AN INVESTIGATION OF THE INNOVATION-DECISION PROCESS OF FACULTY MEMBERS WITH RESPECT TO WEB-BASED INSTRUCTION

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This dissertation entitled

AN INVESTIGATION OF THE INNOVATION-DECISION PROCESS OF FACULTY MEMBERS WITH RESPECT TO WEB-BASED INSTRUCTION

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Although web-based instruction (WBI) is growing faster than any other instructional technology, a large number of faculty members in the universities are hesitant or reluctant to adopt. Using a qualitative approach, this study investigates factors that influence faculty members when deciding to adopt or reject web-based instruction based on the research question: What factors influence the decision process to adopt or reject web-based instruction among faculty members? Rogers’ (1995) theory, diffusion of innovations, focusing on the model of the innovation-decision process, provides the theoretical framework in this study.

The researcher interviewed 31 university faculty members and 5 administrators. The faculty interviewees included those who had adopted WBI as well as those who were planning to adopt or had rejected WBI. Among those who adopted WBI, some used it as a supplement to face-to-face instruction while others taught at a distance. The researcher also attended a workshop, a seminar, and a conference to acquire an understanding of the support provided to the faculty members using or planning to use web-based instruction.

The primary factors that influence faculty members in making their decisions to adopt or reject WBI include: 1) training faculty members how to develop and implement WBI, 2) complexity in the implementation of web-based instruction, 3) compatibility of WBI with faculty members’ teaching values, 4) time and effort needed to develop and
implement WBI, 5) relative advantages of using WBI, and 6) lack of incentives (awards, annual reviews, and promotions). The implications of this study are that universities should 1) encourage collaboration among faculty members as they learn, develop and implement WBI by providing them with opportunities, during faculty meetings, to demonstrate how they are using WBI, 2) provide support that focuses on faculty’s instructional needs for WBI, 3) consider faculty members’ knowledge and technical skill levels in the use of WBI to determine the pace and language to use in training 4) give faculty members time release, course buy-ups or monetary incentives to adopt WBI, and 5) encourage faculty members to use WBI based on their philosophy and pedagogy of teaching. This study concludes with recommendations for future research.

Approved
Sandra Turner
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# Table of Contents

Acknowledgements............................................................................................................. 6

List of Figures ................................................................................................................... 12

CHAPTER 1: INTRODUCTION ..................................................................................... 13
  Background of the Study ............................................................................................... 13
  Problem Statement......................................................................................................... 17
  Research Question ......................................................................................................... 20
  Participants .................................................................................................................... 20
  Site of Study .................................................................................................................. 21
  Significance of the Study ............................................................................................. 23
  Limitations of the Study ............................................................................................... 25
  Summary ........................................................................................................................ 26
  Definition of Terms ....................................................................................................... 27

CHAPTER 2: LITERATURE REVIEW .......................................................................... 29
  Innovativeness ............................................................................................................... 31
  Web-based Instruction .................................................................................................. 33
  Communication Channels ............................................................................................ 34
  Types of Innovation Decisions ...................................................................................... 36
  The Model of Innovation-Decision Process .................................................................. 37
    Knowledge Stage ........................................................................................................ 38
    Persuasion Stage ....................................................................................................... 38
    Decision Stage .......................................................................................................... 39
CHAPTER 4: FINDINGS

Participants .................................................................................................................... 81

The Innovation-Decision Process among Faculty ......................................................... 83

Knowledge Stage ........................................................................................................ 83

Persuasion Stage ......................................................................................................... 86

Decision Stage ............................................................................................................ 91

Implementation Stage ................................................................................................. 96

Confirmation Stage .................................................................................................. 101

Attributes of Innovations ............................................................................................. 105

Relative Advantage ................................................................................................. 106

Compatibility ............................................................................................................ 115

Trialability ................................................................................................................ 121

Observability ............................................................................................................ 123

Complexity ............................................................................................................... 124

Adoption of Web-based Instruction by Faculty Members .......................................... 127

Adoption of Web-based Instruction in Face-to-Face Classes .................................. 129

Use of Web-based Instruction for Distance Courses ............................................ 133

Characteristics of Faculty Members ............................................................................ 138
Faculty Members who took Less Time to Adopt WBI ............................................ 139
Faculty Members who took Relatively Longer to Adopt WBI............................. 140
Faculty Members who Never Adopted WBI....................................................... 142
Summary .................................................................................................................. 143

CHAPTER 5: DISCUSSION AND RECOMMENDATIONS ...................................... 145

Factors Affecting the Innovation-Decision Process among Faculty Members .... 146
Training Faculty Members to Develop and Implement Web-based Instruction..... 147
Complexity in Implementing Web-based Instruction ............................................ 149
Compatibility of WBI with the Faculty Members’ Perceptions of Effective Teaching................................................................................................................... 152
Time and Effort Needed for the Development and Implementation of WBI....... 156
Relative Advantages of Web-based Instruction..................................................... 158
Interaction among Students as well as between Students and Faculty Members ... 160
Awards, Annual Reviews and Promotions............................................................. 161
Conclusion ............................................................................................................. 164
Paradoxes in the Innovation-Decision Process Model ....................................... 165
Innovativeness ......................................................................................................... 166
Discontinuance ........................................................................................................ 167
Types of Innovation Decisions ............................................................................. 168
Implications .......................................................................................................... 169
Recommendations for Future Research................................................................. 172
Summary .................................................................................................................. 174
List of Figures

Figure 1. S-shaped curve of adoption. ................................................................. 41

Figure 2. Adopter categories ................................................................................. 44

Figure 3. Stages of innovation-decision process. ............................................... 105
CHAPTER 1: INTRODUCTION

Background of the Study

As the information age evolves, societies are undergoing massive changes that have tremendous impact on education systems. Groves and Zemel (2000) note, "technology is transforming nearly every aspect of society… (and) the technology revolution is challenging and redirecting all forms of education including higher education" (p. 57). In fact, Khan (1997) quotes Perkins that “the traditional approaches of learning have lately been questioned in their ability to provide the learner with rich rather than minimalist environments” (p. 45). Therefore, since advances in information technology coupled with the changes in society are creating new paradigms for education, participants in the new educational paradigm require rich learning environments supported by well-designed resources (Khan, 1997) in order to be competitive in the current educational system.

So, what are faculty members doing to cope with the instructional challenges of the information age? As Daugherty and Funke (1998) note, universities are witnessing a profound increase in the use of multimedia presentations, video teleconferencing, and more currently, web-based course instruction that all have a direct impact on current university practices and policies. They further add that web-based instruction (WBI) is growing faster than any other instructional technology and that more and more university faculty are using WBI as an integral part of instructional activities. On the same note, Fredrickson (1999) affirms that over the past several years many college and university
faculty members have developed courses or course components for delivery to students over the Web. The faculty members integrating web-based instruction in their courses benefit from asynchronous and synchronous communication, virtual space for interaction, and multiple telecommunication environments (Berge, 1997) which result in accessibility, learner control, heightened communication access to worldwide resources, and a more student-centered learning environment (Angulo & Bruce, 1999).

In spite of the proliferation of web-based instruction in the universities, there is still a large number of faculty members who seem hesitant or reluctant to adopt technology for their teaching tasks (Jacobsen, 1998). Why does web-based instruction appeal to some but not all faculty members? In their research, Groves and Zemel (2000) address the question of the perceived barriers and needs for technology adoption and use in higher education. Their findings show that in order to use technology in teaching, respondents wanted accessible hardware, training, and discipline-specific media that are easy to use. Such requirements are available in many universities yet some faculty members are still reluctant to adopt or have rejected to integrate instructional technology, including web-based instruction, in their teaching. For example, at Ohio University the Center for Teaching Excellence sponsors workshops throughout the year on teaching the larger lecture class, applications of technology in the classroom, and strategies for cooperative learning for its faculty members. At the same time, the Center for Innovations in Technology for Learning offers technical consultants, instructional consultants, and project design and development to the faculty members. Similarly, at Kent State University the Division of Information Services provides students, faculty
members and staff with leadership and support to effectively use information technology to transform and improve the quality of teaching, learning and research. Such services include academic technology services, administrative computing services, institutional research and decision support, and telecommunications and networking services, yet not all faculty members use instructional technology in their courses.

Holt (1999) wrote, “WBI is here and expanding. Institutions and faculty who fail to adapt will be bypassed and eventually made obsolete. But those who adjust and embrace it will be part of the greatest advance in education since the printing press” (Para 17). In this respect, there is need to investigate why some faculty members do not adopt web-based instruction in their courses because, as mentioned earlier, providing resources doesn’t influence all faculty members to use WBI. To this end, universities have provided faculty members with resources required to effectively integrate WBI into their classrooms, but there has not been a move to investigate how the faculty members move from one stage to the other in their innovation decision process. That is, after identifying the existence of an instructional technology, how do faculty members move from one stage to the other in deciding whether to adopt or reject such a technology? Understanding that decision process might illuminate unidentified factors that play a great role in the decision to adopt or reject instruction technology among faculty members. Therefore, this research aims to investigate the innovation-decision process among faculty members to adopt or reject web-based instruction in their teaching.

The theory that informs this research is diffusion of innovations by Everett Rogers (1995). The main aspects that Rogers discusses in his theory are communication
channels, the innovation decision process, individual innovativeness, rate of adoption, and perceived attributes. According to Rogers (1995), diffusion of an innovation is a very social process in that the heart of the diffusion process consists of modeling and imitation by potential adopters of their network partners who have adopted previously (p. 18). Therefore, as Rogers concluded, “the essence of the diffusion process is the information exchange through which one individual communicates a new idea to one or several others” (p. 18). In this view, diffusion is a process that occurs over time and involves five distinct stages: knowledge, persuasion, decision, implementation, and confirmation. These stages imply that potential adopters of an innovation must learn about the innovation, pursue information about the innovation, decide to adopt, implement the innovation, and confirm the decision to adopt or reject the innovation.

Rogers (1995) recognized that individuals who are predisposed to being innovative adopt an innovation earlier than those who are less predisposed. Rogers developed five categories of innovation adopters: innovators, early adopters, early majority, late majority, and laggards. The innovators are the risk takers and pioneers who adopt an innovation very early in the diffusion process while laggards resist adopting an innovation until late in the diffusion process.

Another aspect that Rogers deals with in the diffusion theory is the rate of adoption that shows that diffusion of an innovation spreads over time in a pattern that resembles an S-shaped curve. After a period, the innovation's rate of adoption gradually stabilizes and eventually declines. Therefore, potential adopters judge an innovation based on five attributes of the innovation: relative advantage, complexity, compatibility,
trialability, and observability (Rogers, 1995). That is, an innovation will experience an increased rate of diffusion if potential adopters perceive that the innovation has an advantage relative to other innovations, is not overly complex, is compatible with existing practices and values, can be tried on a limited basis before adoption, and offers observable results.

*Problem Statement*

Web-based instruction is rapidly becoming one of the major avenues to deliver courses to students (Nations, 2000). In fact, Pedroni (1996) notes that the World Wide Web excites and motivates students such that some schools use it as early as kindergarten. As such, more and more faculty members are using web-based instruction as part of their courses or as complete courses resulting in entire programs that can be completed via web-based instruction and virtual universities, which have no physical campus, but which operate totally over the Internet (Burnett, 1999). Nations gave some of the reasons for this proliferation as reduced costs and increased learning, consistent and up-to-date materials, the ability of students to take courses at a time and place of their choosing, faster completion of training, better content retention, better utilization of instructors, platform independence, and flexible course management.

However, the integration of web-based instruction appeals to some, but not to all faculty members. As mentioned earlier, a large number of faculty members seem hesitant or reluctant to adopt technology for their teaching tasks (Jacobsen, 1998). This observation is not new. Jacobsen (1998) quoted Geoghegan that “despite research and testimony that technology is being used by more faculty members, the diffusion of
technology innovations for teaching and learning has not been widespread, nor has
instructional technology become deeply integrated into the curriculum” (p. 2). Adding to
the dilemma concerning the adoption of web-based instruction by faculty members,
Eleser and Chauvin (1998) noted that, when faculty development specialists reexamined
their roles and means by which faculty are supported in their ongoing professional
development, they found that,

Providing resources is not always sufficient to effective systematic and
long lasting changes in teaching/learning or organizational processes.
Similarly, offering faculty a series of workshops on teaching effectiveness
or placing books about teaching practices on library shelves may not be
sufficient to enhance their actual teaching practices. (pp. 181-182).

At the same time educational institutions do not exist in a vacuum, rather societal
events constantly occurring around the educational institutions influence them (Treuhaft,
1995). Treuhaft explained:

Educational institutions must recognize that the world has changed.
Employers and students have needs that our current delivery system is not
meeting…. Doing more of what we are currently doing will not solve
these problems. To survive these challenges, we must find new ways to
deliver education to our students…. The use of academic computing can
contribute to solving some of these problems. (Conclusion, para. 1)

These reports call for attention in how faculty members adopt web-based
instruction in particular and instructional technology in general, mainly because as Paris
(2000) affirms, "expectations about enhancing teaching and learning have been moving away from the traditional forms in part because of electronic technologies" (in Cole, 2000, p. 98). Therefore, following an argument advanced by Baldridge and Deal (1983) that “change is a predictable and natural response to evolving needs of institutions of higher education” (in Stoller, 1995. p. 177), faculty members need to rethink their traditional methods of teaching. This recommendation is easier said than done because as Stoller expresses, the adoption of innovations in the institutions of higher education is a dilemma. That is,

> Innovations, even when grounded in sound theory rarely take hold simply due to their inherent value…. A single innovation can be enthusiastically endorsed and implemented with little or no resistance in some institutional settings, and harshly criticized and then strongly rejected in others. (p. 177)

Considering the above scenario, how then do faculty members decide to adopt or reject web-based instruction? This question is worth asking because web-based instruction is not a passing phase that will disappear like many educational trends that rise and fall as the pendulum swings (Redline, 2001), yet in Lee’s (2001) view, “teachers are generally regarded as independently practicing professionals who make decisions about specific instruction and assessment to use in their classrooms” (p. 4). In this respect, there is need for a study to find out factors that influence the decision process of faculty members to adopt or reject web-based instruction so as to uphold what works and overcome any possible barriers to the adoption decision process.
Research Question

This research study investigated the stages of the innovation-decision process among faculty members based on the adoption or rejection web-based instruction. That is, the research question that governed this research study is,

1. What factors influence the decision process to adopt or reject web-based instruction among faculty members?

This research study focused on understanding the decision process to adopt or reject web-based instruction among faculty members based on Rogers’ (1995) model of the innovation-decision process. The findings from this research study will provide administrators, faculty members and scholars with an understanding of other factors, apart from resources and workshops that influence the adoption or rejection of web-based instruction by faculty members. Likewise, this study shows paradoxes of the diffusion of innovations theory in the way faculty members make decisions to adopt or reject web-based instruction.

Participants

As mentioned earlier, this study focused on faculty members at Ohio University. Some of these faculty members attended a three-hour or six-hour workshop conducted by the Center for Innovation in Technology Learning (CITL) at Ohio University. Some of these faculty members were and others were not using web-based instruction to teach either face-to-face or distant classes. Other research participants included faculty members who had not attended Blackboard CourseInfo workshop and were either using
or not using web-based instruction to teach face-to-face or distant classes. In addition, administrators and staff at Ohio University supported faculty members as they used or decided to use web-based instruction participated in this research study. The research participants included male and female faculty members of any age who were either tenured or non-tenured. The duration the faculty members have taught at Ohio University was not an issue in the selection of the research participants.

Site of Study

This research study took place at Ohio University. Ohio University was chartered by the state of Ohio in 1804 and it is located in southeast Ohio. Ohio University has ten colleges that included: College of Arts and Sciences, College of Business, College of Education, College of Fine Arts, College of Health and Human Services, College of Osteopathic Medicine, Honors Tutorial College, Russ College of Engineering and Technology, and University College. One of the reasons that Ohio University is a suitable research site is that computing resources are widely available for both faculty and students. For example, in the student-computing project originally proposed by the university President three years ago, 2217 desktop computers were installed in first-year students' rooms and residential assistants' rooms. The following summer, the existing desktop computers were refurbished and new machines were installed in the rest of the residence halls, bringing the total number of student computers to 4397. When Ohio University purchased Bromley Hall in 2001, more computers were added to that facility too. Thus, the total number of computers in the residence halls is 4647. The programs installed on these computers are Microsoft Windows 2000, Office 2000, Mulberry e-mail
client, McAfee Anti-Virus, plus standard Internet applications like web browsers, telnet clients, instant-messaging software, QuickTime, and Acrobat Reader (O'Malley, personal communication, 2001).

At the same time, Ohio University has provided faculty members with considerable support essential to the adoption of web-based instruction. The Center for Teaching Excellence (CTE) and the Center for Innovations in Technology for Learning (CITL) are two departments at Ohio University that assist faculty members to effectively integrate and use the Web in their teaching activities. The Center for Teaching Excellence sponsors workshops throughout the year, which focus on teaching the larger lecture class, applications of technology in the classroom, and strategies for cooperative learning. The CTE disseminates announcements concerning the workshops through a newsletter; Teaching Notes, e-mails and the Center's web site. Also, CTE holds quarterly meetings regarding service learning and cooperative learning networks and that provide faculty members with opportunities to hear what other faculty members are doing in their classrooms as well as discuss questions and issues about these teaching/learning tools. In addition, CTE holds seminars on evaluation and assessment issues each year.

To support faculty members in the integration of technology in their classroom, the Center for Teaching Excellence works hand in hand with the Center for Innovations in Technology for Learning (CITL). CITL staff members provide faculty members with technical consultant, instructional consultant, and project design and development. They also work with individual faculty and curriculum committees to design large-scale programmatic initiatives that rely on information technologies. Besides, CITL provides a
Faculty Toolkit that consists of an ever-growing collection of tools, templates, user
guides, and software applications (Browser checker, anonymous feedback form, dynamic
table assistant, image resizer, and Text-to-JPEG), that faculty members can download for
their use. Each tool includes a brief description of what it is, how to use it, and its
limitations (CITL, 2001).

The Center for Innovations in Technology for Learning also offers Blackboard
CourseInfo workshops throughout the academic year to Ohio University faculty and staff
members. In these workshops, faculty and staff get instructions about feature
descriptions, illustrations and systematic use of Blackboard CourseInfo in teaching.
They learn how to use the Blackboard interface, to incorporate learning materials from
word processing, audio and video, spreadsheets, and presentation files in their teaching
activities (Instructor guides/manual for Blackboard, 2002).

Significance of the Study

Anglin (1995) stated, “Society is changing in sweeping ways that make our
current educational system obsolete, in the context of K-12, higher education, corporate
education, health education, and so forth” (p. 86). As Hansen, Deshpande, and
Murugesan (1999) mentioned, this change has influenced many educational institutions
to develop web-based flexible delivery programs to accommodate the needs of a wider
set of students, to be competitive in terms of other institutes and to make more efficient
use of existing instructional resources.

As a result, Daugherty and Funke (1998) concluded, “Web-based instruction is
growing faster than any other instructional technology” (p. 22). Therefore, the World
Wide Web calls for fundamental changes in how teaching occurs at all ages and stages of life (Dodge, 1996). This influence of web-based instruction on teaching calls for a change in the way faculty members teach. Therefore, if providing resources, training, and books on effective teaching does not influence faculty members to adopt web-based instruction, an investigation of how they make decisions would reveal more factors influencing their adoption or rejection process of web-based instruction. As such, this research study focused on the innovation-decision process among faculty members to identify factors that influence their decision to adopt or reject web-based instruction.

Findings from this study will inform administrators about what can be done to encourage more faculty members to adopt web-based instruction, what areas need more investment to enhance the integration of web-based instruction in the universities and other institutes of higher education. Administrators will also identify the extent that they can implement Rogers' (1995) model of innovation-decision process when making decisions to support the use of web-based instruction. On the other hand, faculty members will gain an understanding of what they need to become effective in using web-based instruction, how other faculty members are using web-based instruction, and how other faculty members view the use of web-based instruction. Likewise, researchers will benefit from this study because they will learn the factors that influence faculty members in their decision process to adopt or reject web-based instruction. The study will also identify possible areas of future research.
Limitations of the Study

This study focused on Ohio University faculty members who have either adopted or not yet adopted web-based instruction. The choice of research participants might be a limitation in this study in that they are all at the same university, which might exhibit a culture that does not exist in other universities either supporting or inhibiting the adoption of web-based instruction. Likewise, using a selective method to identify the participants might have influenced the results in that the findings could lean more towards the favorable attitude of WBI. That is, starting with faculty members who attended Blackboard workshops and then asking them to propose other potential participants for this study might have led to bias in the results.

In addition, in this study, the researcher used semi-structured interviews. The researcher controlled the direction of the interviews, indicating that the researcher did not move with the flow of the conversation, but rather guided the discussion to keep on target and obtain answers to the research questions. Thus, the participants were limited in their opportunity to elaborate details of their experiences.

The teacher-student relationship could have adversely affected this study, and in fact, one faculty member felt she could not participate in the research because she did not want to reveal her experiences to the researcher. The researcher tried to anticipate that problem by conducting a pilot study to understand faculty members as well as to identify and modify questions that could have offended the faculty members. Also, the researcher tried to win the confidence of the faculty members who participated in this study before the interviews by providing a clear description of the purpose of the study and the
importance of their participation in the study. In this respect, the researcher sent emails, made phone calls, and paid visits to the research participants to clear any doubt about this research study and to arrange the time and dates of the interviews.

Summary

As the information age evolves, societies are undergoing massive changes that have tremendous impact on higher education. Thus, many faculty members are reconsidering their traditional methods of teaching and incorporating web-based instruction into the teaching-learning process. As a result, universities are witnessing a profound increase in the use of multimedia presentations, video teleconferencing, and, more currently, web-based course instruction that all have a direct impact on current university practices and policies.

In spite of the proliferation of web-based instruction in the universities, there is still a large number of faculty members who seem hesitant or reluctant to adopt technology for their teaching tasks. In this respect, this research study investigated the factors that affect faculty members as they decided to adopt or reject web-based instruction in their teaching. In so doing, diffusion of innovations theory provided the theoretical framework for this study. The main aspects of diffusion of innovations theory are innovation decision process, individual innovativeness, rate of adoption, and perceived attributes. With such a framework the research study investigated why innovation attributes, provision of resources, or offering faculty members a series of workshops on teaching effectiveness may not be sufficient to bring effective, systematic and long lasting changes in teaching/learning.
Ohio University is a suitable choice for this study in that the university sponsors workshops throughout the academic year on applications of technology in the classroom for its faculty members. Similarly, faculty members receive technical consultation, instructional consultation, and project design and development consultation. Subsequently, it will be possible to understand the innovation decision process among faculty members to realize how best to support web-based instruction adoption in higher education.

**Definition of Terms**

**Adoption**: The intensive or limited use of web-based instruction by faculty members either as a supplement to other techniques of teaching or as a complete web-based instruction in face-to-face or distance classes.

**Adopter**: A faculty member who has decided to make use of web-based instruction either in teaching a face-to-face class or for a distance class.

**Awareness-knowledge**: Information that an innovation exists (Rogers, 1995, p. 165).

**Communication channels**: The means by which messages get from one individual to another.

**Diffusion**: The process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1995, p. 5).

**Information**: A difference in matter energy that affects uncertainty in a situation where choice exists among a set of alternatives (Rogers & Kincaid, 1981, p. 64).

**Innovation**: An idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, 1995, p. 11).
Innovativeness: The degree to which an individual faculty member is receptive to web-based instruction in spite of the perception of their colleagues or the administrative staff.

Innovation decision process: A process through which an individual or other decision-making unit progress from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea and to confirmation of this decision (Rogers, 1995, p. 161).

Principle-knowledge: Information dealing with functioning principles underlying how the innovation works (Rogers, 1995, p. 166).

Rejection: According to Rogers (1995), rejection is, “a decision not to adopt an innovation (p. 171), but for the sake of this research, rejection is deciding never to use or using and then deciding to stop using web-based instruction.

Rejecter: A faculty member who formerly used, but eventually stopped using web-based instruction or has never and does not intend to use web-based instruction in his or her classroom.

Web-based instruction: An innovative approach for delivering instruction in a face-to-face classroom or for distant learners using a Web course site as a medium.
CHAPTER 2: LITERATURE REVIEW

As Buikema and Ward (1999) acknowledge, the use of technology in teaching has been widely adopted in the educational community. That is, from preschool to postgraduate education, technology has become an important part of the educational process. In particular, the potential of the World Wide Web as an instructional tool and learning environment has attracted intense academic interest and commercial development (Beangle, 2000). As Daugherty and Funke (1998) affirm, Crossman identified web-based instruction as growing faster than any other instructional technology (p. 22). Therefore, with the increasing acceptance and availability of access to the web, various web-based teaching initiatives are either being developed or are being adopted by educational institutions (Hansen, Deshpande, & Murugesan, 1999).

