INSTITUTO TECNOLÓGICO Y DE ESTUDIOS SUPERIORES DE

MONTERREY

UNIVERSIDAD VIRTUAL

PERCEPTION AND ACCEPTANCE LEVELS OF DISCUSSION BOARD AND MESSAGES BY UNIVERSITY PROFESSORS USING A COURSE MANAGEMENT SYSTEM FOR BLENDED COURSES

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE OF

DOCTOR IN INNOVATIVE EDUCATION

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BROWNSVILLE, TEXAS JANUARY 2008

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Submitted as partial requisite to obtain the degree of

DOCTOR IN INNOVATIVE EDUCATION

January 2008

DEDICATION

I dedicate this dissertation to my beloved wife Rosy for her fervent support, patience, and love.

ACNOWLEDGMENTS

I want to express my gratitude to my advisor, Dr. Yolanda Heredia Escorza, for the guidance she provided throughout the investigation and writing of this dissertation. Special thanks to my committee members Dr. Eduardo Flores Kastanis and Dr. José Guadalupe Escamilla de los Santos as for their reading of my work. I also wish to thank all my friends at The University of Texas at Brownsville and Texas Southmost College for helping me get through the difficult times and for all the emotional support and caring they provided.

Abstract

Higher Education Institutions have welcomed Course Management Systems (CMS) along with professors who teach blended courses with the help of this technology. However, while rates of adoption fluctuate among universities, the process of adopting collaboration and communication CMS's features Discussion Board and Messages is slow. Using Roger's diffusion of innovations theory, this research study produced faculty perceptions on two features that, if used correctly and with regularity, may provide the basis to support lifelong learning and student-centered educational approaches. Results indicated Relative Advantage and Trialability were statistically significant predictors of adoption levels for both Discussion Board and Messages according to faculty perceptions. Population of study included faculty adopters of Blackboard at The University of Texas at Brownsville teaching blended courses.

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Chapter 1. Problem Statement

Introduction

This research study points out the need to overcome the low utilization of technology by professors in the teaching learning process, specifically, the scarce utilization of electronic communication and collaborative tools for enhancing course activities.

In the educational world, scholars are reporting low utilization of technology innovations in education in general. The Organization for Economic Co-operation and Development (OCDE) informed in 2005 that, even though some efforts are being made to include class materials online, application of technology in the classroom is none or trivial in many countries, and that actual functionality of technology is very difficult to assess, at least with the research methods available. According to OCDE, most studies cite institutional issues and budget as widespread barriers for adopting technology, being faculty resistance to embrace technology, as a supplement to face-to-face activities or extra class assignments, the most important issue.

In the cases when technology is accepted, adopted, and placed in practice, its implementation is reduced to handling the managerial aspects of the course and not the interactive features electronic platforms offer nowadays. For most adopters, jumping on the technology wagon may signify uploading the syllabus just to fulfill institutional mandatory initiatives or perhaps making course calendar available and posting grades too keep students happy.

In essence, most faculties do not use electronic platforms to enhance regular courses because of the perception they have about technology and because there is no strong effort made by universities for overcoming those obstacles.

The importance of the mater resides in the fact that, adding personal tools and social networks empower students inside and outside the classroom, provide settings for the development of student centered activities, support problem-based projects, and in general, may help to bring about the possibility of reconverting existing educational schemes into lifelong learning oriented systems.

At this point, the new model for teaching and learning in the classroom with the help of computers, software, the Internet and electronic platforms, still in the early stages and there is no model to follow for designing blended courses, no complete manual available, no ultimate guidelines or marvelous examples to emulate. Instead, professors have the challenge of engaging themselves and their students in the effective use of the many features currently available. The fact of the matter is that only few professors are applying technology for instructional purposes, and even fewer encourage students to build-up a sense of community within the university environment, however, students by themselves are connected to each other by means of the many chat rooms, instant messaging, web logs, wikis, and the like.

Unfortunately, those communication and collaboration tools remain underutilized or even no used at all for instructional purposes. Social software, as they call electronic communication software, provides a context for students to learn from each other and from their research in databases, the Internet, and the professor.

Even tough social software were not originally created for educational purposes, these communication and collaboration tools allow students to work together on educational activities, but at the same time, allows them to retain their individualities, independence, and a sense of ownership of the learning process, as it is theoretically depicted in the new educational paradigm.

In contrast, professors grew up with telegrams and teletype, or perhaps fax and telephone, far from the technicalities of the cyberspace. As a result, most of faculty members lack the necessary skills to engage in interactive communication by electronic means. For instance, it is hard for a professor to endure more than an hour chatting through instant messenger without being exhausted. Another reason, and equally important, is faculty's fear of losing control in the classroom, the fear of giving up a little bit or a *little too much* of the central role educators have been playing for ages. In the new educational environment, technology can help to make possible student-centered approach, because the different kinds of social software allow students to conform networks when they still at the university, to build up human relations that eventually will develop into connections to colleague students, and once they graduate, will turn into professional networks.

Background to the Study

Historically, according to Reiser (2001), many innovative technologies draw a great deal of interest at the beginning of its introduction to educational environments, a fascination that changes later into discouragement once assessments show minimum impact on teaching learning outcomes. Although that assumption is true for

audiovisual media and the first computers, Reiser (2001) thinks the case of the Internet and digital technology will be different because these new:

> media have taken on an increasingly larger instructional and performance support role in other settings such as business and industry and higher education and computers, the Internet, and other digital media will bring about greater changes in instructional practices than the media that preceded them. (p.62)

Professors at universities continue playing a central role in the inclusion of new technology in the classroom depending on their perceptual affinity to the innovation. Larry Cuban (1986) in *Teachers and Machines* analyzed the evolution of educational technology throughout the 20th Century and identified a reiterative pattern for attempts to introducing innovative technology into the instruction-learning processes. Whenever a new media becomes available to educational purposes, it raises great expectations for improving education, only to prove later that its impact is not as successful as expected, allegedly, due to several causes: lack of sufficient resources, administrative bureaucracy, and inadequate faculty training. It happened the same way to the inclusion of radio, movies, slide projectors, television, video, and recently the computer and the Internet.

Educators, in keeping up with tradition have continually used habitual supporting materials and resisted incorporation of media and non-printed resources (Area, 2005). 'Technology refusal,' a term coined by Hodas (1993) is the response to the marketing efforts forcing technology into the academic environment (Area, 2005) to the point that, in the words of Larry Cuban (cited in Lomicka, 2003), "computers have been oversold by policy makers and promoters, and underused by those in

education" (p.3). Cuban also found that teachers use the new technologies at home but not that much in the classroom, and that those who use it for instruction, do so occasionally and unimaginatively.

In addressing these concerns, to Clinton (cited in Surendra, 2001) academics have to be assisted to develop new and different modes from the traditional approaches, be helped to categorize perceived attributes, persuaded to change direction, supported to shift strategies, helped to be free from the old patterns, and encouraged to develop new ways of perceiving technology. Here, Clinton emphasizes the concept of perception as essential in understanding the diffusion of ideas. Field experts may regard and idea as advantageous whereas a common individual may perceive the innovation in a different way, thus, perception is the way a human being reacts to an impression. Concurrently, Cuban (cited in Lomicka, 2003) sustains that technology is useful when educators understand it, when they are empowered to create their own curricula, and when they believe technology enhances the teaching-learning process. At the end, the how teachers use technological innovations is the result of historical, organizational, economical, and contextual constraints.

In the mean time, the current educational scenario requires more professors with more knowledge about instructional technology along with adaptive pedagogical resources; it requires adjustment to the new role of the professor and its new educational setting (Vidal-Puga, 2004). More importantly, the issue is not about adopting and knowing how to use an innovative technology, but about its implications on the teaching and learning process. Zhao, Pugh, Sheldon, and Byers

(2002) concluded that the most successful teachers had qualities of the innovator, namely: high technology proficiency, pedagogical beliefs compatible with technology, aware of social dynamics needed to negotiate around campus, low level of dependence, as well as close to the institution's culture, practices, and resources.

In the process of using technology as a course management instrument, many faculty members come soon to realize about its pedagogical advantages (Morgan, 2003) to such an extent that they "begin to rethink and structure their courses and ultimately their teaching. The result is a sort of 'accidental pedagogy' (pp.4-5), an educational improvement as a side effect rather than a straight consequence of its usage. In this regard, the first step to facilitate a smooth transition into a technological resource-based learning is to provide faculty with easily internalized information about the limitations of the traditional lecturing model and the reasons why students must prepare for lifelong learning if they are set to address the information age when they graduate (Breivik, 1998). "A clearly articulated campus commitment to preparing students for lifelong learning, to developing their critical thinking skills, or to preparing them to be lifelong problem-solvers can also facilitate a positive faculty mind set" (Breivik, 1998, p. 77).

Statement of the Problem

In the process of adopting innovations, individuals are subject to series of factors influencing acceptance and adoption of novelties. They perceive in different ways the attributes of innovations, as Relative Advantage with respect to existing inventions; Compatibility with own cultural values; Complexity of the innovation;

Trialability of the innovation, referring to the perceived possibility of an innovation for being tried by potential adopters (Rogers, 2003); and Observability by others. Individuals go from a stage of knowing about the innovation to taking certain attitude towards the new idea, and then they decide from adoption or rejection, it follows implementation of the new idea, and finally the confirmation of the decision taken (Rogers, 2003).

Professors at the universities are not the exception to the process of adopting innovations, in fact, because of their academic preparation the may be more rational when engaging to novelties, particularly academic ideas and applied technology.

Nowadays faculties, administrators, and students are confronting an adoption process regarding the use of electronic technology and more recently the use of cyberspace to engage in communication for educational purposes. Different kinds of Course Management Systems now offer communication features adapting software originally invented for other purposes beyond the school environment, but plenty of possibilities for application in the teaching and learning processes.

Because decision and adoption of innovations occurs not without a screening process on the part of professors, administrators, and students alike, the process of adopting information technology for education has been gradual.

Reiser (2001) expects changes in schools and in other instructional settings will likely come more slowly and less extensive than most technology enthusiasts predicted. Indeed, as other research studies have demonstrated, the educational environment has not been so open to the inclusion of information and communication

technologies in its instruction learning processes (Vidal-Puga, 2004). Usually, professors show resistance to modify the way they teach, and despite the institutions' efforts to maintain themselves up to date on technology advancements and instructional support, professors are not making enough use of such innovations.

Given current global circumstances and the rapid evolution of technology and its application in all kinds of human activity, it is the premise of this study that university professors may embrace technology to fulfill students' expectations and academic endeavors. Of concern however is the fact that most research and survey reports show moderated acceptance of technology, and when adopted, there is a rather low level of intensity of its use, meaning that professors may report using Course Management Systems (CMS's) for their classes but in reality, this use refers to few managerial features. Instead, CMS's should support students' independent work and actively facilitate collaborative relations among students and between students and faculty, working towards a student-centered approach, and not being a system for simply managing daily tasks for the class.

Under this rationale, the research problem for this study is: Essential to student centered approach and life long learning endorsement, collaboration and communication tools of Course Management Systems are not being used enough or not used at all by university faculty members.

In the educational settings, professors perceive technology from different perspectives. Then, is of scientific, academic, and social importance that "diffusion scholars … understand how potential adopters perceive new ideas" (Rogers, 2003, p.

419). According to Everett Rogers and his theory about diffusion of innovations, there are five innovation attributes, in this case technology's characteristics that define the level of acceptance or rejection: relative advantages, compatibility with cultural values, its complexity to the eyes of potential users, as well as the possibility of trying the novelty with success, and the observability by other people.

In this sense, adopters of Course Management Systems have reasons for selecting some of its internal features most likely according to their perception on the innovation characteristics, not on objective traits (Surendra, 2001).

Purpose of the Research

Concerning the inclusion of technology in education, Area (2005) identified four research tendencies: Studies about indicators of computers quantity in school systems, studies about computer effects in learning, studies about opinion, perspectives, and attitudes of educational agents to the use and integration of technology in the classroom, and studies about computers' educational use in classroom and colleges.

The objectives of this research study focus on the study about opinion, perspectives, and attitudes of university professors to the use and integration of technology in the classroom, specifically, the utilization of the features Discussion Board and Messages in Blackboard.

General Objective

The general purpose of this investigation is to identify the level o influence each of the Rogers' innovation attributes have on professors' adoption of Blackboard's

features Discussion Board and Blackboard Messages in a higher education environment, as it is the University of Texas at Brownsville and Texas Southmost College (UTB/TSC). The intention is to know the categorical importance of the intervening elements, right through the professors' perception, concerning the attributes encouraging and discouraging the utilization of the two aforementioned Blackboard's features.

Specific Objectives

The specific objectives of this research study are to:

1. Explore and produce information about university professors' perceptions, regarding Blackboard's features Discussion Board and Blackboard Messages in blended courses.
2. Know about the level of adoption of Blackboard's features Discussion Board and Blackboard Messages by professors teaching blended courses.
3. Identify the key innovation attributes related to Blackboard's features Discussion Board and Blackboard Messages adoption as perceived by university professors teaching blended courses.

Justification for the Study

Since 1995 UTB/TSC is a member to the Southern Association of Colleges and Schools (SACS) that establishes standards for educational programs that address the appropriate use of technology to enhance student learning, meet program objectives, and enrich resources available to students and faculty. The Southern Association of Colleges and Schools (2005) demands its institutional members to be responsible for

providing opportunities for students and faculty to develop competencies in the use of technology. Its Principles of Accreditation, Section 3: Comprehensive Standards, item number 3.4.14, intend to ensure that every "institution's use of technology enhances student learning, is appropriate for meeting the objectives of its programs, and ensures that students have access to and training in the use of technology" (p. 24).

Table 1

Four Blackboard Features Used in Blended Courses Fall 2006 at UTB/TSC

College or School	Number Blended Courses	Percent of Use			
		Gradebook	Course Content	Discussion Board	Exams
Liberal Arts	237	55	65	14	10
Science, Math & Technology	209	44	62	13	9
Business	**102**	**61**	**88**	**27**	**32**
Education	142	37	56	9	2
Health Sciences	133	50	71	**17**	20
TOTAL	823	49_a	67_a	15_a	13_a

Note: Data computed with information provided by Office of Distance Education and Instructional Support, UTB/TSC.

[a]n = Total percentages prorated.

UTB/TSC started using the learning management system Blackboard in 2003 as a pilot program. A year later, UTB/TSC acquired Blackboard license to support teaching and learning activities, offering faculty training and instructional design support for developing online and blended courses. From the 661 full time and part time faculty members, only 247 or 37% use Blackboard at different levels, mainly to post syllabus, grades, and some course content.

Regarding number of blended courses in the fall semester 2006, UTB/TSC offered 823 blended curses but only 15% included Discussion Board interaction (See Table 1).

The School of Business held the highest Discussion Board usage rate 27%, whereas the lowest utilization rate 9% pertained to the School of Education. Data for Blackboard Messages usage was not available. Given the lowest adoption levels of Discussion Board in the School of Education for instance, of concern is how future teachers are getting behind in regard to training, and eventually understanding, today's importance of collaborative and communication tools using technology in the educational environment. Current educational scenario requires more professors with more knowledge about instructional technology along with adaptive pedagogical resources; it requires adjustment to the new role of the professor and its new educational setting (Vidal-Puga, 2004). Convinced that technology is never neutral; Hodas (1993) sustains that:

> Its values and practices must always either support or subvert those of the organization into which it is placed and … the failures of technology to alter the look-and-feel of schools more generally results

> from a mismatch between the values of school organization and those embedded within the contested technology. (p. 1)

Accordingly, forcing technology into educational settings would confront rejection on the part of the organizational culture. Bennett and Bennett (2003) identified technology characteristics, possibly influencing professors' eagerness to adopt technology based on Rogers' diffusion theory, throughout a study which results were applicable to a training program. They concluded that a training program for faculty members should include a first-class presentation and a good discussion concerning relative advantages of instructional technology. Training has to show how technology can be used to improve the teaching learning process, provide professors an opportunity to try hands-on the new technology, consider and take in account the level of comfort with technology, and demonstrate how technology fits their teaching values and philosophy.

Moreover, instructional support staff should make every effort to facilitate the transition from teacher-centered into a student-centered approach. In Rao and Rao words (as cited in Benett & Bennett, 2003), instructional support programs must evolve from merely teaching about the software to "training faculty in how to use the software in a learning environment" (p. 57). Cope and Ward (2002) sustain that "For successful integration leading to enhanced learning outcomes, teachers need to perceive learning technologies as part of a student centered/conceptual change teaching approach" (p. 72). Similarly, O'Banion (1997), citing Excerpts from a Vision of Learning Excellence, writes that educators will transform learning by means of a faculty development plan focused on using technology to enhance

personal productivity, lecture presentation, interactivity, and student-centered-learning.

Results of this study would bring in learning regarding the factors related to acceptance and adoption levels of the innovations in general. In particular, findings would serve to assist higher education institutions on the better understanding of those factors that in turn would lead to designing improved faculty development alternatives.

Contributions of the Study

This research may be relevant to trainers and administrators who are in charge of the responsibility of promoting and overseeing the adoption of Course Management Systems and its internal features towards its integration to the learning-oriented educational model. Incidentally, according to Rogers (2003):

> Many innovations require a lengthy period of many years from the time when they become available to the time when they are widely adopted. Therefore, a common problem for many individuals and organizations is how to speed up the rate of diffusion of an innovation. (p. 31)

Consequently, the better understanding of professors' perception as well as the progression through which professors adopt and utilize technology in the classroom, may serve higher education planners and administrators to make decisions regarding resource distribution and strategies to speed up the adoption process. In essence, the results of this study may hint at some insights for improving faculty development programs that stress academic enhancement by means of the various features within the Blackboard platform.

