing to participate in an in-depth interview regarding your Laptop Workshop experience? 

Yes  No

If yes, your name is and your email address is.
REFERENCES


Teaching and Learning with Technology (TLT) Web site:

http://www.tltgroup.org/resources/F_Eval_Cases/RIT_Fac_Study.html


http://www.carnegiefoundation.org/CASTL/guidelines/background.htm

http://www.udel.edu/provost/tltr/old/facdevel.html


http://www.tltgroup.org/resources/F-LIGHT/2002/June.html#F-LIGHT


Ely, D. (1995). *Technology is the answer! But what was the question?* (ERIC Document Reproduction Service No. ED 381 152)