In fact, the World Wide Web has changed how teaching, training, and self-directed learning will occur at all ages and stages of life (Daughterty & Funke, 1998). This change is mainly because there are questions about the ability of traditional approaches to provide the learner with optimal rather than minimalist environments and with authentic experiences of learning which are meaningful to the learner in some intrinsic manner (Perkins, 1996). Such criticisms have escalated as multimedia and telecommunication technologies continue to evolve and advance with promises of providing the learner with richer, more meaningful education relevant for the future work place and learning environment (Bethany, 1994; Reigeiuth, 1994). In this respect, “universities are witnessing a profound increase in the use of multimedia presentations, video conferencing, and… web-based course instruction” (Daughterty & Funke, 1998, p.
Daughterty and Funke added that these technological innovations have a direct impact on current university practices and policies and subsequently have the potential to alter the traditional definition of education. Roach (2001) supports this view in that with the movement towards greater use of instructional technology by faculty, institutions want to establish reasonable policies and procedures to ease the adoption. Consequently, there is need to understand the faculty members’ innovations-adoption process in order for universities to establish these policies and procedures.

This research study investigated how faculty members adopt web-based instruction by considering their innovation-decision process based on Rogers’ (1995) diffusion of innovations theory. This study considered that the innovation-decision process among faculty members was not in isolation, rather there were other factors that triggered their decision to adopt or reject an innovation. Some of the factors considered were faculty characteristics, the attributes of innovations embedded in web-based instruction, and the communication channels. That is, the knowledge of Rogers’ adopter categories and how they influence innovativeness shows how the individual characteristics influence the decision to adopt or reject an innovation. On the other hand, research has found that attributes of innovations have great influence on the adoption or rejection of an innovation. Hischman (1980) gave an example of such research. He mentioned that Ostlund classified innovators 70% of the time relying on five product perceptual variables. This varied only to 80% when 13 characteristic variables were included. In a second study, using the perceived product attributes Ostlund classified 77% of eventual innovations where he obtained a rate of 79% by including personal
characteristics variables in the discriminating function. In addition, Rogers (1995) commented that, “the communication channels used to diffuse an innovation also may influence the innovation’s rate of adoption” (p. 207), and therefore, the communication channels used by individuals to inform others about a new or an existing innovation might eventually be of great significance for the current research study.

Therefore, the researcher starts by explaining how the information about web-based instruction gets to one or several individuals, which gives way to the types of innovation decisions and the innovation-decision process. Next, the discussion focuses on Rogers’ (1995) categories of adopters and how their characteristics influence their innovativeness followed by the research findings on the characteristics of university faculty members. Eventually, discussion focuses on the attributes of innovation in web-based instructions, but first two key terms; innovativeness and web-based instruction are discussed.

_Innovativeness_

Rogers’ (1995) defined innovativeness, as “the degree to which an individual is relatively earlier in adopting new ideas than other members of his system” (p. 27). According to Venkatraman (1991), this definition has a problem. He emphasized, “A fundamental problem with much of the research on consumer innovators is that innovators are being identified by their new product adoption,” (p. 51), but in his view, these people are new product adopters but not innovators. Midgley and Dowling (1978) supported this idea in that, Rogers’ definition of innovativeness is couched directly in terms of innovativeness via the time taken for an individual to adopt, but the potential
measurement error in determining when an innovation was introduced into the social system hinders such a definition.

However, Rogers and Shoemaker’s (1971) definition has its strength in its characterization of an innovation as “an idea, practice, or object perceived as new by the individual” (p. 19). Accordingly, Midgley and Dowling (1978) produced a definition of innovativeness as “the degree to which an individual is receptive to a new idea and makes innovation decisions independently of communicated expressions of others” (p. 236). These definitions of innovativeness are the anchor that guide the definition of innovativeness in this research study. In this regard, Lee (2001) quoted Csikszentmihalyi that regardless of the external rewards or incentives, faculty members tend to motivate and commit themselves to the teaching process. Csikszentmihalyi identified two general intrinsic rewards the faculty members have. One is the educational process; in that a “faculty member as an instructor wants to induce and maintain the student’ attention and to sustain their motivation to pursue goals valued by him/her” (in Lee, 2001, p.154). The other is that the subject matter the faculty member teaches, where a continuing integration of new information, which may happen during course preparation and classroom teaching, is enjoyable. Csikszentmihalyi added, “Teaching is probably most effective when the teacher enjoys both processes at the same time” (p.154). Therefore, in this study, innovativeness is the degree to which an individual faculty member is receptive to web-based instruction in spite of the perception of their colleagues or the administrative staff.
According to Khan (1997), web-based instruction is “a hypermedia-based instructional program, which utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported” (p. 6). Web-based instruction comprises of three stages. Wiens and Gunter (1998) explained these stages as the design stage where instructors plan for course content, objectives, and complete pedagogy by imagining how the course will operate. The second stage is the development stage that involves bringing the design and instructional guidelines on to the computer screen. Delivery stage is the third stage of web-based instruction that comprises the actual delivery of the course. Wiens and Gunter (1998) quoted Ellsworth that delivery uses multi-modal, non-linear, self-paced, asynchronous, and synchronous instruction. In fact, Khan (1997) noted,

Well-designed WBI program can provide numerous features conducive to learning and instruction. Examples of key features includes: interactive multimedia elements, open system, online search, device-distance-time independent, global accessible, electronic publishing, uniformity world-wide, online resources, distributed multimedia resources, cross cultural interaction, multiple expertise, industry supported, learner-controlled among others. (pp. 7-8)

Web-based instruction can be used in both face-to-face and in distance learning. In the case of distance learning Khan (1997) notes, “Students can register, do coursework, conduct research, and communicate with instructor via the Internet without having to physically travel” (p. 14). In the same way, “instructors can update course
materials with relative ease, provide guidance and support, both synchronously and asynchronously, without being confined to a classroom and office hours” (p. 14).

Rogers, D. L. (2000) affirmed this argument by noting that “a recent Department of Education study of postsecondary schools found that 58% of two-years and 62% of four-year public colleges offers distance education courses, and over 150 accredited institutes offer entire bachelor’s degree programs to students, who rarely, if ever, visit campus” (p. 20).

In a traditional classroom, instructors use the course web sites to supplement their traditional methods of teaching. An example of such use of web-based instruction is a study by Angulo and Bruce (1999) on student perceptions of supplemental web-based instruction. In this study, the instructors varied their use of skills with supplemental web-based instruction and the results showed “a general agreement among student perceptions that supplemental WBI is a moderately useful asset to their learning” (p. 115).

In sum, for the sake of this study, web-based instruction refers to an innovative approach for delivering instruction in a conventional classroom or for distant learners using a web course site as the medium.

**Communication Channels**

Information is a vital tool in the diffusion of innovations in that individuals must be aware of the existence and relevance of an innovation in order to decide to adopt or reject it. According to Rogers (1995), “Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (p. 35). In this view, communication channels play a major role in determining
the adopters’ and rejecters’ innovation decision process. As Rogers (1995) defined, “a communication channel is the means by which messages get from one individual to another” (p. 36). Therefore, communication channels by virtue of providing a means to get the information regarding an innovation from one individual to another, open up new possibilities for individuals to exercise both rights and responsibilities of moving from one stage of innovation decision process to the next. In fact, Rogers (1995) refers to the innovation-decision process as an “information-seeking and information processing activity in which the individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation” (p.165).

What are effective communication channels in web-based instruction? In the Population Issues, (1999), it is clear that effective communication channels in web-based instruction range from one-on-one counseling to the formal school curricula and include the use of the mass media such as traditional folk arts, public forums such as seminars and town meetings. These communication channels include important carriers of information ranging from newspapers, radio, film and television, computer networks, global telephone systems, digital data transmission and new multimedia technologies, which are all tools that people can use to access the information they need.

These communication channels are consistent with the Rogers’ (1995) categories of communication channels: mass media and interpersonal channels. Mass media channels refer to “those means of transmitting messages that involve a mass medium, such as radio, television, and newspapers, which enable a source to reach an audience of many” (Rogers, 1995, p. 18). Rogers defined interpersonal channels as “a face-to-face
exchange of messages between two or more individuals” (p.18). He emphasized that interpersonal channels are more effective in persuading an individual to accept a new idea especially if they are of the same social status and education level among other similarities. Rogers (1995) further explained that human communication involves transferring information between individuals who are similar in certain attributes (homophily) or between dissimilar individuals (heterophily), but he concluded that although “the very nature of diffusion demands that at least some degree of heterophily be present between two participants… more effective communication occurs when two or more individuals are homophilous” (p.19). However, Rogers note that adoption or rejection of an innovation can be by an individual member of a system or by the entire system. Thus, despite the types of communication channels, individuals can make the decision to adopt an innovation independently or collectively.

*Types of Innovation Decisions*

Rogers and Shoemaker (1971) explained three types of innovation decisions. First, there are optional decisions, in which “choices to adopt or reject innovations are made by an individual independent of the decisions of other members of a system” (p. 28), although at the same time the individual’s decision is undoubtedly influenced by the norms of his or her social system and the need to conform to group pressures. Second, there are collective decisions that refer to “choices to adopt or reject an innovation that are made by a consensus among members of a system” (p. 28). Rogers and Shoemaker (1971) asserted that in collective decisions, all members of a society must conform to the system’s decision once it is made. Finally there are authority decisions that refer to,
“choices to adopt or reject innovations that are made by relatively few individuals in a system who possess power, status, or technical expertise” (p. 28). Thus, the individual members of the system have little or no influence in decision making. In authority decisions, Rogers and Shoemaker (1971) explained, “the individual’s attitude toward the innovation is not the prime factor in his or her adoption or rejection, he or she is simply told of it and is expected to comply with the innovation decision, which was made by an authority” (p. 36). After developing these types of innovation decisions, Rogers (1995) concluded that innovations requiring an individual optional decision are generally adopted more rapidly than an innovation adopted by an organization.

Although Rogers (1995) acknowledged that a type of innovation-decision might change over time, he noted that each type of innovation-decision takes time too. That is, the individual or a decision-making unit passes through a mental process “from knowledge of an innovation to forming an attitude toward the innovation, to deciding to adopt or reject, to implementation of new idea, and confirmation of this decision” (p. 36). As a result, Rogers developed a five-stage model of innovation-decision process.

The Model of Innovation-Decision Process

Rogers (1995) defined the innovation decision process as,

The process through which an individual or other decision making unit passes from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation and use of the new idea, and confirmation of this decision. (p.20)

Rogers and Shoemaker (1971) stressed that diffusion scholars have long recognized that
an individual’s decision about an innovation is not an instantaneous act, but a process that occurs over time and consists of a series of actions. In this regard, Rogers (1995) established a model of the innovation-decision process that has five different stages during which potential adopters deal with the uncertainty that is inherently involved in deciding about a new alternative to that previously in existence. This model focuses mainly on optional innovation decisions. The five stages developed by Rogers (1995) are: knowledge, persuasion, decision, implementation, and confirmation stages.

**Knowledge Stage**

The knowledge stage refers to, “the time period when an individual or other decision making unit is exposed to an innovation’s existence and gains some understanding of how it functions” (p. 165). This stage has three subdivisions. First, the awareness, which is information that an innovation exists, second is a how-to-stage referring to the information necessary to use an innovation properly, and finally is a principles knowledge stage that refers to the information dealing with the functioning principles underlying how the innovation works (Rogers, 1995).

**Persuasion Stage**

The persuasion stage is the stage at which "the individual or some other decision making unit forms a favorable or unfavorable attitude toward the innovation” (p. 168). At this stage, the individual becomes more psychologically involved with the innovation, that is, he or she actively seeks information about the new idea and it is at this stage that an individual forms a general perception of the innovation. In developing a favorable or
unfavorable attitude toward the innovation, an individual may mentally apply the new idea to his or her present or anticipated future situation before deciding whether or not to try it because the individual wants to know that his or her thinking is on the right track in comparison with the opinion of peers (Rogers, 1995). In this case, some individuals are more likely to have an attitude-adoption gap than are others in that the formation of favorable or unfavorable attitudes toward an innovation does not lead to an adoption or rejection decision.

**Decision Stage**

The decision stage is the stage where an individual or decision-making unit engages in activities that lead to a choice to adopt or reject an innovation. Most individuals will not adopt an innovation without trying it first on a probationary basis in order to determine its usefulness in their own situation. Thus, innovations that can be divided for trial are generally adopted more rapidly, but for some individuals and for some innovations, the “trial of a new idea by peers like themselves can substitute, at least in part, for their own trial of an innovation” (p. 171).

**Implementation Stage**

The implementation stage occurs when an individual or other decision-making unit puts an innovation into use. Implementation may represent the termination of the innovation decision process for most individuals, but for others, a confirmation stage may occur (Rogers, 1995). It is at this stage that reinvention occurs in which the user changes or modifies an innovation in the process of its adoption and implementation.
Confimation Stage

The confirmation stage takes place when an individual or other decision unit, if exposed to conflicting messages about the innovation, seeks reinforcement of the innovation decision already made or reverses a previous decision to adopt or reject the innovation. During this stage, the individual wants supportive messages that will prevent dissonance from occurring. This stage is critical to the rate of adoption in that, as Rogers (1995) notes, “Diffusion scholars previously assumed that later adopters are relatively less innovative because they did not adopt or were slow to adopt. But the evidence of behavior of discontinuance suggests that many laggards adopt but then discontinue usually owing to disenchantment” (p. 182).

In summary, how potential adopters deal with the uncertainty that is inherently involved in deciding about a new alternative to that previously in existence differs from one individual to another. In this case, individuals or decision-making units do not adopt or reject an innovation at the same time rather their decision period differs depending on their innovativeness. Therefore, there are different categories of adopters depending on the degree to which an individual or a decision unit of adoption is relatively earlier in adopting an innovation than other members of a social system.

Categories and Characteristics of Adopters

Rogers (1995) has developed five major categories of adopters that include innovators, early adopters, early majority, late majority and laggards. These categories have been developed based on evidence that all individuals in a social system do not
adopt an innovation at the same time, rather they adopt in an ordered sequence, and they can be classified on the basis of when they first begin using the idea. Rogers (1995) has observed an S-shaped curve of adoption regarding most innovations (see Figure 1). The S-shaped curve of adoption illustrates that adoption of an innovation usually follows a normal bell shaped curve when plotted over time on a frequency basis.

![S-shaped curve of adoption](image)

Figure 1. S-shaped curve of adoption.

Thus, it is clear that everybody does not adopt an innovation at the same rate and so later adopters have a longer decision period than earlier adopters resulting in different categories of adopters as explained below.

**Innovators**

In Rogers’ (1995) view, “innovators are the first 2.5 percent of the individuals in a system to adopt an innovation” (p. 262). He adds that innovators are venturesome and
their interest in new ideas leads them out of a local circle or of peer networks and into more cosmopolitan social relationships. Rogers (1995) emphasized that, while an innovator may not be respected by other members of a local system, he or she plays an important role in the diffusion process: that of launching the new idea in the system by importing the innovation from outside of the system’s boundaries. Furthermore, Rogers and Shoemaker (1971) found that innovators desire the hazardous, the rash, the daring, and risky. They are willing to accept an occasional setback when one of the new ideas they adopt proves unsuccessful, implying that the innovators must be able to cope with a high degree of uncertainty about an innovation at the time of adoption (Rogers, 1995).

Early Adopters

The second category of adopters consists of the next 13.5% of individuals in a system to adopt an innovation, that is, “they are included in the area between the mean minus one standard deviation and the mean minus two standard deviations” (Rogers, 1995, p. 262). Early adopters are a more integrated part of the local society than are innovators, such that their peers respect them and they are the embodiment of successful and discrete use of new ideas (Rogers & Shoemaker, 1971). In this respect, the early adopters decrease uncertainty about a new idea by adopting it, and then convey a subjective evaluation of the innovation to near-peers through interpersonal networks (Rogers, 1995).

Early Majority

The next 34% of individuals in a system to adopt an innovation referred to as
“early majority” (Rogers, 1995). Subsequently, the early majority’s unique position between the very early and the relatively late adopters places them in a linking role in the diffusion process, that of interconnectedness in the system’s interpersonal network (Rogers, 1995). Early majority adopters are deliberate for they may premeditate for some time before adopting a new idea. Their decision to adopt or reject an innovation is relatively longer than that of innovators and early adopters because they follow with deliberate willingness in adopting innovations, but seldom lead (Rogers & Shoemaker, 1971).

Late Majority

The late majority consists of the next 34% of individuals in a system to adopt an innovation (Rogers, 1995). The late majority adopters are skeptical and to them the adoption may be both an economical necessity and the answer to increasing social pressures. The weight of system norms must definitely favor the innovation before the late majority are convinced to adopt since they can be persuaded of the utility of the new ideas, but the pressure of peers is necessary to motivate adoption (Rogers & Shoemaker, 1971).

Laggards

The last 16% of individuals in a system to adopt an innovation are called the laggards (Rogers, 1995). Decisions are usually made in terms of what has been done in the previous generations when laggards finally adopt an innovation (Rogers & Shoemaker, 1971). The laggards’ innovation-decision process is relatively lengthy for
they are suspicious of innovations and change agents. These feelings are caused mainly by the fact that “their resources are limited and they must be certain that a new idea will not fail before they can adopt” (Rogers, 1995, p. 266).

Rogers (1995) used the following bell shaped curve to illustrate the five adopter’s categories based on innovativeness. He measured innovativeness by time at which an individual adopts an innovation or innovations whereby the average time was (x). In this case, the classification has three categories to the left of the mean and two to the right as seen in Figure 2.

![Figure 2. Adopter categories.](image)


*Other Categories: Cognitive and Sensory Innovators*

The terms cognitive innovators and sensory innovators refer to latent underlying
personality traits. As Venkatraman and Price (1990) defined them, cognitive traits are "predispositions to seek stimulation with the objective of arousing the mind" while sensory traits are the “predispositions to seek stimulation with the objective of arousing the senses” (p. 294).

Venkatraman (1991) argued that cognitive innovators consider relative advantage important in making decisions while newness influenced the adoption decision of sensory innovators. In their research, Venkatraman and Price (1990) found that cognitive innovators enjoy thinking for its own sake and have a propensity to devote a great deal of mental energy to solve problems they encounter in day to day living while sensory innovators have heightened optimum level of stimulation and seek experiences with the objective of maintaining this state of arousal. So, according to Venkatraman and Price (1990), "cognitive innovators evaluate specific attributes and consider these evaluations important in deciding whether to adopt or not while sensory innovators are impulsive; they are quick in thinking and tend to act on the spur of moment without too much deliberation” (p. 303). Venkatraman and Price further explained, young people tend to be more sensory innovative than older people; “there was a positive relationship between age and cognitive innovativeness and negative relationship with sensory innovativeness” (p. 303). They also infer that gender differs in its relationship with cognitive and sensory innovativeness with men scoring significantly higher on sensory innovativeness. Education was also a factor in determining innovativeness since in Venkatraman and Price (1990) found a significant relationship between education and cognitive and sensory innovativeness, in that higher education was associated with higher cognitive-
innovative scores.

In another research study, Venkatraman and MacInnis (1985) learnt that cognitive consumers make extensive use of verbal information when searching for products and satisfy curiosity about products by finding out how they work. They may also choose products because they are cognitively stimulating. The second category of innovators that Venkatraman and MacInnis mentioned is hedonic innovators. They noted that hedonic innovators are primarily feelers, enjoy stimulation and they are likely to be explorers in novel consumption environments. From their findings, Venkatraman and MacInnis concluded that, some consumers possess both cognitive and hedonic orientations and hence use both modes of experiencing in their exploratory behaviors. Innovators may use both factual verbal and sensory information when searching and may seek and innovate with esthetic and functional products (Hirschman & Holbrook, 1982). On the other hand, there are individuals who are low on both cognitive and hedonic tendencies and so they are likely to prefer known to unknown products and experiences.

Acknowledging that different categories of adopters exist, review of the adoption characteristics of faculty members in the universities is important in that such information may be used to investigate whether these personality characteristics can determine faculty members’ adoption or rejection of web-based instruction. That is, knowing the faculty personality characteristics might assist in finding ways to persuade them to adopt web-based instruction in their teaching.

**Adopter Characteristics**

In an endeavor to ascertain characteristics of faculty who are likely to adopt web-
based instruction, in the light of the adopter categories and characteristics discussed above, an examination of previous related research is important. This view is taken because innovation diffusion research shows that “users of innovations have identifiable characteristics that can be used to differentiate them from non users” (Solem, 2000, p.1).

In his research on differential adoption of Internet-based practices in college geography, Solem (2000) recognized that a combination of factors was responsible for the differential adoption patterns observed in the study. First, faculty members’ research specialty was closely related to how Internet-based teaching was perceived and practiced. Secondly, the place of employment was related to adoption such that rates of adoption were higher at research universities than at comprehensive colleges. On the other hand, although Solem’s (2000) research showed that academic rank is unrelated to faculty’s innovation, he noted that it has a meaningful relationship with any particular Internet-based practice. Thus, any effort to promote Internet-based teaching in colleges should take into account faculty members’ particular needs and circumstances rather than assume that instructional technology offers the same advantages and benefits to everyone.

Indeed as Hirschman (1980) indicated, “Despite the search for demographic and socio-psychological correlates for innovativeness, few attempts have been made to chart its development within an individual over time” (p. 284). She proposed that one explanation for lack of causal investigation is that innovativeness may have been assumed constant for each individual and states, “each consumer is ‘born with’ a certain allotment of innovativeness and this personality trait remains invariant over his/her life
course” (p. 284). This assumption compels one not to focus only on the personality traits but to consider other possible causes of innovativeness, such as the attributes of innovations. Rogers explained that “characteristics of an innovation as perceived by individuals help to explain their different rates of adoption” (p. 15).

Attributes of Innovations

Rogers (1995) defined an innovation as “an idea, practice, or objective that is perceived as new by an individual or other unit of adoption” (p. 11). He emphasized that it matters little whether or not an idea is objectively new as measured by the lapse of time since its first use or discovery. In fact, Rogers coined five attributes of innovations: relative advantage, compatibility, complexity, trialability, and observability, in which each is somewhat empirically interrelated with the other four, but they are conceptually distinct. Rogers developed these attributes with a desire for maximum generality and succinctness. The attributes of innovations explain from 47% to 87% of variance in the rate of adoption (Rogers, 1995). As a result, Rogers emphasized that the better the perception of these attributes, the higher the chances of a successful adoption of an innovation.

Relative Advantage

Relative advantage is “the degree to which an innovation is perceived as being better than the idea it supercedes” (Rogers, 1995, p. 15). Relative advantage is expressed as a degree of economic profitability, social prestige, a redeeming time and effort, low initial cost, a decrease in discomfort and immediacy of reward. Economic
profitability refers to “low prices resulting from low production costs” (Rogers, 1995, p. 216). Therefore, when the price of a new product decreases during its diffusion process, a rapid rate of adoption is encouraged. Social prestige refers to desire to gain social status among adopters (Rogers, 1995). Status motivations for adoption seem to be more important for innovators, early adopters, and early majority and less important for the late majority and laggards (Rogers 1995, p. 214).

Educators have argued that integrating the web in instruction supersedes other methods of teaching especially the traditional methods of teaching. For example, Relan and Gillani (1997) acknowledge, “The repertoire of effective methods is vastly improved via effective use of the World Wide Web in instructional delivery” (p. 43). To Relan and Gillani (1997), the web has enabled teachers to design innovative instruction in spite of seemingly immutable structures in place.

Relan and Gillani (1997) have contrasted traditional and web-based instruction in ways that may be relevant for this study to focus on the attribute of relative advantage. Some of their considerations consist of, firstly, lack of boundaries to the extent learning can take place in web-based instruction unlike in traditional classrooms where learning occurs within a physical boundary, secondly, the design of web-based instruction, which enables collaboration and interaction that leads to effective learning while traditional instruction, tends to discourage social interaction, thirdly, the shift from the textbooks and teachers as the dominant source of information to web-based instruction that enable learners to use highly developed meta-cognitive skills to glean, review, assess, select, and integrate this content meaningfully, with the facility of collaborative discourse,
synchronous or asynchronous simultaneously available on the World Wide Web, and finally, the ability to learn at a distance with web-based instruction, which has been a cumbersome and expensive process with the traditional instruction. In this case, Relan and Gillani add, the learner is able to enjoy the flexibility of time and content, and is able to obtain individualized feedback on assignments. The World Wide Web also provides the ability for instructors and students to communicate privately or collectively in a synchronous or asynchronous manner.

Burgstahler (2000) has identified other advantages of web-based instruction in that the Internet is a powerful, flexible, and effective tool for delivery of instruction and so when "properly implemented web-based instruction promotes the full inclusion of individuals with disabilities in education and leads to greater independence and productivity in employment” (p. 339). Thus, text descriptions of graphic images on the Web pages provide access to blind users and facilitate word search for others.