This work may be of interest for instructional support departments to improve criteria in conducting training programs for faculty and administrators on the most effective implementation and use of Course Management Systems in face-to-face classes supported with technology.

Limitations of the Study

Certain limitations to consider when analyzing the contributions of this research are; first, the institutional framework had certain restrictions in the sense that the process of technology adoption in the university of study was in its initial stages. A second limitation has to do with the degree results would apply beyond the studied population because the number of participants may be too limited for broad generalizations; however, the study sample represented the population of a university in the process of embracing technology, therefore, educational institutions entering the technological stage might get some benefit from the findings. In addition, this study was limited to the professors' perception without considering the students' side of the issue; consequently, this standpoint may represent a limiting factor.

This study analyzed only two Blackboard features, in the hope the disconnection from other features could provide a very first scenario towards developing a further studies to explore the effects from the students' perspective.

Research encompassed a public higher education institution purporting a unique partnership between a community college and a university in one single organization; therefore, supplementary empirical evaluations would be necessary to replicate the findings in different context and environments.

A further consideration is that, given the non-experimental and cross-sectional nature of the study, there was no control over particular participant characteristics and there was no subjects' randomization that had put in question internal validity. Participation was voluntary and consequently some effects might have resulted from the self-selection.

Another caveat Rogers (2003) cautions is that the innovation decision period, from the first knowledge to the adoption decision, may take several years, "even in the case of innovations with spectacular results" (p. 81). Thus, members of the population of this study might have been within their own deliberation-to-adopt process at different stages, which may have affected results emanated from this research.

Moreover, Course Management Systems are continuously evolving and the studied innovation attributes Discussion Board and Blackboard Messages may change, hence, results from this study may not apply to new technological configurations because participant's perception may change even over shorts periods.

Furthermore, participant professors may have had certain perception and adoption attitude due to prior knowledge of other innovations besides the communication and collaboration tools of Blackboard, e.g., chat rooms, instant messenger, or Skype. In this regard, Moreau, Lehmann, and Markman (2001) found correlation between prior product knowledge and attitudes towards and adoption of innovations and demonstrated "that both existing knowledge and innovation continuity are major factors influencing the consumer's adoption process" (p. 14).

Thus, attitude, perception, and acceptance of the two Blackboard features in study might have varied because of their prior familiarity with a different tool. Lack of information about this prior professors' knowledge could have had an unknown effect on this study's results. At the same time, "adoption of one technological component without a related innovation component may not provide required / anticipated relative advantage" (Surendra, 2001, p. 139), e.g., use of Discussion Board without having computer access or Internet connectivity of students and professors alike, may have affected faculty positive perception.

In any case, results emanated from this work could serve to university administrators and managers to get a better understanding of the matter of the study. This may be of help in the processes of planning and budgeting of faculty-training programs oriented towards the inclusion of communicative and collaborative cyber-based tools in the context of blended courses at the different academic levels.

Every research study takes palace in specific settings, therefore, findings and conclusions from this work must be interpreted accordingly.

Chapter 2. Theoretical Framework

Higher education have implemented Course Management Systems worldwide in supplementing traditional face-to-face courses with digitalized class materials, computer based activities, and cyber-communication, bringing up a renewed concept of what continues evolving as a blended course approach. During the adoption process, barriers for embracing technology go from institutional budget issues to faculty resistance to the innovation. Adoption is limited to utilizing CMS's to do course management tasks, and thus, communication features remain underutilized or not used at all, a situation that might be better expounded by Rogers' diffusion of innovations theory.

Course Management Systems, known otherwise as Learning Management Systems (LMS) (Meerts, 2003), provide contexts that allow educational institutions to offer not only distance education but also make possible supplementation of face-to-face courses with electronic materials, and are the basis for bringing into practice different kinds of blended courses (Observatory on Borderless Higher Education, 2004). Morgan (2003) defines course management system as software package or:

> Suite of software tools usually organized around a class or unit of instruction. The suite includes most of the tools that faculty members need to teach a class, such as software to organize and present content, communicate (synchronously and asynchronously), assess student performance, record and report grades, and manage class materials and activities. (p.16)

In this citation, the term 'suite' refers to a collection of software products to provide a complete set of functional software modules that interact with each other, eliminating complexity.

CMS's have the purpose to assist planning, implementing, and evaluating the instructional learning process. In essence, CMS's provides professors with a set of tools plus a framework that allows a relatively easy creation of online course content and the subsequently teaching and management of that course, including a variety of interactions with learners (Meerts, 2003). Main reason for the development of these instruments, according to Storey, Phillips, Maczewiski, and Wang (2002), was to facilitate putting materials online for those instructors who have little knowledge on creating and handling hypertexts, being the most common services; access control, learning content provision, communication tools, and user group management.

Even though Learning Management Systems and Course Management Systems are often cited interchangeably, Carliner (2005) differentiates LMS's as designed to support corporate training that entails short instruction events intended to build knowledge for immediate application, most likely providing environments able to manage e-learning and a broad range of registration and administration tasks. Learning Management Systems examples are NetDimensions EKP, Saba, SumTotal, Toolbook, and Authoware. On the other hand, Course Management Systems were designed and are mostly used to support institutional education in academic settings to build long-term knowledge at universities that, by separate, have long-term investments in complete independent systems to control enrollment, registration, payment for courses, grades, and many other clerical functions. Examples of CMS's are Blackboard and WebCT, Prometeus, eCollege, Course in a Box (WCB), VirtualU,

TopClass, and IntraLearn (Whitmyer & Grimes, 2000), that require few specialized skills and have capabilities to manage discussions (See Appendix 1).

Growing standardization of platforms and the blooming of open source systems continue disentangling CMSs' incompatibility issues and today's existence of too many electronic platforms has contributed to varied ways for combining technology with face-to-face-sessions, to the point that the term *hybrid course* is still discussed among scholars. Willoughby (2003) reported the existence of around 100 technological platforms, including software, hardware, and infrastructure available for online learning at universities. Even though CMS's were designed to provide virtual sites for distance education classes, often they are a good option in campus to supplement traditional courses (Harrington, Gordon, & Schibik 2004). That is, faculty use them to support face-to-face sessions that "some authors consider within the term hybrid model face-to-face courses incorporating the use of technology without reducing the number of actual contact hours. Even so, more than hybrids, those models are face-to-face courses supported with the use of technology" (Escamilla, 2007, pp. 40-41).

In these blended courses, as defined by (Duhaney, 2006), some class work replaces part of face-to-face teaching/learning when students are required to participate in activities like: online discussions, inter-teams' assessment, and collaborative online work projects. Yet, significant campus attendance remains, Graham (in press) observes, as blended courses combine two historically separated

instructional/learning models: the face-to-face model and the learning system disseminated through computers where the electronic technology is emphasized.

Conversely, Sing and Reed and Smith (as cited in Chiok, 2005), appears to correct Graham's statements by affirming, "Such an approach which uses more than one mode of delivery has existed as long as education exists" (p. 1). It has been a method mixing traditional instruction with materials delivered by different means as television, Internet, and electronic mail, among many other combinations. In blended or face-to-face courses supported with technology, mixed mode, hybrid courses, or any kind of not-distance education courses, traditional classrooms continue being the place to meet and the point of reference where students learn "simultaneously the same material by the same person. During class time, interaction among students and faculty is 'many-to-one' and 'one-to-one' during office hours" (Aggarwal & Bento, 2000, p. 5). According to OECD (2005), major impact of CMS's have been on-campus acting as a supplement to classroom activities, hence, Green (2000) foresees instructional-learning systems at universities as a blended approach in which technology will not substitute but complement content and traditional class discourse.

In essence, this study proposal focuses on the higher education faculty adoption of two CMS's features and its relevance on blended courses, without discussing implications regarding learning or pedagogical issues or any aspects directly related to distance education.

Managerial Use of CMS's

Besides the low CMS's adoption rates among professors, a further concern is adopters' usage of CMS's internal features. Enthusiasts like Blackboard (n.d.) claim that educational technology has changed its approach going from simple increase of managerial efficiency towards the inspiration of pedagogical innovation and improvement of the learning process. However, things are far from being as intended. For captive CMS's users, posting syllabi, and perhaps a calendar, mid term or final grades, is enough to say they are onboard the technological wagon. Former research assumed individuals adopt innovations the same way, but Emrick et al. (as cited in Rogers, 2003) found for instance that 56% adopters of a new decentralized educational diffusion system selected only some aspects of the innovation at the time of implementation and that 20% made important changes. Being selective about certain CMS's tools may also include the rejection of some other features. Rogers (2003) stated that potential adopters not only have acceptance or rejection alternatives, they also have the option to modify the innovation or the rejection of certain components. Thus, during the implementation stage, often the innovation evolves as part of this re-invention phenomenon that consists on the modification or change of the invention to adapt it to local conditions or particular, individual, collective, or organizational needs. In this regard, scattered statistics collected from several universities show strong concentration in the selection and use of managing-type CMS's features, (e.g., posting grades for students and uploading course materials in Word documents), and disregarding of other tools with more pedagogic potential.

Computers have been perceived by professors to get communication with students (Hinostroza & Mellar; Wang Yu-mei; Akurekoglu, as cited in Reyes, 2005) while Chiok (2005) proposed course management platforms would have to become authentic teaching-learning tools. However, according to the aforementioned reports from universities, CMS's have been used by professors merely as a tool for handling day-to-day course chores (e. g. Chiok, 2005; OECD 2005).

Woods, Baker, and Hopper (2004) noticed that managerial features tend to be more popular among female professors, younger faculty members, and the ones with more experience using CMS's, and concluded that primarily usage of CMS's was management of blended courses. They wrote down in their study:

> Results indicate that faculty primarily used blackboard as a course management/administration tool to make course documents available to students and manage course grades. Few faculty used blackboard for instructional or assessment purposes, and even fewer utilized blackboard to foster a more positive sense of community within their face-to-face classes. (p. 281)

In a study conducted the by University of Texas at Austin in 2000, during a pilot program before CMS implementation, faculty members participating in a qualitative survey believed most important features of a course management system were syllabus posting, announcements, content, information on how to get in contact, as well as Microsoft Word documents dissemination. Similarly, at Duke University, North Carolina, O'Brien (2001) reported a sample of 111 faculty members using CMS primarily to disseminate course information, announcements, document uploading, and e-mail. By 2004 at the same Duke University, 72% of professors had had at least half of their courses in CMS (Belanger, 2004), finding that most used

CMS's features were of managerial type; 74% for e-mail, 59% uploaded class materials, and 51% posted announcements. Gerdes and Urata (2003) reported only 17% of faculty at Kansas University utilized all features, 66% uploaded documents, 47% basic functions, and just 11% most evaluation functions. Likewise, Morgan (2003) reported that at the University of Wisconsin System CMS's utilization was concentrated on features facilitating course content presentation. Still, according to Morgan (2003) it takes more time to faculty members the adoption of more complex features as grading book, or the more interactive features like discussion boards and evaluation instruments. Then, professors at Duke University suggested CMS's should include better ways for handling multimedia materials and proposed evaluation tools improvement (Belanger, 2004), and once adopted Morgan (2003) points out, these features usage becomes intensive. In any case, as indicated, experience teaching with the CMS's determines usage variation of instructional features (Woods, Baker and Hopper, 2004), but the "underlying issues for the slow uptake go beyond the attitude of individual lecturers and students. Until institutional support is perceived and received, Blackboard will remain in its limited role as an administrative tool in the faculty" (Chiok, 2005, Conclusions section, ¶ 2).

Woods, Baker y Hopper (2004) studied 38 universities across the United States, surveying 862 faculty members using CMS's as supplement to face-to-face courses. They found most professors sent e-mail, uploaded syllabus, supplementary materials, and used the grade booking system, but only 30% collected homework through the file exchange box, and only 20% sent it back to students using the same feature.

Regarding instructional functions usage was even lower. Only 33% used it frequent or occasionally for getting diverse opinions from students as is usual in face-to-face classes, 25% used electronic board for continuation of class discussions online and/or formed discussion groups, and very few used the virtual classroom. Besides, a vast majority never used CMS's for exams and never used the platform turning back assignments to students. In Morgan (2003) opinion:

> Faculty described their initial adoption of a blackboard as being driven primarily by the need to address a particular pedagogical challenge. When probing below the surface, however, it seems that most of these needs have less to do with pedagogy, per se, and more to do with class management. Faculty adopt course management systems principally to manage the more mundane tasks associated with teaching, especially teaching large classes. (p. 2)

In the meantime, Garrett and Vincent-Lancrin (2005) adopted some sort of neutrality concerning learning effectiveness with CMS's, once all respondents to a survey reported *positive* pedagogic outcomes/experiences using technology, but very few could cite systematic evidence. Overall, in the average institution, there is an obvious use of CMS's for managerial functions over pedagogic innovation and there is little evidence of course redesign.

Thus, as Rogers (2003) mentioned, an innovation may be re-invented by adopters becoming a changing entity instead of being fixed, and that a high level of re-invention speeds the adoption process and leads to a higher and sustainable use of the innovation. Selection of CMS's managerial features and rejection of other internal tools or components apparently confirms Roger's innovation re-invention presumptions.

Beyond CMS's Managerial Tasks

The new model for teaching and learning is either in its early stages or it is yet to be invented according to OECD (2005), and at this point the challenge is to engage "faculty and students to use innovatively and effectively existing technological functionalities" (p. 17).

As portrayed in the later section, managerial tasks absorb most attention from professors, leaving features like collaboration and communication tools with little use or not use at all. Education, as a social activity nowadays demands people inclusiveness and student centered approach, not just the application of technology for mechanizing course environments. In the process, utilization of social-oriented features within CMS's seems to be the missing target. Scholars suspect that, besides their lack of knowledge about handling interactive-communication features, subjacent reasons for not using socialization tools as part of the academic package are professors' fears of loosing control of their authority, their central role in the classroom, and their jealously maintained hegemony over students for centuries.

As the Internet has changed the way we do business, it has also changed the way we conduct education-learning activities Kirschmer and Pass (as cited by Barron, 2004) and broadly speaking, CMS's standardizes class elements that had been refined and protected by professors for nearly a millennium (Katz, 2003). In effect "The dominion of the instructor over the classroom is a long-established principle of academic governance, and although the CMS does not dictate either a discipline or pedagogy, it does possess a structure that threatens faculty hegemony" (p. 54). The

teaching-learning process has been inherently and historically a social activity impacted by disturbances associated to novel approaches and technologies (Katz, 2003). To Shoshana Zuboff (cited in Katz, 2003), the most recent concern in the teaching-learning activity is how to incorporate CMS's into its social environment in which the "new work depends upon a radically different approach to the distribution of knowledge and authority, according to principles of equal access and equal opportunity" (p. 54). There is a need for understanding this approach to e-learning that does not consist on letting students just loose on the web, neither confining student activities to a course management system (Dalsgaard, 2006). Surprisingly, according with (Morgan, 2003), faculty members reported communication with students increased by using CMS's and many professors reported being initiated a course restructuring process and ultimately their teaching. In addition, Summers (2004) found main reason for professors adopting CMS was "because it improves communication … it eliminated the need for photocopying… and it facilitates student learning" (p. 3). Still, Morgan (2003) remains unconvinced about the operational use of CMS's by professors arguing "Faculty looks to course management systems to help them communicate easily with students, to give students access to class documents, and for the convenience and transparency of the online gradebook" (p. 2). Only few social tools (e.g., discussion boards) are employed, complains Dalsgaard (2006), as he recognizes social software was not originally created for educational purposes. According to Aggarwal and Bento (2000) "Instructors who are technologically-inclined may become so enamored of the technology that they

concentrate on form rather than content in their lectures" (pp. 5-6) and professors may become much focused on technological devices leaving not enough energy to stimulate class discussion and dialogue among students. Such concerns are somehow reflected on the following data gathered by different authors as follows.

Regarding socialization in class by means of discussion board, only 11% of Woods, Baker and Hopper (2004) respondents to a survey reported having utilized CMS's features for that end, 14% more answered 'some times,' and 15% 'on rare occasions.' They also reported, "The main factor in determining blackboard usage-whether for course administration or instructional purposes-was experience with the tool" (p. 1). In fact, faculty 43 and 55 years old tended to maintain after face-to-face class discussions by means of discussion boards. Before these estimations, Gerdes and Urata (2003) reported that faculty at Kansas University was not using enough communication and evaluation tools in CMS's with only 3% using some communication instruments and no professor using the virtual classroom. At Duke University, North Carolina, O'Brien (2001) reported faculty members showed low interest in using more interactive features as are discussion boards, evaluation instruments, and file exchange. In effect, Belanger (2004) reported only 20% of Duke University's respondents used interactive instruments. Regarding usefulness, 250 instructors from The University of Southern Indiana reported discussion forums and digital drop box were the most useful features (Bonnel, 2004), citing on the other hand, materials that are more useful: syllabus, grade book, announcements, detailed class notes, and study guides among others.

Corich, Kinshuk and Hunt (2004) sustain that CMS's offer many advantages, but are often accused of being faceless mediums doing little to promote social exchange, discussion, or students' collaboration. At present, discussion forums are gaining popularity as an instrument to foster interaction among students within the e-learning environment and are regarded as one CMS's tools enabling students to collaborate, share ideas, and discuss course related concepts.

These new social software (i. e. discussion boards, chat rooms, live classroom, wikis), as referred by Anderson (2005), are "networked tools that support and encourage individuals to learn together while retaining individual control over their time, space, presence, activity, identity, and relationship" (p.4).