Mason (2000) conducted a research on online teacher education, which may provide support to the above arguments regarding the attribute of relative advantage in web-based instruction. Mason’ research showed that active participation in an online learning community enhanced opportunities for peer collaboration and reflection while computer mediated communication allowed the participants to engage in self-directed and self-initiated professional dialogue. Likewise, the participants translated the use of technology from personal context to the classroom context such that technology encouraged a paradigm shift so that it became the environment for learning rather than a repository that stores information to be exchanged.
In another research study on student attitudes toward web-enhanced instruction in an introductory biology course, Sanders and Morrison-Shetlar (2001) found that students seemed most comfortable with taking quizzes and accessing course grades through the Web and they preferred using web-based instruction in classroom as opposed to not using it. At the same time, the majority of the students worked part or full-time jobs and so the asynchronous forms of web communication allowed them to log on at their convenience although the students who used the chats regularly believed it helped them in studying for the class. The study also found that the web component was successful in reaching all types of learners and met the needs of diverse group of students.

Compatibility

Compatibility is “the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (Rogers, 1995, p. 15). Therefore, compatibility depends on socio-cultural values and beliefs, previously introduced ideas or the client’s needs for the innovation. This implies that an innovation’s incompatibility with cultural values and preceding ideas can block its adoption because old ideas are the main mental tools that individuals utilize to assess new ideas (Rogers, 1995). That is, previous practice provides a familiar standard against which an innovation can be interpreted, thus decreasing uncertainty. Therefore, a negative experience with one innovation can have a negative effect on the adoption of future innovations. In other words, “the compatibility of an innovation, as perceived by members of a social system, is positively related to its rate of adoption” (Rogers, 1995, p. 324).
The compatibility aspect of web-based instruction can be deduced from Shelly Shelly, Cashman, Gunter, and Gunter’s (1999) argument that hypertext and hypermedia allow students to learn a non-linear way by branching and investigating related topics. Likewise, as students’ interest inspires them to learn more, the Web allows them to continue exploring for additional sources of information since exploration is easy for students because, "Web surfing is like using a remote control to jump from one television channel to another” (Shelly et al., 1999, p. 2.18). In addition, “a web-based course offers advantages for students that live far from a college or university campus or work full time, allowing them to attend class from home or at any time that fits their schedule” (p. 2.18).

Furthermore, Crossman (1997) emphasized that it is easy for faculty, students and administrators to use web-based instruction because the hypertext transfer protocol (http), which is a standard form of uniform resource locator (URL) used throughout the world, opens a homepage in any part of the world. In this case, standardization provides consistency of access and thus the Web user has access to standardized protocols and simplicity of operation in addition to full text, full color graphics, and photography, full motion video, and high fidelity sound. Simplicity of operation is also possible with a variety of search engines, since the simple entry of a key word or words yields a richness of information. Crossman further notes, "The World Wide Web does not only permit the use of most earlier Internet services, it is in color, deals easily with graphics and pictorial materials of all kinds, handles full motion video, and supports very high quality audio, all of which is accessible with commonly available hardware and software" (p. 21).
Regarding web-based instruction, Garson (1998) agreed, “There is increasing interest in the use of the World Wide Web for teaching purposes” (para. 1). Garson performed an experiment for an introductory course in American government in which he integrated traditional and technological innovative educational elements. This experiment was characterized by the absence of lectures, no class attendance requirement, use of an online textbook-related workbook, online reading in place of reserve room reading, online research in place of library research, an electronic discussion group in place of discussion sections, and an email for the advising of students. The major traditional course elements in the experiment were the use of print textbook, traditional midterm and final examinations that consisted of structured and essay items, and a writing requirement.

The results from Garson’s (1998) extensive experiment in web-based political science education for an introductory course in American government reveals that when implemented well, web-based instruction can provide a valid educational alternative that will appeal to a substantial number of students. Web based sections are best seen as part of a mix of offerings rather than as a new mode of instruction displacing traditional forms and they avoid embracing technology in favor of a mix of traditional and new components. At the same time, the traditional instructor benefits from students’ access to web-based resources and from reducing the number of lectures, which frees time for course development.

**Complexity**

Complexity is “the degree to which an innovation is perceived as relatively
difficult to understand and use” (Rogers, 1995, p. 16). Rogers (1995) maintained that some innovations are clear in their meaning to potential adopters whereas others are not, indicating that, “the complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption” (p. 242).

According to Fredrickson (1999),

Over the past several years, many college and university faculty have developed courses or course components for delivery to students over the web [in which case] most of these faculty had expertise or interests that included developing web pages and web based activities prior to commencing their development of web based courses. (p. 1)

Fredrickson (1999) explained that many of these faculty members were highly skilled in using html, a standard generalized markup language, or similar scripting and authoring programs. On the other hand, many other faculty members did not have the expertise, the time, or the inclination to develop the requisite skills needed to create web-based courses. Consequently, “in the mid 1990s, web based instruction programs were developed by institutions and commercial establishments to allow faculty to create web based courses without necessarily having to invest large quantities of time to learning html or similar languages” (Fredrickson, 1999, p. 1). Hence, according to Fredrickson, “Faculty simply have to input their content, resources and other data into the program and they produce professional looking, effective Web based courses” (p. 5). As a result, the development of more web-based instruction programs made more faculty
members start using them to delivering a wide variety of courses. That is, more
development of web-based instruction programs led to more courses on the Web
(Fredrickson, 1999). For clarity, at this juncture two of the Web based instruction
programs (one from an educational institution and one from a commercial
establishment) explained by Fredrickson are considered.

The University of British Columbia developed WebCT for course material
presentation. It is a full service program with both (asynchronous and synchronous)
types of discussion groups, in-house e-mail, file sharing, and students grading
assessment. In addition, WebCT has course tracking by the instructor that shows the
amount of time each student spent on each section, the last time the student visited the
site, the percent of pages visited and similar data. WebCT also includes external links to
references and it is multimedia capable and it has searchable image features, a student
self evaluation component, a student presentation area, note-taking page annotation
abilities, and team grouping abilities as well as timed online quizzes and tests. The
instructor has the ability to allow students to create their own accounts on the system,
which saves him or her a lot of time and hassle developing those accounts. Another
feature that is not present in other web-based instruction programs is a ‘tip of the day’, a
feature that is presented when the user first enters the system to acknowledge him or her.
Fredrickson (1999) establishes that “WebCT is a very powerful and versatile web based
instruction program that is fairly easy to use and has nice features” ()

Blackboard Inc., a leading online education company, developed Blackboard
CourseInfo in collaboration with faculty from Cornell University and other leading
institutions (Blackboard Inc., 2000). Blackboard CourseInfo enables faculty members, students, and administrators to transform the Internet into a productive environment for teaching and learning. Likewise, it has a hands-on demonstration version that prospective purchasers use to create classes that the students can matriculate into courses online for a semester. Blackboard CourseInfo has a student created homepage section, synchronous and asynchronous discussions, test generation and grading components, and built-in e-mail. The Blackboard Inc. (2000) has developed a free Web page where educators can visit and create their own course web sites with their own learning materials and students. If desired, independent instructors can charge students tuition using the Blackboard.com service and together with institutions, instructors can market their courses through Blackboard.com featured course listings (Blackboard Inc. Product brochure). Fredrickson (1999) concluded, “Blackboard CourseInfo has an easy to follow interface and the use is very intuitive” (p.3).

Trialability

Trialability is “the degree to which an innovation may be experimented with on a limited basis” (Rogers, 1995, p. 16) and so new ideas that can be tried on the installment plan are generally adopted more rapidly than innovations that are not divisible (Rogers 1995, p. 243). Indeed, when potential adopters are able to try out an innovation, they are able to give meaning to the innovation and find out how that innovation works under the potential adopter’s own conditions. Thus, there is a positive relationship between trialability of an innovation, as perceived by members of a social system, and its rate of adoption. This argument is true because the innovators have no precedent to follow
when they adopt, whereas later adopters are surrounded by peers who have already adopted the innovation (Rogers, 1995).

In 2000, Jones and Rice conducted a study that demonstrated the importance of trialability in adoption of an innovation. In their research study, Jones and Rice (2000) set out to test the premise that a group of MBA students in a consulting class could enhance their learning and understanding of the course content by utilizing corporate web-based knowledge sharing tools. In this case, "the MBA acted as consultants analyzing customer problems, identifying solutions, and proposing a statement of work to help solve the customer's issues" (p. 100). Findings from this study showed that the use of web-based knowledge sharing tools had a significant impact on student productivity and the learning process. As Jones and Rice affirm, “MBA consulting students, working with their clients and faculty, have captured and documented ‘moments of discovery’ that demonstrate their knowledge about customer, their business processes, their approach to the customer's problem, and the proposed solution” (p. 106). Hence, Jones and Rice concluded that “educators and students can easily draw upon this knowledge base and assess the students' demonstration of their knowledge and experience in management consulting” (p. 105).

Observability

Observability is “the degree to which the results of an innovation are visible to others” (Rogers, 1995, p. 16). The results of some ideas are easily observed and communicated to others, whereas some innovations are difficult to observe or describe to
others. Consequently, as observed by Rogers, the observability of an innovation as perceived by members of a social system is positively related to its rate of adoption.

In 1999, WebCT appealed to Benjamin, then a professor and chair of University of Toledo’s Public Health and Rehabilitative service (Teaching and Learning, 2000). She viewed WebCT as an ideal platform to supplement her on-campus courses and to provide professional courses work within the Ohio Masters Network Initiative Education (OMNIE). Benjamin appreciated WebCT for the opportunity to create the class from the comfort of her home and to interact with students from either home or office. Before beginning the course Benjamin met face to face with her remote students, who had mixed experiences with different Internet learning platforms and did not expect WebCT to be any different. During this meeting, Benjamin conducted a hands-on experiment on the Web course she had developed with WebCT. After the hands-on experiment, WebCT won the skeptical students because they saw for themselves that the syllabus was easily accessible and they were particularly impressed at how quizzes became learning tools. That is, after taking a quiz the students could receive explicit feedback for examination preparation. The students were enthusiastic about meeting online in discussion rooms rather than traveling. After experimenting with several online course platforms, University of Toledo decided to adopt WebCT for online courses.

*Other Attributes*

Fliegel and Kilvin (1966) expanded the list of innovation attributes developed by Rogers (1995) to include characteristics such as financial cost, social cost, return on the investment, risk associated with the product, and efficiency of the product in terms of
time saving and avoidance of discomfort. On the other hand, Hirschman (1981) explained two other types of innovation adoption: symbolic and technological innovations. She explained, “a symbolic innovation is one that communicates a different social meaning than it did previously, while a technological innovation is one that possesses some tangible features never before found in that product class” (pp. 225-226). Therefore, symbolic innovations exhibit product characteristics that have a greater financial cost and smaller social cost than technological innovations and due to their lower costs, symbolic innovations are also more amenable to trial purchase than are technological ones. In addition, symbolic innovations can be observed more than technological innovations (Hirschman, 1981).

**Summary**

Web-based instruction is growing faster than any other instructional technologies such that various web-based teaching initiatives are either being developed or are being adopted by educational institutions. Therefore, the web has changed how teaching, training, and self-directed learning occurs at all ages and stages of life. In fact, educators have questioned the ability of traditional approaches of learning to provide the learner with optimal rather than minimalist environments and with authentic experiences of learning which are meaningful to the learner in some intrinsic manner.

There are different factors that may affect the adoption of web-based instruction in the universities and other institutes of higher education. Firstly, the types of innovation decision relate to an innovation’s rate of adoption in that individual members of a social system or the entire social system can decide to adopt or reject an innovation.
innovation decision comprise of individual optional, collective, and authority decisions. In this case, innovations requiring individual optional decisions are generally adopted more rapidly than when an innovation is adopted by an entire organization. Secondly, an individual’s decision about an innovation is not an instantaneous act rather it is a process that occurs over time. Hence, a decision process consists of a series of actions leading to five different stages: knowledge stage, persuasion stage, decision stage, implementation stage, and confirmation stage. Thirdly, individuals in a social system do not adopt an innovation at the same time rather they adopt it in an ordered sequence that results in an S-shaped curve of adoption. In this case, there are five different categories of adopters classified based on when they first begun using the idea: innovators, early adopters, early majority, late majority, and laggards. Other categories of adopters include cognitive and sensory innovators determined by the latent personality traits of the adopters.

The fifth factor that may influence the adoption of web-based instruction is the adopter characteristics. Users of innovations have identifiable characteristics that differentiate them from non-users implying that the adoption of an innovation is generally affected by the characteristics of the adopters. Sixth, attributes of an innovation affect the rate of adoption in that adoption rate depends upon the perception of the characteristics of the innovation that may be perceived as an interrelated bundle or a complex of new ideas. In this respect, there are five major attributes of innovations developed with a desire for maximum generality and succinctness: relative advantage, compatibility, complexity, trialability, and observability. Other attributes include financial cost, social cost, return on investment, risk associated with the product,
efficiency of the product in terms of redeeming time and avoidance of discomfort as well as symbolic and technological innovations.
CHAPTER 3: METHODOLOGY

Fredrickson (1999) established that more and more university faculty members are using WBI as an integral part of instructional activities. As such, many college and university faculty members have developed courses or course components for delivery to students over the Web. The faculty members integrating web-based instruction in their courses benefit from asynchronous and synchronous communication, virtual space for interaction, and multiple telecommunication environments (Berge, 1997). As a result, as Reid and Woolf (1997) explained, by using web-based instruction, faculty members gain learner control, heightened communication, access to worldwide resources, and a more student-centered learning environment (in Angulo & Bruce, 1999).

However, the use of web-based instruction does not appeal to all faculty members. According to Stoller (1995), the enthusiasm with which faculty members adopt web-based instruction differs. So, if providing faculty members with resources, a series of workshops on teaching effectiveness or books about teaching practices may not be sufficient to enhance their actual teaching practices (Eleser & Chauvin, 1998), what influences the faculty members as they decide to adopt or reject web-based instruction?

The purpose of this study was to investigate the factors that influence the faculty members as they decide to adopt or reject web-based instruction. The research question that guided this study is,

1. What factors influence the decision process to adopt or reject web-based instruction among faculty members?
Therefore, the major aim of this study was to get first hand information from the faculty members who are either using web-based instruction or those that are yet to make their decision to adopt or reject it and those that have rejected web-based instruction. To acquire this information from the faculty members, the researcher used qualitative research methods for this study.

According to Marshall and Rossman (1989), “qualitative research is a broad approach to the study of social phenomena; its various genres are naturalistic and interpretive, and they draw on multiple methods of inquiry” (p. 2). On the same note, Denzin and Lincoln (1994) emphasize, “qualitative research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter (and so) qualitative researchers deploy a wide range of interconnected methods, hoping always to get a better fix on the subject matter at hand” (p. 2). As such, in this study, the researcher used semi-structured interviews and participant observation methods to let the participants (faculty members) explain their experiences that have influenced them to adopt, reject, or to be in the decision process. Therefore, the research findings provided important insights and knowledge from the participants’ point of view.

Rubin and Rubin (1995) argued, “Social research is not about categorizing and classifying, but figuring out what events mean, how people adapt, and how they view what happened to them and around them” (p.34). Thus, the researcher used interpretive approach to analyze the data. Concerning this approach, Rubin and Rubin (1995) explained that interpretive researchers seek thick and rich descriptions of the cultural and
topical arenas they are studying and try to develop an empathetic understanding of the world of others.

Selection of Research Participants

To select the research participants, the researcher got a list of faculty members who had attended Blackboard CourseInfo workshops from the Center for Innovations in Technology for Learning (CITL). From this list, the researcher identified 21 faculty members and communicated with them about the purpose of the study and the importance of their participation in this research study through email and telephone calls. All 21 faculty members responded to the email and 17 of them were able to participate in this study. From them the researcher got potential research participants. That is, at the end of every interview session, the researcher would ask the faculty members to propose another potential participant for this study among his or her colleagues, and they all gave the researcher names and contact addresses to communicate with those faculty members. As a result, through snowballing, the researcher identified faculty members at Ohio University who were using web-based instruction, but had not yet attended the Blackboard CourseInfo workshops or seminars, as well as faculty members who had neither attended the workshops nor were using web-based instruction to teach.

Although not all of the proposed faculty members agreed to participate in this research study due to various reasons such as very busy schedules, most of them did and eventually the researcher interviewed 31 faculty members. In addition, the faculty members mentioned the five administrators who had a direct influence on how they used
WBI at Ohio University and when the researcher informed those administrators about this study, they accepted to participate in face-to-face interviews.

Among the participants, all faculty members had the liberty to acquire the necessary skills for the use of WBI free from the university, the same technical support was available to all of them, and the same resources (computer hardware and software) were at their disposal at any time that they needed them. Consequently, differences that might result from the faculty members being located in different departments, differences in training and technical support, and differences in availability or accessibility to resources, did not affect this study.

Research Participants

As mentioned earlier, this research study focused on faculty members and administrators in Ohio University. The participants included 5 administrators and 31 faculty members. Among these faculty members, 20 of them were male and 11 were female, who had adopted WBI, were planning to adopt WBI, or had rejected WBI. Some of the faculty members who participated in this study had and others had not attended Blackboard CourseInfo workshops and seminars. CITL conducted these workshops and seminars to train faculty members how to develop, implement and maintain web-based courses.

Among the five administrators who participated in this study, two were from the library. One participant assisted faculty members with how to incorporate the library resources into their teaching and at the time of interviews was assisting a faculty member to develop a course web site with information on how to use and get library resources.
The other administrator from the library annex assisted faculty members with library instructions too and was involved in hiring the library staff. In this case, she was involved in redefining the job description of a library staff as a bibliographer to include library instructions. As this administrator explained, normally the role of a bibliographer involves making decisions for requesting books and buying materials for the library, but at the time, in Ohio University, the bibliographers were also involved in helping faculty members to design and develop course web sites.

Two more administrators who participated in this research study were from CITL. One was in charge of the Blackboard CourseInfo training and consultation, while the other directed the activities in CITL and was the one who proposed the implementation of Blackboard CourseInfo at Ohio University. The fifth administrator was from the Division of Information Technology, which oversees the activities in CITL, CNS, CSC, and the Help Desk. He was involved in applying for grant money on behalf of those departments, organizing conferences, and providing technical support to the faculty members and staff at Ohio University.

Pilot Study

Before conducting the interviews, the researcher interviewed two faculty members from Ohio University, one who had just started using WBI and another one who had not yet adopted WBI although she had attended Blackboard CourseInfo workshop. The researcher booked appointments with them to explain to them what the research study entailed and the importance of their participation in the pilot study. During the first appointments, the faculty members and the researcher scheduled face-to-
face interviews that took place in the faculty members’ offices. In these interview sessions, the researcher assured these faculty members that their names will not appear in the report and that the information that they disclose will be in confidence. The researcher also observed the non-verbal communications from the faculty members to see whether they were comfortable and responding freely to the research questions. At the same time, the researcher was able to identify responses that were not in line with the information that the researcher was looking for, which helped in reframing the questions to address the research study.

Both of the faculty members who participated in the pilot study mentioned the departments at Ohio University that support the use of instructional technology. These departments were: Center for Innovations in Technology for Learning, Instructional Media, and the Division of Information Technology. According to the two faculty members, these departments provide faculty members with support in the process of learning, development, implementation and maintenance of instructional technology. As a result, the researcher decided to extend the research design to include interviews with administrators from the Center for Information and Technology Learning, the library, and the Division of Information Technology in Ohio University to learn more about the support offered to the faculty members as they developed and implemented web-based instruction in their courses.

According to Glesne and Peshkin (1991), the idea of a pilot study is "to learn about your research process, interview schedule, observation techniques, and yourself" (p. 30). Therefore, during the pilot study the researcher tested and modified the
interview questions to focus more effectively on the research question. In addition, the researcher identified the most convenient and efficient way to introduce the research study to the faculty members and how to conduct the interviews including approximately how much time to spend with each faculty member.

**Gaining Access**

As explained earlier, the researcher first contacted the Center for Innovations in Technology for Learning (CITL) for a list of faculty members who have attended the Blackboard CourseInfo workshops at Ohio University. After getting the list, the researcher identified 21 faculty members and sent emails (Appendix A) to all of them informing them of the purpose of the study and the importance of their participating in the study. All the faculty members, except four, expressed willingness to participate in the study. Of the four, one was out of the country, two transferred from Ohio University, and one confessed that she was not comfortable with discussing the topic. Therefore, out of the 21 faculty members, 17 participated in this study.

After the 17 faculty members responded, the researcher made phone calls to thank them for their acceptance and scheduled the interviews. During the interview sessions, the researcher gave a brief introduction of the topic covered by this study, requested the interviewees to sign the consent form (Appendix B), and began the interview questions. At the end of every interview session, the researcher asked the faculty members to propose another potential participant among his or her colleagues. Not all of the proposed faculty members agreed to participate in this research study due to various reasons such as very busy schedules as mentioned earlier, but the researcher managed to
interview 31 faculty members altogether. Twenty-seven interviews took place in the faculty members’ offices, and the other four interviews took place in different locations (a studio room, a conference room, and a media center).

As mentioned earlier, the researcher also identified administrators and staff members who support faculty members in using instructional technology and sent an email that described the research study and requested them to participate. All five administrators agreed to participate in the study.

*Data Collection*

Data collection for this research study commenced at the beginning of the spring quarter up to the first month of fall quarter, 2002, which is approximately a six-month period. The primary method used to collect data in this study was qualitative interviewing. As Rubin and Rubin (1995) explained, “Qualitative interviewing explores the shared meanings that people develop in work groups… and any other place where people interact” (p. 8). They further emphasized that qualitative interviewing is different from an ordinary conversation because it calls for listening and hearing meaning to obtain more depth and detail on a narrower range of topics. As such, the researcher used topical interviewing to find out the factors that affect faculty members in making decisions to adopt or reject WBI from their point of view. Rubin and Rubin add that topical interviewing explores the what, when, how, and why something happened. In this case, the researcher developed semi-structured interview questions to remain focused on the study topic during the interview sessions.
The researcher used three sets of interview questions: one for faculty members, another set for staff instructing the faculty members and a third set for the administrators (Appendix C). Although all the questions were geared toward the same research question, different categories of participants had different ways of dealing with the WBI. The interviews were semi-structured. Since different participants had different responses to the questions, the researcher asked probing questions for more details and clarity of points in the interviewing process. “Probes signal the interviewees that you want longer and more detailed answers, specific examples, or evidence… they ask the interviewee to finish up the particular answer currently being given and they indicate that the interviewer is paying attention” (Rubin & Rubin, 1995, p. 148).

Participant observation was the second method that the researcher used to collect data for this research study. The researcher observed participants by attending a conference and participating in a workshop and a seminar that administrators offered to the faculty members. One of the reasons for the use of observation to collect data is it has the least potential for generating observer effects and secondly, it is effectively used with other methods (Adler & Adler, 1994). Adler and Adler support their argument by quoting Phillips that “the naturalness of the observer role, coupled with non-directional, makes it [participant observation] the least noticeable intrusive of all research techniques” (p. 382). In particular, participant observation “demands firsthand involvement in the social world chosen for study” (Marshall & Rossman, 1999, p. 106).

The researcher enrolled for the workshop: Course Design with Blackboard and the seminar: Blackboard 5.5 Course Development, like the faculty members. Enrolling
as a faculty member was an advantage to the researcher because the major aim of attending the workshop and the seminar was to learn how the faculty members are trained to use WBI and whether the faculty members are given an opportunity to actively participate in the learning process. The researcher also wanted to know whether the faculty members get an opportunity to ask questions, how their instructors respond to the questions. Because the researcher did everything the faculty members did, there was no discernible difference between the faculty members and the researcher, which made the collection of data flow naturally.

Concerning the conference, the researcher was invited by one of the university administrators who after participating in this study’s interviews felt that the topics to be presented in the “Spotlight on Learning” conference were similar to the information the researcher was studying. The researcher reviewed the conference schedule and selected one session that closely related to this research study. The session the researcher attended had three goals: to improve students’ learning, engagement and attendance; to improve the transfer of learning to higher level courses; and to ensure more efficient use of faculty time.

During the participant observation, the researcher took field notes that included reflective notes on the implications of the training, discussions, and demonstrations. The researcher reviewed the training manuals and web sites that the instructors gave to the faculty members for more information regarding the topics covered during the training sessions.
From the beginning to the end of the data collection process, the researcher kept weekly reports, memos (reflective field logs), and analytic files (to keep track of useful information and thoughts). Such notes were important for the data analysis because as Denzin (1989) suggested, “all observation notational records should contain explicit reference to participants, interactions, routines, temporal elements, interpretation, and social organization” (Denzin & Lincoln, 1994, p. 380). The researcher also recorded the interviews on audiotapes in order to report the findings in the participants’ own words.

Researcher

The researcher in this research study is a doctoral student in the College of Education at Ohio University in the Instructional Technology program. The researcher has had opportunities to mentor faculty members in building and managing course web sites. For two quarters, the researcher participated a Wired Professor project, along with 18 other doctoral students, to mentor faculty members on how to effectively use instructional technology in their teaching to deliver course material, as well as to promote classroom interaction and communication between faculty members and students. Each student was paired with a faculty member and developed a mentoring strategy based on the faculty member’s needs for the use of instructional technology at the most convenient time for their weekly one-on-one sessions. These faculty members had the resources they needed and were at liberty to choose any instructional technologies that they wanted to implement in their courses. Although different faculty members chose different choices of technologies, all of the 19 faculty members included the development of
course web sites in the topics of interest. Therefore, in that one-on-one mentoring project, all the faculty members developed course web sites.

However, although all the faculty members who participated in the Wired Professor project expressed contentment with the mentoring project, only two of them implemented course web sites in their courses. Consequently, this project left the researcher with unanswered questions of what else the 17 faculty members needed to adopt web-based instruction. That is, first, faculty members had voluntarily enrolled for the project without any cost. Second, mentors (students) based their tutorials on areas that the faculty members said that they needed assistance. Third, the faculty member decided the most appropriate time and day for mentoring sessions. Fourth, mentoring took place in the faculty members’ offices where faculty members were most comfortable. Fifth, all faculty members had personal computers in their offices. Sixth, technical support was available at any time they needed it, and seventh, instructional computer laboratories were available whenever they wanted to schedule classes with their students. In addition, the faculty members did not spend any money of their own to learn and implement web-based instruction. As a result, this project motivated the researcher to investigate factors that influence faculty members as they decide to adopt or reject an innovation with a special focus on web-based instruction.

At the same time, as a student, the researcher had taken courses in which faculty members used course web sites and greatly appreciated the access to web-based resources. Equally, the researcher appreciated the synchronous and asynchronous communication with fellow students and faculty members using emails, listserv and
discussion boards available in the web-based courses. The researcher also liked the fact that assignments and class articles could be sent through attachments and students did not have to wait until class time or walk to the faculty members’ office to get access to the articles or to deliver assignment papers. Similarly, the researcher found the ability for students to send anonymous messages to the faculty members when using web-based courses valuable. When a course web site include the anonymous messages feature, the shy students in a class or a student who wishes to give a suggestion on how to improve the teaching-learning activities and does not want to be identified can freely communicate their view to the faculty members. After participating in such courses, the researcher wondered why even with the knowledge of such benefits, some faculty members are reluctant to adopt web-based instruction.

The researcher maintained respect and dignity toward the research participants throughout the research study as recommended by Stake in that, “qualitative researchers are guests in the private spaces of the world. Their manners should be good and their code of ethics strict” (Denzin & Lincoln, 1994, p. 244). Therefore, the researcher respected the participants’ limits of accessibility and heeded the agreement regarding time allotted for the interview.

Data Analysis

Quoted by Merriam (1988), Ratcliffe states that “data do not speak for themselves; there is always an interpreter, or a translator” (p. 149) and so analysts have an obligation to monitor and report their own analytical procedures and process as fully and truthfully as possible (Merriam, 1988). Therefore, “because each qualitative research
study is unique, the analytical approach used is unique” (Patton, 1980, p. 372). In this study, Denzin and Lincoln’s (1994) model of data analysis is used. They explain that data analysis contains three-linked sub-processes: data reduction, data display, and conclusion drawing. They further note, “these processes occur before data collection in the study design and planning; during data collection as interim and early analysis are carried out; and after data collection as final products are approached and completed” (pp. 428-429). As a result, data analysis in this study occurred before, during and after data collection.

**Before Data Collection.**

Following Denzin and Lincoln’s (1994) assertion that, “choices of conceptual framework, of research questions, of samples, of case definition itself, and instrumentation all involve anticipatory data reduction—which… is an essential aspect of data analysis” (p. 430). In this study, the researcher based analysis on the diffusion of innovations theory: Attributes of innovation, adopter categories and the innovation decision process. At the same time, the researcher defined the site of study as Ohio University.

The choice of Ohio University was a vital site for study because Ohio University provided instructional support, financial support, and resources that faculty members required to develop and implement WBI. The researcher also specified the participants of the study as the Ohio University faculty members and administrators in which, having the financial, instructional, and resources support from the university reduced differences that could have come about due to lack of any of that support.
In the same way, the researcher selected the data collection methods that involved interviewing and participant observation, which made it possible to get first hand information regarding their decision process. That is, use of semi-structured interview questions guided the researcher to stay focused on the topic and to hear from the faculty members the factors that made them make adopt or reject WBI and for those who had not made their decision, the reason making them take long to do so. Likewise, deciding to use an on-going descriptive analysis during the data collection process helped the researcher get ask probing questions to clarify some of the information that was not clear during the interview questions.

*During Data Collection.*

In the process of conducting interviews, the researcher adopted a process of ongoing analysis that guided the plan for the next interview session based on review of the previous interview. Denzin and Lincoln (1994) justified the concurrent process of data collection and analysis in that it guides data collection in a theoretical sampling so that excess and unnecessary data are not collected. They concluded, “The researcher maintains control rather than ‘drowning in data’” (p. 229).

Similarly, after each participant observation, the researcher would go to a quiet place and write reflective notes and memos regarding the observations from the conference, seminar or workshop. The researcher wrote a descriptive analysis for the observations followed by an interpretive commentary on the lessons learnt from the observations. The researcher made sure that all the tape-recorded interviews and the field notes could easily be retrieved, cross-referenced, and linked with original sources.
During analysis, the researcher identified theoretical insights, themes, and concepts that responded to the research questions in this study. That is, the researcher identified the factors that influenced faculty members’ decision to adopt or reject web-based instruction based on Rogers' (1995) diffusion of innovations theory.

*After Data Collection.*

At the end of the data collection process, the researcher had an enormous volume of data that needed additional analysis to reduce its volume and reveal its essence. As Bogdan and Biklen (1998) explain, data analysis “involves working with data, organizing them, breaking them into manageable units, synthesizing them, searching for patterns, discovering what is important and what is to be learned and deciding what you will tell others” (p. 157). Consequently, the researcher organized all the information collected, that is, interview transcripts, reflective notes, memos and material from the faculty and staff, together by saving it in the same folder on the computer.

The researcher read and reread the organized data to gain a better understanding of what the data contained and in the process, the researcher wrote comments on the margins to identify patterns and regularities that were used in developing categories, which the researcher eventually used in interpreting the research findings. For better analysis, the researcher compared emerging categories and further merged them to make sure that assignment of any data into a category did not affect the classification of other data (Merriam, 1988).

Developing categories from the data entails coding the data first. Rubin and Rubin (1995) define coding as “the process of grouping interviewees’ responses into
categories that bring together the similar ideas, concepts, or themes you have discovered, or steps or stages in a process” (p. 238). Thus, following Bogdan and Biklen’s (1998) advice that in any given study, more than one coding family is used, the researcher used open coding, axial coding and selective coding. In this respect, the researcher started with open coding the data, which is defined by Strauss and Corbin (1998) as “the analytical process through which concepts are defined and their properties and dimensions are discovered in data” (p. 101). Use of open coding enabled the researcher to generate general abstract conceptual categories. The researcher then moved to axial coding to develop categories which as Punch (1999) explained, is "the second stage (of coding), where main categories that have emerged from coding of the data are interconnected with each other" (p. 215). As such, in the first and the second stages of coding the researcher looked for repetition in the information obtained and confirmation of the previously obtained data to group data that seem to address one particular factor (Rubin & Rubin, 1995). Consequently, the researcher gained a broader understanding of the categories that developed from the coding process.

A third level of coding in this research study was selective coding. Selective coding is “the process of integrating and refining the theory” (Strauss & Corbin, 1998, p. 143). Strauss and Corbin further noted that deciding on a central category is the first step in selective coding. In this respect, the researcher deliberately selected the data that addressed the research question; what factors affect the decision process to adopt or reject web-based instruction among faculty members? Therefore, the researcher went through the categories repeatedly to merge most of the related data (data that seem to
address a common theme) by considering the main stories, and the outstanding comments among the categories.

To successfully sort out the data, the researcher subdivided selective coding into three categories: context codes, event codes and strategy codes. In the case of the context codes, the researcher considered the general statements regarding the use of web-based instruction that the faculty members and the administrators made during the interviews. Consequently, the researcher found the attributes of innovation that lead to the adoption or rejection of WBI. The researcher gave different attributes of innovation initials AOI and then a number for each attribute. For example, the researcher gave complexity initials AOI 1 and relative advantage initials AOI 3. Event codes focused on the data collected from the participant observations. In this case, the researcher coded training with TR and to the different ways of training the researcher added numbers. For example, the researcher coded workshops with TR1, graduate assistants with TR2, and colleagues with TR3. Effective use of WBI was coded EF and different ways of using WBI effectively were given numbers. On the other hand personal views were coded PV. The researcher eventually used strategy codes for the strategies that the faculty members and administrators followed to assist faculty members when using WBI and coded them with ST. Thus, strategy codes consisted of the responses that faculty members and administrators explained during the interviews as ways to solve the problems that faculty members face as they use WBI.

So by using different types of coding, the researcher did what Rubin and Rubin (1995) advocate, to look at each detail and each quote to see what it adds to the current
understanding, and after finding the individual concepts and themes, put them together to build an integral explanation. Therefore, the coding process made the researcher to examine and compare data within and across categories and to develop themes addressing the factors that affect faculty members in their decision process to adopt or reject web-based instruction. The researcher presents these findings in the next chapter.
CHAPTER 4: FINDINGS

As indicated earlier, web-based instruction (WBI) is growing faster than any other instructional technology, and universities are providing faculty members with accessible hardware, training, and discipline-specific media. Consequently, more and more university faculty members are using WBI as an integral part of instructional activities. In spite of this proliferation, a large number of faculty members are hesitant or reluctant to adopt technology for their teaching tasks. How then do faculty members decide to adopt or reject WBI? To find answers to this question, the researcher conducted a qualitative research study to investigate factors that affect the innovation-decision process among faculty members based on their use of WBI. Rogers’ (1995) diffusion of innovations theory provided a framework for the research study. The research question that guided this research study is: What factors influence the decision process to adopt or reject web-based instruction among faculty members?

Participants

The participants of this study were 11 female and 20 male faculty members from Ohio University. Four faculty members were from the College of Arts and Sciences, two faculty members from the College of Business, nine faculty members from the College of Education, eight faculty members from the College of Fine Arts, seven faculty members from the College of Health and Human Services, and one faculty member from the Russ College of Engineering and Technology. The researcher also interviewed five administrative staff, three females and two males, from the Division of Information.
Technology (IT), Center for Innovations in Technology for Learning (CITL), and Alden Library. Twenty-six of these faculty members had adopted the use of WBI, three faculty had rejected the use of WBI, and two faculty members were planning to adopt WBI in the future.

Among the faculty who had adopted the use of WBI, five of them were teaching distance courses either using the web materials only or integrating the use of video clips and use of textbooks into the web-based course. The rest were teaching traditional classes using a course web site to supplement other teaching materials like journal articles, textbooks, and video clips. As well, out of the two faculty members who were planning to use web-based courses in future, one of them intended to use it for a long distance course.

In this chapter, the researcher reports research findings based on Rogers’ (1995) diffusion of innovations theory in relation to the adoption or rejection of WBI among Ohio University faculty members. The research findings showed that factors that affect the innovation-decision process are not only in the process itself, but also in the attributes of an innovation. Therefore, in this chapter the researcher starts by reporting the research findings about the factors that influenced the innovation-decision process among Ohio University faculty members. Next, the researcher shows how faculty members adopted WBI in their teaching activities followed by the characteristics of the faculty members who adopted or rejected WBI revealed in this study. The chapter concludes with a summary of these findings.
The Innovation-Decision Process among Faculty

In his definition, Rogers (1995) referred to the innovation-decision process as “an information seeking and information processing activity in which the individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation” (p. 165). Uncertainty in this case implies “a lack of predictability of structure, of information” (p. 6). The current research findings portray a picture of uncertainty in the adoption of WBI. For instance, when giving her views about the use of WBI, one faculty who teaches a web-based distance course explained the use of WBI as,

Somewhat, it is like driving through a strange city to a destination you have never seen, but you have a sense that you will like it, and the whole time your only directions come from a walky-talky while you are driving, and you are saying hello, I am lost. Hello, am I there yet, how will I know I am there?

Rogers (1995) showed that the innovation-decision process involves five stages: knowledge, persuasion, decision, implementation and confirmation.

Knowledge Stage

The knowledge stage involves learning that an innovation exists and acquiring some understanding about how that innovation functions (Rogers, 1995). Therefore, for the information about an innovation to move from one individual to another, communication channels are involved. As defined earlier, a communication channel is the means by which messages get from one individual to another (Rogers, 1995).
Communication channels consist of mass media channels used in transmitting messages that involve a mass medium, or interpersonal channels that involve face-to-face exchange between two or more individuals (Rogers, 1995).

Regarding the use of WBI among Ohio University faculty, the knowledge stage of the innovation-decision process was evident from the interviews with faculty members. One faculty member from the College of Health and Human Services reported learning about WBI from a colleague who showed him how to use it in his classroom. That faculty member said that when he was first hired, a colleague of his showed him his website and explained to him how he was using it. He further told him, “It made it easier for students because it is up all the time and the students can access it.” Another faculty member, who was not using WBI by the time interviews were conducted, noted having learnt about WBI from her professors when she was a student. Brochures were other sources of information about WBI, as indicated by a faculty member from the College of Communication: “I must have read a brochure.”

Other faculty members reported to have learnt about WBI primarily through emails from administrators that support the use of instructional technology in Ohio University, as in the case of a faculty from the College of Education who mentioned, “Our chair is really interested about WBI, she is always sending emails saying, hey, this is available.” About five faculty members said that there were other sources of the information about WBI, as indicated in the following excerpt,

I think I learnt through different channels. One was through emails from CITL and through fliers that they had a course workshop. There were
some magazines that were talking about distance learning and how some platforms are available like WebCT and Blackboard for delivering courses. Also, CITL was sending emails that if anyone wanted to develop a web-based course, they would help. In fact, some time ago, there was a call for faculty who want to put their syllabus on the web and they were to give training to people interested in that. It was through CITL or Computer Services Center and I signed up for that and I attended the workshop.

After explaining the knowledge stage as, “the stage which occurs when individual or other decision-making unit is exposed to an innovation’s existence and gains some understanding of how it functions” (Rogers, 1995, p. 162), Rogers then asked which comes first, need or awareness of an innovation? In his response to this question, Rogers emphasized that an individual may develop a need when he or she learns that an innovation exists, or some change agents can create needs among their clients through pointing out the existence of desirable new ideas. Rogers’ argument was apparent when considering responses given by the faculty members at Ohio University. Twenty faculty members who adopted WBI reported to have identified the need before going to learn how to develop course web sites either from the workshops offered in Ohio University, from their colleagues or from skilled graduate students. For example, when a faculty member who was already teaching a web-based distance course in the College of Fine Arts was asked what influenced him to decide to use WBI, he responded,
Well, it goes back a couple of years ago when we decided to implement a distance learning masters program… we were pursuing the possibility of cameras and all these types with pictures, but somehow someone introduced Blackboard to us and we shifted our entire process towards that.

On the other hand, five faculty members reported to have heard about WBI from administrators or friends before identifying a need. An example is a faculty member who, when asked whether he has influenced anybody to use WBI, gave an example of his colleague. He said, “probably my colleague from India, he had no interest in the web before and when I came here, I talked him into it, I told him what I saw as my vision, and he embraced it very readily.”

As a result, findings from this study support Rogers’ (1995) argument that “by no means are perceived needs or problems a very complete explanation of why individuals begin the innovation-decision process” (p. 165). In fact, the above responses support Rogers’ argument that some individuals do not always recognize when they have a problem or a need.

Persuasion Stage

The second stage in the innovation-decision process is the persuasion stage. In this stage, an individual or other decision making unit actively seeks information about the innovation and hence forms a favorable or unfavorable attitude toward that innovation. In the current study almost all faculty members reported to have attended some conferences, workshops, seminars, or to have read books to learn more about WBI. For example, a faculty member from the College of Fine Arts reported to have gained
more information about effectively integrating WBI into his courses from a workshop sponsored by CITL. He said,

If I can reflect on how things happened, and got to this point, I would have to say that a colleague of mine and me attended a workshop at the Ohio University Inn that was done by people from CITL. This workshop was excellent and was for anybody on campus who had any type of instruction going up [on] the web or online. It was more of a sharing type of workshop where people who were successful in doing it were sharing with people who were considering doing things of that nature.

Other faculty members sought more information through individual self-study as mentioned by a faculty member from Russ College of Engineering and Technology, I bought a couple of books about creating courses on the web and just about creating web materials like home page design. I have done some readings, that is, self-study in this area and that is kind of how I started.

At the same time, other faculty members sought more information from multiple sources within or without their university as indicated in the following excerpt, I use Form · Z, which is a very discipline specific software… I mostly learn by reading magazines on the Internet, talking to colleagues, going for conferences…. reading keeps me up with all the things that are going on, and what other people publish.

By seeking more information regarding WBI, some faculty members formed positive attitudes while others formed negative attitudes toward the use of WBI. These
attitudes are vivid from the views that faculty members reported concerning the use of WBI. The views given by faculty members concerning WBI include a response given by a faculty member from the College of Education who is already using WBI:

We are expecting the future teachers to be able to use technology in their classes.... I should be modeling to them and showing them that it is possible, this is how you should do it. It (WBI) should not be isolated into a technology course. It should be integrated across the course; they should see it across the board.

At the same time, other faculty members believed that effective use of WBI depends on the courses that faculty members teach and the instructional needs. One faculty member told the researcher that,

Well, I do not think it [use of WBI] is possible for all people, I think you have to design your curriculum in your course based on a number of things including the course objectives and also your knowledge about your learners…. I mean it will be very hard to teach courses that require a lot of physical or kinetic activities with the web. It will be hard to teach sports and recreational courses. You could show people physical movement… but it will not necessarily give them the physical or kinetic intelligence that they might need to master something.

These research findings also showed that some faculty members believed that since they did not grow up with the use of computers, WBI is more for the young generation that has grown up with computers, mainly because they are not intimidated by
using it. An example of such a faculty member is a professor from the College of Health and Human Services who emphasized that the generation gap has led to his rejection of WBI. That professor explained that the younger faculty members find computers as easy to use as he finds the use of telephones that he grew up with. Another faculty member supported that idea: “I think it is age-related… My children have grown up with the web. I mean they do not know what is life without the web.”

Rogers further noted that, in the persuasion stage, a favorable or unfavorable attitude toward the innovation usually follows overt behavior consistent with the attitude held, but in other cases, attitudes and actions are disparate. This latter view was evident in this study. During one of the interview sessions, one faculty member from the College of Education reported that he had not attended Blackboard training because he was not interested in developing a web course. Despite his lack of action to pursue WBI, the same faculty member gave positive views about the use of WBI,

I think having a web site that you can use for the dissemination of information or links to other places, that is great…. I think those faculty who have done that are moving to the right direction and I think within a short time everybody will have that…. It lets you do some things better. Without the web, you could do the simulations, but the web opens other person’s software sites for you and so you have a variety at least to choose from. The web is like having an encyclopedia so it opens up more resources…. I think the university could facilitate that by having a
template put up and have a site that you would submit syllabi, course material electronically.

However, as Rogers (1995) argued, in other circumstances, attitude and behavior may be consistent. An example of such consistency is a quote from a faculty member in the College of Education,

I started seeing information about Blackboard CourseInfo and in a number of ways, I have had technology help before, although not much about WBI. So when I was invited to do a PT3 grant it seemed like it would be a very good match for me because I had heard something about WBI and I have heard about other ways to enhance a course and I thought it would be a great opportunity for me because it [PT3] did provide a one-on-one tutor… So, it is really wonderful because it really met my agenda. I use it all the time now and I will put it in another course next year…. So, it is a wonderful enhancement…. That is my preference, I understand other people use different styles, but when I am teaching with it we do a lot of interaction and I think what this [WBI] adds to my class is a degree of interaction.

Likewise, the 26 out of the 31 participating faculty members who were using WBI believed that use of WBI has tremendous potential for engaging students in their learning, although some of them advocated that it should not stand alone. Indeed, one faculty member from the College of Education emphasized this idea:
I think WBI has a tremendous potential to increase students’ engagement in a variety of ways... I do not necessarily think everything should be offered web-based without any face to face, but I almost think that everything ought to have information available for every course. … So, if teachers, faculty, and students accept the advantages that web-based instruction would give us, they would use it to enhance what they do.

Succinctly, faculty members had different views or attitudes about the use of WBI, which in some cases correlated and in other cases were contrary to the faculty members’ decision to adopt or reject WBI.

*Decision Stage*

The decision stage is the third stage of the innovation-decision process that “occurs when an individual or the decision making unit engages in activities that lead to a choice to adopt or reject the innovation” (Rogers, 1995, p. 20). In this case, adoption is the “decision to make full use of an innovation as the best course of action available” (p. 171). Of the 31 faculty members interviewed for this study, 28 had reached the decision stage. A comment from a faculty member in the College of Fine Arts explains his decision:

I think we do not have a choice. I think that is where we are, and the next generation of students will come in and that will be their world. …They are growing up in a world where they have all this information, and so, a lot of things that I am helping students with right now, I don’t have to
worry about in the future. They will be walking into the classroom knowing how to do it.

Another faculty member already using WBI supported the idea of all faculty members ultimately using WBI in that,

What I think about is that if you do not embrace the idea about WBI now, you are going to weaken your ability to use it later and soon a new technology is going to replace it. So, it is good to keep up with the curve.

If you do not know what is there now, you are going to really make it a hardship to learn what the next phase is because there is such a wealth of information that is within the vehicle of the web. So, if you are not going to embrace it now, you are causing hardship for those students you are teaching because any research is enhanced by the web and you have to be web savvy to know what is authentic and what is its ups and downs.

On the other hand, “rejection is a decision not to adopt an innovation,” (Rogers, 1995, p. 171), and as in the case of adoption, some quotes from the faculty members who participated in the current study are evidence of rejection of WBI. However, Rogers (1995) explained, “each stage in the innovation-decision process is a potential rejection point” (p. 171) and in the decision stage, he described two types of rejection. One type of rejection is active rejection in which an individual considers adopting an innovation, but then decides not to adopt. This type of rejection was evident in this study in that some faculty started using WBI, but they later stopped. One example is a faculty member in the College of Fine Arts, who mentioned,
When I first started teaching I had a web site for all my classes, but I realized I was doing it just because it seemed like it is a thing that I should do. I realized it was a lot of work…. Eventually I removed the web site from my class because the work it involved was not worth it.

Another faculty member in the College of Arts and Sciences had not totally abandoned the use of WBI, but he was using it in more limited ways than when he started teaching. He told the researcher, “I do not have web sites for every course that I teach and I teach about six courses a year. I used to do that more, but I got too busy to do it.”

The second type of rejection in the decision stage is the passive rejection that according to Rogers (1995) is when an individual never considered the use of an innovation. Passive rejection was evident in the findings from this research study. For instance, one faculty member from the College of Education said,

I was one of the first people to use overhead projectors in the early 1960s in the classroom. I used one for a full year in 1966 and then I went back to the blackboard and chalk…. So I think innovations are fine and I think there will be some people who love WBI, but I will not be one of them.

Another faculty member is not using WBI because she does not expect it to be more efficient than using emails and listserv. She explained:

Now I already communicate with the class via emails and listserv and I guess I do not understand clearly how setting up a web site is more efficient than that. That is, how is it more helpful than that because if a student has a question for me they can email me and if it is a question that
everyone needs an answer to it, then I can send the answer to the listserv.

So I am not sure how having a site can improve what I do.

Therefore, the three faculty members who rejected the use of WBI at the decision stage either never adopted it or adopted it and eventually rejected it.

At the decision stage, “change agents often seek to speed up the innovation process by sponsoring demonstrations of a new idea in a system” (Rogers, 1995, p. 171). In this case, Ohio University sponsored various conferences for its faculty members. An example of such a conference was Spotlight on Learning. The purpose of Spotlight on Learning was to provide a large-scale venue for faculty to "show and tell" about innovative learning-centered pedagogies that they have successfully implemented in the classroom. This conference was designed to promote and recognize the work that faculty members have been doing to engage students in active thinking, inquiry and the discovery of different ways of knowing.

Other ways that Ohio University has sponsored demonstrations includes open houses, as explained by a faculty member who was given a campus tour when he was first hired. The tour demonstrated the services provided to faculty members at Ohio University. He said, “Instructional media services does outreach where they send cards in the mail to all the faculty and they have an open house for faculty to go and see new equipment.”

College forums are another way that Ohio University has sponsored demonstrations for its faculty members, as described by a faculty member currently using WBI when asked how she learnt about WBI:
My first introduction to WBI was last year when CITL conducted a college forum. The dean sponsored this forum where CITL brought folks from CITL and other departments that were using Blackboard and they showed us examples of their classes on Blackboard… and so we saw examples instead of templates being presented by CITL.

Also, two faculty members reported that their dean encouraged them to demonstrate their innovative teaching activities to their colleagues during their staff meetings. Because of such demonstrations, faculty members knew which colleague to go to in case they had a question regarding various instructional technologies, which include WBI.