Taking a step further, Dalsgaard (2006) brought to the table the puzzle of integration or separation of CMS's and social software from a social constructivist point of view. Dalsgaard (2006) sustains faculty is not using enough social constructivist approaches, to which Woods, Baker and Hopper (2004) add that faculty attitudes, on the whole, are positive to classroom management functions of CMS's but neutral or otherwise undecided in terms of its instructional or psychosocial benefits. The introduction of social software in the form of personal tools and social networks conveys a different approach to using CMS's because a course is delivered through and takes place within an integrated system.

In contrast, adding personal tools and social networks to CMS empower self-governed students and support problem- based activities without going to the extreme of just placing students in front of a search engine on the web, simply because it

would be extremely difficult for students to navigate the vast amount of resources (Dalsgaard, 2006).

Furthermore, Koper (2004) complains that the changing role of faculty has been ignored, as they must learn how to teach using new pedagogical models and technology applications to be effective, efficient, and appreciated. Often technology in campuses "is just an add-on to existing work, leading to increased workload and costs without increase in the effectiveness of education." (p. 19). To Koper (2004) the longer-term endeavor of the educational change process is to (a) increase educational effectiveness, (b) to increase educational flexibility and accessibility, (c) to increase education attractiveness, and (d) to decrease workload for faculty and staff and even to decrease institutional costs.

The fact is tat until now, CMS's have had a partial impact on pedagogy, according to Dalsgaard (2006) whereas Woods et al. (2004) have stated that "Even though professors make frequent use of Blackboard, it seems like they are not taking advantage of the full pedagogic potential that signifies the improvement of courses by means of learning management systems" (p.296).

At the University of Texas at Austin, Courseware (2001) indicated that, even though discussion forums and grade book were being used to certain extent, faculty members were not taking advantage of features to stimulate students' collaboration and learning as virtual classroom, file exchange, evaluation, presentation and teamwork features, or multimedia functions.

At any rate, faculty members interviewed by Lopes (2003) stated that CMS's "Blackboard and WebCt helped them to be better and more efficient professors and in some way transformed their teaching" (p. 3), adding they used the platforms because they felt the request from new students. Those new students, as Costello, Lenholt, and Stryker (2004) point out, pertain to Generation X, the generation born during the 60's and 70's (Merriam-Webster, 2007) a group of individuals with special learning needs.

Lee (cited in Costello et al., 2004) sustains students of present digital age have a preference for short and specific segment materials, demand stimulant class sessions instead of alienation, and require interesting and concise materials to capitalize on their enthusiasm for technology. Still, this cohort wants to get opportunity for personal contact with other students and Duderstadt and Womack (2004) believe that "the digital generation's tolerance for the traditional classroom may not last long" (p. 15). Furthermore, Manuel (2002) contends that for Generation Y, the generation next to generation X, specially people born in the USA and Canada from the 80's to the 90's (The American Heritage, 2006), conference-type class sessions are no longer effective as instructional technique.

Those students want an active work environment and "may prefer the simpler instant messenger services they have been using as long as they can remember" (Gardner & Eng, 2005, p. 415). Furthermore, Duderstadt and Womack (2004) perceive digital generation as one that is comfortable living and playing in the electronic-space, to the point that they demand learning and work experience has to be adapted to their cyber-reality.

Hence, being students at the center stage, they own and control what they call 'personal tools' that are used for constructive-type activities as well as reflective tasks, e.g., writing, presenting, drawing, and programming (Dalsgaard 2006). There are at least two types of technological personal tools: individual and collaborative.

Individual tools, like web logs or wikis, are personalized, owned, and controlled to do independent work. The potential of these kinds of personal tools is to support a student's independent work process. For instance, Dalsgaard (2006) mentions:

> a student involved in a project, working on solving a problem, can use a weblog to communicate and present ideas and thoughts. Further, the student can use wikis or other kinds of web pages to develop the project. An e-portfolio can be used to arrange resources of relevance to the work. Individual personal tools support self-governed and constructive processes. (p. 6)

Wikis and, to a certain extent, weblogs also are collaborative personal tools, besides discussion forums and file sharing, all owned and controlled by several students working together in student-centered teams.

A deeper way of seeing CMS's as a very important part of the educational change is Brown and Currier (2001) assertion that, "technology is a means to an end; the provision of high quality learning" (p. 8) to which Fraser (as cited in Brown & Courier 2001) adds the concept of resource-based learning as follows:

> Resource-based learning in general has an advantage of including within it printed works, computer-based materials, and resources in other media forms. Resource-based learning, rather than computer-based learning draws attention away from the medium and back to the content, assuming that a 'resource' has something inherently useful about it (p. 8).

If considered, CMS's collaboration and communication features play a fundamental role in the process of making resources available, workable, interchangeable, and in the end, making these resources useful. In this sense, learning materials are considered resources or tools, in Dalsgaard (2006) terms, that students use to solve academic problems, to him, resources are not learning materials until students use them actively. Hill and Hannafin (2001) stated when writing about resources for teaching and learning:

> Resources are media, people, places, or ideas that have the potential to support learning. Resources are information assets – data points organized by an individual or individuals to convey a message … For learning, resources must be contextualized to determine situational relevance and meaning. (p. 38)

From there, the importance of CMS's communication and socialization features as the vehicles for handling and dealing with resources in the educational field has to do with instruction learning effectiveness in the new educational paradigm. Unfortunately, and in plain contrast with management tools utilization, collaboration and communication features are reported in low percents, even though there is some casual evidence that MCS's implementation increases communication. Interaction through electronic means remain in the low scores at a time when student-centered approach is challenging academia performers, after the new generations grew up taking for granted the impact of electronic means in their lives; either for entertainment, socialization, or for conducting business transactions.

Needs for Conducting Research on this Phenomenon

According to Aggarwal and Bento (2000), for most universities the difficult "question becomes how to preserve and expand the desirable aspects of face-to-face teaching models when translating them into the new environment of Web-based education" (p. 2).

The assessment, explanation, and prediction of the factors preventing or helping innovations' diffusion are possible only by understanding the multiple elements influencing technology adoption (Surry & Farquhar, 1997). Given that educational technology is inherently based on innovation, finding the best way for introducing this novelty for potential adoption would require exploration of the factors influencing its adoption, in order to come up with and effective diffusion model.

Strauss (2004) points out that many faculty members at higher education institutions feel already overwhelmed with regular academic duties to participate in technology training, especially when tenure committees put little attention to teaching effectiveness as part of the qualification. Many colleges offer optional training or workshops on how to use technology in teaching, but few offer incentives to encourage professors to improve those skills. Whereas all of this happens, Strauss raises several questions:

> What should be done about the disconnect between colleges' vast expenditures on technology and the feeble uses to which the hardware and software are being put? Is the solution truly just a matter of more or better training for instructors? Or are faculty members actively resisting the technology? If so, is that because they shun innovation, prefer doing things the way they always have, or simply believe that some subjects cannot be effectively taught with high-tech gadgetry?

> Were colleges' decisions to buy all that technology showy but misdirected moves? (n.p.)

Piotrowski and Vodanovich (2000) indicate existent literature does not explain in full some of the identified barriers for technology adoption in education, signaling the need for more specific studies, as researchers' challenge is to understand the factors influencing educational technology adoption.

Diffusion of Innovations Theory

Diffusion of innovation is the process in which, over time, certain communication channels enlighten the members of a social system about an innovation. Scholars studying diffusion theory center their attention on the factors influencing the chance that a new product, idea, service, procedure, or practice will be accepted and then adopted by individuals within certain social context. Mahajan and Peterson (1985), maintain that diffusion process is probably one of the social phenomena most researched and better documented, defining that Everett M. Rogers' Diffusion of innovations theory is "a communications-based theory for interpreting the diffusion of diverse phenomena" (p. 10). Rogers diffusion of innovation theory intends to explain the process throughout an innovation is created, all the way until its utilization or rejection depending on the user perspective. Pérez and Terrón, 2004; Clarke, 1999; Dillon and Morris (cited in Reyes, 2005) concluded that diffusion of innovations theory provides the concepts for understanding the technology impact across time in addition to the continuous supply and research of new perceptions and the comprehension of the innovation characteristics. Everett M. Rogers' diffusion of innovations theory emphasizes that interpersonal social contacts and mass

communication are responsible for spreading the news about novelties and therefore influencing peoples' perception and opinion.

Theoretically, Rogers defines four contextual elements in the diffusion of innovation process: (a) the innovation itself, (b) communication about its existence by means of any channel, (c) the temporary framework regarding decision stages, adopters' chronology adoption, and (d) the social context where opinion leaders and change agents play specific roles in the innovation adoption process.

During the innovation decision process, Rogers (2003) defines five stages:

1. The knowledge stage takes place when an individual is aware of an innovation's existence and gains an understanding of how it functions.
2. Persuasion stage, when individuals form a favorable or unfavorable attitude towards the novelty.
3. Decision stage, occurs by the time an individual engages in activities that lead to a choice to adopt or reject the new idea.
4. Implementation phase occurs when an individual puts a new idea into use.
5. Confirmation whenever an adopter seeks reinforcement on an innovation-decision already made, but he or she may reverse this previous decision if exposed to conflicting messages about the innovation.

Perceived attributes of the innovation are: Relative Advantage, Compatibility, Complexity, Triability, and Observability (Rogers, 2003). These perceived attributes are of particular importance because they depict:

1. The relative advantage of the innovation, evaluated by the extent an innovation is better than its predecessor, or at least to the individuals' perception. Influencers of the relative advantage perception are social, economic, convenience, satisfaction, and even necessity factors.
2. The compatibility of the innovation and consistency with existent values, past experiences, and present needs. Socio-cultural beliefs and methodologies used in the past define compatibility perception.
3. Complexity reflected in a difficulty level scale to assess understanding of the innovation and its utilization.
4. The level the innovation is subject to trial and evaluation through minor testing.
5. The observability of the results before other individuals.

Rogers (2003) reports the five perceived attributes have been extensively investigated, however, he points out:

> Much diffusion research has studied "people" differences in innovativeness (that is, in determining the characteristics of the different adopter categories). Much less effort has been devoted to analyzing "innovation" differences (that is, in investigating how the perceived properties of innovations affect their rate of adoption), although the imbalance…may be disappearing in recent years (p. 862).

Conceptually, Rogers' diffusion theory encompasses a broad level of social diffusion and, even though it does not provide any explanation about the reasons for the acceptance, it "provides a context to analyze the importance of the information technology's impact on the basis of adoption time" (Pérez & Terrón, 2004, p. 1). Mahajan and Peterson (1985) define that Diffusion Model describes the successive

increments in the number of adopters or adopted units over time, providing the prediction about the continuity of this phenomenon as well as a general explanation regarding its dynamic process. Accordingly, Pérez and Terrón (2004), explain that "theoretical research in users …focus on their interest in the evaluation of factors that affect the electronic resources' acceptance, with the purpose of … predict acceptance level" (p. 1) without predicting the how the user embraces new technology (Dillon & Morris, 1996).

Marshal (cited in Surendra, 2001) believes the dominant factor for individuals adopting an innovation, is not the objective newness but the perceived newness.

As part of the diffusion of innovations theory, the perceived attributes theory states that innovation's characteristics, Relative Advantage, Compatibility, Complexity, Triability, and Observability, as perceived by individuals, help to explain innovation rates of adoption. The more positive perception on innovation attributes, the higher the adoption rates, with the exception of complexity that has an inverse relationship (Rogers, 2003). According to Rogers (2003), these five perceived attributes explain 49 to 89 percent of adoption levels variance. To diffusion researchers, Relative Advantage is one of the major elements predicting adoption levels (Rogers, 2003). In addition, other intervening variables are (a) the type of decision making the innovation optional, collective, or authoritarian, (b) the kind of diffusion channels, (c) the nature of social system, and (d) the scope of the effort made by an innovation's promoter (Rogers, 2003). Authority decisions sponsor

fastest rates of adoption, whereas "optional decisions can usually be made more rapidly than collective decisions (p. 73-74).

Even though Pérez and Terrón (2004) argues diffusion theory lacks explicit treatment about user acceptance and Lundblad (2003) contends this theory does not provide elements about the internal and intra-organizational issues, Reyes (2005) believes this theory encompasses a perspective with a broad range of characteristics that make it applicable to units of analysis and organizations as well. According to Rogers (2003), "Innovations requiring an individual-optional innovation-decision are generally adopted more rapidly than when an innovation is adopted by an organization (p. 353). Based on this theory Lundblad (2003) explains that the innovation adoption processes within institutions is related to its organizational structure, its leadership, and its openness level.

Bennett and Bennett (2003) based on the diffusion of innovations theory, identified technology characteristics that could be influencing professors' eagerness to adopt in order to apply those characteristics to faculty training program. They concluded that a training program should include a good presentations and discussion about the relative advantages of instructional technology, demonstrate how technology can be used for teaching-learning process improvement, provide teachers with opportunities to practice, be concerned about faculty comfort levels with technology, and demonstrate how technology fits their teaching values and philosophy. In Rao and Rao opinion, (cited in Bennett & Bennett, 2003), instead of training on how to use software, it would be better to train professors on how to use it

for educational purposes. Moreover, faculty training must evolve from a teaching-centered approach to a learner-centered development.

The Blackboard Platform

Blackboard is a Course Management System which internal structure includes sections, tools, and features to create or upload announcements and different sort of documents containing syllabus, course calendar, academic topics, and course materials in general. Likewise, it includes communication instruments, as are e-mail, an internal messaging system, voice mail, discussion forums, a section to conduct live text-based sessions, and lately, voice interaction capability to held class presentations using live chat boards and multimedia documents (See Appendix 2).

Other tools make possible exams configuration and its application as well as giving back grading notice to students on an individual basis.

At present, Course Management Systems like Blackboard are no longer exclusively for teaching distance education courses. The platform serves to convert traditional face-to-face classes into blended or web enhanced courses. Chiok (2005) argues that Blackboard usage as a novelty for management and operative tasks is rather limited because it could be more competent in terms of becoming a more efficient teaching and learning tool. However, Lopes (2003) sustains that platform usage by itself does not necessarily means good or superior results than traditional chalk and board systems because it could improve the teaching process but could also increase its deficiencies.

According to Blackboard (n. d.), publications this Course Management System supports four major functions depending onto the grouping and handling of its internal features as follows:

1. Course administration. Professors create curses' structure in electronic formats.
2. Instructional medium. Professors use internal features to create, organize, and provide class materials for each session.
3. Communication, collaboration, and interchange channel. Professors and students use sections for announcements, messages, e-mail, and file exchange. They also work on discussion forums and live chat boards with text and voice capabilities.
4. Evaluation environment. Professors create and give exams and other evaluation instruments. The grade book calculates and display grades from exams, assignments, homework, presentations, and other class activities.

In essence, CMS's adoption worldwide still in the adoption process while at the same time is continuously evolving. Low percentages of faculty members at universities use CMS's and adopters utilize these electronic platforms to do managerial tasks related to blended courses. Because new student generations grew up and are used to cyber communication for social and other life activities, it follows that the inclusion of such novelties as communication vehicles in class would enhance student participation and provide, at least, an environment already familiar to the students. Whereas professors may use

different types of communication tools, they may be getting behind technology advancements and its academic present and potential applications. The study of perception of faculty members in this research project is based on Everett M. Rogers diffusion of innovations theory concerning CMS Blackboard features Discussion Board and Blackboard Messages.

Chapter 3. Research Methodology

This chapter reports on the general methodology for the entire research project, including the operated procedure in conducting the pilot test and its results. Sections in this chapter are research design, research environment, research questions, research hypothesis, population sample, questionnaire design, pilot study, data collection, methodology for data analysis, and ethical issues.

Because this was a survey-based study, a pilot test served to validate a questionnaire applied to a sub-sample of faculty members in the targeted population. The overall research methodology intended to produce statistical parameters which interpretation would give response to the research hypotheses. Analysis of respondents' demographics provided a framework to understand the perception and acceptance relationships regarding Blackboard features Discussion and Blackboard Messages.

Research Design

Being a cross-sectional study, this work correlated a set of variables without attempting to establish any causality of such associations if they happened. As an expo-facto research, the variables remained non-manipulated but observed, as they behaved in the research context where the independent variables' performance had previously taken place (Hernández, Fernández, & Baptista, 2003). Expressed in Kerlinger (2002) terms, one or several uncontrolled independent variables *x* and dependent variables *y* underwent examination. This way, the project carried out an assessment on professors' perceptions about independent variables or *Rogers'*

Innovation Attributes regarding Blackboard features Discussion Board and Messages and dependents variables for *Levels of acceptance* of those features.

Variables

This study based its analysis on quantitative methodology computing faculty perceptions on innovation diffusion factors for acceptance of two Blackboard features, using Rogers (2003) Diffusion of Innovations Theory, and focusing on the five innovation attributes Rogers (2003) established in his Diffusion of Innovations Theory applied to Blackboard features Discussion Forum and Blackboard Messages. The innovation attributes were Relative Advantage, Compatibility, Complexity, Triability, and Observability. In essence, Rogers (2003) criteria for perceived innovation attributes are:

1. Relative Advantage of an innovation, as perceived by members of a social system, is positively related to its rate of adoption.
2. Compatibility of an innovation, as perceived members of a social system, is positively related to its rate of adoption.
3. Complexity of an innovation, as perceived members of a social system, is negatively related to its rate of adoption
4. Trialability of an innovation, as perceived members of a social system, is positively related to its rate of adoption
5. Observability of an innovation, as perceived members of a social system, is positively related to its rate of adoption.

Table 2

Variables Intervening in the Study

Independent Variables (Innovation Attributes)	Dependent Variables (Acceptance levels[a] of)	
	Discussion board	Messages
Relative Advantage	Differences	Differences
Compatibility	Differences	Differences
Complexity	Differences	Differences
Triability	Differences	Differences
Observability	Differences	Differences

Note: Differences = significant differences between pairs of variables.

[a] Faculty willingness to use Discussion Board and Messages within the next five semesters and faculty willingness to use Discussion Board and Messages if qualified training and support offered.

In determining the nature of the diffusion process of Blackboard features Discussion Board and Blackboard Messages, independent variables in this study were UTB/TSC professors' perception about Rogers innovation attributes applied to the two mentioned Blackboard features. Dependent variables were the professors' levels of acceptance of Blackboard features Discussion Board and Blackboard Messages (See Table 2). Two items in the research instrument assessed the levels of acceptance:

(a) faculty willingness to use Discussion Board and Messages within the next five semesters and (b) faculty willingness to use Discussion Board and Messages if qualified training and support offered.

Research Environment

The University of Texas at Brownsville and Texas Southmost College (UTB/TSC) started using the learning management system Blackboard in 2003 as a pilot program. A year later UTB/TSC acquired Blackboard license to support teaching and learning activities offering faculty training as well as instructional design support for developing online and blended courses.

Three years later in the Fall 2006 total number of UTB/TSC faculty members counted 616, from which 247 were using Blackboard either for face-to-face courses supported with Blackboard.

Research Questions

Course Management Systems' collaboration and communication features, essential to student-centered approach and life long learning endorsement, are for the most part, either underutilized or disregarded by university faculty members. To identify professors' perceptions about each of these Blackboard features, this study will attempt to answer five research questions as emerged in relation to Rogers' innovation attributes and Blackboard's features Discussion Board and Messages:

1. According with Rogers' innovation diffusion factor Relative Advantage, what is the relationship between UTB/TSC professors' perception and their level of acceptance of Blackboard's features Discussion Board and Messages?
2. According with Rogers' innovation diffusion factor Compatibility, what is the relationship between UTB/TSC professors' perception and their level of acceptance of Blackboard's features Discussion Board and Messages?
3. According with Rogers' innovation diffusion factor Complexity, what is the relationship between UTB/TSC professors' perception and their level of acceptance of Blackboard's features Discussion Board and Messages?
4. According with Rogers' innovation diffusion factor Trialability, what is the relationship between UTB/TSC professors' perception and their level of acceptance of Blackboard's features Discussion Board and Messages?
5. According with Rogers' innovation diffusion factor Observability, what is the relationship between UTB/TSC professors' perception and their level of acceptance of Blackboard's features Discussion Board and Messages?

Research Hypotheses

According to Rogers (2003) "diffusion scholars have found Relative Advantage to be one of the strongest predictors of an innovation's rate of adoption" (p. 370). Altogether, Reyes (2005) reported Relative Advantage as one of the most important factor determining acceptance. Surendra (2001) found that most crucial Rogers diffusion attributes were also Relative Advantage and Trialability, as well as Complexity, nevertheless, Rogers (2003) believes "Complexity may not be as

important as Relative Advantage" (p. 405). In addition, to Rogers (2003), Trialability as is the more important innovation attribute perceived by early adopters.

In contrast, according to Rogers (2003), past diffusion research suggests that Compatibility may be somewhat less important in predicting rate of adoption than is Relative Advantage. (p. 394). Besides, Reyes (2005) reported Observability as the less consistent attribute.

Based on these findings, some hypotheses in this study include independent variables Relative Advantage and Trialability together while other hypotheses set together Compatibility, Complexity and Observability.

The hypotheses in this study include also: (a) willingness to use Discussion Board and Messages in courses in the next five semesters as well as (b) willingness to use them if training and support provided, both as the dependent variables measuring faculty rates or levels of adoption.

Thus, responses to the research questions arose from the statistical testing of the following research hypotheses:

Hypothesis 1 .- There is statistically significant difference between perception about each of the attributes Relative Advantage and Trialability; and the level of acceptance of Blackboard's Discussion Board by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Discussion Board within the next five semesters.

Hypothesis 2 .- There is statistically significant difference between perception about each of the attributes Compatibility, Complexity, and Observability; and the

level of acceptance of Blackboard's Discussion Board by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Discussion Board within the next five semesters.

Hypothesis 3 .- There is statistically significant difference between perception about each of the attributes Relative Advantage and Trialability; and the level of acceptance of Blackboard's Discussion Board by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Discussion Board if qualified training and support offered.

Hypothesis 4 .- There is statistically significant difference between perception about each of the attributes Compatibility, Complexity, and Observability; and the level of acceptance of Blackboard's Discussion Board by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Discussion Board if qualified training and support offered.

Hypothesis 5 .- There is statistically significant difference between perception about each of the attributes Relative Advantage and Trialability; and the level of acceptance of Blackboard's Messages by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Messages within the next five semesters.

Hypothesis 6 .- There is statistically significant difference between perception about each of the attributes Compatibility, Complexity, and Observability; and the level of acceptance of Blackboard's Messages by UTB/TSC professors teaching

blended courses during Fall semester 2006, assessed by faculty willingness to use Messages within the next five semesters.

Hypothesis 7 .- There is statistically significant difference between perception about each of the attributes Relative Advantage and Trialability; and the level of acceptance of Blackboard's Messages by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Messages if qualified training and support offered.

Hypothesis 8 .- There is statistically significant difference between perception about each of the attributes Compatibility, Complexity, and Observability; and the level of acceptance of Blackboard's Messages by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Messages if qualified training and support offered.

Population Sample

Table 3

Faculty Members Population at UTB/TSC

	Type of course taught			
	Traditional	Blended	Online/Distance	Total
Full Time	146	183	60	389
Part Time	203	64	5	272
Total	349	247	65	661

Note: Data computed with information provided by Office of Distance Education & Instructional Support, UTB/TSC.

According to the research design, the objectives of the study, and its element characteristics, targeted survey population for this study were the 247 full time and part time faculty members using Blackboard platform to teach any variation of face-to-face courses supported by Blackboard platform in five schools or colleges at UTB/TSC during the Fall semester 2006, (See Table 3).

The first attempt for organizing this population sample was to classify survey participants by the academic school or college they pertained within UTB/TSC, as is resembled in Table 4.

Table 4.

Projected UTB/TSC Academic Schools of Survey's Participants

	Total		Blending	
School or College	Faculty	Percent	Faculty	Percent
Liberal Arts	240	36	63	26
Sciences, Math & Tech.	157	24	60	24
Business	66	10	41	17
Education	128	19	44	18
Health Sciences	71	11	39	16
TOTAL	661	100	247	100

Population sample across colleges was expected to be distributed proportionally to the size of each of the faculties. For instance, the college of Liberal Arts was expected to have around 26% participation in the sample given the number of its faculty members.

Questionnaire Design

The foundations of the survey's questionnaire did lay on two previously used instruments by two researchers doing their dissertations. For the most part, items from Reyes (2005) shaped the backbone of the instrument providing about 80% of the constructs. Items taken from Surendra (2001) completed the sets of statements on each of the five Rogers' innovation attributes. The author performed phrasing adaptation taking in account the general purposes of this study as well as the specific topic under investigation. Instrument's reliability and its validity are discussed later in this chapter.

The survey questionnaire had three sections:

Section I contained an informed consent form and directions for completing the questionnaire.

Section II intended to gather information on the perceived value of Blackboard features Discussion Board and Messages as linked to Rogers' five innovation attributes:

1. Perceived Relative Advantage associated to Blackboard features Discussion Board and Messages over traditional face-to-face discussions and e-mail, as

determined by time concerns, effort, and effectiveness, as well as users' perceptions.

2. Perceived Compatibility of Blackboard features Discussion Board and Messages associated to the users' style of teaching, views, existing values, past experiences, and needs.
3. Perceived Complexity associated to skills, training, and level of difficulty teaching with Blackboard features Discussion Board and Messages.
4. Perceived Triability associated with trial opportunities and experimentation with Blackboard features Discussion Board and Messages.
5. Perceived Observability associated with demonstrations and observing evaluations of Blackboard features Discussion Board and Messages.

The instrument enclosed five items on each of the five Rogers' attributes of innovations for each of the Blackboard features Discussion Board and Messages. The five items, multiplied by each of the five attributes, times two features, resulted in 50 statements. These statements appeared grouped by attributes within the survey questionnaire.

The Likert scales were generated along with written statements, as is defined by Hernández, Fernández, and Bautista (2003), both "in favorable or positive sense and unfavorable or negative sense" (p. 370) which in turn defined the coding direction depending on the item case. Items were no more than 20 words in length avoiding double negative to make them easy to understand. The optional response 'Totally Disagree' appeared first on each scale in order to moderate participants' tendency to

select impulsive responses favoring a given model and evade the "phenomenon that involves the desire to be socially accepted" (Kerlinger & Lee 2002, p.611). To Hernández, Fernández, and Bautista (2003) a Likert scale is, in strict sense, an ordinal assessment; however it is common to work with it as an interval scale, meaning that the distance between 'strongly agree' and 'agree' in this study was taken as having the same distance between 'agree' and 'neither agree nor disagree.' Thus, Likert scales in evaluating of human behavior are not true interval scales, however, they are very close, and researchers treat them as interval evaluations. Moreover, Kerlinger and Lee (2002), uphold Likert scales produce almost the same results than interval scales.

Section III requested demographic and related information about the respondents, as were Age, Gender, Status as faculty member, Years of experience as faculty (all institutions included), Course levels taught, Educational level, College or School, and Kinds of courses teaching. Demographic data served to help validation of the research model by verifying adequacy of the sample and to help the study of relationships among variables. According to nomenclature stated in Hopkins, Hopkins, and Glass (1996), set of responses for this section were one nominal dichotomous and seven nominal or categorical. Finally, an item for Comments was included to explore a greater breadth of respondents' attitudes and preferences.

With those two pre-existent surveys as foundation, key terms and items' overall wording kept, only those concepts that needed to be adapted to fit this study were changed or adjusted. Hence, to keep high the reliability levels, two aspects were taken

especial attention. One was making suggested adjustments by reviewers and reducing wording ambiguity on the items as described in the pilot testing section later. Two, as suggested by Kerlinger and Lee (2002), the self-administrated questionnaire was applied in the cybernetic context that implies standard, well controlled, and similar conditions to all respondents.

Pilot Study

A first informal trial of the questionnaire took place on a personal basis with voluntary reviewers and was intended to assess completion time, uncovering problems related to the overall functionality of the instrument, and served to make corrections, some adjustments, and to reorganize the questionnaire. This way, the entire set of constructs passed through three voluntary reviewers who responded to the informal trial by filling the online questionnaire and, after that, made suggestions to the author throughout separate meetings.

The first reviewer, a professor in a public Mexican university made only one comment regarding the possible misunderstanding of the central option in the Likert scale 'Neither Agree nor Disagree.' A second reviewer, a retired professor from an American university, marked three questions that he considered ambivalent. A final reviewer, an active faculty member which first language is English from Anglo-Saxon culture, suggested some rewording and rephrasing adjustments to several items. Changes recommended by the third and fourth reviewers emanated from this trial.

After this informal test, items 3, 4, 5, and 26, 27, 28 that required rephrasing, changed as suggested by the third reviewer, given the confirmation of ambiguity when reviewers tended to select the neutral option on the Likert scale. Then, items on attribute Observability, 21, 22, 23, 24, 25, and 46, 47, 48, 49, 50 underwent minor wording adjustments. In addition, Author decided that dependent variables, items 60, 61, 63, and 64 must have changes in the Likert levels codification, as well as changes on text content because, instead of measuring level of acceptance were measuring past usage level of the tools in study. Finally, an open-ended question asked the participants to write how they used Discussion Boards if they used it, and to express any other comments.

The UTB/TSC Institutional Review Board-Human Subjects, which evaluates and oversees all research protocols involving human subjects, did review the questionnaire before dissemination in the field, and issued a letter of approval (See Appendixes 3 and 4).

Next step in the process was to conduct a real pilot test among a sub-sample of faculty members at UTB/TSC using Blackboard platform to teach blended courses. An invitation to participate letter (See Appendix 5) and an informed consent statement accompanied the survey questionnaire as mandated by the Review Board. The informed consent did not require any participant signature because of the online environment of the survey, therefore responding to the survey indicated consent

The pilot testing included a mini-sample of 30 potential participants selected randomly out of the total 247 but taken proportionally from the five schools and

colleges at the university. Out of the 30 faculty members originally invited, only 20 participated in the real pilot test but one entry was not complete.

Validity of the Instrument

It is content what defines validity of an instrument. Most of the items did include a keyword regarding Rogers' innovation attributes, a synonymous, or a similar idea. Each construct or item contained an affirmative or negative statement where respondents could find implicit a concept on each Blackboard feature's attribute as innovation. This way, the instrument's content reflected specific domain of what it was intended to assess, as recommended by Hernández, Fernández, and Bautista (2003).

To Hyman, Lamb, and Bulmer (2006), the validity of the attributes' scale takes in account four aspects: Face validity, content validity, construct validity, and criterion-referenced validity. Face validity "is high if it is generally believed that a question is (or appears to be) a good measure of a concept" (Hyman et al. 2006, p. 6). According to instrument reviewers for this research study, items in the questionnaire seemed to be measuring issues related to the topic at hand. For instance, item 15 stating *Learning to use Discussion Board as a classroom tool is easy*, clearly refers to the issue of Complexity of the innovation at hand, or item 16, *Discussion Board could be tried on a small scale first*, without a doubt alludes the Triability of this communication tool.

Regarding content validity, it simply focuses on whether or not an item embodies the full definition of the concept (Hyman, et al.). On the above examples,

items 15 and 16 in the questionnaire, the concepts of *easiness* or *complexity*, and the *possibility of trying the innovation* are inherently part of the constructs.

In the case of construct validity, it refers to whether multiple indicators of a measure produce similar or identical results (Hyman, et al.). Altogether, to Stapleton, (1997), construct validity encompasses all forms of validity and respond to the question of whether a test measures what is supposed to assess.

As per criterion-referenced validity, it encompasses predictive validity and concurrent validity. An item question holds high criterion validity if measures up to a certain standard or criterion. Previously existing questions are regarded as having criterion-referenced validity (Hyman, et al.). Thus, reviewers' criteria applied to this study instrument's items provided what Hernandez et al. (2003) refers as the theoretical framework to support the relationship of each construct with the rest of the group of constructs (Hernandez et al., 2003) and which convergence implies the possibility of a similar result to the original set of constructs. Even though the statements in the questionnaire were adapted to fit the theme about the five Rogers' innovation adoption attributes, wording or rewording made before and after the pilot test followed closely the original text on the pre-existing questionnaires taken from both Reyes (2005) and Surendra (2001). Moreover, Hyman, et al., maintain that "concurrent validity is achieved if a question is associated with a pre-existing indicator or question that is already seen to have high face validity" (p.7). As mentioned before, Reyes (2005) and Surendra (2001) questionnaires have been tested on issues related to perception and level of acceptance of new educational

technologies, and, web technology based education respectively. This research study concurred in the sense that it intended to assess specific educational technology tools.

Reliability

Reliability of a questionnaire is the degree an instrument produces the same results when applied repetitively to a research subject. This reliability or scoring consistency is part of validity. In turn, validity of an instrument reflects a specific domain about the content of what is being assessed (Hernández, Fernández, & Bautista, 2003). The confidence level or reliability of questionnaire items and the instrument resides on the precision of the survey to assess what is intended to be assessed (Kerlinger & Lee, 2002) and allows stability, reliability, consistency and replica-ability of the study with minimum possible distortion.

In the case of this study's instrument, two aspects were carefully worked to increase reliability. First, reduction of construct ambiguity by submitting the questionnaire to reviewers and doing suggested wording adjustments to the constructs, aimed to eliminate possible distortion of interpretation and assess what was intended.

Moreover, the statements of the questionnaire emanated from two proved instruments. The first source was the instrument from Reyes (2005) which assessed professors' perceptions about the use of computers as tools in the instruction-learning process. The second source was the questionnaire used by Surendra (2001) which assessed professors' level of acceptance and perception of factors influencing adoption of educational systems based on web technology. Both original instruments

used Rogers' innovation attributes as independent variables and included responses of five level points on a Likert scale. In the words of Hyman, Lamb, and Bulmer (2006), one advantage of using pre-existing survey items is that:

> They have been extensively tested at the time of first use…'recycled' questions are accurate measures of the concept of interest (and many will have been pre-tested to ensure this), the degree of validity is likely to be high, resulting ultimately in obtaining data of higher quality (p. 34).

For Likert scaled instruments, according to Kerlinger and Lee (2002), nowadays is possible to know reliability scores by calculating Cronbach's alpha, which is an estimate of the average of all split half estimates of reliability calculated using the following equation:

$$\text{alpha} = k * \text{avgcor} / [1+(k-1) * \text{avgcor}]$$

In this formula, k is the number of items and *avgcor* is the average inter-item correlation coefficient (Ward, n/d). According to Hopkins, Hopkins and Glass (1996), a perfect reliability level would be 1.0.

The groundwork survey conducted by Surendra (2001) reported confidence or reliability values for each group of items in the survey and yielded a Cronbach's alpha value $\alpha = .77$ for the first 29 items on perception diffusion factors, and $\alpha = .80$ for the 23 following items about levels of acceptance. For foundation survey from Reyes (2005), alpha coefficients were $\alpha = .67, .62, .60, .73$, and .79 for the variables Relative advantage, Compatibility, Complexity Flexibility, and Observability, respectively.

In this study's pilot test, Cronbach's alpha .893 resulted for the overall 50 items regarding Rogers' perceived attributes, and alpha .700 for items about acceptance level of Blackboard Discussion Board and Messages. Minimum reliability is α = or > .700, therefore, the overall group of scales met the criteria for internal reliability.