During some of the CITL seminars and workshops conducted for the faculty members, instructors demonstrated examples of the concepts they were teaching. For example, the researcher attended one workshop, Course Design with Blackboard, where the instructors used a desktop computer and an computer projector to show examples to the faculty members participating in the workshop. In this case, the instructors showed the participating faculty members different course web sites to illustrate how different faculty members used Blackboard tools such as the drop box, discussion board, and attachments. They also showed them building blocks that faculty members could access, from other web sites like respondus.com, to develop assessment items for their course web sites. The instructors gave faculty members web addresses to access those web sites after the workshop and see more examples to gain a better understanding and more information about the content covered during the workshop. In fact, when the instructors
gave the participants a chance to ask questions, one faculty member asked why they did not conduct the workshop in a computer room to allow participants to browse through the web pages used as reference for the workshop. The instructors said that Course Design with Blackboard was an introductory workshop focusing on the pedagogy, but they also conducted advanced workshops that entailed many hands-on activities in the computer room.

The idea of exposing faculty members to how other faculty members are using WBI supports Rogers’ (1995) argument that most individuals do not evaluate an innovation based on scientific studies of its consequences, rather they depend on the subjective evaluation of an innovation by individuals like themselves who have previously adopted that innovation.

In brief, the decision stage was the last stage of the innovation-decision process for five out of the 31 faculty members who participated in this study. Three faculty members rejected the use of WBI while two others were planning to use it in the near future.

Implementation Stage

Rogers’ (1995) fourth stage of the innovation-decision process is the implementation stage. In this stage, an individual puts an innovation in use. As noted earlier, 26 faculty members reported to have implemented WBI. For example, the faculty member who reported to have learnt about WBI from a colleague eventually adopted it. To him, maximizing his free time regardless of the large number of students that he teaches motivated him. He explained:
One of the things that is really important to us, and my colleague shares the same philosophy, is that we have almost 300 students in the program and we have only five faculty that teach most of the classes. So maximizing our free time is very important. So I decided to build a site for every class that I teach so the syllabus is online all the time, assignments are online all the time.

Another faculty from the College of Business explained that he had implemented WBI into his classroom for four years although none of his colleagues knew how. He explained, “I have at least four years that I have been using the web page and people didn’t know what I was doing. They just heard I was using the web, but nobody had any idea of what I was doing.” This faculty member was not the only one who had implemented WBI in his classroom for years. A faculty member who used WBI to teach a distance course told the researcher, “The Division of Lifelong Learning wanted to have some of their courses that are done in the usual fashion as independent courses put on the web and my course was one of the first to be done in 1997.” Still, another faculty who learnt how to use WBI with the assistance of a skilled graduate student explained:

We decided together what my project will be and then stayed with it… We said we are going to have this class on the Blackboard and we went through it following different steps…. This is my second quarter of using it…. from the moment I started learning it, I started using it.

According to Rogers (1995), sometimes the adoption of an innovation may mean exact copying or imitation of the use of an innovation from a different setting or
reinvention may occur. He said, “In many other cases, the new idea changes and evolves during the diffusion process” (p. 174). Considering this research study, in most cases, when the researcher asked faculty members whether they had reinvented anything in the process of using WBI, they responded that they implemented the use of Blackboard Course Info for the exact purposes they learnt during their training. When the researcher asked the faculty members, “Are there other possible ways that you might have discovered or heard from your colleagues that you can implement WBI into a classroom other than the ones taught to you or written in books?”, a professor from the College of Business responded, “I haven’t used it for any other purpose. In fact, I have not fully utilized its benefits like the chat room and the discussion board.” Similarly, a faculty member from the College of Education felt that it was early for him to have reinvented the use of WBI for he had done very little with it and that he was still in the learning process.

However, some faculty showed that, in their use of WBI, they have modified its use to fit their purpose. A faculty member from the College of Fine Arts explained that he was sensitive about the design and so he decided to use animations, which turned out to be favored by his colleagues. He said that when the administrators saw the animations, they were fascinated. From the same College of Fine Arts, another faculty member reported to have reinvented a way of developing a course web site so that he always had a backup. His described his process:

I think one of the things that I discovered on my own is that when you build a web site, put all your pages in one folder. When I make changes to
it instead of changing that folder, I duplicate it each with different dates…. That way if I am working and realize that I have messed it up and like the way it was two days ago, I can go back to what I did two days back. I call that my safety net.

Another area of reinvention that a faculty member from the College of Health and Human Services reported is introduction of a class rotation list into the course web site. That is, 

A colleague came to me and said we need to do class rotation, and I said I agree we need to. One day when I had some free time, I just did it… we fixed it and then I just published it. Now, instead of students coming by to ask such questions, they know that they can go to this web site and check that information and that helps them plan for graduation.

Furthermore, Rogers mentioned, “When an innovation is implemented in order to solve a wide range of users’ problems, reinvention is more likely to occur” (p. 178). In this respect, Ohio University introduced the use of Blackboard CourseInfo to serve any interested faculty members, not just high-end technology users as indicated by an administrator from CITL:

Before introducing Blackboard in Ohio University, there were faculty or groups of people who used various tools because they needed to be high-end users. So, they basically found the tools and did the work, but it was an isolated area of innovation. They were very separate. There was a great number of faculty who were interested in online or web-based
material but didn’t have either time or desire to learn HTML online authoring, and there was no university unit that supported that need. …. So Blackboard was a way to quickly ramp up some success, give faculty an opportunity to experience a web-based environment without having to invest a tremendous amount of time in building web sites.

In fact, for Blackboard Course Info to serve the needs of faculty members, some upgrade took place. An administrator from the division of Information Technology noted,

The problem they got into when it got into being popular: We did a major upgrade about one year and a half ago and we bought Blackboard 5 level 3… level 3 part means it is capable of being integrated with other computers. So, what we did is that we automated the loading of class rosters. So now, faculty can go online, pick a term, and see their list of courses and students…. Every night the web is updated. So, if a student drops a class, the next day the list is corrected automatically. Also, students log in using their oak account [email] passwords and so there isn’t a separate database of passwords to support any more.

In short, the implementation stage of the innovation decision process is evident in how faculty members decided to adopt WBI. Some faculty members implemented WBI according to their training, while others modified its use to meet the needs of their courses. These faculty members implemented WBI individually, in collaboration with their colleagues, or they got assistance from
departments that promoted the use of instructional technology in the university or from graduate students who were skilled in the use of instructional technology. As a result, some faculty members have implemented WBI in their traditional or long distance classes for a number of years and said they still want to continue teaching with WBI.

Confirmation Stage

The final stage of innovation-decision process according to Rogers (1995) is the confirmation stage. Confirmation stage occurs when “the individual seeks to avoid a state of dissonance or to reduce it if it occurs” (p. 181). He further noted, “Individuals frequently try to avoid becoming dissonant by seeking only that information that they expect will support or confirm the decision they already made” (p. 181-182). For example, the faculty member using Form · Z rather than the more popular Blackboard explained that the use of that software enabled his students to accomplish so much that they could not do without it. He admitted that he and a fellow faculty member had problems when using Form · Z, but they did all they could to solve those problems, which sometimes took them many hours.

Another faculty member from the College of Communication said that he had to use WBI to teach his course because, “Well, I teach web design. So, it would be logical that I use a web site when I teach web design.” In this respect, that faculty member reported that he had to always model what he taught his students by using WBI.

At the confirmation stage, Rogers (1995) explained that the change agents have an additional responsibility of providing supporting messages to individuals who have
previously adopted. In the case of Ohio University, as explained by one of the grant coordinators, “We are trying to remove any obstacle that can get into their [faculty members] way to adopt WBI.” Therefore, some faculty members who have adopted WBI not only get supporting messages, but they also get technical, instructional, and financial support from the university, especially those who have received support from grants.

Concerning grants, one administrator said,

> It is only fair for faculty to get release time to develop something like this. Often, when we have grant programs to do this kind of things, we set them up in a way that faculty can take buy ups, where instead of faculty teaching two courses this term, maybe they only teach one course. We provide funding to hire someone else to teach the second course to have time to work on developing an interactive web site for her future teaching.

Other faculty members mentioned that the installation of computers in the dorms has helped them because as one faculty member said,

> Student can sit in their doom room and look at things and it is appealing to them. Like now, looking at this you can answer questions about it and that convenience is a huge thing…. I think it [WBI] makes it [learning] more convenient. My colleague and I have web pages in which we have a number of things…. So, I have things that students can look at. They can get syllabus course schedule, some notes, I have tests online, and so there are many things they can do. They can take a test online and they do not have to come to class, they can do it in their doom room.
In another instance, another administrator explained several levels of institutional support for faculty members using WBI:

There are several levels of support. There is support for all the hardware and software systems; the information architecture, servers, networks, desktops, software application, then there is support for the instructional design…. CITL’s goal is to provide help to enable faculty to design effective instruction in an on-line environment and to use, select or become familiar with some of the supporting tools for software… Right now, Computer Network Services provides central support for the Blackboard server. There is no other such support for any other web-based tool.

At the same time, an administrator from the Division of Information Technology explained that Blackboard Course Info has become “a universal service for faculty just like email. Any faculty member can go online, log into an account and then automatically load it with students.” In addition, the Division of Information Technology has provided shortcuts to the faculty members’ course web sites by creating portals, as explained by another administrator:

Now with the upgrade, we also have a portal, so instead of having to know the web address you can just log into one URL and it knows whom you are and brings up the course that you are taking with that Blackboard account and it will link you right to your course. This upgrade also can aggregate a lot of different information into one place under a single login.
You get this portal field customized with a list of all the course accounts you are teaching or taking in one place. You do not have to go finding an individual course account.

One other way that some departments supported their faculty members was by providing them with graduate assistants. When the researcher asked one grant coordinator from the College of Education about the support that they offered to faculty members using WBI, that coordinator replied,

The graduate students make personal visits to the faculty and they teach the faculty what they [faculty] want to know…. We are trying to remove any obstacles that can get in their way. So, the graduate students will meet with them at their convenient time. For example, we had one participant who lived in Lancaster (45 miles away) and a student would drive there.

To summarize, the findings from this study support all five stages of the innovation-decision process as explained by Rogers (1995). Figure 3 illustrates this adoption rate among the participants in this study.
All the 31 faculty members reached the knowledge and persuasion stages, 28 reached the decision stage, 26 reached the implementation stage and three reached the confirmation stage. These findings indicate that individual faculty members take time to move from the knowledge stage to the confirmation stage as explained by Rogers (1995).

Attributes of Innovations

As Rogers (1995) stated, “Research on predicting an innovation’s rate of adoption would be more valuable if data on the attributes of innovation were gathered prior to, or concurrently with individuals’ decisions to adopt the innovation” (p. 211). Attributes of
innovations include relative advantage, compatibility, trialability, observability, and complexity. The findings related to each attribute are reported in the next section.

Relative Advantage

The attribute of WBI that was most prominent from the interviews with participating faculty members was relative advantage. Rogers (1995) defined relative advantage as the degree to which an innovation is perceived better than the idea it supersedes” (p. 15). As such, in the adoption or rejection of an innovation, it is the perceptions of an individual toward an innovation that matter. That is, does the individual perceive the innovation as advantageous or not? The findings from the current research portrayed the use of WBI as advantageous. That is, even the three faculty members who declared to have rejected it still said that there are some advantages associated with its use. For better analysis of relative advantage, Rogers (1995) identified different sub-dimensions that include immediacy of reward, economic profitability, saving time, and decrease of discomfort.

Immediacy of the Reward.

Immediacy of reward is a sub-dimension that Rogers (1995) explained in relation to relative advantage. In the case of WBI at Ohio University, the 26 faculty members who favored the use of WBI explained how using WBI has enabled them to immediately start engaging their students in learning. For example, a faculty member from the College of Fine Arts, said,
One thing I have learnt, if you want students to use the web, when you talk in the classroom, let what you are teaching be second or third exposures to it…. I ask them to answer some questions [on the course web site before class]… So, when they come to class with these questions answered, and thought about, I would get more interaction between us, unlike before when I would just ask them to read it.

Use of online quizzes increased students’ engagement in learning too. One faculty member, who was teaching with a team of other faculty members, reported that in their course web sites they had an online quiz set to develop the students’ reasoning. Thus, they designed their quizzes such that when the students responded to a question from the online quiz, the page moved to a challenge from the instructor and the student had another chance to go back to the question and reason more why their answers were the best. In addition, faculty members encouraged students to go to the Internet and discover other web sites that covered the class topics. As a result, that faculty member noted that the online quiz helped students to prepare themselves for the class and to know that there were many paths to come to a solution. Thus, that faculty member mentioned that their students became more engaged in their learning activities and they got very enthusiastic about it.

Other advantages that some faculty members mentioned regarding the use of WBI are reduction of students’ note taking, and keeping the faculty members focused on the topic they are covering during the class lesson. These advantages also illustrate the
immediacy of rewards in the use of WBI as seen in the following quote from a faculty member in the College of Health and Human Services:

What I do, I ask my students to print the notes out from the course website before they come to class and that cuts the writing they have to do so that they can listen and just fill in the gaps so that they can spend less time writing and more time listening. I do not like looking at their foreheads; I like looking into their eyes. And if they are writing they can’t listen and write at the same time and comprehend as well. So that was my way of cutting down the amount of writing students have to do. The other thing it [WBI] does to me is that the structure keeps me focused. In other words, if I start talking about other things, the structure always keeps me, that is, if I get off base, the outline brings me to the point that I left off on it…. It is just more organized and it is better to students and to me. It helps the learning process. My students write less and listen more and the feedback I get through the evaluation shows that it is of great help…They seem to value it.

_Economic Profitability._

Rogers (1995) identified economic profitability as another way to express the degree of relative advantage. In fact, seven faculty members reported the reduction in printing cost as one advantage of using WBI, to a point that low printing cost was the main reason that two of these faculty members started to use WBI. The following excerpts support this view.
Faculty E: It [WBI] saves a lot of money. When I make copies, the budget comes up here, or the students had to go and buy a packet, or they had to come here and make some copies. So, this is less expensive because I have between 400-500 pages of article readings.

Faculty F: When using Blackboard here in college, I am doing it with another faculty. She said to me that we needed to put our course online to reduce copying cost in our department. It is a damn reason and it is working. It is not about pedagogy, it is not about going to scale, it is not about quality of teaching, it is about 5 cents a copy. Isn’t it damn? Nevertheless, it is working. It is okay. We have reduced copying cost and finally we have our course on the web.

Decrease of Discomfort.

Another sub-dimension of relative advantage identified by Rogers (1995) is a decrease of discomfort. Two faculty members associated web-based instruction with more convenience in distributing information to their students, as portrayed by the response from a faculty in the College of Fine Arts:

After knowing how to use the web, it is very easy for me to distribute information, earlier I would normally go to the copier machine, make copies, staple them, and hand them to students in class, but now, I do not have to go to the copier very often; I use the web page. It [WBI] becomes a point of convenience in some ways for the faculty because of something like that; you do not make copies. Or sometimes I worried about those
several students that missed my class and I would take to them notes, but now with the notes online, if someone says that he or she missed a class, it is all on the web page. So, it eases the difficulties for me as a teacher from that point of view.

Another faculty member reported a colleague’s experience. Before using WBI, the colleague was facing a problem of overflow in large enrollment classes. He explained how redesigning the course using web-based instruction helped to solve a pedagogical problem:

For example, my friend and his colleagues redesigned Biology 100. They had to rethink pedagogy, what needs to happen in class and outside the class to get students prepared…. They did not involve very elaborative technology, but they got to resolve their problems and got their students more engaged in class, getting enthusiastic, learning at a higher level going on to higher level biology courses and remembering more of what they learnt in Biology 100.

Still regarding the decrease of discomfort, two faculty members said that they find the use of WBI a good way to change from the traditional method of teaching. One of these faculty members from the College of Education explained how exciting it is to her when she rethinks the courses she had taught using the traditional methods and that she is happy to know that she is moving in the right direction. The second faculty member who was from the College of Business, said,
I think the students are reading more when learning with the web. You know, I was getting bored in the traditional class where I was going to reread the book, but now I am reading the answers and seeing whether they have understood the concepts or not.

_Saving Time and Effort._

Considering the idea of saving time and effort that Rogers (1995) associates with relative advantage, all the 26 faculty members who were using WBI explained that they are able to cover more in their teaching. One of these faculty members expressed this advantage in that,

Sometimes during class discussions, maybe we don’t have enough time to get assignments out early, so I send that through emails. Sometimes I ask them to respond to questions through email attachments and I can have those responses when I go back to class, and that shows me who is in which camp. For my distance learning students, I use Microsoft Word, send documents, post questions on the class web site, and then ask them to answer and send them to me. So, I write my questions in red and they respond in black. I can also respond to them to let them know whether they are in the right track. I send this through attachments.

The ability to have diverse and concise ways of communicating information to many students in a short time and being able to communicate with students at anytime and from anywhere is an advantage that all faculty members expressed during the
interviews. For example, one faculty member from the College of Health and Human Services mentioned,

Different people’s minds operate in different ways. Some students in class like to be told things, other students in class like to see things printed out, and other students like to see things on computers. So, what I like to do is to cover all the ways. Also, what this does, it reinforces the message. They say you need to tell somebody three times before they completely understand everything…. The advantage is that my course web site is one place that all students can go to and see a review of all of the information. So it is concise with the paper copies if they do not keep their files organized, and they can access it from anywhere in the world… because all they need is to get on the Internet and look for my web site.

Other advantages of using WBI reported by the faculty are the ease of use and consistency, which represent a decrease in discomfort as well as saving time and effort in the attribute of relative advantage. Thus, according to one faculty member from the Russ College of Engineering and Technology, WBI is “easy to use, it has a consistent interface and it has some essential tools… that require relatively minimal technical support.” Another faculty member added,

I think consistency is one (advantage) because if you have something online and you are making comments about it, everyone has the ability to see it and that means there is consistency. Otherwise, when you make a comment in a class, someone might miss it because they could be facing
somewhere else, they could be a little bit shy about asking you to repeat what you said, or maybe you are addressing it to one student. When you address it publicly and it is written down, all the students can read and that is a major advantage of the WBI. There is also clear communication in addition to consistency.

Rogers (1995) emphasized that many change agents use incentives to increase the degree of relative advantage of an innovation. He defined incentives as “direct or indirect payments of either cash or in kind that are given to an individual or a system to encourage some overt behavioral change” (p. 219). In this study, the researcher identified a monetary incentive to faculty members using WBI. In this case, the researcher was browsing through the CITL web site and it had a promise of 250 dollars to any faculty member who develops courses on the web. However, faculty members reported the need for more incentives to encourage the use of WBI among them. The suggested incentives include teaching awards, promotions and opportunities to publish. Faculty members reported that awards, annual merit ratings and promotions were rarely based on the use of technology in teaching. One faculty member, who had received teaching awards, but did not use web-based instruction or any other instructional technology said,

I have won a university professor award and a college outstanding teacher award and you know I feel I am doing something right. I get a lot of good feedback from students about how I teach and so I have never seen WBI as a very necessary thing.
That faculty member explained that when faculty members are considered for teaching awards, what matters is passion, knowing how to engage students, how to create a comfortable safe classroom, knowledge in their subject, academic vigor, having students learn as well as being able to bring life to the books, readings, and coming up with assignments that integrate the course content. So, to her use of instructional technology was not a priority.

Likewise, a faculty member who had adopted WBI expressed that if the work they do using WBI could have a way of being published, more faculty would adopt it. That is, if there were something that could be orchestrated by professors so that it could easily flow into an article for a trade journal, this would boost the use of WBI because publishing is ever present in the faculty mind. Also if there is a little gift or award, that would help. So, if there are a series of awards to the individuals who have successfully published their web pages, then that would be a major plus for the faculty… there has to be some monetary benefit.

Still a faculty member from the College of Arts and Sciences expressed that, We do not get rewards from the university for it (teaching). We get rewards for research though. If you bring research money, they give you a kick back. So, for us to spend extra time teaching, we do it mainly because I have to stand in front of students and I do not want to embarrass myself and I want to get good product. The university does not reward teaching classes even in the tenure process.
In summary, all faculty members who participated in this study reported that using web-based instruction was advantageous. These faculty members explained how using web-based instruction provided immediate rewards, economic profitability, decreased discomfort, and saved time and effort in their teaching activities. As such, although three faculty members rejected web-based instruction, the faculty members who reached the implementation and confirmation stages of the decision process reported the relative advantage of web-based instruction as having a great influence on their decision. On the other hand, faculty members reported the need for more incentives such as teaching awards, promotions and opportunities to publish.

Compatibility

Compatibility is another attribute of the innovations that this study found as having an impact on the faculty members’ decisions to adopt or reject WBI. Compatibility is “the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters” (Rogers, 1995, p. 15). Rogers affirmed that if an innovation is compatible, the individual finds it familiar for he or she can give meaning to such an innovation. He added that an innovation can be compatible or incompatible with socio-cultural values and beliefs, with previously introduced ideas, or with client needs for the innovation.
Socio-cultural Values and Beliefs.

In the current study, compatibility or incompatibility of an innovation with socio-cultural values and believes was identified as an influence in the decision to adopt or reject WBI among faculty members. Three faculty members declared that WBI is incompatibility with their styles of teaching. They reported physical presence as the best way to teach. They explained that face-to-face teaching is the way they prefer to teach as expressed by the following excerpts from a faculty in the College of Education (Faculty J), another faculty member from the College of Business (Faculty K) and a third faculty member from the College of Health and Human Services (Faculty L).

**Faculty J:** I do not take Blackboard training and I am not interested in developing a web course because in fact one of the strengths and one of the things I enjoy about teaching is personal contact. I enjoy it and I think it’s one of the things that I do better than other things. So taking away from me those things I enjoy and those things that I do well and having to cost me time, is not attractive to me. I do not see it [WBI] as an improvement.

**Faculty K:** So far we know, state universities still use face-to-face instruction… It is freer and less structured. In the same way when teaching the classes, I want to establish warm, personal and productive relationships with my students. I can still establish a personal relationship with students in Afghanistan by the web if we are of the same language, but I do not prefer that. I am of the old generation where I prefer to have a group of students in a class.
Faculty L: I prefer to talk to someone face-to-face… although I use email all the time… So, everybody has a preference of discussion. When it comes to teaching, technology is a very detailed kind of issue, and emails are not good for exchanging that kind of information…. I need to touch base with people when it comes to dealing with complex issues.

The importance of values associated with an innovation in the decision to adopt or reject WBI among faculty came out clearly from a response by a faculty member who was not using WBI. After the researcher asked that faculty member to give a general view about the use of WBI he replied,

It is always a matter of priority. There are people who have invested in the web and web instruction and they feel that is a superior instructional tool. Those persons I believe invest good amounts of time and energy into that. I think there are others who feel that is valueless and they cannot give it any time.

Previously Introduced Ideas.

In addition, it was evident from this study that compatibility or incompatibility of an innovation with the previously introduced ideas affected faculty members when deciding to adopt or reject WBI. For example, a faculty member from the College of Education mentioned,

I think older people tend to be a little more conservative, meaning that they hold past activities perhaps with higher value because they have lived with them and have seen some of the traditional pieces pass the test of
time. They tend to work pretty well over a period of time. Innovation is always neat, fun and exciting, but you should look more critically at it…. The web is unique, isn’t it? It has a dominant role, but its economic importance was a bit over rated.

In another instance, a faculty member who is not using WBI mentioned,

I am talking of experience. I remember when television was going to revolutionarize the classroom; I was one of the first people to use overheard projectors in the early 1960s in the classroom. I used one for a full year 1966, and then I went back to the Blackboard and chalk because these were flexible, took less time, was better. I think over the years we find what works for us and what we can do and we try to do those things as best as we can…. I think innovations are fine and I think there will be some people who love WBI and I will not be one of them…. I have taught via the microwave, I do not like it and I think web-based instruction is further removed…. So I think the web is very useful but having seen some of the other innovations having impact but not revolutionize the classroom, I do not expect this to be much different.

As noted earlier, all the 31 faculty members who participated in this research study talked about time. They all mentioned how using WBI takes more time than the traditional method of teaching that they had been using before the introduction of WBI. One of these faculty members from the College of Arts and Sciences gave a breakdown
of how faculty members spend their time when using the traditional method of teaching.

She explained,

The bottom line is, it takes approximately 30% of my time to teach a class of 100 students. That is, the truth is I work more that 40 hours a week because it takes an extra 12 hours to be in class, prepare material, time to get to and from the classroom, time to answer students’ questions, time to write and grade exams. If I am teaching two classes, which is what most of us do, we teach 5 classes per year and usually the second class is not a large class, but it is a laboratory class coming to a total 15 hours a week. So, together they add to 67% of our time.

She further explained that if innovation, which includes WBI, is added, the work of the faculty is increased. That is,

If you are going to innovate, you can, but to teach a course for the first time or to significantly innovate takes approximately four hours per one hour of lecture. If you do minor innovations it may be two hours…. It would take 60% of my time for a single course of the 40 hours per week, in other words, 24 hours per week to innovate.

Client’s Needs for an Innovation.