Table 5

Pilot Test Means and Cronbach's Alpha Values for Reliability

Scales	Items	Pilot Test (N = 19)	
		Mean	Alpha
Discussion Board			
Relative advantage	1 to 5	3.22	0.935
Compatibility	6 to 10	4.07	0.885
Complexity	11 to 15	2.44	0.868
Triability	16 to 20	4.13	0.827
Observability	21 to 25	3.22	0.661
Blackboard Messages			
Relative advantage	26 to 30	3.18	0.924
Compatibility	31 to 35	4.18	0.900
Complexity	36 to 40	1.66	0.805
Triability	41 to 45	4.15	0.890
Observability	46 to 50	3.08	0.742

The analysis conducted in SPSS also assessed the internal reliability of each attribute scale in the questionnaire for the pilot test. Cronbach's alpha scores resulted in values ranging from .935 to .661, as indicated on Table 5.

Data Collection

Instrument Application Process

As mentioned before, the UTB/TSC's Institutional Review Board-Human Subjects, reviewed and approved the research project and its study instrument, including the informed consent documents.

For the actual survey, respondents were notified in advance about the survey through an e-mail-type postcard to alert about the survey arriving in approximately one week. The author believes that this pre-notification increased the likelihood of response because the respondents might be more likely recognizing the survey when it arrived.

The survey was uploaded to the Internet encompassing four web pages enabling participants to answer more questions in fewer steps. Given that the questionnaire was designed for online fielding, the number of screens presented to respondents were minimized as well as the amount of scrolling they have to do to answer questions, but not all questions were fitted on a single screen in order to make it easier to deal with. Moderated use of colors and neat graphic design increased the attractiveness of this online survey.

To reach faculty users of Blackboard across campus, the instrument was distributed through an e-mail enclosing an invitation to participate, explaining the purpose of the study and instructions on how to access the questionnaire.

Participants' e-mail addresses originated from an existing listserv at UTB/TSC's Distance Education and Instructional Support Department. The data collection instrument was a self-administered 65-item survey questionnaire including eight items on demographic data and one open-ended question (See Appendix 6).

Participants were asked to rate their perceptions of the 50 items related to Rogers' five characteristics plus six items on acceptance of Blackboard features Discussion Board and Messages, on a scale from 'strongly disagree' to 'strongly agree,' with strongly agree being the most positive response. Values were assigned to the scale with 1 (one) being the most negative response and 5 (five) being the most positive. In this study's questionnaire, items of positive or favorable wording had Likert scales codes 1, 2, 3, 4, 5, while negative or unfavorable worded scales had codes ordered 5, 4, 3, 2, 1 (See Appendix 7).

In the case of the Complexity attribute, positive items had reversed coding in order to identify the inverse relationship between perception and acceptance level estimators. Total items in the questionnaire with reversed codes were 4, 8, 9, 10, 13, 14, 15, 29, 33, 34, 35, 38, 39, and 40. Responses entered automatically to a Microsoft Access database hosted at one of the UTB/TSC servers.

Because of the electronic environment, the instrument was self-administered "always under well-controlled and similar standard conditions" as Kerlinger and Lee

(2002) prescribe, even though professors might have varied surrounding environments at the moment and place they took the survey. Given the electronic and self-administration nature of the questionnaire, for this study was not possible to report 'not response cases' by individuals not wanting to respond because all participants were contacted by e-mail and became volunteers. The possibility that any number of inquired persons did not respond, did not necessarily mean they refused to take the questionnaire. Other reasons for not getting response might be due to lack of e-mail delivery, message delivered but never opened, missive opened but not read, mail read but not answered because response was postponed and then forgotten, including among other possible causes, refusal to participate. With the exception of textual responses, all responses arrived as numbers as they were codified in an electronic format.

Data collection took nearly three weeks. First, the electronic formatted survey was launched via e-mail inviting faculty members to participate and including a link for accessing the questionnaire online. Responses arrived throughout the next 5 days. By the second week, an e-mail remainder was directed to all faculties in the survey population and responses started arriving again. By the third week, the author of this work started visiting faculty offices to remind them about the questionnaire and more responses were produced.

From the total 121 collected responses, five were discarded because of incomplete or if many answers were not filled. Workable sample comprised 116 responses, meaning that 47% of the population of study participated in the survey.

The questionnaire was designed for submission of responses already codified to an Access database set in a UTB/TSC server for that specific purpose. Once process completed, data set was transferred to an Excel file in order to check accuracy of numbers, screening for possible inconsistent responses and missing data. Answers to open ended questions were also collated in a separate file for further analysis.

Final set of data then was copied and pasted into an SPSS file previously set up with specific codification for each of the variables. Likert scale variables were set as ordinal variables while demographic items were programmed as nominal.

Methodology for Data Analysis

Rogers (2003) Diffusion of Innovations Theory has been used to conduct many studies as stated on the related Literature Review Chapter II of this study. Author was looking to verify the effect of each of the Rogers' innovation attributes on the perception about Blackboard features Discussion Board and Blackboard Messages.

As mentioned before, all responses gotten from the survey underwent detailed inspection to detect errors, missing information, and incomplete questionnaires. Once the data was clean, all information went into a data file in Statistic Package of Social Science (SPSS) version 15.0 for Windows. For the final working sample, only clean responses took part in the statistical analysis.

In general, data produced from this study was processed in SPSS as follows:

1. For descriptive analysis, frequency tables from SPSS showed a general vision about participant's characteristics by converting observed

frequencies into relative frequencies or percentages (Hernández, Fernández, & Baptista, 2003).

2. Factor analysis assessed validity by identifying the factors that categorized the underlying variables.
3. Correlation analysis showed the nature of the relationships among independent and dependent variables.
4. Stepwise regression analysis served to discover predictors in the relationship among independent and dependent variables. A simple linear regression is a line drawn in a two dimensional space represented by the equation $\gamma = \alpha + ß\chi_i + \varepsilon_i$ where γ = Dependent variable, α = constant (the interception), ß = beta values of independent variables, χ = independent variables, and ε = error. Multiple regression equation cannot be represented in just two dimensions but serves for this study because research design has several independent variables, as depicted in the following equation: $\gamma = \alpha + ß\chi_1 + ß\chi_2 + ß\chi_3 + \ldots ß\chi_k + \varepsilon$.Stepwise regression is a form of multiple regression analysis that screens for superfluous variables.
5. ANOVA to determine any differential effects among the university schools and colleges.

Ethical Issues

This research project and its study means, including the informed consent and invitation to participate documents, passed revision and got approval from the

UTB/TSC Institutional Review Board-Human Subjects, in accordance to all requirements involved.

In addition, the author did take in account foremost ethical considerations motioned by Shrader-Fechtte (cited in Kerlinger & Lee, 2002):

1. Research results had not intention, implicit or explicit for compromising the good name and image of UTB/TSC. It is only an academic study.
2. Participants were informed about the objectives and scope of the research, about the sponsoring institution, and about the identity of the author.
3. Participants provided consent by means of a letter of informed consent transmitted via e-mail that contained an access link to the questionnaire (See Appendix 8).
4. Acceptance on the part of the respondent was implicit in the act of accessing and responding to the survey. The author made the compromise of keeping confidentiality of all collected information.
5. Participants' identity remained protected by not requesting name or any other identification along the research process.
6. Respondents were made aware that all participation was voluntary and that they could chose not to respond to the survey without having to explain any motive or reason, free from any kind of pressure or any stated obligation by the researcher.

Chapter 4. Findings

This research study sought to identify perceptions about innovative attributes of Discussion Board and Messages in Course Management Systems Blackboard by professors at the University of Texas at Brownsville teaching blended courses in Fall semester 2006. An online questionnaire prearranged in three sections totaling 65 items, served to know about demographics, to assess perceptions, and adoption levels: 25 items addressed perception Discussion Board attributes, 25 items addressed perception on Messages attributes, six items assessed adoption levels, eight were demographic questions, and one blank space was set for comments. Items in the instrument referred to Diffusion of Innovations Theory by Everett M. Rogers.

This chapter presents findings arranged in the following sections: Characteristics of Survey Respondents and Response Rate; Factor Analysis; Correlation; Attributes Predicting Discussion Board and Messages Adoption; Differences Among Schools and Colleges; and Findings on the Comments from Participants.

The study posed five research questions; each of them corresponded by a pair of hypotheses. In the section Attributes Predicting Discussion Board and Messages Adoption, this chapter refers to each of the research questions with the analyses employed to address the associated hypotheses.

Demographics of Respondents and Response Rate

According to statistics generated by the Course Management System Blackboard, during Fall semester 2006 in UTB/TSC, 247 professors were using different combinations of Blackboard's internal tools at diverse levels. Such combinations

included posting announcements, sending e-mail, uploading syllabus and supplementary materials, using the grade book system, collecting homework through the file exchange box, setting discussion forums for student participation, among other features.

Kerlinger and Lee (2002) stipulated that a hard but effective rule of thumb is to utilize a sample as big as possible. Comrey and Lee (cited in Kerlinger & Lee, 2002) specify that samples of 50 elements of less do lack confidence with respect to correlation coefficients.

The instrument for this study was sent to 247 university faculty members teaching blended courses. The survey produced 116 good questionnaires meaning that almost half of the population of study (47%) had participated.

Table 6

Faculty Participants by Age

Age	Percentage (N = 116)
21 -30	3
31- 40	24
41 - 50	27
51- 60	34
61-70	11
71- 80	1
Total	100

Mwaura (2003) detected that age and work experience influence on how faculty make the decision to accept or reject an innovation. Then, Woods, Baker and Hopper (2004) noticed that managerial features within Course Management systems tend to be more popular among female professors, the ones with more experience using Blackboard, and that faculty 43 and 55 years old tended to maintain after face-to-face class discussions by means of discussion boards.

Correspondingly, in this study more women (63%) than men responded to the survey even though population included equal number of men and women, and 85% professors were at their early mature or mature age 31 to 60 (see Table 6).

Table 7

Faculty Participants by Years of Experience

Years of Experience	Percentage (N = 116)
0 - 1	3
2 - 4	23
5 - 8	28
9 - 15	18
16 - 25	16
26 - 35	10
36 - more	2
Total	100

On the other hand, half of respondents to the survey were faculty members having between 2 and 8 years of experience (Table 7). Another 40% had some 9 to 35 years of teaching experience. The very low participation of UTB/TSC faculty with 36 years experience or more reflected Mwaura (2003) findings about professors with more than 35 years of experience being more critical to new ideas and not accepting novelties. The 2% participants in this study having 36 or more years of teaching experience most likely pertained to the cohort between 61 to 80 years old; however, this old-age cohort makes 12% of course blenders on Table 6, meaning first, that not all aged professors have too many years of experience. Second, it suggests that age of professors may not be as influential as might be years of experience for rejecting or accepting innovations like Course Management Systems.

On years of experience however, Mwaura (2003) found age and work experience influence together on how faculty make the decision to accept or reject an innovation. Surendra (2001) found relationship between years working in college and acceptance of innovation, and relationship between age and acceptance of innovation. Hence, Barron (2004) found that faculty who had taught from 1 to 15 years were more likely to web enhance. In any case, Rogers (2003) acknowledged, "There is inconsistent evidence about the relationship of age and innovativeness" (p.453). The issue may need more investigation.

Per apart, Table 8 shows approximately one-third of survey participants with tenured status. They are professors holding a permanent employment position.

Table 8

Faculty Participants by Professional Status

Status	Percentage (N = 116)
Full Time	
Tenured	32
Tenure track	34
Lecturer	23
Part Time	
Adjunct Faculty	10
Visiting professor	1
Total	100

Another one-third of respondents were Tenure Track faculty, holding a five-year employment contract conditioned to proper fulfillment and demonstration of research work and active participation in departmental committees, work performed towards student extracurricular activities, and positive evaluation assessed by students.

More than one-fifth of participants were Lecturers, hired on a year-to-year basis, whose only obligation is to teach a given number of courses per semester.

Tenured, Tenure Track, and Lecturer, all three together are generally accounted as full time professors. At UTB/TSC, full time faculty did comprise 74% of total population; however, in the sample taken this cohort participation was 89%, according to the survey responses. This high percentage was influenced by the low

participation of Adjunct Faculty members, part time professors paid by each course they taught under a temporary contract being two courses per semester the maximum allowed. These part time cohort of professors were represented by only 10% of the participants (see Table 8), whereas total UTB/TSC population includes 25% of Adjunct Faculty members.

Most of these part timers are either retired professors, independent professionals in diverse specialties, or teachers pertaining to local school districts holding master degrees; they do not have any designated offices on campus and are less prone to participate in many university endeavors, becoming hence difficult survey prospects.

Their low percent of participation in the survey may be attributed to the minimum time they spent in the university campus, which in turn minimized opportunities to contact them personally. It is worth to mention that half of total responses resulted from approaching professors personally at their offices to remind them about the online survey questionnaire.

Table 9

Faculty Participants by Educational Level

Degree	Percentage (N = 116)
Ph.D	39
Ed.D	11
Master	43
Other	7
Total	100

UTB/TSC is a partnership between The University of Texas System and the Texas Southmost College. Many professors teaching college level courses hold master degrees and therefore percentages from the survey reflect high participation of faculty with master degrees. Table 9 shows 50% of the participants in this study had either Ph. D. or Ed. D whereas 43% respondents had Master degrees.

Table 10

School/College Membership of Faculty Respondents to the Questionnaire

	Percentages			
College or School	Total (N = 661)	Blending (N = 247)	Survey (N = 116)	Difference Survey-Blending
Liberal Arts	36	25	31	24
Science Math Tech	24	24	21	-13
Business	10	17	12	-29
Education	19	18	13	-28
Health Sciences	11	16	19	19
Other (Applied Tech)	-	-	4	-
Total	100	100	100	-

Table 10 presents data on college or school affiliation of participants as compared to the original population of study. In the survey, faculty represented six different schools or colleges with the largest participation teaching Liberal Arts, followed by

Health Sciences, whereas faculty from Science Math & Technology, and Education were less participatory. A brand new college at UTB/TSC detected in the sample taken was Applied Business Technology, which appeared just by the time of the survey application, right at the beginning of Fall semester 2007. Many of the new college of Applied Business Technology professors used to teach at the school of Business Administration, therefore, actual percentages of Business Administration could be affected because of this inter colleges' faculty transference.

Table 11

Type of Courses Taught by Respondents

Course type	Respondents Percent (N =116)
Blended	92
Face-to-face	98
Online	23
Other	2

Of particular interest to this study was the type of courses faculty had taught. The majority of faculty indicated they were teaching undergraduate courses and only 40% had taught graduate level classes.

Mainstream of responses indicated professors taught or had taught blended courses by including face-to-face instruction plus technology.

In Table 11, those few participants not declaring themselves as teaching blended courses suggest some faculty members doing certain level of *blending* did not consider themselves teaching blended courses, even though their course's statistics section in the Blackboard platform registered some sort of blending activity during Fall semester 2006.

In addition, almost all participants reported teaching also face-to-face classes with no technology included, and besides teaching blended or face-to-face courses, one-fourth respondents declared they conducted or had conducted on-line courses as well.

Table 12

Participants' Use of Discussion Board and Blackboard Messages

	Percentages (N= 116)	
Use or have used	Discussion Board	Blackboard Messages
Yes	49	64
No	51	36
Total	100	100

When asked whether they used or had used Discussion Board as a teaching tool, about half of faculty responding to the survey indicated they used or had used Discussion Board in courses during and before Fall semester 2006, as is shown in Table 12.

Table 13

Willingness to Use Discussion Board and Blackboard Messages

	Percent (N = 166)			
	Next 5 semesters		If trained	
	Discussion Board	Messages	Discussion Board	Messages
Strongly Agree	**29**	**29**	**28**	**28**
Agree	**45**	**41**	**50**	**40**
Neither Agree nor Disagree	20	12	16	19
Disagree	4	12	4	9
Totally Disagree	2	6	2	4
Total	100	100	100	100

Moreover, as illustrated in Table 13, an even greater percentage (74%) *Agreed or Strongly Agreed* when asked if they will use Discussion Board within the next 5 semesters. Furthermore, 78% would be willing to use a discussion board if they had access to qualified training and support.

Set together, the last three percentages suggest that even though about half of respondents had some experience with Discussion Board, additional one-fourth was willing to use it in future semesters and additional few more will use it if training is available.

Obviously, participants echoed Rogers (2003) assertion that training relieves anxiety, leading to perceived usefulness and increased innovations use, otherwise, as in the case of new computer users, "Simply providing computer equipment to employees is unlikely to result in increased … use unless training is also provided" (p. 645).

Per apart, respondents were also asked whether they used or had used Blackboard Messages to communicate with their students in their courses and 64% indicated they did use or had used Messages for communication during Fall semester 2006 or before, as is shown in Table 12.

Subsequently, as illustrated in Table 13, a slightly greater percentage (70%) indicated *Agree* or *Strongly Agree* when asked if they would be willing to use Blackboard Messages within the next 5 semesters and 68% *Agree* or *Strongly Agree* when asked if they would be willing to teach with Blackboard messages if they had access to training and support.

The last three percentages suggest that even though two-thirds of respondents had some experience with Blackboard Messages, only additional 6% was willing to use it in future semesters and only 4% more will use it if training and support available, suggesting that further increase on the level of Messages' adoption might depend on factors different from training and support.

A closer examination to bottom part of Table 13, suggest there were more professors deciding not to use Messages in the next five semesters (*Disagree and Totally disagree*) even if they have access to qualified training and support, than

professors deciding not to use Discussion Board in the next 5 semesters or if they have training and support.

Also in Table 13 under Discussion Board, the percentages of faculty responding *Neither Agree nor Disagree* decreased in 4 points, from 20 to 16, if training and support offered, but added 4 percent points to the positive acceptance *Agree and Strongly agree.* In other words, one-fifth of undecided faculty would adopt Discussion Board if training and support offered.