Considering the idea of compatibility with a client’s needs for the innovation, an example was reported by a faculty member who teaches web design. He said:

I think it [WBI] is highly compatible. Every classroom that I have taught in the past two years has had Internet connections. If they do not have a
computer, I can bring my own computer and projector. So, I plug it in and if I have my web site up I just pull it up, and say this is what we are talking about today. I am going to cover it and if you want more information, you can go here, here, here. So in general if the students want to learn more of it they can write it down, they see it, hear it, they can go back and review it so it is super compatible.

Another example of need for an innovation is that WBI enabled students to plan for their graduation on time. That is, students could register for courses even during their vacation time, as explained by a faculty member from the College of Education:

We did an experiment this summer when I was in Germany. My students were in Athens, California, Italy for a study abroad, and I did not have to be here in Athens either. I was in Germany and in India, and I was able to communicate with students and they were able to communicate with me.

So, it worked out both for me as an instructor and for the students.

Likewise, because online courses did not have a schedule conflict, students took more than one course simultaneously enabling them to meet their graduation deadline. Talking about the scheduling, a faculty from the College of Business reported:

They could be students who have class conflict and they want to graduate on time. For example, a student could be in Athens campus and could be taking another class. That student may be enrolled in my online course because a traditional class conflicted with the class they wanted to take…
It is useful in some types of courses that students can have an opportunity to take two courses at the same time.

**Trialability**

Rogers (1995) defined trialability as “the degree to which an innovation may be experimented with on limited basis” (p. 16). Rogers further noted, “Most individuals will not adopt an innovation without trying it on a probationary basis in order to determine its usefulness in their situation” (p. 171). He explained that by personally trying out an innovation, an individual finds out how such an innovation works under one’s own conditions. Thus, “trial is a means to dispel uncertainty about the new idea” (p. 243). In the current research study, findings supported the value of trying WBI before using it. As such, some faculty members tried WBI during their learning process. That is, they tried WBI as a supplement to their ongoing courses, as explained earlier. At the same time, administrators have provided opportunities to the faculty members to try the use of WBI before implementing it in their classrooms. For example, CITL has a web site that allows faculty members to create temporary courses as a self-learning process. In this case, faculty members use this web site to create temporary course accounts even with no official record of this course yet, and then later they can create an official course account and copy content into it, as was explained by an instructor from CITL.

The hands-on activities during the workshop training are another way that a majority of the faculty members reported to have tried the use of WBI. One faculty member explained that during one of the interviews, in the Blackboard workshop,
We were given an overview of what Blackboard can do and then we were
given some tasks to learn how to do. We had to learn how to log in, how
to type in information on the announcements, [upload our] syllabus….

We had specific tasks that we were working on and if we had trouble
when working on them, somebody came to help us with it.

Therefore, faculty members got the opportunity to follow systematic instructions
from the instructor on how to develop course web sites using Blackboard CourseInfo.

The researcher asked one faculty member who was teaching a distance course using the
WBI whether he used WBI immediately after learning about it, and he responded,

Not until I took this other course from CITL, which went deeper-into
actually not saying you can post your course online in this particular box-
but it went into when you are communicating with the people online, this
is the way you have to write, and how to set up modules…. We got to
visit the web sites [used for training] ourselves and we got to read all that
information…. All of these things became clear to me that this was
possible. Not only could we deliver it, but also we could deliver it more
effectively with that [web].

Another faculty member, who had developed a course web site using Netscape
Composer, but attended a Blackboard Course Info workshop for more information,
explained,

I attended the workshop to see whether Blackboard was better than what I
have right now, so that I could improve mine and it was better. I met all
my goals when I went there. I found everything I wanted and I think I made an intelligent decision whether or not I needed to switch over.

Other faculty members tried the use of WBI on their own. One faculty member from the College of Fine Arts reported that, after knowing about WBI and understanding how it functions, she decided to try it on her own through trial and error. That is, when the researcher asked her whether she acquired the skills from training as one of her colleagues had reported, she said,

No, I did not have an opportunity to do that. I actually got started before, but when he took the course, he shared his information with me and a book that he got, “Practical tips on teaching online,” and when I read it, a lot of it I had already figured out through trial and error. I was going, I wish I had this book earlier because it would have helped me over some hurdle. I had started before I had an opportunity to use the book.

Therefore, faculty members tried the use of WBI during the learning process either in self-study, while teaching authentic classes, or during the training sessions conducted at the university.

*Observability*

Observability “is the degree to which the results of an innovation are visible to others” (Rogers, 1995, p. 16). To some extent, the findings of this study supported the idea of observability. Some colleges in Ohio University provided opportunities for faculty members to demonstrate the how they used WBI in their classrooms to their colleagues. An example is the College of Business from which two faculty members,
who participated in this research study, explained how their director encouraged faculty members to demonstrate their innovative teaching activities during the staff meetings. One of these faculty members said, “In our department, communication is pretty good. We do have a director who advocates for it and so we show the rest of the faculty what we are doing when we go for staff meetings.” Therefore, other faculty members are able to see what their colleagues are doing and to ask questions as explained by the second faculty member,

   In our department, I presented a course last week…. I think there is need for more organized effort to communicate or demonstrate to faculty what others are doing using the web. I think that is lacking and it can be done on departmental basis…. There was a lot of interest from them [faculty members], but they were, wow! You are putting in a lot of time. What about testing online? What if students cheat? I said, yes, they might cheat, but I can only minimize this cheating.

   Likewise, as explained earlier Ohio University held conferences for faculty to see how their colleagues are using WBI, as in the case of “Spotlight on Learning,” a conference that was organized to provide a large-scale venue for faculty members to demonstrate innovative learning-centered pedagogies that they have successfully implemented in the classroom.

   **Complexity**

   Rogers (1995) defined complexity as, “the degree to which an innovation is perceived as difficult to understand and use” (p. 16). During the interviews, faculty
members portrayed complexity in the use of WBI in different ways. A faculty member who is already using WBI explained,

To begin with, using a new technique requires investment of time and effort. So to start using the computer will take a lot of time and effort at the beginning before anything comes out of it. So, if somebody is not familiar with the computers, it will take them some time and effort just to get to a point where they can do anything, and I am sure they are not willing to spend that effort.

Therefore, how fast faculty members understood the use of WBI mattered in deciding to adopt or reject it. One faculty member from the College of Fine Arts, although using WBI, said that difficulties in learning how to use WBI intimidated her colleagues such that they did not want to get involved in it. She said,

If you are quick at something or if it comes to you easily, you are more likely ready to try it, but if you have been intimidated by it from the beginning, you do not want to deal with it. A lot of people like later generations than I and probably a lot of people in my generation are intimidated by it, right a way because it is hard for you to open it and say, yes, I think I will give this a try. So, there are a lot of faculty here that would rather not get involved in it.

In fact, five faculty members complained about the technical jargon used in training. One faculty member told the researcher that she decided to use WBI after
getting involved in a grant that provided her with a graduate student to teach her how to use WBI. She said her decision emanates from the fact that finally she could understand the jargon. That faculty member said,

The big thing is that it [WBI] is being explained to me in a very simple language without the technical language, and that has built a lot of confidence in me. I have written little notes on how to get into different things and any question I have, my graduate assistant is able to answer. It is not long technological responses, it is just how to make the web do what we want it to do and I think that is what some of us who are not technologically gifted, we just need to know. We just want someone to come and show us what we want the computer to do for us.

Another faculty member, interested in using WBI, explained that she attended a Blackboard training session in which the participants were given notes for future reference. That faculty member said when she tried using the notes in her office, she could not understand them and that made her not want to use WBI. She mentioned,

I am teaching this course, and a little bit ahead of time I got out that folder of Blackboard CourseInfo, and I opened it, and it was something in a foreign language. I had no recollection of what was in there and so I found another way of doing it.

Similarly, faculty members who were not familiar with the use of WBI reported that they found it hard to use. When the researcher asked two faculty members, both from the College of Health and Human Services, why they are not using WBI they said,
Faculty M: The drawback for me is that it [WBI] requires understanding of the technology and the learning curve is different for people especially for people who did not grow up with technology, and consequently I do not think I would use it to an extent that I think could be fun.

Faculty N: Fear, I know an early fear because I was afraid of making my first class too, but I also know that I really have an ability to create a safe engaging classroom with WBI…. So, I can move beyond that fear of learning it, fear of my learning curve.

In another instance, one faculty member from the College of Education reported the pace at which the training took place as a reason of not using WBI. She said, “When I attempt to attend workshops that they have, I do not get what they teach. They are too fast for me.” Another faculty member from the Russ College of Engineering and Technology emphasized that lack of knowledge of how to apply theory into practice makes it hard for faculty members to use WBI. That is,

Rejection of WBI might be an institutional issue. You have students with a PhD in Engineering and you make them faculty members…. How do they know how to be a teacher?... They understand the technology, but they have a deficit of understanding how to apply it in teaching.

Adoption of Web-based Instruction by Faculty Members

As explained earlier, Rogers (1995) defined adoption as “a decision to make full use of an innovation as the best course of action available” (p. 171), but in this study,
adoption is the intensive or limited use of web-based instruction by faculty members either as a supplement to other techniques of teaching or as a complete web-based instruction in face-to-face or distance classes. Findings from this study showed that out of the 31 faculty members who participated in this study, 26 had adopted WBI while five of them never adopted it although two of them were planning to do so in the near future.

Mainly, faculty members who adopted WBI in this study designed their course web sites using Blackboard CourseInfo, which was the only courseware tool sponsored by Ohio University by the time of study although there were faculty members who used other courseware tools to develop WBI. Some of these tools included Adobe PageMaker, HTML, Dreamweaver, Netscape Composer, Lotus Notes, and Form · Z to develop and implement WBI courses as explained by a faculty member from the College of Arts and Human Services:

Right now, I am using Adobe PageMaker, which is a cheap program. I have access to Dreamweaver, but I have not had time to learn it. I was using HTML before, but when they introduced the shorter programs, I tend to use them instead. We have Netscape Composer in our computer classroom and so I teach my students how to use it.

In another interview session, a faculty member explained that he used Lotus Notes to develop a Masters course when his college (College of Business) requested him and other five faculty members to design web-based courses for a distance Program to Malaysia, which as he mentioned, gave him “confidence to use blackboard later.”

Other faculty members used Internet Explorer to design WBI too. One
faculty members from the College of Fine Arts emphasized that using Netscape explorer to design WBI is convenient for students because,

When I think of it right now, today most students are coming with pervious knowledge of Internet Explorer and that is the common denominator. So, it is an easy flow like reading a book, they already know this and they do not have to learn anything to work with it. So, if I put my syllabus in that format they can just go to it.

Form · Z was another courseware tool used by faculty members to design WBI as mentioned by a faculty from the College of Health and Human Services,

I use form Z, which is very disciplined specific… somebody telling me to have a look at it, I downloaded a free version and I said okay this is good… we are using it is because of three dimensional animations, the ability to create plan views, also as a source of different information structure based on 3D visualization. So we created an entire different environment on the computer use in our program.

As a result, faculty members who adopted WBI used it in varying ways in both face-to-face and in distance courses. The following section presents different ways in which faculty members used WBI in their teaching activities.

*Adoption of Web-based Instruction in Face-to-Face Classes*

While teaching students in a face-to-face classroom, faculty members used WBI to supplement their traditional methods of teaching as one of them said, “ My way of using the web is more of web assisted or supplementary instruction rather than WBI.”
Thus, some faculty members used WBI in limited ways as one faculty member confessed, “I am doing very little with WBI. So far, I am co-teaching with somebody and we are using blackboard, but I am doing very little with it” while other faculty members used WBI in intensively in various ways. That is, some of the faculty members used WBI only for communication through emails, listserv, chat, or discussion boards. For example, a faculty member from the College of Arts and Sciences explained that his emails come from different sources and so he decided to use WBI “to know that I am talking to my senior classroom and that I am posting certain information and I can repeat or echo that next year and the next.” In another instance, another faculty member mentioned that he used WBI for class discussions using the chat, listserv, discussion board and email. He said,

We tried the discussion [discussion board] part in the online office hour where I would set up two hours, and I would go to the computer and they would get to the computer with whatever questions they needed to ask me. That faculty member reported that he also used the chat, but using the chat feature was not convenient for the class because,

The problem was that chat room did not work very well and the students were not familiar with the discussion board at that time…. We ended up using listserv on most of the communication…. In fact, there were times when during my office hours instead of using chat room, I would email students.

Still another faculty member said,
In terms of the WBI, I think I have started using the emails more. Also I like the interactions when using the listserv. I felt really good about some of the things we did and what I would do is, I would put a topic on the listserv every other week and I would ask everybody to respond and we had some good online discussions about various things. Probably we could have done it in class, but certainly we did not have time in class and it had a different feel to it. Whether it was good or bad, I do not know, but it was certainly a useful kind of discussion.

In addition to communication, faculty members used WBI for reference materials as indicated by a faculty member from the College of Education who said, “The WBI is purely to get access to materials and for communication. We use the chat room and some of other features in there.” Other ways that faculty members used WBI to supplement their traditional method of teaching was giving class projects, exams, and for reference materials as in case of a faculty member in the College of Education who explained that he used WBI in various ways,

I used it for links for students to go to their projects. They had to go to various web sites that were reference work, different course information from the web…. Also, they took exams using CourseInfo…. There was also a place where they could do group projects and some of them did that and apparently they were successful with it…. I don’t know whether the chat room was any better than any other discussion, but I think they used
the emails more because it was set for such a small group and it was easy for them to email everybody within the group.

In the same case, a faculty member from the College of Health and Human Services explained that his students posted all their work as web pages and because of the nature of their discipline and visualization that is required he used WBI together with hand based tools; scanners, digital cameras, digital videos, and web videos. Likewise, another faculty member mentioned, “I sometimes teach students how to create web pages and I have had writing projects where they have created web pages instead of writing essays.”

Other faculty members used WBI both for their coursework and for other services like student advising. A faculty from the College of Health and Human Services gave a detailed explanation about how he was using WBI:

I decided to build a site for every class that I teach so the syllabus and assignments are online all the time. I have the ethic journal projects, their grades with their ID numbers and all that is online 24-7 so that they can access any time. There are a lot of things I put on my web, not just classes notes, advising, class rotation for students to know when faculty are teaching different classes, I have a site to help them write their resume, a link for students looking for jobs and internships…. So when writing my web page I include the web sites that have job opportunities. That is, companies that have job opportunities and internships available…. So,
when they come with that information, I am able to maximize my time
during the appointment time.

As a result, faculty members who used WBI for face-to-face instruction used it in
varying ways and some used it more intensively than others did. However, not all faculty
members used WBI for face-to-face instruction, but some used it for distance classes.

Use of Web-based Instruction for Distance Courses

One perspective that most faculty members revealed in this study was that using
WBI for distance courses suits Masters programs. For example, a faculty member in the
College of Education expressed that WBI fits a Masters program because,
I think running Doctoral programs on the web is like selling mail order to
Greece. I think it is not very good…. The web does some things
exceptionally well, but the mistake is to think that it does everything for
everybody and that it will replace everything.

In the same view, another faculty members from Russ College of Engineering and
Technology noted that in order to develop a distance WBI, “You have to perceive a real
need in this case. In our case, we were interested in developing a Masters level course.”
That faculty member explained that faculty members from different universities were
developing such courses and then their students could enroll for any of them. So as he
mentioned, “The benefit to us and to our students is giving us courses that we may not be
able to offer in our departments… our graduate students will be able to take the web-
based courses that we do not teach and vice versa.” He further expressed that “for
undergraduate courses I do not think we would have such motivation to teach…. there is
no real need for distance learning at undergraduate level.” The reason for his argument was that undergraduate students need to be equipped with some basic skills to be able to learn at a distant and so he argued, “it is not physically possible because there is some things that you can not put on the web. It is not practical for engineering primarily for undergraduate level students.”

Another reason that influenced faculty members to adopt WBI distance courses was that at Masters level, most students were established with families and other responsibilities, which made it difficult for them to take on-campus face-to-face courses and so providing WBI distance courses was more convenient for them. A faculty member from the College of Fine Arts illustrated this view by explaining the average normal habit of students graduating from college. He said,

Let us take students getting out of college… and track their average normal habits. They graduate, they get a job when they are 22 they work for two or three years and most likely get married when they are 25 or 26. They get a new car, a house, which means they are part of the mainstream of our economy which means they have bills…it is very difficult from that to come back to school, but the education system is forcing students to get a Masters degree to be licensed. So when we felt this is an excellent opportunity to provide a market for students with those specific problems and it is inviting to students who are being forced, at the state education level, to get a Masters degree we sort of wanted to assist them in doing that as they maintain their jobs and still get a Masters degree.
This view was also expressed by a faculty member from the College of Education who said, “I certainly wouldn’t want to diminish the efforts to implement WBI... I think it is the variety that allows you to pick the right kind of tool for the right job.” He further emphasized that the use of WBI is essential for faculty members who are,

Trying to deliver a course to someone at a distance, has children, has a job and does not want to leave the area [because] you need to deliver that course in a different way than you might want to deliver to someone who wants to be immersed into an institution and move to the area.

Another faculty member from Russ College of Engineering and Technology also mentioned that,

Sometimes our Masters students do not always complete. They have to leave for various reasons…. So, that [WBI] would be a good thing for some of these students that for various reasons have to leave campus and cannot finish their degrees.

Apparently, findings from this study showed that faculty members who adopted WBI for distance courses were teaching primarily at the Masters degree level. That is, their major goals were either to provide Masters level courses or to develop a Masters program. The following excerpts illustrate this point. One of the excerpts is from a faculty member who was involved in developing a Masters program (Faculty O) and the other one was from a faculty member who adopted WBI for a Masters course (Faculty P).

**Faculty O:** When we decided to implement distant learning Masters program… one of the things we had to do as a people who were creating
that program was to educate ourselves on how this can be done. So… we started looking for possibilities to do that, which included the web-based instruction…. So we were pursuing the possibility of cameras and all these types with pictures, but someone introduced Blackboard to us and we shifted our center process towards WBI.

Faculty P: The greatest motivation for me to start teaching with the web was when our college was trying to save money to deliver a Masters program to Malaysia. Earlier, a faculty used to go to Malaysia for 8 weeks teaching the students and that became very expensive. So, they were looking for technology that will reduce travel and living expenses in Malaysia and therefore, they asked us to develop something web-based that students can work on this course when we were physically not there. I actually developed a whole Marketing course while others created a few things…. When I developed this course to Malaysia then I thought I could develop a web-based Marketing course for other students.

In this study, faculty members who used WBI for distance courses used it entirely web-based (online), or others supplemented WBI with textbooks while others included face-to-face instruction as well. For example, a faculty member from the College of Arts and Sciences explained that he taught a distance course using WBI entirely. He said,

The course that I have on the web… is a distance course…. Instead of reading from the book, people read from the screen… with the web, you
need to have an outline of material and have links to that material, so I try to take that into consideration.

An example of how faculty members taught using WBI at a distance concurrently with using textbooks is a faculty member from the College of Fine Arts, who said, I have a course that I taught last quarter, that I did it purely distance learning. I had to set it up using a model of a type of project that I wanted the student to do and was done with a textbook. I had a textbook to a certain extent and I wanted things from the textbook that would suit the objectives that I had on the situation that I wanted the students to learn. I also had another project that was very reasonable and effective to support the information that I was trying to communicate with students. They could do that project easily within their lifestyle or timeframe that I allowed them to do it.

A faculty member who directed a distance Masters program explained how they use WBI together with face-to-face instruction in their program:

One of the things we had to decide when putting this curriculum together was how to teach the things in our curriculum that we cannot just teach online… and those are the things that we do when students come on campus in summer…. The students are required to come to campus two weeks per summer… and just before they come, they get a course outline. For example as part of this program, this summer I am teaching two workshops…and each of them is designed as a one week intense, four hours a day, of course
internship. One is this week and the other is next week. Therefore, we design courses like this within the curriculum to accommodate most of the coursework that cannot happen online.

Briefly, faculty members who adopted WBI for distance courses targeted Masters students who could not easily take on-campus courses due to various commitments such as family responsibilities and jobs. In this case, faculty members taught the entire web-based courses online or they supplemented it with textbooks or face-to-face instruction.

**Characteristics of Faculty Members**

Findings from this study showed that faculty members made their decisions to adopt or reject WBI at different times. That is, they had different levels of innovativeness. In this study, innovativeness means the degree to which an individual faculty member is receptive to web-based instruction in spite of the perception of their colleagues or the administrative staff. As such, 17 faculty members took a relatively short time from knowing about WBI to adopting it, nine faculty members took a relatively longer time to either see the outcome of using it from their colleagues or to confirm that they would get support or incentives when using WBI, while five faculty members never implemented it. As a result, the faculty members who participated in this study portrayed different adopter characteristics as explained in the following section.
Faculty Members who took Less Time to Adopt WBI

In this study, the researcher identified 17 faculty members who adopted web-based instruction for their convenience in teaching whether others were using it or not. An example is a faculty member who mentioned:

I have always been a technology addict. So, I have always looked at anything that gives me information about technology especially things that I can do on the computer… When the web started to take off and I realized I had opportunity to build web pages and put it somewhere and students could access it, it seemed to me like this is a great way to do things where I can answer a lot of questions by having a web page. I try to get the easiest way to do things and putting things in the web is an easy way to do things.

Typically, these faculty members did not stop using WBI when faced with problems. In case of problems, they looked for any possible solution. One faculty member described his approach to problems:

There are institutional and technological problems. We get institutional help from CNS, which is charged with assisting and supporting faculty with the use of technology in campus… So we call CNS, but often they are so busy and they can’t come and fix something or make it work for days or weeks… If you have a problem and they can’t solve it for a long time, that slows down the use of things… My colleague and I have spent
time trying to keep things in our design studio running… So, we read manuals, talk to someone else, it takes time.

This faculty member was not pushed to use WBI, rather he did all he could to be effective in using WBI. Therefore, when faced with problems while using WBI, he looked for assistance from within the university or from outside.

Also, these faculty members were active information seekers and once they identified that the use of WBI was beneficial to themselves and to the students, they spread the word to other faculty members. They gave evidence of why they used WBI and demonstrated how they effectively implemented it in their courses. They were also willing to assist other faculty members in the adoption process, which earned them respect among their colleagues for their knowledge. As one faculty member mentioned,

Most faculty members have seen my web site and some come to me and ask for help and I have helped some of them. They come to my office or I email them…. So, I try to teach them the process so that they can learn how to do it [develop and use WBI].

*Faculty Members who took Relatively Longer to Adopt WBI*

Nine of the 31 faculty members in this study took some time before adopting web-based instruction, but they would interact frequently with those who had adopted to learn more about their experiences in using WBI. Thus, although it took them some time to adopt WBI, they eventually did it. An example is a faculty member who said that he adopted WBI because of working with a colleague who had interest in using innovations in teaching. He said, “We
talk a lot to each other and because of that, my colleague who is very computer oriented, he reads Wired magazine, he is always looking for new things. So when he discovers something, he tells me.”

This study also revealed that the faculty members who took longer to adopt WBI needed more support. For one, they wanted all the services very close to them; second, incentives mattered to them; and third, they needed to prove that WBI works by watching what others did before they used it. Although they attended workshops and other types of training offered by the university, they would not implement the skills unless they had one-on-one assistance, not by going an extra mile of seeking for such assistance, but by having it arranged for them in their offices or classrooms. Likewise, incentives such as monetary benefits mattered to these faculty members. For example, one faculty member explained that she attended a workshop because of the monetary incentive and even after that workshop, she did not use the skills she acquired because, “I didn’t have a graduate student helping me after the workshop. There was no incentive.” That faculty member did not seek assistance because,

    Every time I thought of going to CITL for a workshop, I have so many other things, and I think that I have to go there to do it. If it was here hey, that is good for me. I want the services to come to me.

That faculty member said that she eventually participated in the PT3 grant and was given a skilled graduate assistant to help with learning and implementing web-based instruction and by the time of interview, she was teaching a course with it.
Therefore, such faculty members eventually used WBI, but the university had to increase the support for the adoption of web-based instruction. As one administrator said, “You know, when getting into that mainstream of faculty we have to provide better support because these are the people who are necessarily not quite as enthusiastic about technology like that early group. We have to support them better.”

Faculty Members who Never Adopted WBI

Out of the 31 faculty members who participated in this study, five did not adopt WBI. Out of these five faculty members, two of them said they were to adopt WBI in future, but three faculty members did not show signs of ever adopting it despite identifying some benefits from its use. Mostly, they had observed their colleagues using WBI, but they still did not want to use it. Some of the reasons of not using WBI included incompatibility with previously introduced ideas and with their instructional needs. One of these faculty members from the College of Education explained,

We do not have revolution in schools. Schools evolve. I have seen these evolutions and I believe the web will influence schools. There will be real changes, but I think it will be gradual and it will move to those pockets where it is perfectly needed, competitive and the faculty will have to do it because they need to, but as for me, I still prefer the more traditional way.

In another interview, a faculty member expressed that the use of WBI would take away the personal satisfaction that he derives from teaching:

I think if I were going to be web-based, I would suffer person deprivation, social withdrawal, I would say to myself, I do not want to do this I would
rather go and write a book or I can be an accountant. Teaching means interacting personally, personal contact. If I cannot have that, why would I want to teach? Where is the fun of it?