For Messages, respondents reacted the opposite way by increasing in 7 points to *Neither Agree nor Disagree* from 12 to 19 if training offered, lessening the percentages of *Disagree or Totally disagree,* but also lessening the percent of *Agree and Strongly agree.* In other words, the percent of undecided faculty to use Messages increased if training and support were available.

Both interpretations together suggest that if training available, willingness to use Discussion Board increased but willingness to use Messages did not increase. Therefore, responses from participants suggest they would like to have training and support for Discussion Board but were not too much enthusiastic about having training and support for Messages.

Table 14

Attributes of Discussion Board and Likert Scale Percentages

Attributes	Totally Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total Percent
Relative Advantage	4	8	**46**	**33**	10	100
Compatibility	3	8	**30**	**38**	21	100
Complexity	**17**	**27**	**27**	**24**	5	100
Trialability	1	5	**25**	**46**	23	100
Observability	3	11	**52**	**25**	11	100
Total/scale	6	12	**36**	**33**	14	100

Table 14 summarizes percentage calculations for all Likert-scaled responses, counted from all Discussion Board items in the survey questionnaire.

Vertically, these percentages highlight major tendencies on Likert scales *Neither Agree nor Disagree* and *Agree* for all the attributes. Percentages reveal about half of respondents concentrated their perception on this neutral-like scale for the two attributes Relative Advantage (46) and Observability (52). In essence, about half of respondents had no clear opinion about the advantages or disadvantages or the *visibility* to others of using Discussion Board.

Conceivably, many participants had a better-distributed opinion regarding Compatibility, Complexity and Trialability.

Horizontally, all attributes in Table 14, with the exception of Complexity, had positive balance towards scales *Agree* and *Strongly Agree*. The opposite direction of Complexity toward *Disagree* and *Totally Disagree* is due to the inverse effect of Complexity on respondents' perception, the less complexity the more likelihood for adoption.

Also on Table 14, seems like faculty members believing Discussion Board is not a Complex innovation provided 44% of responses by selecting *Totally Disagree* and *Disagree*. An interesting finding was that, being an inverse-scaled attribute, Complexity did not mirror the rest of the attributes rather, 24% professors did a*gree* Discussion Board was complex in some way, whereas the rest of attributes mirrored a less-important pattern for column *Disagree*. Such a tendency suggests Complexity of Discussion Board may hinder adoption by a worthy faction of professors.

In fact, comments from the final open-ended question in the survey confirm the suggestion as follows:

> I like using the Discussion board area but feel the upgraded version in blackboard is cumbersome. Threaded discussions in open forums are so easy to use. Blackboard seems to put so many steps into its features that it becomes problematic for students that do not have high-speed internet access. I guess it is the design of the blackboard discussion area that presents problems for me and not the idea of using a discussion board. I feel that discussion boards increase discussion in a class.

What is more, the "cumbersome" or perfunctory technical aspects of the Discussion Board interface may not be the only aspects involving the Complexity of use perceived by some professors, as the following comment exposed:

> The skills required for face-to-face interaction are not the same as those required for cyber communication. Most students use cyber interaction and abbreviated cyber language effectively already. They need to develop their use of standard, professional writing and speaking to others personally. Many students lack both confidence and basic skills in personal communication.

In the same way, another professor respondent to the survey wrote concisely:

> Most of my students do not read or write well and online discussion and messaging will not help.

Perceptibly, the complexity of Discussion Board involves not only the technical aspects for handling the interface but also some other non-apparent intricacies related to the other users, namely the students, particularly because Discussion Board is interactive.

Table 15 summarizes percent calculations for all Likert-scaled responses, counted from all Messages' items in the survey questionnaire.

Vertically, percentages bring to light respondents concentrated their perception on neutral-like scales *Neither Agree nor Disagree* and *Agree* for the two attributes Relative Advantage (44) and Observability (55). More than half of total respondents revealed neutrality regarding Observability of Messages. Reasonably, many respondents had a more distributed opinion regarding Messages attributes Compatibility, Complexity and Trialability.

Table 15

Attributes of Messages and Likert Scale Percentages.

Attributes	Totally Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Relative Advantage	8	13	**44**	**26**	9	100
Compatibility	5	11	**32**	**32**	21	100
Complexity	**22**	**33**	**24**	**16**	4	100
Trialability	5	7	**28**	**41**	**18**	100
Observability	5	12	**55**	**17**	10	100
Total/scale	9	15	**37**	**26**	13	100

Horizontally, all attributes in Table 15 with the exception of Complexity, had positive balance towards scales *Agree* and *Strongly Agree*. The opposite direction of Complexity toward *Disagree* and *Totally Disagree* is due to the inverse effect of Complexity on respondents' perception according to Rogers (2003) theory, which upholds less complex innovations have more likelihood of adoption.

From Table 15, seems like faculty members believing Messages is not a Complex innovation provided 55% responses by selecting *Disagree* and *Totally Disagree*.

Finally, attribute Trialability added 59% of opinions *Agree* and *Strongly Agree*, suggesting faculty members doing blended courses think Messages is something they can try on the way to adoption.

At the time of this research work, there was little or none reference found in the literature focusing on perceptions about Relative Advantage, Compatibility, Complexity, Trialability, or Observability of Discussion Boards or Messages within Course Management Systems for blended classes.

Factor Analysis

The items in the Discussion Board and Messages sections of the questionnaire were comparable statements but phrased to address Discussion Board characteristics and Messages characteristics. Five subscales, consisting of five items each, addressed the five innovation attributes stated by Rogers (2003); Relative Advantage, Compatibility, Complexity, Trialability, and Observability, proposed for each of the features Discussion Board and Messages. Responses to the questions consisted in a number-coded Likert scale as follows: *Totally Disagree* (1), *Disagree* (2), *Neither Agree or Disagree* (3), *Agree* (4), and *Strongly Agree* (5). Seven of the items on both the Messages and Discussion Board scales had to be reverse coded *Totally Disagree* (5) to *Strongly Agree* (1). Reverse coding was necessary because some statements were in negative direction and because Rogers' Theory establishes attribute Complexity has negative relationship to adoption. Those seven reverse-coded items

for both Discussion Board and Messages sections were statements 4, 8, 9, 10, 13, 14, 15, and 29, 33, 34, 35, 38, 39, and 40.

The proposed subscales were based on previous research conducted by Everett Rogers and his Theory on Diffusion of Innovations regarding Attributes of the Innovations. Within the questionnaire, each item pertained to only one of five groups, each of these groups corresponding to one of Rogers' innovation attributes, namely Relative Advantage, Compatibility, Complexity, Trialability, and Observability.

Table 16

Factor Analyses for the Items on Discussion Board

Resulting Components					
1	2	3	4	5	6
cx13[a]	ob25[c]	ra3[d]	tr18[e]	ob24[c]	cx12[a]
cx14[a]	ra1[d]	ra4[d]	tr16[e]	ob21[c]	ob23[c]
cx11[a]	cp6[b]	ra5[d]	tr17[e]		ob22[c]
cx15[a]	ra2[d]	cp7[b]	cp8[b]		
cp9[b]	tr19[e]				
cp10[b]	tr20[e]				

[a]Complexity. [b]Compatibility. [c]Observability. [d]Relative Advantage. [e]Trialability.

A principal component factor analysis using a varimax rotation was attempted for the Discussion Board and Messages scales to determine whether the proposed five subscales would emerge from the factor analysis procedure.

However, the factor analyses failed to identify the proposed subscales for both Messages and Discussion Board in the instrument.

Table 16 reveals how factor analyses identified six components in the instrument for Discussion Board. Combination of these components from the factor analyses did not coincide with the theoretical factors stated by Rogers.

Table 17

Factor Analyses for the Items on Messages

Resulted Components				
1	2	3	4	5
cx39m[a]	tr42m[b]	ra27m[e]	ob49m[d]	ob48m[d]
cx38m[a]	tr43m[b]	ra26m[e]	ob47m[d]	ra30m[e]
cx36m[a]	tr44m[b]	cp31m[c]	ob46m[d]	
cx40m[a]	ob50m[d]	cp32m[c]		
cp33m[c]	ra29m[e]	ra28m[e]		
cx37m[a]	tr41m[b]			
tr45m[b]	cp34m[c]			
cp35m[c]				

[a]Complexity. [b]Trialability. [c]Compatibility. [d]Observability. [e]Relative Advantage.

In addition, Table 17 presents how factor analyses produced five components from the instrument for Messages. Combination of these components from the factor analyses did not coincide with the theoretical factors stated by Rogers.

Overall, factor analysis produced six and five factors solutions accounting for 71.4% (Discussion Board) and 69.7% (Messages) of the variance with acceptable reliability but the factors did not confirm the theoretical underpinnings of the survey.

It is worthwhile to mention that running factor analysis requires large sample sizes, going from five observations per variable to a ration of 10:1. Raven (1996) suggests, "a study with 30 variables would require at least 150 subjects in order to conduct an adequate factor analysis" (p.12). This study produced 116 responses. Then, the decision was made not to use the subscales identified by the factor analysis in further calculations. Instead, the original theoretical subscales were used and reliability was calculated for these subscales. These five subscales from Rogers' Theory served once for Discussion Board and once again for Blackboard Messages.

Table 18

Cronbach Alphas for Discussion Board and Messages Subscales

	Discussion Board	Messages
Relative Advantage	0.831	0.815
Compatibility	0.885	0.827
Complexity	0.868	0.889
Trialability	0.850	0.872
Observability	0.704	0.732

Reliability of the questionnaire was calculated and the findings are in Table 18. Cronbach alphas ranged high from $\alpha = .704$ to $\alpha = .889$, and therefore the instrument was acceptable for the theoretical subscales.

Correlation Analysis

It was of interest to ascertain the strength of the relationships between the attributes of the Discussion Board and the participants willingness to use Discussion Board within the next 5 semesters as a teaching tool (item 60 in the questionnaire), and participants willingness to use Discussion Board in classes, if training and support offered in the future (item 61). Table 19 presents the correlation matrix for this analysis.

Table 19

Correlation Coefficients for Discussion Board, NEXT5, and WILL

	NEXT5	WILL
Relative Advantage	0.570	0.500
Compatibility	0.539	0.446
Complexity	-0.238	-0.187
Trialability	0.615	0.519
Observability	0.280	0.285

Correlation coefficients for each of the three subscales Relative Advantage, Compatibility, Trialability and independent variables willingness to use Discussion Board within the next 5 semesters (NEXT5) and willingness to use Discussion Board in classes if training and support offered (WILL), resulted in medium to high positive relationships. The correlation coefficients for Observability resulted in low but still positive relationships.

Conversely, in the case of Complexity, both NEXT5 and WILL had negative relationships, corroborating the suggested generalization of Rogers (2003) regarding "complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption" (p. 405). The more complex an innovation the less likely adopted. The negative relationship obtained simply means that respondents did not consider Discussion Board was complicated, although the relative low negativity suggests participants did not think Discussion Board is an easy tool.

Table 20

Correlation Coefficients for Blackboard Messages, NEXT5, and Will

	NEXT5	WILL
Relative Advantage	0.724	0.694
Compatibility	0.609	0.621
Complexity	-0.203	-0.130
Trialability	0.660	0.687
Observability	0.389	0.406

The relationships between the attributes for Blackboard Messages in Table 20, willingness to use Messages in the next 5 semesters, and willingness to use Blackboard Messages if qualified training and support offered, were somewhat higher than the ones resulting for Discussion Board.

Correlation coefficients for each of the three Messages attributes Relative Advantage, Compatibility, Trialability, and independent variables NEXT5 and WILL resulted in high positive relationships. Observability resulted in moderate positive relationships.

Conversely, in the case of Complexity, there were negative relationships, confirming Rogers' theoretical principles.

Attributes Predicting Adoption of Discussion Board and Messages

Multiple regression analysis renders essential information as the multiple correlation coefficient *R* indicates the correlation levels among the dependent variable and the independent variables. Correlation coefficient *R* varies in between 0 and 1.00 and the higher the number the more effective the independent variables to explain the dependent variable's behavior. In turn, R^2 denote the variability of dependent variable due to independent variables. This analysis also calculates ß values to indicate the weight of each of the independent variables, or Rogers' attributes, on the dependent variables NEXT5 and WILL in this study.

As mentioned already, stepwise regression is a variant of multiple regression analysis and was used to prove the stated hypotheses. Stepwise regression is used

because decisions regarding what variables to include in a regression equation are difficult. This analysis eliminates variables that become superfluous because of its relationship to the other variables (Lohninger, 1999; Schroeder, Sjoquist, & Stephan 1986), accordingly, stepwise regression allows "the computer to experiment with different combinations of independent variables" (Schroeder et al, p. 69).

The set of five research questions in this study implicitly asked if a model could be developed establishing a statistically significant relationship between independent variables; Relative Advantage, Compatibility, Complexity, Trialability, and Observability as predictors of willingness to use Discussion Board within the next five semesters (NEXT5).

Table 21

Model Summary for Discussion Board and NEXT5

Step	*R*	R^2	R^2_{adj}	*F*	*df*	*p*
1	.615	.378	.373	69.293	1, 114	<.001
2	.665	.442	.432	12.944	1, 113	<.001

A stepwise regression analysis included the subscales Relative Advantage, Compatibility, Complexity, Trialability, and Observability as independent variables and NEXT5 as dependent variable with a probability level of $p = .05$ for determining whether a variable makes a significant contribution to the model. The stepwise regression allowed variables to enter the model and tested combinations of variables

to identify the best model. Table 21 presents the results of is analysis and Table 22 the coefficients produced in developing the model.

Table 22

Coefficients for Final Model Discussion Board and NEXT5

Step	*B*	β	*t*	Bivariate *r*	Partial *r*
1 TR	.800	.615	8.324	.615	.615
2 TR	.555	.426	4.862	.615	.416
RA	.412	.315	3.598	.570	.321

The stepwise regression analysis indicated attributes Trialability and Relative Advantage were significant predictors of use within the next five semesters (NEXT5) ($R = .665$, $R^2 = .442$, $F(1,113) = 12.94$, $p < .001$). This model accounted for 44% of variance as R^2 indicates in Table 21.

The results on Table 21 and Table 22, suggest Trialability and Relative Advantage attributes of Discussion Board were statistically significant predictors for willingness to use Discussion Board within the next five semesters.

Consequently, there were statistically significant differences between perception about the rest of the attributes; Compatibility, Complexity, and Observability; and the level of acceptance of Discussion Board as assessed by willingness of using Discussion Board within the next five semesters.

The set of five research questions in this study also implicitly asked if a model could be developed establishing a statistically significant relationship between

independent variables Relative Advantage, Compatibility, Complexity, Trialability, and Observability as predictors of willingness to use of Discussion Board if qualified training and support offered (WILL).

Table 23

Model Summary for Discussion Board and WILL

Step	*R*	R^2	R^2_{adj}	*F*	*df*	*p*
1.	.519	.270	.263	42.075	1,114	<.001
2.	.571	.326	.314	9.393	1,113	.003

A probability level of $p = .05$ was used for assessing significance and the stepwise method of entering variables into the model was used. Table 23 presents the results for the regression analysis and Table 24 the coefficients produced in developing the model.

Table 24

Coefficients for Final Model Discussion Board and WILL

Step	*B*	β	*t*	Bivariate *r*	Partial *r*
1 TR	.655	.519	6.487	.519	.519
2 TR	.432	.343	3.555	.519	.317
RA	.374	.293	3.065	.500	.277

The stepwise regression analysis indicated Trialability and Relative Advantage were significant predictors of WILL (R = .571, R^2 = .326, F(1,113) = 9.39, p = .003). This model accounted for 32.6% of the variance as indicated by R^2 in Table 23.

Results on Table 23 and Table 24 indicate Triability and Relative Advantage attributes of Discussion Board were statistically significant predictors for willingness to use Discussion Board if qualified training and support offered, according to this stepwise regression test.

As a result, there were statistically significant differences between perception about the rest of attributes Compatibility, Complexity, and Observability and the level of acceptance of Discussion Board, as assessed by the willingness to use Discussion Board if qualified training and support offered.

Table 25

Model Summary for Blackboard Messages and NEXT5m

Step	R	R^2	R^2_{adj}	F	df	p
1	.724	.525	.520	124.708	1, 113	<.001
2	.748	.559	.551	8.799	1, 112	.004

The set of five research questions in this study also implicitly asked if a model could be developed establishing a statistically significant relationship between independent variables; Relative Advantage, Compatibility, Complexity, Trialability, and Observability as predictors of willingness to use Messages within the next five semesters (NEXT5m).

Table 26

Coefficients for Final Model Blackboard Messages and NEXT5m

Step	*B*	*β*	*t*	Bivariate *r*	Partial *r*
1 RA	1.106	.724	11.167	.724	.724
2 RA	.795	.521	5.606	.724	.468
TR	.388	.276	2.966	.660	.270

The stepwise method was exercised to identify significant predictors of the model for NEXT5m with a probability level of $p = .05$. Findings shown in Table 25 and Table 26 indicate Relative Advantage and Triability were identified as having a significant predicting relationship for the NEXT5m model. The model accounted for 55.9% of the variance as indicated by R^2 in Table 25 and was statistically significant ($R = .748$, $R^2 = .559$, $F(1, 112) = 8.79$, $p = .004$).

Perceptions on attributes Trialability and Relative Advantage of Blackboard Messages were statistically significant predictors for using Messages within the next five semesters, according to this stepwise regression test.

Accordingly, there were statistically significant differences between perception about the rest of the attributes Compatibility, Complexity, and Observability and the level of acceptance of Blackboard Messages, as assessed by willingness of using Messages within the next five semesters.