Still, there was suspicion of the use of WBI as well as of the administrators who advocated for it among the faculty members who declared to have rejected WBI. The following quote illustrates one faculty member’s skepticism:

The web is unique, isn’t it? It has a dominant role but its economic importance was a bit over-rated with stock market and all these companies. You know the university as an institution needs to be competitive but it also sees it [WBI] as financially having great potential and so I can see why universities around the world support and promote this.

Therefore, according to this faculty member, universities are promoting the use of WBI mainly to be more competitive, rather than to enhance the faculty members’ teaching effectiveness.

In brief, the innovativeness of the faculty members differed and so some of them were early to adopt while others took some time to adopt WBI and others never adopted it.

Summary

In this study, the researcher conducted interviews with 31 faculty members and five administrators, and attended conferences, workshops and seminars to investigate factors that influenced their innovation-decision process.
based on the use of WBI in Ohio University. The findings supported Rogers’ (1995) five stages of innovation-decision process: knowledge, persuasion, decision, implementation and confirmation stages. That is, 31 faculty members went through the knowledge and persuasion stages, 28 reached the decision stage, 26 reached the implementation stage and three reached the confirmation stage. Likewise, the five attributes of innovations identified by Rogers: relative advantage, compatibility, trialability, observability and complexity influenced faculty members when they decided to adopt or reject web-based instruction.

Faculty members adopted WBI for both face-to-face and distance courses and some of them supplemented it with textbooks or face-to-face instruction while others did not. In this case, although Blackboard was the only courseware sponsored by the university at the time, faculty members also used Adobe PageMaker, HTML, Dreamweaver, Netscape Composer, Internet Explorer, Lotus Notes, and Form · Z to develop and implement WBI courses. As such, the adoption of WBI was not uniform nor did all the 26 faculty members do it at the same time. Some faculty members took a shorter time to adopt WBI after learning about it than others while five of them did not adopt and three of these five declared that they will not adopt WBI in their teaching activities.
CHAPTER 5: DISCUSSION AND RECOMMENDATIONS

As discussed earlier, web-based instruction (WBI) is growing faster than any other instructional technology and more and more university faculty are using WBI as an integral part of instructional activities (Fredrickson, 1999). Nonetheless, a large number of faculty members in the universities are hesitant or reluctant to adopt WBI (Jacobsen, 1998). How then do faculty members decide to adopt or reject WBI? This question motivated the researcher to conduct this study based on Rogers’ (1995) theory: Diffusion of innovations. The research question that guided this study was:

What factors influence the decision process to adopt or reject web-based instruction among faculty members?

The researcher used qualitative methodology to investigate this research question. The researcher conducted interviews with 31 faculty members and 5 administrators at Ohio University and used participant observations to collect data by attending a conference, a workshop and a seminar offered to the faculty members in Ohio University. Rogers’ (1995) diffusion of innovations theory provided the theoretical framework of this study with a focus on the model of innovation-decision process.

In this concluding chapter, the researcher identifies the factors that influenced the faculty members who participated in this study in deciding to adopt or reject WBI. Rogers’ (1995) diffusion of innovations theory and the literature reviewed in Chapter 2 guide the interpretation of the research findings. Second, the researcher discusses the paradoxes in the innovation-decision process and then gives some recommendations and possible areas of further research.
Factors Affecting the Innovation-Decision Process among Faculty Members

The innovation-decision process concerns the reduction of uncertainties. Rogers defined the innovation-decision process as “an information seeking and information processing activity in which the individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation” (Rogers, 1995, p. 165). Uncertainty is “a lack of predictability of structure, of information” (p. 6). In this research study, faculty members reported their uncertainty about using web-based instruction to have resulted partly from either not having used it for long enough to see the outcome, or because they had not fully used all the tools available in web-based instruction. Therefore, as one faculty member emphasized, using web-based instruction was like “driving through a strange city to a destination you have never seen, but you have a sense that you will like it and the whole time your only directions come from a walky-talky.”

However, this study revealed that uncertainty did not stop faculty members from adopting web-based instruction. Despite that only three among the 31 faculty members who participated in this study confirmed to have no doubt in continuing to use WBI, none of them mentioned uncertainty to have played a part in their decision to adopt or reject web-based instruction. Instead, to cope with the uncertainty associated with the use of WBI, faculty members looked for support from within or without the university. That is, faculty members collaborated with one another as they learned, developed, and implemented web-based instruction. They also got assistance from skilled graduate students and from departments such as CITL, CNS, CSC and Information Technology in Ohio University, that support the integration of instructional technology in teaching
activities. In addition, if the support that faculty members needed to effectively use web-based instruction was not available in Ohio University, they looked for that support from outside the university from institutions that provided support to encourage faculty members to redesign their instructional approaches using instructional technology.

As a result, this study revealed the following factors that influenced faculty members in making their decisions to adopt or reject WBI: 1) training faculty members how to develop and implement WBI, 2) complexity in the implementation of web-based instruction, 3) compatibility of WBI with the faculty members’ teaching values, 4) time and effort needed to develop and implement WBI, 5) relative advantage of using WBI, and 6) lack of incentives (awards, annual reviews, and promotions) to the faculty members using WBI. Each of these factors will be discussed in the following sections.

*Training Faculty Members to Develop and Implement Web-based Instruction*

The strategies for training faculty members to develop and implement WBI influenced them in deciding to adopt or reject it. When faculty members could not learn at the same pace as the instruction, they withdrew from the training and if they had no other way of learning, they became discouraged about using WBI. Reports from faculty members who participated in this study showed that although some faculty members were able to implement WBI in their teaching activities after attending the training sessions, it was difficult for others. One faculty member who had given up on using WBI but eventually adopted it after getting one-on-one assistance from a skilled graduate student said that after attending the training sessions she could not implement WBI because the instructors “were too fast for me.”
Likewise, when the instructors used a technical language that made it difficult for the faculty members to comprehend the concepts and process of developing and implementing WBI in teaching activities, they were discouraged from adopting WBI. As such, one-on-one training from skilled mentors and collaboration between faculty members was more effective in influencing faculty members to adopt WBI. In this study, when faculty members got one-on-one assistance from skilled graduate students or their colleagues, they were more likely to adopt WBI because they were involved in a dialogue in which they explained what and how they wanted to learn and use WBI. As such, the language used in the two-way conversation was adapted to their knowledge and skills and the response was based on their specific needs. In addition, they got this assistance at their most convenient time and in their own offices.

This research found that 5 out of the 7 faculty members who reported to have received one-on-one assistance from skilled graduate students had implemented WBI and one of them was developing a course web site to use the following quarter. Also, although all the faculty members who had implemented WBI reported to have attended conferences, workshops and seminars sponsored by Ohio University for the faculty members, they relied mainly on their colleagues who had either adopted WBI before them or were learning or implementing it at the same time.

Another factor related to training that affected the faculty members was conflict between the expectations of the faculty members as they attended the training sessions and the objectives of that training. Five faculty members said that they went for training expecting to learn how to integrate WBI into their courses, but the training sessions
focused on the features of the software. These faculty members felt that the training did not meet their need and although four of them looked for alternative sources of help, one faculty member decided to use other types of instructional technologies instead of pursuing WBI. As a result, the faculty members recommended the instructors consult with faculty members before conducting the training to identify the faculty members’ goals for attending the training in order to address them during the training session rather than having a general training for all faculty members.

In summary, when faculty members understand the language that the instructors used and learned at the same pace with the instructors, they were more likely to implement web-based instruction; otherwise, they became discouraged. Similarly, if the objectives set for the training sessions were consistent with their objectives for attending the training, they were more likely to implement web-based instruction, but if the objectives were disparate, faculty members were discouraged from pursuing the use of web-based instruction. Overall, one-on-one training from skilled mentors and collaboration between faculty members was more effective than workshops in influencing faculty members to adopt WBI.

*Complexity in Implementing Web-based Instruction*

When faculty members find no problems in implementing web-based instruction, they adopt it quicker that when the implementation process intimidates them. Mainly difficulty in implementing WBI among faculty members was related to its complexity. According to Rogers, (1995) complexity is “the degree to which an innovation is
perceived as difficult to understand and use” (p. 16). The complexity that faculty members faced in using WBI was a factor in their decision to adopt or reject.

As shown by findings from this study, faculty members gained their knowledge and skills about WBI by collaborating with their colleagues, one-on-one mentoring from skilled graduate students, literature or from professional development training provided by the university through workshops, seminars and conferences. In this case, fear to learn new skills and reluctance to try something new discouraged some faculty members from adopting WBI. One faculty member reported that she was sure that she would get through the fear of her learning curve and be able to use WBI effectively because she was also fearful of teaching her first class. Other faculty members associated failure to adopt WBI with the fact that they did not grow up with WBI, which made them reluctant to try WBI. As such, how individual faculty members confront fear affects their decisions to adopt or reject WBI. That is, as stated by a faculty member who was using WBI:

You can’t make faculty do it [use WBI], people by nature fear change sometimes…. I don’t know what to tell faculty in order to embrace WBI, either they are going to embrace it or they are going to push it away because they are fearful of it.

According to Pedroni (1996),

The World Wide Web represents the latest in communication technology and much like the printing press’s beginning days, it can be threatening to both students and teachers in the manner that it makes new demands and changes to expectations associated with traditional models. (para. 36)
Another factor associated with complexity in using WBI was lack of background in the educational theories. Faculty members, apart from the professors in the education programs, reported that in graduate school, they acquired knowledge in different disciplines, but they did not learn how to communicate those skills to students and that made it more difficult for them to use WBI. A faculty member who has taught for 20 years reported to have experienced that difficulty. He explained that such faculty members understand the technology, but they have a deficit of understanding how to apply it in teaching mainly because “they do not have a background on educational theory or on students’ evaluation.” Similarly, the three faculty members who rejected web-based instruction reported the inability to integrate the use of web-based instruction into their courses as a major factor. In particular, one faculty member said that he has a computer degree and that he has owned a computer since 1983, but he has “no experience and the knowledge base to know how to take a course from the classroom and put it on the web.” Thus, these faculty members believed that they are competent in teaching without WBI and in using computers for their personal affairs, but they do not know the pedagogy of teaching with the web.

Nonetheless, complexity did not inhibit the 26 faculty members who implemented WBI. As discussed earlier, they looked for support from within and without the university to reduce the complexity of WBI. In addition, the university administrators reported that they have tried to remove barriers to the use of instructional technology by sponsoring conferences based on the faculty members’ philosophy and pedagogy of
teaching, workshops and seminars to provide skills on instructional design, and by providing technical support to the faculty members using instructional technology including web-based instruction. Therefore, the administrators made specific efforts to remove the barriers that Daugherty and Funke (1998) identified as affecting faculty members when deciding to adopt instructional technology: lack of technical support, lack of software and adequate equipment, and lack of faculty and administrative support.

In brief, reluctance to learn new skills and lack of background in the educational theories about integrating WBI in the teaching activities made faculty members find using WBI difficult. As a result, some faculty members were discouraged from using WBI while others looked for assistance from within and without the university to effectively implement it in their teaching activities.

Compatibility of WBI with the Faculty Members’ Perceptions of Effective Teaching

The current research findings showed that compatibility of WBI with the way faculty members perceive effective teaching was a salient factor that influenced their decision to adopt or reject WBI. According to Rogers (1995), an innovation can be compatible or incompatible with socio-cultural values and beliefs, with previously introduced ideas, or with client needs for the innovation.

Socio-cultural Values and Beliefs.

In this research study, faculty members who declared to have rejected WBI emphasized that physical presence is the best way to teach. That is, they did not perceive WBI as an improvement to their traditional methods of teaching because it takes their joy
of teaching away. They believed that face-to-face teaching is freer and less structured and enabled them to establish warm, personal and productive relationships with their students. Besides, these faculty members emphasized that using technology was not a good way to discuss complex issues with their students. Thus, these faculty members rejected WBI because they did not view it as compatible with their beliefs about effective teaching.

On the other hand, there were faculty members who reported that WBI was compatible with their teaching styles. They said, for example, that being able to project their course web sites in the classroom made it convenient for them to teach because visual images from the web enhanced clarity in the explanation of concepts to students. These faculty members further noted that using WBI made it possible for them to use different teaching materials because the web is like having a large-sized library in the classroom.

Thus, faculty members who found value in WBI gave it a priority and invested time and energy in it. Alternatively, faculty members who viewed WBI as incompatible with their beliefs decided not to give it further consideration, hence rejecting it.

Previously Introduced Ideas.

Findings from this study showed that in the teaching process, faculty members identify the most effective ways to teach such that they eventually become reluctant to change. One such faculty member, who had taught for 35 years, emphasized that, “after working for many years, faculty members become more critical and conservative at new ideas because they have seen some of the traditional pieces pass the test of time.” Thus,
In the view of a faculty member who had taught since 1966, the use of WBI is for the faculty members who are “new” in teaching because, “when faculty members are new in teaching, they are curious to try different ways of teaching before they establish the best way to teach.”

Likewise, the teaching experiences that faculty members had from using other types of instructional technology mattered in deciding to adopt or reject WBI. That is, faculty members who had used different types of instructional technology in the past, but eventually went back to using the traditional methods of teaching were reluctant to implement the use of WBI. For example, a faculty member who was not using WBI said that PowerPoint, with its flashing animation, distracts students from the content of a lecture.

Client Needs for the Innovation.

Cited in Rogers (1995), Hassinger explained that an innovation must be perceived as relevant to a client’s need:

Individuals will seldom expose themselves to messages about an innovation unless they first feel a need for the innovation, [and that] even if such individuals are exposed to these innovation messages, such exposure will have little effect unless the innovation is perceived as relevant to individual’s needs, and as consistent with the individual’s attitudes and beliefs. (p. 164)

This research study showed that faculty members who learnt about WBI when looking for ways to meet their instructional needs mostly adopted WBI, unlike the faculty
members who learnt about the use of WBI with an intention to create a need for it. As such, the faculty members who had not used WBI acknowledged that their colleagues were effectively using WBI, but they themselves had not yet found a need for it in their teaching activities.

In this study, the salient need that influenced faculty members to use WBI included the ability to use the course web sites at any place and time. Faculty members found the ability for the students to take courses at any time and place particularly effective because both traditional and distance students could do their course work from their home, in their dorms, or even when traveling. Likewise, if a faculty member remembered a point that he or she missed during the class time, he or she could post an announcement on the course web site for the students to read at any time of the day. Consequently, faculty members were able to clarify things that students might not have understood in class or during their private studies because they could access the course web site and ask questions at any time whether the class was in session or not.

Furthermore, students could enroll for online courses during their vacation because they did not have to be at the university to take the courses and this enabled them to plan to graduate on time because online courses do not have schedule conflict. Equally, the faculty members were able to use different resources, such as textbooks, concurrently with WBI when teaching distance students which made it more convenient for their students to accomplish the course work.

To support the faculty members in satisfying the need for the use of WBI, Ohio University installed desktop computers in the residential students' rooms. Faculty
members reported to have benefited from those desktop computers. Thus, as affirmed by Solem (2000), any effort to promote Internet-based teaching in colleges should take into account faculty members’ particular needs and circumstances.

_Time and Effort Needed for the Development and Implementation of WBI_

Faculty members are busy people. One faculty member explained that they are expected to spend 40% of their time teaching, 40% on research and 20% on service. However, that faculty member reported that to accomplish all her teaching responsibilities, she spends 67% of her time on teaching without using any innovations. Faculty members reported that implementing WBI takes a lot of the already limited time and effort and therefore, if it does not relate to their research specialty or if they do not have any profound instructional need for it as seen earlier, some of them decide not to spend time on integrating WBI into their teaching activities.

On the contrary, faculty members who valued the use of WBI created time for it. In this study, faculty members who implemented WBI agreed that it takes a lot of time to develop and implement WBI, but as in the case of one faculty member, they emphasized:

- You make time to do whatever you need to do to be the best you can be…
- you have to get time to learn it, it does not come by learning the tutorial, it doesn’t come out of learning the books, it comes from having free time to play with it on a project that is meaningful to you.

Thus, these faculty members believed that WBI requires a lot of upfront preparation, but it saves time eventually.
Reports from this study showed that faculty members identified WBI as saving time and effort in the distribution of class notes because they did not have to spend time printing and distributing hard copies to the students. Likewise, WBI enabled them to quickly communicate with diverse students by posting messages on their course web site whether the class was in session or not. In addition, posting messages to the course web sites reduced students’ visits to the faculty members’ offices and that saved time too. One faculty member who explained this point said,

[WBI has] cut down the amount of traffic to our offices. If they [students] can find information easier, they do not have to come to us. It takes time to answer their questions and it is amazing as far as… what it [WBI] can do to save time because we have so many students coming to ask so many questions.

Faculty members explained that sometimes the time allotted for each lesson is not enough for class discussions, but using WBI made it possible for those discussions. That is, when using WBI some faculty members gave their students online quizzes on the topic to be discussed in the classroom, which enabled students to prepare for the lesson in advance and actively participate in class discussions. As such, faculty members were able to cover more of the course work in shorter time because they did not have to retell what the students could read from their course textbooks or other reading materials during the class discussions.
Therefore, although some faculty members were discouraged from using WBI because it required a lot of time to learn, develop and implement it, faculty members who implemented it found it saved their teaching time and effort in the long run.

**Relative Advantages of Web-based Instruction**

The advantages that faculty members experienced from using WBI over other ways of teaching affected their decisions to adopt or reject web-based instruction. Faculty members do not like to completely redesign a course to integrate WBI if they are not going to benefit from the time and effort spent in doing so. The benefits identified in this study as greatly influencing faculty members to adopt WBI include: reduction in printing costs, reduction of students’ note-taking, decrease in discomfort, and more interaction among students as well as between students and faculty members.

*Reduction in Printing Costs.*

Seven faculty members from this study reported the reduction of printing costs as an advantage of using WBI. In particular, one faculty gave the reduction of printing costs as the reason that made her and her colleague to start using WBI. In addition, the faculty members reported that when the students had to buy course reading packs, it was expensive for them. Thus, posting the reading materials on the course web site was economical for both faculty members and the students.

*Reduction in Students’ Note-taking.*

Reduction in students’ note-taking during a lecture was a factor that influenced a few faculty members when deciding to adopt WBI. In this study, faculty members who
had their class notes on a course web site said that they asked the students to print those
notes before class and bring them to class so that in class, they only needed to write a few
additional notes to make the points clear for them. Thus, the students listened more
carefully to the lecture or they participated more in class discussions. As one faculty
member stated, “I do not like looking at the foreheads; I like looking into their eyes. And
if they are writing they can’t listen and write at the same time, and comprehend as well.”
Furthermore, when faculty members projected their class notes on a screen, they said that
they were able to keep focused on the points they had prepared for the lesson and as some
of them reported, they were able to accomplish much more than otherwise.

*Decrease in Discomfort.*

Decrease in discomfort from the way faculty members teach was a strong
motivation to the adoption of WBI by faculty members. Faculty members reported that
the use of WBI motivated them to reconsider the way they had been teaching for a long
time, which enabled them to teach effectively and to encourage engagement in learning
among students. For example, two faculty members reported that using WBI enabled
them to start encouraging more critical thinking, more synthesizing of the concepts, more
applying of the concepts rather than retelling the students what they could have read from
the books, especially when using the online quizzes. The online quizzes enhanced the
students’ reasoning to know that there are many paths to come to a solution. Faculty
members achieved this objective particularly when they designed the online quizzes such
that when the students responded to a question the page moved to a challenge from the
instructor and the students had another chance to go back to the question and reconsider
why their answer should be the best answer. As a result, faculty members reported that using WBI made their students became more engaged in their learning activities and they got very enthusiastic about it. In this respect, faculty members reported that they found it stimulating to rethink their courses by considering other ways of communicating with their students through WBI.

Conversely, the faculty members who rejected WBI reported that using WBI would bring discomfort rather than comfort in their teaching activities. Discomfort in this case, as expressed by one faculty member, related to, “I think if I were going to be web-based, I would suffer personal deprivation, social withdrawal, I would say to myself, I do not want to do this, I would rather go and write a book, or I can be an accountant.” Other examples of discomfort related to the compatibility and complexity as explained earlier.

*Interaction among Students as well as between Students and Faculty Members.*

The 26 faculty members who implemented WBI in this study reported that using WBI enhanced interaction between students and with the faculty members. This interaction was reported both for traditional and distance students. One faculty member who used WBI reported:

The students got more interaction with me through the web than they would have done in a regular classroom. In the classroom, many times, they sit there, take notes and they never ask questions, and they just disappear. So, even if I see them face-to-face there isn’t really a dialogue.
On the web, they… if they did not understand they could send me an email.

Other reasons that faculty members gave for the increased interaction when using WBI were that in the traditional classroom interaction may be limited by the fact that some students could be shy to ask questions in class, or a faculty member may be addressing one student and so the other students do not get involved. Therefore, using WBI gave all students the same opportunity to attend and respond to the information posted on the course web site.

Awards, Annual Reviews and Promotions

Faculty members reported that incentives such as awards, annual reviews and promotions are rarely based on the use of instructional technology in teaching. Thus, faculty members focused on the areas that would give them such opportunities and so, as the findings from this study showed, faculty members need more incentives to encourage them to use WBI. The suggested incentives included teaching awards, promotions and opportunities to publish.

Faculty members emphasized that effective teaching contributed very little to tenure and promotion decisions and that what matters most is the research conducted by faculty. Therefore, instead of developing course web sites, they concentrated on research that rewarded them more than effective teaching. One faculty member explained this point of view:

We do not get rewards from the university for it [teaching]. We get rewards for research though. If you bring research money, they give you a
kick back. So, for us to spend extra time teaching, we do it mainly because I have to stand in front of students and I do not want to embarrass myself and I want to get good product. The university does not reward teaching classes even in the tenure process.

This notion might be from the fact that when hiring faculty members, they are assumed to be competent teachers. As one faculty member involved in the hiring process mentioned, “In my experience, faculty come in highly rated and they are very bright. Every time we have an open position, we get over 100 applicants and we take the very best.” As such, universities do not give effective teaching a lot of consideration, but rather they put more emphasis on research projects that bring funds to the universities. Therefore, as most faculty members expressed, if use of WBI were valued as highly as research, it would be given a higher priority by faculty members across the board.

Likewise, faculty members reported that using instructional technology was not a priority for the teaching awards. As a result, faculty members who got teaching awards without using instructional technology were content with their way of teaching and they did not find the need for WBI. For example, one faculty member said:

I have won a university professor award, and I won a college outstanding teacher award and you know, I feel I am doing something right. I get a lot of good feedback from students about how I teach and so I have never seen WBI as a very necessary thing.
That faculty member explained that in Ohio University, teaching awards to faculty members depended on other factors rather than the use of instructional technology, which include WBI. That is, teaching awards depended on the faculty members’ passion for teaching, how they engage students in learning, whether they create a comfortable safe classroom, their knowledge in their subject, academic vigor, their able to bring life to the books, readings, and whether they give their students assignments that integrate the course content. So, to her the use of instructional technology was not a priority.

The possibility of publishing about their experiences using WBI may be a factor that influences faculty members as they decide to adopt or reject it. As one faculty member mentioned, publishing is ever present in the faculty mind and so, “if there were something that could be orchestrated by professors so that it could easily flow into an article for a trade journal, this would boost the use of WBI.” Alternatively, that faculty member said, “If there are a series of awards to the individuals who have successfully published their web pages, then that would be a major plus for the faculty.”

In conclusion, this study revealed external factors as playing a major role in the innovation-decision process of the faculty members in the adoption or rejection of WBI. That is, although faculty members reported internal factors such as fear, reluctance to try new things, and inability to acquire the necessary skills as factors that influenced their decision to adopt or reject WBI, they attributed external factor as major factors that influenced their decision. The three major external factors that faculty members reported to have greatly influenced their decision to adopt or reject web-based instruction are how
training was conducted, relative advantages, and incentives. That is, not acquiring the necessary skills needed for the integration of WBI into their teaching activities or the disparities between their objectives and those of the instructors discouraged faculty members from adopting WBI. Likewise, faculty members do not like reworking their courses to integrate WBI if they were not going to gain from the time and effort put into it yet they are very busy people with limited time left to do so. Still, awards, teaching reviews and promotions counts in the teaching career of the faculty members and so if WBI does not pay off in those areas, faculty members need incentives to encourage them to continue or to start using WBI.

**Conclusion**

The decision to adopt or reject WBI by faculty members is a process that takes time as faculty members move from the knowledge to the persuasion stage, to the decision stage, to the implementation stage, and finally to the confirmation stage. Although Rogers (1995) emphasized that every stage in the innovation-decision process is a potential rejection point, this study showed no rejection at the knowledge or persuasion stages. As a result, the types of communication channels, either interpersonal or mass media, had little if any influence on faculty members as they made decisions to adopt or reject WBI.