Table 27

Model Summary for Blackboard Messages and WILLm

Step	*R*	R^2	R^2_{adj}	*F*	*df*	*p*
1	.694	.481	.477	105.826	1, 114	<.001
2	.740	.548	.540	16.705	1, 113	<.001
3	.754	.569	.557	5.298	1, 112	.023
4	.766	.587	.572	4.908	1, 111	.029
5	.777	.604	.586	4.882	1, 110	.029

Furthermore, the set of five research questions in this study also implicitly asked if a model could be developed establishing a statistically significant relationship between independent variables Relative Advantage, Compatibility, Complexity, Trialability, and Observability as predictors of willingness to use of Discussion Board if qualified training and support offered (WILLm).

Stepwise method was exercised in this analysis with a probability level $p = .05$ or less in determining whether the model was significant. Table 27 indicates the results of the regression analysis and Table 28 the coefficients produced in developing the model.

Analysis of the findings indicated Relative Advantage, Compatibility, Complexity, Trialability, and Observability were all significant predictors of WILLm. It is interesting this was the only model to find all of the attributes to be significant predictors accounting for 60.4% of the variance as indicated by R^2 in Table 27.

Table 28

Coefficients for Final Model Blackboard Messages and WILLm

Step	*B*	*β*	*t*	Bivariate *r*	Partial *r*
1 RA	.971	.694	10.287	.694	.694
2 RA	.574	.410	4.371	.694	.380
TR	.495	.384	4.087	.687	.359
3 RA	.551	.394	4.261	.694	.374
TR	.594	.460	4.697	.687	.406
CX	.190	.157	2.302	-.130	.213
4 RA	.519	.371	4.057	.694	.359
TR	.549	.425	4.359	.687	.382
CX	.221	.182	2.683	-.130	.247
OB	.257	.151	2.215	.406	.206
5 RA	.385	.276	2.764	.694	.255
TR	.417	.323	3.036	.687	.278
CX	.325	.269	3.472	-.130	.314
OB	.263	.154	2.299	.406	.214
CP	.347	.264	2.210	.621	.206

The regression analysis indicate Relative Advantage, Compatibility, Complexity, Trialability, and Observability were significant predictors of WILLm (R = .777, R^2=.604, F(1,110) = 4.88, p = .029).

All the attributes Relative Advantage, Compatibility, Complexity, Trialability, and Observability of Blackboard Messages were statistically significant predictors for willingness to use Messages if qualified training and support offered, according to this stepwise regression test.

Therefore, there were no statistically significant differences between perception about the Relative Advantage, Compatibility, Complexity, Trialability, and Observability; and the level of acceptance of Messages, as assessed by the willingness to use Messages if qualified training and support offered.

The described stepwise regression analyses in this chapter led the researcher to support some hypotheses for some attributes and reject some hypotheses for other attributes as follows:

Hypothesis 1 established statistically significant difference between perception about each of the attributes Relative Advantage and Trialability; and the level of acceptance of Blackboard's Discussion Board by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Discussion Board within the next five semesters.

Results indicated attributes Trialability and Relative Advantage were statistically significant predictors for willingness to use Discussion Board in blended courses within the next five semesters.

Therefore:

Hypothesis 1 is rejected for at the .05 level of significance.

Hypothesis 2 established statistically significant difference between perception about each of the attributes Compatibility, Complexity, and Observability; and the level of acceptance of Blackboard's Discussion Board by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Discussion Board within the next five semesters.

There were statistically significant differences between perception about attributes; Compatibility, Complexity, and Observability; and the level of acceptance of Discussion Board as assessed by willingness of using Discussion Board in courses within the next five semesters.

Therefore:

Hypothesis 2 is found to be consistent at the .05 level of significance.

Hypothesis 3 established statistically significant difference between perception about each of the attributes Relative Advantage and Trialability; and the level of acceptance of Blackboard's Discussion Board by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Discussion Board if qualified training and support offered.

Results from stepwise regression indicated Trialability and Relative Advantage were statistically significant predictors for willingness to use Discussion Board if qualified training and support offered.

Hence, the following judgment originates:

Hypothesis 3 is rejected at the .05 level of significance.

Hypothesis 4 established statistically significant difference between perception about each of the attributes Compatibility, Complexity, and Observability; and the level of acceptance of Blackboard's Discussion Board by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Discussion Board if qualified training and support offered.

There were statistically significant differences between perception about attributes Compatibility, Complexity, and Observability; and the level of acceptance of Discussion Board, as assessed by the willingness to use Discussion Board if qualified training and support offered.

Hence, the following judgment originates:

Hypothesis 4 is found to be consistent at the .05 level of significance.

Hypothesis 5 established statistically significant difference between perception about each of the attributes Relative Advantage and Trialability; and the level of acceptance of Blackboard's Messages by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Messages within the next five semesters.

Perceptions on attributes Trialability and Relative Advantage of Blackboard Messages were statistically significant predictors for using Messages within the next five semesters, according to stepwise regression.

As a result, the next judgment originates:

Hypothesis 5 is rejected at the .05 level of significance.

Hypothesis 6 established statistically significant difference between perception about each of the attributes Compatibility, Complexity, and Observability; and the level of acceptance of Blackboard's Messages by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Messages within the next five semesters.

There were statistically significant differences between perception about attributes Compatibility, Complexity, and Observability; and the level of acceptance of Blackboard Messages, as assessed by willingness of using Messages within the next five semesters.

` As a result, the next judgment originates:

Hypothesis 6 is found to be consistent at the .05 level of significance.

Hypothesis 7 established statistically significant difference between perception about each of the attributes Relative Advantage and Trialability; and the level of acceptance of Blackboard's Messages by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Messages if qualified training and support offered.

Attributes Relative Advantage and Trialability of Blackboard Messages were statistically significant predictors for willingness to use Messages if qualified training and support offered, according to stepwise regression.

Therefore:

Hypothesis 7 is rejected for at the .05 level of significance.

Hypothesis 8 established statistically significant difference between perception about each of the attributes Compatibility, Complexity, and Observability; and the level of acceptance of Blackboard's Messages by UTB/TSC professors teaching blended courses during Fall semester 2006, assessed by faculty willingness to use Messages if qualified training and support offered.

Attributes Compatibility, Complexity, and Observability of Blackboard Messages were statistically significant predictors for willingness to use Messages if qualified training and support offered, according to stepwise regression.

Therefore:

Hypothesis 8 is rejected at the .05 level of significance.

Differences among Schools and Colleges

Next stage in the analysis process was to run ANOVA to determine any differential effects among the university schools and colleges.

A univariate analysis of variance was used to test for differences in the six colleges participating in this study. The data was assessed to ensure it was appropriate for ANOVA and the Levene statistic indicated homogeneity of variance, therefore data was appropriate for analysis.

Table 29

Perception's Means on Discussion Board by College

	Lib Arts	Sci & Math	Business	Education	Health Sci	App Tech
Relative Advantage	3.43	3.32	3.27	3.04	3.52	3.24
Compatibility	3.86	3.54	3.40	3.53	3.88	3.08
Complexity	2.87	2.84	3.11	3.07	2.72	3.36
Trialability	4.00	3.65	3.60	3.84	3.94	3.64
Observability	3.27	3.38	**3.00**	**3.08**	**3.64**	3.04

Differences between colleges were tested for Discussion Boards using a probability level of $p = .05$.

Table 30

Analysis of Variance for Discussion Board by Colleges

	F	*df*	*p*
Relative Advantage	1.072	5, 110	.380
Compatibility	1.851	5, 110	.109
Complexity	1.343	5, 110	.252
Trialability	1.240	5, 110	.295
Observability	3.281	5, 110	**.008**

Table 29 organizes the means for the subscales for each college and Table 30 presents the results of the ANOVAs showing that, according to probability values greater than $p = .05$, there were no significant differences among colleges for Relative Advantage, Compatibility, Complexity, Trialability. However, Observability showed significant differences between colleges ($F(5, 110) = 3.281$, $p = .008$).

It is important to note that ANOVA identifies whether there are differences between the groups but does not identify where the differences may be. Then, a Tukey post hoc test was used to determine how the groups differed for Observability.

Table 31

Differences Schools/Colleges on Observability of Discussion Board (*p values)*

	Health Sciences
School Business	0.012
Education	0.037

Findings of Tukey post hoc test in Table 31 indicated there were significant differences on Discussion Board for Observability between Health Sciences and School of Business ($p = .012$), and Health Sciences and Education ($p = .037$). Other differences for Discussion Board were not statistically significant.

Accordingly, statistics on Table 31 suggest Observability perception of the faculty members at Health Sciences differed from the perception of faculty at the School of

Business more than Health differs from Education but does not indicate in what direction the difference goes.

Then, a close view to Observability averages on Table 29 suggests faculty at Health_Sciences (mean 3.64) perceived better Discussion Board than Education (mean 3.08) and than Business (mean 3.00, '*neither agree nor disagree'*).

Differences between colleges were also tested for Blackboard Messages using a probability level of $p = .05$. The data was assessed using the Levene statistic to determine whether the data was appropriate for ANOVA analysis and was found to be appropriate.

Table 32

Perception's Means on Blackboard Messages by College

	Lib Arts	Sci & Math	Business	Education	Health Sci	App. Tech
Relative Advantage	3.34	2.91	2.67	3.24	3.25	3.44
Compatibility	**3.82**	3.29	**3.00**	3.71	3.61	3.40
Complexity	2.33	2.40	2.77	2.42	2.56	2.72
Trialability	**3.83**	**3.22**	**3.00**	**3.90**	**3.82**	3.56
Observability	3.10	3.10	2.95	3.16	3.35	3.12

Table 32 organizes the means for Blackboard messages and Table 33 presents the results of the ANOVA analysis.

Table 33

Analysis of Variance for Blackboard Messages by Colleges

	F	*df*	*p*
Relative Advantage	2.390	5, 110	**.042**
Compatibility	2.923	5, 110	**.016**
Complexity	0.652	5, 110	.660
Trialability	4.231	5, 110	**.001**
Observability	0.775	5, 110	.570

As can be seen on Table 33, there were significant differences in Messages by college for Relative Advantage (F (1, 110) = 2.390, p = .042), Compatibility (F (1, 110) = 2.923, p = .016), and Trialability (F (5, 110) = 4.231, p = .001).

Table 34

Differences among Schools/Colleges on Messages (p values)

	Compatibility	Trialability	
	Liberal Arts	Liberal Arts	Business
School Business	0.015	0.012	
Education			0.027
Science Math		0.043	
Health Sciences			0.029

Data for Complexity and Observability showed that differences between the groups were not statistically significant.

On the other hand, for Relative Advantage, Compatibility, and Trialability the differences between the groups were statistically significant.

The Tukey post hoc test was used again to test for differences between the groups for Relative Advantage, Compatibility and Trialability. Findings of this test in Table 34 indicated there were significant differences for Blackboard Messages regarding Compatibility and Trialability only.

On the Compatibility subscale, it was found Liberal Arts differed significantly from the School of Business ($p = .015$). In addition, on Trialability, Liberal Arts differed significantly from Business ($p = .012$) and from Science/Math ($p = .043$).

It was also found Business differed from Education ($p = .027$) and from Health Science ($p = .029$). Other differences between groups were not found to be statistically significant for Blackboard Messages.

Accordingly, statistics on Table 34 suggest Liberal Arts faculty members' perception differs from the professors at Business regarding attributes Compatibility and Trialability of Messages, but does not indicate in what direction the difference goes.

Then, averages on Table 32 suggest faculty at Liberal Arts (scale mean 3.82) perceived better Messages' Compatibility than Business faculty (3.00).

Faculty from Liberal Arts (3.83) perceived better Messages Trialability than faculty at the school of Business (3.00). In addition, Liberal Arts (3.83) perceived better Messages Trialability than faculty at Sciences & Math (3.22).

Furthermore, School of Education professors (3.90) perceived slightly better Trialability of Messages than faculty at Health Sciences (3.82), and better than faculty at Business (3.00).

Findings from Comments in the Survey (See Appendix 9).

- A third of total respondents posted comments in the survey.
- From total number of comments, about 26% were informative regarding how they use Discussion Board and its applications to blended courses.
- Some 13% were positive comments, mainly regarding Discussion Board.
- Roughly speaking, about 61 % of all generated comments were in the form of complain regarding several aspects of Discussion Board and Messages functionality, applicability, and disadvantages.
- Women provided two thirds of the comments.
- Women tended to be more complaining about Discussion Board and Messages than men, who in turn were more informative and positive than women.
- Faculty from Schools of Health Sciences posted 30% more comments when comparing Colleges proportion of participants in the survey and Colleges' proportion of generated comments.

- Proportionally, professors from Education were the less participatory in the survey. Surprisingly, they posted 50% more comments (than the percent they were supposed to post) when comparing Colleges proportion of participants in the survey and Colleges' proportion of generated comments.
- Faculty from Sciences and Math gave no positive comments and, gave more proportion of negative comments and less informative postings.
- Faculty from Liberal Arts gave less proportion of comments than any other college.
- Five general comments were produced, one per each of the five principal colleges, and were rather negative regarding Blackboard.
- It is assumed that faculty not having concerns or not being willing to express concern (67%) did not post any comments.

Chapter 5 Conclusions

At the time of this work, there was little or none reference found in the literature focusing on perceptions by faculty members at the university level on Discussion Board or Messages, much less concerning the intricacies of its attributes as defined by Everett M. Rogers and the impact on the overall utilization of Course Management Systems like Blackboard. This study focused on the five innovation attributes of the adoption process stated by Rogers (2003): Relative Advantage, Compatibility, Complexity, Trialability, and Observability.

The researcher conducted a survey producing 116 viable responses from faculty at the University of Texas at Brownsville and Texas Southmost College. Blackboard was the only Course Management System supported by the university at the time of the study to develop and implement blended and distance education courses.

On the Description of Subjects in the Study

- Even though population included equal number of men and women, females were more participative in this research study's sample. Considerably more females responded to the survey questionnaire (63%) and provided two thirds of the comments to the open-ended question.
- According to this study, age of professors may not be as influential as might be years of experience for accepting an innovation. Half of respondents to the survey were faculty members having between 2 and 8 years of experience. Another 40% had some 9 to 35 years of teaching experience. The 2% participants in this study having 36 or more years of teaching experience most

likely pertain to the cohort between 61 to 80 years old; however, this old-age cohort makes 12% of course blenders at UTB/TSC, meaning first that not all aged professors have too many years of experience. Second, it suggests that age of professors may not be as influential as might be years of experience for rejecting or accepting an innovation.

- At least one-fourth faculty members perceive Discussion Board is a complex feature, and according to some comments from the survey, complexity may reside in the technicalities plus some other non-technical aspects, e.g., lack of students' good communication skills.
- Concerning Messages, faculties perceive complexity is not an issue according to descriptive statistical indicators. Still some professors complained about the intricacies to access inboxes, in the comments section of the survey.
- Perception of 69% and 59% respondents indicate they consider Discussion Board and Messages *Trialable* features.
- Faculty willingness to adopt both Discussion Board and Messages during the following five semesters and if training and support offered was around 73%.
- Faculty level of adoption for Discussion Board in blended courses would increase after being offered qualified training and support, but would not increase for Messages.

On the Attributes Predicting Adoption of Discussion Board and Messages

- Relative Advantage and Trialability were the best predictors of faculty willingness to adopt Discussion Board and Messages in Blackboard for

blended courses, in the next 5 semesters, according to stepwise regression analysis of this study. Surendra (2001) also found Trialability and Relative Advantage among the strongest predictors of adoption.

- In the stepwise regression analysis, all five Rogers's innovation attributes were found predictors for adoption of Messages if training and support available. Coincidentally, Surendra (2001) found training was "the best predictor of successful adoption of educational Web technology" (p. 87).

On the Hypotheses

- Results indicated attributes Trialability and Relative Advantage were statistically significant predictors for faculty willingness to use **Discussion Board and Messages** in blended courses within the next five semesters as well as faculty willingness to use **Discussion Board and Messages** if qualified training and support offered.
- Results indicated attributes Compatibility, Complexity, and Observability were not statistically significant predictors for faculty willingness to use **Discussion Board and Messages** in blended courses within the next five semesters as well as faculty willingness to use **Discussion Board** if qualified training and support offered.
- All of the five attributes; Relative Advantage, Compatibility, Complexity, Trialability, and Observability of Blackboard **Messages** were statistically significant predictors for faculty willingness to use **Messages** if qualified training and support offered.

- Overall, findings in this study resulted within the Rogers' Diffusion of Innovations Theory regarding innovation attributes.

On the Differential Effects among the University Schools and Colleges

There were statistically significant differences among certain schools or colleges for attributes Observability, Trialability, and Compatibility:

- Faculty at Health Sciences perceived significantly better Observability of Discussion Board than the faculty at Education and than the faculty at Business School. Even though according to Table 1, Business School had the highest percent of blended courses using Discussion Board, the fact that Business faculty neither agreed nor disagreed that Observability was important (averaged 3.0 perception in Likert scale on Table 10), suggests business professors used Discussion Boards because of reasons other than the perception on Observability. In fact, the stepwise regression confirmed best predictors for adoption were Relative Advantage and Trialability for Discussion Board. As well, Reyes (2005) reported Observability as the less consistent attribute and the overall percentages in Table 14 reveal about half of respondents concentrated their perception on this neutral-like scale for Observability (52%) meaning that half of respondents had no clear opinion about the visibility to others of using Discussion Board. Furthermore, according to Meyer and Goes (1988, cited in Rogers, 2003), Observability, together with low risk and low complexity, explained 40% of the variance in the dependent variable acceptance of an innovation in a hospital, which may

hint on the reason why faculty from Health Sciences in this study distinguished Observability of Discussion Board more importantly than Business and Education.