However, three faculty members did not move to the decision stage, partly because of disparities in their objectives for attending training sessions as well as how the instructors conducted those training sessions. Likewise, inability to integrate WBI in their teaching activities influenced their decisions. Still, two more faculty members did not
move to the implementation stage mainly because of incompatibility of WBI with their teaching values, complexity in the implementation of WBI, or reluctance to try new things or learn new skills. The research findings showed that only three out of the 31 faculty members who participated in this study reached the confirmation stage, primarily because they perceived WBI as having relative advantages over other instructional technology.

However, the use of WBI among the 26 faculty members who adopted differed. Mainly, those faculty members used Blackboard CourseInfo, which was the only courseware tool sponsored by Ohio University at the time of study, to develop and implement WBI, although there were faculty members who used other courseware tools. For some of these faculty members, the use of WBI was intensive. That is, they included course syllabus and objectives, class notes, external links to web sites, grade-book, class discussions together with advising, internship, class rotation, job opportunities, and links to external resource materials. On the other hand, other faculty members made minimal use of WBI for posting their course syllabus only, or for communication with students. In this case, faculty members used WBI for either face-to-face or distance courses which were either totally web-based or the faculty members supplemented it with textbooks or face-to-face instruction. Out of the 26 faculty members who adopted WBI, six used it for distance courses; the remainder used WBI as a supplement to face-to-face instruction.

Paradoxes in the Innovation-Decision Process Model

This research study showed evidence of most of the elements of Rogers’ (1995) innovation-decision process model, but there are some elements of the model that were
contradictory to the findings. These contradictions relate to innovativeness, types of discontinuance, and types of innovation decisions.

_Innovativeness_

According to Rogers (1995), individuals or other units in a system that most need the benefits of a new idea are generally the last to adopt an innovation. He further noted that this paradoxical relationship between innovativeness and the need for benefits of an innovation tends to result in a wider socioeconomic gap between the higher and lower socioeconomic individuals in a social system. In the first place, since all the participants of the current study were full-time faculty members in a university setting that provided them with technical support, instructional support and the resources that they needed to use WBI, their socioeconomic status was similar. Therefore, the seniority of the faculty members, which could have resulted in a socioeconomic gap, did not count in the decision-making process among the faculty members. In fact, two senior faculty members who had taught for more than 35 years did not favor the use of WBI.

In this study, need counted more than socioeconomic status to the faculty members when deciding to use or reject WBI. The research findings showed that perceived instructional need was important to the faculty members when deciding whether to adopt or reject WBI. Indeed, the faculty members who rejected WBI gave lack of need as a major reason for not using it. Alternatively, as in the case of one faculty member who stopped teaching a course because she could not understand instructions on how to use WBI, complexity and not socioeconomic status made faculty members not adopt WBI, even though they had a need for it.
Faculty members who implemented WBI agreed with those who were not using it that need was essential in deciding whether or not to use WBI. One faculty member reported that needs are created and a faculty member can acknowledge or ignore a need. He said,

People will make different uses of everything from technological things and any other kind of resources and they use them as they see their need for it. Some people may see no need to use the computer and they may be right given their environment…. Any individual can create needs…. Need is not something that comes to us from the universe; it is something you identify or ignore.

Accordingly, two faculty members expressed that they needed WBI because they could not have managed to teach what they were teaching without integrating WBI into their courses. They said that using WBI changed the student’s ability to represent their ideas much more accurately and quicker than before.

Thus, these findings contradict Rogers’ (1995) view that socioeconomic status is related to the need for an innovation or to the decision to adopt or reject it.

**Discontinuance**

In the innovation-decision process model, Rogers (1995) explained that there is a chance of discontinuance to occur after adoption of an innovation has taken place mainly because of the circulation of negative messages about an innovation through interpersonal networks in most client systems. In this case, Rogers explained two types of discontinuance that include replacement discontinuance, which is “a decision to reject
an idea in order to adopt a better idea that supersedes it” (p. 182). A second type of discontinuance is disenchantment discontinuance, which refers to “a decision to reject an idea as a result of dissatisfaction with its performance” (p. 182).

This study did not show either of these two types of discontinuance among faculty members as they decided to adopt or reject WBI. As identified earlier, the faculty members who reported to have used WBI for a while and then discontinued its use said it was because of the excess workload, not because they were either dissatisfied with WBI or identified a better instructional technology. This finding does not rule out the possibility of both replacement discontinuance and disenchantment discontinuance in other settings or for other innovations, but there was no evidence of their existence in the decision process to adopt or reject WBI among the faculty in this study.

Types of Innovation Decisions

Rogers (1995) explained three types of innovation decisions: optional innovation-decisions, collective innovation-decisions, and authority innovation-decisions. This study found evidence of optional innovation decisions in that individual faculty members were free to make decisions to adopt or reject WBI independent of the decisions of the university as a whole.

Faculty members in higher education value their academic freedom and typically resist authority decisions related to their teaching. Whatever the setting, people often resist change. As Papa, Singhal, Sood, Rogers, and Shefner-Rigers (2000) noted, “Since established patterns of thought and behavior are difficult to change, people are often resistant to social changes in their system… until new patterns are fully internalized.”
This observation was evident in this study in that although all faculty members identified benefits related to the use of WBI, five of them did not use it. As such, according to Papa et al., “Resistance can be complex, contradictory, and tenuous,” and they emphasized the importance of exploring the enactment of resistance to social change. This resistance might have contributed to the absence of authority decisions in this study because the university respected faculty members’ academic freedom. Therefore, faculty members were free to decide to adopt or reject WBI. Although administrators encouraged the use of WBI by providing instructional, financial, and technical support, they did not require its adoption.

Consequently, as in the case of the types of discontinuance, although results showed no evidence of collective or authority innovation decisions as Ohio University faculty members decided to adopt or reject WBI, this study does not refute their existence in other settings or for other innovations.

Implications

Of the 31 faculty members who participated in this study, 26 adopted WBI, some more effectively than others. Findings from this study showed that those faculty members who adopted WBI collaborated with their colleagues and got one-on-one mentoring from skilled graduate students and administrators. Consequently, universities need to encourage more collaboration among faculty members, at the departmental level, by providing opportunities for faculty members to show their colleagues how they are effectively using WBI. Universities could provide such opportunities through faculty meetings, as was the case in this study. In this case, faculty members had the opportunity
to present to their colleagues how they were using WBI and they were able to answer questions from their colleagues regarding that use. Consequently, as reported by these faculty members, they were able to identify the faculty members they could go to in case they needed help in using WBI. In addition, universities could provide faculty members with one-on-one mentoring from skilled students (which requires tuition scholarship for those students) or from administrators.

Likewise, this study showed that although faculty members supported one another in learning, developing, and implementing WBI in their teaching activities, they had university-level support too. That is, Ohio University provided faculty members with technical and financial support to effectively adopt WBI. Some of the ways that Ohio University provided this support was by upgrading Blackboard, providing financial aid and grants to faculty who adopt WBI, and by sponsoring workshops, conferences and seminars. Therefore, as in the case of Ohio University, universities need to provide a variety of forms of support that faculty members need to effectively adopt WBI. In providing this support, universities need to take into account that different faculty members use WBI differently depending on their instructional needs. That is, some faculty members use WBI for distance courses while others use it for face-to-face instruction. In some cases, this use is intensive while in other cases, it is limited and the faculty members might supplement the use of WBI with other teaching resource materials. As such, these different uses of WBI lead to different needs from faculty members. Consequently, when supporting faculty members, universities need to focus on the faculty members’ instructional needs for WBI, which calls for a need analysis.
before launching any support to the faculty members. Furthermore, to encourage more
use of WBI among faculty members, universities need to consider giving recognition
such as teaching awards and other incentives such as opportunities to publish that make a
difference in tenure and promotion decisions.

This study revealed that strategies for training the faculty members to develop and
implement WBI had a great influence on their decisions to adoption or reject WBI. As
the study shows, the pace and the language that the instructors used to teach faculty
members how to develop and implement WBI was of major concern as they made
decisions to adopt or reject WBI. In addition, lack of background in the educational
theories discouraged faculty members from adopting WBI. In this case, universities need
to consider the knowledge and technical skill levels regarding the integration of WBI in
teaching activities among faculty members to determine the language and pace at which
to provide training to different categories of faculty members.

Time was also an issue in deciding to adopt or reject WBI for all faculty members
who participated in this study. That is, all faculty members reported they are busy with
teaching, advising students, and conducting research, and those who had adopted WBI
worked more hours than the university expected of them. Therefore, considering that, as
revealed in this study, adopting WBI takes much time upfront, faculty members who
have not adopted WBI due to time factors need to have support from their universities.
That is, universities need to give such faculty members time release, course buy-ups or to
provide monetary incentives to faculty members who would develop WBI courses during
their vacation to implement them during the school year, as proposed by faculty members
who participated in this study. On the other hand, faculty members need to be ready to spend time in the beginning when learning and developing WBI if they want to save time in the long run.

The compatibility of WBI with the faculty members’ perceptions of effective teaching was another factor that influenced faculty members in deciding to adopt or reject WBI. As such, universities need to encourage faculty members to develop and implement WBI based on their philosophy and pedagogy of teaching. To be more effective, universities could emphasize this use by encouraging faculty members to demonstrate to their colleagues how they are effectively using WBI based on their philosophy and pedagogy of teaching or through one-on-one mentoring from skilled graduate students or administrators. An example of how faculty members were encouraged to do such demonstrations in this study was through the “Spotlight on Learning” conference. That conference gave faculty members an opportunity to demonstrate innovative learning-centered pedagogies that they had successfully implemented in the classroom. The “Spotlight on Learning” conference was designed to promote and recognize the work that faculty members had been doing to engage students in active thinking, inquiry and the discovery of different ways of knowing.

**Recommendations for Future Research**

The following research questions could be used as a basis for future research to deepen our understanding of WBI in higher education.

1. This study investigated the faculty perception of WBI. Future research should extend this work and focus on how students view WBI. For example, a faculty
member said that online quizzes encouraged engaged learning, and another
one said that online notes reduced students’ note-taking in class and hence
encouraged more concentration on lecture and class discussions. So, what are
the perceptions of the students regarding the use of WBI to enhance the
effectiveness of teaching and learning?

2. Faculty members reported incompatibility with their teaching values and
complexity in the use of WBI. Future research could focus on what features
faculty members would like to have in course management systems like
Blackboard and WebCT to reduce its complexity and to increase the
compatibility of WBI with their teaching values.

3. This study investigated faculty members’ use of WBI at a large residential
university where resources to support technology were widely available and
well supported. Further research is needed to understand faculty members’
issues in a wide range of colleges and universities.

4. Future research could focus on the adoption of WBI over time in order to
identify adopter categories among the faculty members in relation to the use
of WBI. Identifying the adopter categories would provide an understanding of
how to provide support that is effective for different categories of faculty
members, whether they are early or late adopters.

5. This study adopted Rogers’ diffusion of innovations theory as a theoretical
framework. However, other researchers may choose to take a critical approach
to identify the impact of such factors as faculty workload or tenure and
promotion. Others may choose an interpretive approach and focus on experiences expressed by faculty members regarding the use of WBI and the meaning they give their experiences. These alternative frameworks would provide different lenses for understanding the issues related to faculty use of WBI in higher education.

**Summary**

There are different factors that influence faculty members as they make decisions to adopt or reject WBI and so even though WBI is growing faster than any other instructional technology, it appeals to some but not to all faculty members. The salient factors that influenced the faculty members in deciding to adopt or reject WBI identified in this study were: 1) training faculty members how to develop and implement WBI, 2) complexity in the implementation of web-based instruction, 3) compatibility of WBI with the faculty members’ teaching values, 4) time and effort needed to develop and implement WBI, 5) relative advantage of using WBI, and 6) lack of incentives (awards, annual reviews, and promotions) to the faculty members using WBI. Nevertheless, the research findings revealed some paradoxes in the innovation-decision process among faculty members regarding the adoption or rejection of WBI in the areas of innovativeness, the types of discontinuance and the types of innovation decisions.
References


Appendix A

The Introductory Emails Sent to Research Participants

I am a student in Instructional Technology, College of Education Ohio University. I am currently collecting data for my dissertation that includes interviewing faculty and I trust that you will lend a hand in this area. The major aim of my research study is to find out what is really behind the decision-making, among faculty, to adopt or reject the use of technology and mainly Web-based instruction in the classrooms. The dilemma comes in when we consider that some universities such as Ohio University have provided almost all the resources, training, and support required for the use of technology to their faculty. That is, hardware, software, training/workshops, technical support, focus groups for faculty to exchange their teaching experiences, seminars for professional development to name but a few, yet some faculty are not ready to integrate the technology in the classrooms. Therefore, there is need to learn, from the standpoint of the faculty, the process they go through to get to a point of adopting or rejecting the use of technology in their classrooms.

Consequently, I am concerned with faculty members who are either using or not using Web-based instruction, those faculty members who are either using Web-based instruction co-currently with other methods of teaching or are wholly using Web-based instruction to teach their courses. Also of concern are those faculty who have used, but are not currently using Web-based instruction as well as those who have attended Blackboard course Info workshops and are either currently using or not using Web-based
instruction in their classrooms (Traditional or distance classes). Therefore, considering all these categories all faculty members are potential participants in this research study. I am desperately looking for your assistant in this study. If you do not mind, although you might be very busy at this time of the quarter, please allow me to have a one-hour interview session with you. I am available any time on Wednesdays and Fridays, or Saturday if that is fine with you.

Your participation in this research will be of great benefit to the current faculty, administrators and scholars because I believe faculty need a voice concerning their perspective in adopting or rejecting instructional technology in their teaching activities. Otherwise, the way things are currently, the use of technology in the classroom is a done deal, whether faculty are willing to use it or not, there is no way out. So I will greatly appreciate to hear your views concerning integrating technology in the classroom and the process that brought you to the final decision in this area. Please inform me when we can meet for the one-hour interview session, which depends on your most appropriate time.

Thanks in advance and have a great day.

I remain yours sincerely,

Catherine Mwaura.
Appendix B

Ohio University
Consent Form: Participating Faculty

Title of Research: An Investigation of the Innovation Decision Process of Faculty Members with Respect to Web-based Instruction

This research will investigate the stages of innovation decision processes among faculty to adopt or reject Web-based instruction. The aim of doing this research is to bring an understanding of why some faculty members are swift in adopting instructional technology while others are either slow or not adopting the use of instructional technology, mainly Web-based instruction in teaching. Therefore, faculty members from Ohio University will voluntarily respond to interview questions by the researcher, and participate in a focus group discussion to be hosted by Center for Teaching Excellence at Ohio University. The research findings will benefit administrators, faculty, and scholars.

At the end of this research, the findings will enhance the understanding of how faculty go through the innovation decision process and the factors that influence their decisions to adopt or reject Web-based instruction. In this respect, this study contributes to the awareness of what can be done to encourage more faculty members to adopt Web-based instruction, what areas need more investment to boost the integration of Web-based instruction in the universities and other institutes of higher education, and to what extent Rogers' (1995) Model of Innovation-Decision Process can be implemented by the administrators when making decisions to integrate Web-based instruction in higher education.

This consent form is a partial fulfillment of Ohio University Institutional Review Board requirement for research involving human subjects. By signing below, you indicate:

• You understand that you are a voluntary participant in this research study.
• You are informed that any information obtained from interviews with you will remain confidential and will only be disclosed only with your permission.
• You are requested not to share information learned from the focus group. However, confidentiality cannot be assured for this part of the study.
• There are no anticipated risks in this research study, and that in case of any risk you will not get any compensation from Ohio University or its employees.
• You are free to withdraw your consent and stop participation at any time.

If you have any question regarding this research study you can contact:
1. Dr. Sandra Turner, turners@ohio.edu, (740) 593-9826
2. Catherine Mwaura, capesabe@hotmail.com (614) 475-9739

For questions regarding your rights as a voluntary research participant please contact:
1. Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740) 593-0664.

Your Name (print please) ______________________Date: ____________________

E-mail Address: _______________________________Phone Number: __________

Your Signature: _______________________________
Appendix C

Interview Questions for the Faculty Members

Part 1: Adopters.

1. You are one of the faculty members using Web-based instruction (WBI) in your classroom. How did you get to know about WBI? (Channels of communication)

2. Do faculty members and administrators discuss in the college about the use of WBI in the classroom? If yes, what are some of the views regarding WBI? (Communication network)

3. Did you receive any instructions about effective use of WBI before integrating it into your classroom? If yes, what are some of the advantages of WBI compared to other methods of teaching? If no, how did you gain skills to use WBI in your classroom? (Relative advantages)

4. What are some of the factors that attracted you to use WBI in your classroom? (Relative advantages)

5. Does one require a lot of training and practice to know how to use WBI in the classroom? (Complexity)

6. Is WBI a complicated method of teaching? (Complexity)

7. Is it possible for an instructor to combine WBI with other methods of teaching in a classroom? If yes, in which ways? If no, why not? (Compatibility)

8. Is it possible for a novice instructor to see the impact of using WBI by attending a WBI integrated class? If yes, in what ways? (Observability)
9. Is it possible for an instructor to try WBI before using it in the actual classroom setting? If yes, how? (Trialability)

10. Are there other possible ways that you might have discovered or heard from your colleagues that you can implement WBI into a classroom other than the ones taught or written in books? (Reinvention)

11. Do you face any problems when using WBI in your classroom? If yes, do you get any assistance? If yes, what type of assistance do you get and who provides that assistance? If no, how do you manage the problems? (Complexity)

12. What triggered your decision to use WBI in your classroom? (Innovation-decision process)

13. How did you come to the final decision of using WBI in your classroom? (Innovation decision-process)

14. If you were to do it again, would you follow the same decision process to get where you are today in using WBI in the classroom? If no, what changes would you make in deciding to adopt WBI? (Factors influencing the innovation decision-process)

15. What recommendations would you give to other faculty members who have no intention or are yet to decide to use WBI in their classroom? (General)

16. What other comments would you give concerning using WBI in a classroom? (General view about WBI)

Part 2: Rejecters.

1. How long have you taught in a university college?
2. Have you ever considered using Web-based instruction (WBI) in your classroom?  

(Adopter categories)

3. How did you learn about it? (Communication channels)

4. Do faculty members and administrators in your college discuss about the use of WBI in the classroom? If yes, what are some of the views do they give about it?  

(Communication network)

5. Have you ever seen or been in a class where the instructor uses WBI? If yes, what did you learn from the experience? If no, what would you expect to learn if you had such an opportunity? (Observability)

6. Have you ever tried WBI or wished you could try using WBI in a classroom? If yes what did you learn? If no, what are your expectations from such an experience? (Trialability)

7. From your observation (or from your view) do you expect that there could be other ways of using WBI in a classroom? If yes, which ones? (Re-invention)

8. What is your view about the ease-of-use of WBI in a classroom? (Complexity)

9. Do you expect it possible for an instructor to combine WBI with other methods of teaching in a classroom? If yes, in which ways? If no, why not? (Compatibility)

10. After learning about the use of WBI in a classroom, what triggered the decision you made about it? (Innovation-decision process)

11. How did you get to the final decision you have made so far concerning using WBI in a classroom? (Innovation-decision process)
12. What else do you have to say about using WBI in a classroom? (General view about WBI)

Interview Questions for the Administrators

Part 1: Administrators from the Center for Innovations in Technology for Learning (CITL).

1. What concerns led to the decision to implement Blackboard CourseInfo in Ohio University? (Compatibility)
2. How did you come to the decision to adopt Blackboard CourseInfo in Ohio University? (Innovation decision process)
3. What reasons made you give Blackboard CourseInfo the first priority above all the other courseware tools? (Relative advantage)
4. What are the major objectives for the use of Blackboard CourseInfo as a tool to develop course Web sites? (General)
5. Please give a brief description of how the Blackboard CourseInfo helps faculty to design a course Web site? (Persuasion stage)
6. How do you inform the faculty about the Blackboard CourseInfo workshops in Ohio University? (Communication channels)
7. How many faculty members have enrolled for the Blackboard CourseInfo workshops so far? (Communication channels and Networks)
8. Are there any requirements for the use of Blackboard CourseInfo? If so which are they? If no how do you introduce it to the novice faculty users? (Complexity)
9. How long does it take for the faculty to learn and be competent in using Blackboard CourseInfo? (Complexity)

10. Is it possible for a faculty to see the effectiveness of use of Blackboard CourseInfo in a class before implementing it in his/her classroom? If yes, what are some of the uses can a faculty member observe? If no, what makes it hard to see the results? (Observability)

11. Is it possible for a faculty to try the effectiveness of use of Blackboard CourseInfo in a class before implementing it in his/her classroom? If yes what are some of the uses can a faculty try? If no, what makes it hard to try the use of Blackboard CourseInfo before implementing it? (Trialability)

12. Is it possible for a faculty to use Blackboard Course Info together with other methods of teaching? If yes in which ways? If no why is it not possible? (Compatibility).

13. Do you evaluate the effectiveness of use of Blackboard CourseInfo in Ohio University? If yes what are some of the responses from the faculty that relate to your objectives? If no what makes you continue instructing faculty how to develop course web sites using Blackboard CourseInfo in Ohio University? (Relative advantages)

14. Are there other ways that the faculty members have reinvented the use of Blackboard CourseInfo when developing course Web site using Blackboard CourseInfo other than what you have taught them? (Reinvention)
15. Are there any problems reported by the faculty associated with the use of Blackboard CourseInfo to develop a course Web site? If yes, what are they and how do you deal with those problems? If no, what has made Blackboard CourseInfo such a perfect courseware tool? (Complexity)

16. Are there some features that you would rather change in Blackboard CourseInfo if given an opportunity? If so which ones and why? (Complexity)

17. Have you identified any trend in the way the faculty make decision to adopt or reject Blackboard CourseInfo in developing their course site? If yes, please explain. (Innovation-decision process)

18. What other comment can you give to faculty regarding the use of Blackboard CourseInfo in developing Course Web sites? (General)

Part 2: Administrators from the Division of Information Technology.

1. As the launching point for anyone seeking information on various technology services in Ohio University (OU), what part did the Center for Information Technology Education (CITE) play in the implementation of Blackboard CourseInfo? (General)

2. What concerns led to the decision to implement Blackboard CourseInfo in OU? (Compatibility)

3. What reasons made you give Blackboard CourseInfo the first priority above all the other courseware tools? (Relative advantage)

4. What are the standards governing the use of Blackboard CourseInfo as a courseware tool? (Compatibility)
5. What are the major objectives for the use of Blackboard CourseInfo as a tool to develop course web sites in OU? (General)

6. How did you come to the decision to adopt Blackboard CourseInfo in OU? (Innovation decision Process)

7. Is there a protocol followed in the adoption or rejection of instructional technology in OU? If yes, please explain the decision process and who does what. If no, please explain how the final decision to adopt or reject an instructional technology is made? (Innovation-decision process)

8. How do you inform the OU faculty members about the services offered by CITE in relation to Blackboard CourseInfo? (Communication channels)

9. Does CITE provide services to the general faculty members or does it assist only the faculty members who go to them with questions? If yes, how effective are they in addressing the concerns of instructional technology among the faculty members? If no, how do they disseminate their information to the faculty irrespective of whether they have shown interest or not? (Communication channels)

10. Is there any requirement for a faculty member to qualify for the advise regarding the use of Blackboard CourseInfo offered by CITE? If yes, which are the requirements? If no, what makes it possible to advice the novice the novice users? (Complexity)

11. Are there ways that CITE show the effectiveness of using Blackboard CourseInfo to the faculty before using it in the teaching activities? If yes, what
uses can the faculty members observe? If no, what makes it hard for such showcases? (Observability)

12. Does CITE give the faculty members an opportunity to try the available Blackboard CourseInfo infrastructure before implementing it in their classrooms? If yes, what are the uses that a faculty member can try? If no, what makes it hard to try the use of Blackboard CourseInfo before implementing it in the teaching activities? (Trialability)

13. Is it possible for a faculty member to use Blackboard CourseInfo together as a supplement of other teaching materials? If yes, in which ways? If no, why isn’t it possible? (Compatibility)

14. Do you evaluate the effectiveness of using Blackboard CourseInfo by the OU faculty members? If yes, what are some of the responses from the faculty members that relate to your objectives? If no, what reasons make OU to continue advocating the use of Blackboard CourseInfo as a courseware tool for the development of course web sites by the faculty members? (Relative advantages)

15. Are there ways that faculty members have reinvented the use of Blackboard CourseInfo when developing course web sites using Blackboard CourseInfo other than the way you have taught them? (Reinvention)

16. Have the faculty members who are using Blackboard CourseInfo to develop course web sites reported any problems with it? If yes, what the problems and how do you deal those problems? If no, what has made Blackboard CourseInfo such a perfect courseware tools? (Complexity)
17. Are there some features that you would rather change in Blackboard CourseInfo if given an opportunity? If yes, what are they? (Complexity)

18. Have you identified any trend in the way faculty members make decision to adopt or reject Blackboard CourseInfo in developing course web sites? (Decision making process)

19. What other comments can you give regarding the use of Blackboard CourseInfo in developing course web sites by faculty members? (General)