- Liberal Arts professors perceived significantly better Compatibility of Messages than the Business faculty.
- Professors at Liberal Arts perceived significantly better Trialability of Messages than faculties at the schools of Business and Sciences & Math.
- Education professors perceived Trialability of Messages significantly better than the faculty at Business.

On the Comments from Faculty Participants

Comments from faculty in the survey revealed variety of perspectives. Possibly, professors concerned with some aspects of Discussion Boards and Messages tended to write more comments in the survey. Some professors reported messages were time-consuming and burdensome because they had to check every class in Blackboard to look for messages coming from students. In essence, they would like Blackboard Massages having more capabilities and versatility. Other professors stated regular e-mail has advantages over messages.

The comments in the survey from faculty participants may be of help to instructional support departments for improving workshops curricula, disseminating tips and recommendations to professors and students as well, designing in-deep survey questionnaires for Blackboard users, not to mention making aware Blackboard, Inc. about suggestions and concerns produced from this investigation.

Suggestions

According to OECD (2005) The concept of 'staff development' is crucial to sustainable e-learning in higher education, however, education systems around the world face a great challenge trying to engage current faculty to use and develop e-learning. Faculty development concerning the principles of student-centered models for blended courses may prompt professors to supplement traditional lecturing model.

Also recommendable are workshops about Discussion Board applications regarding student's interaction for academic purposes. The so-called Net Generation attending college at this stage does not appreciate traditional lecturing as former generations were accustomed. Today's students "may prefer the simpler instant messenger services they have been using as long as they can remember" (Gardner & Eng, 2005, p. 415). Digital generation is one that is comfortable living and playing in the electronic-space, to the point that they demand learning and work experience has to be adapted to their cyber-reality (Duderstadt & Womack, 2004).

In general, faculty-to-faculty development meetings are advisable. According to Shamoail (2005) research, teachers learned much better from other teachers. Professors liked more individual instruction given at their offices by hired students than technicians at Duke University (O'Brien, 2001), echoing Mwaura (2003) complains regarding technicians training professors focusing sessions on programmatic aspects of the platform, when all that professors want is to know how to use Course Management Systems' tools, and effectively, in their courses.

In this regard and according to the differences among schools and colleges detected through the ANOVA analysis in this study:

- Faculty from Health Sciences perceives better Discussion Board than faculty at the School of Business and Education. Then, it would be advisable to organize some sort of dialog meetings among professors from the School of Health Sciences and the ones from School of Business and especially with faculty from the School of Education. Those meetings would serve to share experiences, mutual advice and even debate about the benefits of Discussion Board and its *Observability* by other professors, students and administrators.
- It would be worthwhile to set up meetings between professors from Liberal Arts and faculty from School of Business so the ones from Liberal Arts could share their perceptions about their good Compatibility with Messages.
- Likewise, because faculty at Liberal Arts perceived higher Trialability of Messages, short informal meetings could be set up among faculties from Liberal Arts and faculty at the schools of Business and Science & Math, to share personal impressions over the use and handling of Messages.
- Faculty from Health Sciences had higher average on perception regarding Triability of Messages than Business Education and Health. Mini-sessions among these colleges' professors could benefit the ones not understanding functionality of Blackboard Messages.
- Professors need to see some sort of advantage for embracing Discussion Board or Messages, and faculty developers can make aware professors about

the advantages of applying these social tools to the academic environment, especially to Web-enhancing or blending courses.

Benefits of the Study

More than courses of action, suggestions from this study should be interpreted as auxiliary information that may help administrators in the quest to understand elements that have an effect on their planning, strategy choice, implementation and supervision of faculty development programs, budgeting, and investments on technology equipment and software.

To faculty developers at the university and college levels, findings of this research may hint on the better detection of the crucial spots in the training process. Understanding faculty perceptions on use, management, and application of software tools for teaching and learning, may show the way to improve faculty-training strategies. Focusing on those key diffusion factors, trainers could foster better perception among faculty trainees and monitor faculty progression, not just on the use, but also on the improvement of the teaching-learning process, which at the end, is the major endeavor pursued by educators.

Software corporations may find some sort of feedback from results in this study. Actual operational data from the field of application, surely may guide towards refocusing end user's needs and expectations. The search for the best models for software applications would be helped by understanding the intricacies of its application in the field.

Further Research

- More research concerning Discussion Board and other social software as enhancers of communication skills might be useful to higher education institutions looking for ways and strategies in preparing students for present and future cyber-communication demands from the global environment.
- Several research questions may arise from this study, related to Colleges and Schools. Research questions like; Why Health Sciences professors see significantly different Discussion Board than professors from Business and faculty from Education? Or; What specifically professors from Liberal Arts see as Compatible traits of Messages as compared to professors with a different opinion from the school of Business?; What makes faculty from Education to perceive lesser *Relative Advantages* of Discussion Board than professors at other schools and colleges perceive? In addition:
- Of particular interest would be doing more in-deep research within the Schools of Education. Faculty members are teaching future teachers. Then, studies on how faculty and future teachers embrace technology, specifically socialization tools like Discussion Board, live classroom, instant messenger, web logs, wikis, and the like, would help new generation of students, university faculties, and school district teachers to find ways to take advantage and channel the skills of the net generation into the classroom and extra classroom applications.

- Surveys focusing on Trialability and Relative Advantage as best predictors for adoption of Discussion Board and Messages, conducted on new faculty members could guide faculty developers in targeting those new professors needing more elements for embracing social software in blended courses.
- Moreover, confirmation of Relative Advantage and Trialability as the best predictors for adoption of Discussion Board and Messages may serve for improving faculty development programs and policy implementation.
- Replication of this research model could be conducted targeting student populations in search for similarities and differences to faculty perceptions.

Findings of this research work resulted in several ways in agreement to former research studies at other universities and the theory of diffusion of innovations upheld by Everett. M. Rogers. This study confirmed; Relative Advantage and Trialability as best predictors; the relationships between perception about innovations attributes and levels of adoption in accordance to Rogers' theory; plus some other findings regarding differences among perception indicators from professors at different colleges in a university. More research is necessary to understand better the dynamics of the new applied technology into blended courses, especially on social software, as these emergent tools for enhancing extra class communications are plenty of applications in the global environment.

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Appendix 1

Internal features of six most known Course Management Systems: Blackboard, WBT Systems, VLE, MadDuck, WebCT, and Embanet.

Collaboration Tools	Course Management Tools	Learning Tools
Discussion Options	Instructor information pages	Bookmarking/last place visited
Asynchronous	Course info/syllabus	Self-assessment exercises
Email (one to one)	Course calendar/schedule	Annotation (markup)
List Servs/Newsgroups	Announcements/Bulletins	Private directory on course server
Text-based conferencing (many to many)	Attendance/Participation Tracking	Glossary help (student generated)
Bulletin Board (one to many)	Student presentation/project pages	Course Index/Search Engine
Synchronous	Quizes	Learning Exemplars/Guidance
Chat	Batch upload	Access to own grades
	Batch delete	Student guide
Whiteboard	Student management	Study skill building
	Attendance	Student Web pages
Teleconferencing	Participation	Library and Information Access
Video	Gradebook	Team building
Audio	Student access to own data	Shared work (see Work Group Areas)
Live, text-based conferencing	Automatic assignment progress tracking	Batch upload
File sharing	Assignment reminders	
Email attachments	Automatic grade calculation	
Message attachments	Class averages auto calc	
Private directory on course server	Registration	
File storage	Assessment	
Public file library	Timing	
Work Group Areas	Repeatable	
Group Web pages	Exercises	
Group conferences	Repeatable	
Team building	Course Archive/Backup	
	Course replication	
	Course revision	
	Online Help/FAQs	

Source: Whitmyer & Grimes (2000).

Appendix 2

Internal Features of Course Management System Blackboard

Grouped features	**Main Function**
Course Management	Professors use Blackboard to create the structure of the courses within formats that can be personalized. Administrators register or terminate students massively or individually and can assign user privileges.
Instructional Tools	Professors use internal tools for the creation, organization, and provision of class material and sessions.
Collaboration and Communication	Professors and students use the announcements section, internal messages section, e-mail, as well as file exchange, discussion forums, chat lectures, question–and–answer chats, archives, white boarding, and group Web browsing for synchronous, Web–based collaboration, including recording and storage of sessions.
Assessment and Evaluation	Professors create and provide exams and other evaluation instruments and post results on the electronic grade book.

Source: Blackboard (s. f.)

Appendix 3

PROTOCOL REVIEW FORM

(Page 2 of 4)

I. HUMAN SUBJECTS INVOLVED IN PROJECT

A. Who are the subjects? UTB/TSC professors users of Blackboard

B. How many subjects are involved? Potentially 300 professors

C. How will you recruit and/or select subjects? Via e-mail

D. How long will each subject be involved? Number of occasions One Duration (each) 30 min.

E. Do your subjects include any of the following:
(Please mark the appropriate column and attach details as necessary)

Yes	No	
○	◉	Infants/Children younger than 7 years of age?
○	◉	UTB/TSC Students?
○	◉	Students enrolled in investigator or co-investigator's classes?
○	◉	Students from institutions other than UTB/TSC? (if yes provide name of other institution)
○	◉	Institutionalized mentally impaired individuals?
○	◉	Prisoners?
○	◉	Other special populations? _____ (specify and attach details)

F. Are you advertising for subjects or posting a notice for volunteers? ◉ Yes ○ No
(If yes, attach copy of advertisement or posting.)

G. Will subjects be paid for participating in this research project? ○ Yes ◉ No
(If yes, attach a description of the amount to be paid and how subjects who withdraw from the project before its conclusion will be paid.)

H. Please attach a copy of the Certificate of Completion for the Protection of Human Subject On-Line Training. Each individual involved with Human Subjects in this protocol must be certified prior to the submission of the protocol for review by the Human Subjects Research Review Committee.

PROTOCOL REVIEW FORM

II. RESEARCH PROTOCOL

A. Attach a 7-10 page protocol that includes the following:

1. Purpose / Aims / Rationale
2. Background / Significance
3. Clearly Identify your Research Question / Hypothesis
4. Methods (must include the following)
   - Setting
   - Sampling Plan (include number of participants)
   - What will you be doing?
   - Who will conduct the procedure?
   - Data collection plan
5. Analysis
   - How do you plan to analyze the data you collect?
6. Bibliography

B. Attach consent forms **NOTE: Please use Model of Standard Consent Form**

C. Attach copies of any instruments you are using

PROTOCOL REVIEW FORM

III. Please mark the appropriate column and provide details. Include attachments as necessary.

Yes	No	
○	◉	Will you obtain information about your subjects' private behavior, economic status, sexual preferences, religious beliefs, or other matters which, if made public, might impair their self-esteem or reputation? If yes, describe how you will ensure that all your data are kept secure and confidential.
○	◉	Does your study involve deception of your subjects? If yes, how will they be debriefed?
◉	○	Are you willing to allow subjects to withdraw after debriefing and remove from your data all records of their involvement?
○	◉	Has this research been reviewed and approved by an "ethics committee" of your department or school? If yes, provide documentation of committee's action.
○	◉	Are there prospective subjects who might be especially vulnerable to risk due to applied procedures? If yes, describe how you will screen and eliminate all vulnerable subjects from the study.
○	◉	Will you be carrying out procedures or asking questions that might disturb your subjects emotionally or produce anxiety or stress? If yes, describe your plans for counseling and treating such subjects.
◉	○	Are you using a questionnaire or structured interview as part of your procedure? If yes, attach a copy of the questionnaire and/or interview questions.

IV. Describe the final disposition of your data (notes, lists of subjects, photographic records, tapes, etc.) after you have completed your research.

Appendix 4

SPONSORED PROGRAMS
THE UNIVERSITY OF TEXAS AT BROWNSVILLE and TEXAS SOUTHMOST COLLEGE
80 Fort Brown • Brownsville, Texas 78520 • (956) 882-7849 • Fax: (956) 882-7851 • sponsoredprograms@utb.edu

April 25, 2007

Ignacio E Rodriguez - Principal Investigator
Modern Languages
University of Texas at Brownsville
and Texas Southmost College
80 Fort Brown, Cortez Hall 118
Brownsville, Texas 78520

RE: IRB-HS Approval

Study Title: "Perceptions on Discussion Forums and Messages by University Professors who Adopted Course Management Systems for Hybrid Classes"

Protocol #: 2007-014-IRB-1

Dear Mr. Rodriguez,

In accordance with Federal Regulations for review of research protocols, the Institutional Review Board – Human Subjects of the University of Texas at Brownsville and Texas Southmost College have reviewed your study as requested.

The IRB-HS has determined that this project is classified as Exempt/Category 2 and grants its approval for this project for the following period April 25, 2007 thru April 05, 2008 contingent on compliance with the following items. Signed consent is waived, survey will be administered via web.

Responsibilities of the Principal Investigator also include:

- **Inform the IRB-HS in writing immediately of any emergent problems or proposed changes.**
- **Do not proceed with the research until any problems have been resolved and the IRB-HS have reviewed and approved any changes.**
- **Report any significant findings that become known in the course of the research that might effect the willingness of the subjects to take part.**
- **Protect the confidentiality of all personally identifiable information collected.**
- **Submit for review and approval by the IRB-HS all modifications to the protocol or consent form(s) prior to implementation of any change(s).**
- **Submit an activity/progress report regarding research activities to the IRB-HS on no less than an annual basis or as directed by the IRB-HS through the Continuing Review Form.**
- **Notify the IRB-HS when study has been completed through submission of a Project Completion Report.**

Should you have any questions or need any further information concerning this document please feel free to contact me at (956) 882-5083 or via email at Linda.MacDonald@utb.edu.

Sincerely yours,

Linda R. MacDonald, MS
IRB – Human Subjects Chair

Rusteberg Hall 101

Appendix 5
Invitation to Participate

E-mailed recruitment letter to faculty
To: UTB/TSC Faculty Members teaching blended courses
Subject: Faculty Invited to Participate in Survey

Faculty using Blackboard Platform are invited to participate in a survey on Blackboard Features for a research project by Ignacio E. Rodriguez.

The survey will explore and provide information about university professors' perceptions, regarding two Blackboard features (discussion Board and Messages). The study has been reviewed and approved by the UTB/TSC Institutional Review Board - Human Subjects (IRB-HS).

Participants will not be asked for any identifying information and every effort has been made to keep responses anonymous and confidential, including the use of a secure server. However, no guarantees can be made regarding the tracking or interception of your responses by a third party. The survey will take about 10 minutes.

To participate in the survey, please click on the following link:
Take Survey on Blackboard Tools

For questions on this survey, please call (956) 793-7981 or send an e-mail to:
Blackboard.Survey@utb.edu

Thank you for your cooperation,

Ignacio E. Rodriguez
Principal Investigator

Appendix 6

Innovation Attributes and Item Numbers in the Questionnaire

Innovation Attributes	Item Numbers
Independent variables	
Discusión Forum	
Relative Advantage	1, 2, 3, 4, 5
Compatibility	6, 7, 8, 9, 10
Complexity	11, 12, 13, 14, 15
Trialability	16, 17, 18, 19, 20
Observability	21,22, 23, 24, 25
Messages	
Relative Advantage	26, 27, 28,29, 30
Compatibility	31, 32, 33, 34, 35
Complexity	36, 37, 38, 39, 40
Trialability	41, 42, 43, 44, 45
Observability	46, 47, 48, 49, 50
Demographics	51, 52, 53, 54, 55, 56, 57, 58
Dependent variables	59, 60, 61, 62, 63, 64

Appendix 7

Validated Questionnaire

Perception on Discussion Forums and Messages by University Professors who Adopted Course Management Systems for Blended Classes Survey Questionnaire						
	Items	Likert Scale				
		Totally Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Discussion Board Questions						
1	Discussion Board has advantages over conventional face-to-face discussions.	1	2	3	4	5
2	Teaching with Discussion Board would enhance communication among my students.	1	2	3	4	5
3	Using Discussion Board for extra class activities Stimulates student participation.	1	2	3	4	5
4	using Discussion Board for extra class activities decreases course effectiveness	5	4	3	2	1
5	Students using Discussion Board in class activities learn better.	1	2	3	4	5
6	I value (or believe) in Discussion Board.	1	2	3	4	5
7	Discussion Board can be incorporated as a teaching tool in any academic course.	1	2	3	4	5
8	Using Discussion Board for courses dehumanizes the teaching-learning process.	5	4	3	2	1
9	I am not comfortable with the idea of having to work with Discussion Board in courses.	5	4	3	2	1
10	Using Discussion Board for courses goes against the professional values of the instructor.	5	4	3	2	1
11	The complexity of Discussion Board makes it difficult to understand and use.	1	2	3	4	5

12	Lack of technical expertise and lack of necessary support for teaching with Discussion Board makes professors not use it.	1	2	3	4	5
13	I understand the technical aspects for using Discussion Board in my courses.	5	4	3	2	1
14	I understand how to teach my courses using Discussion Board.	5	4	3	2	1
15	Learning to use Discussion Board as a classroom tool is easy.	5	4	3	2	1
16	Discussion Board could be tried on a small scale first.	1	2	3	4	5
17	I would enjoy the challenge of trying to teach my courses with new approaches, such as Discussion Board.	1	2	3	4	5
18	Discussion Board can be tried if necessary support is available.	1	2	3	4	5
19	I would like to try Discussion Board in my teaching activities.	1	2	3	4	5
20	I would feel confident trying Discussion Board.	1	2	3	4	5
21	Other Colleagues are using Discussion Board in blended courses.	1	2	3	4	5
22	There is a good amount of journal articles discussing the use of Discussion Board in courses.	1	2	3	4	5
23	I learned ways of using Discussion Board from another professor.	1	2	3	4	5
24	A good number of blended courses use Discussion Board as a didactical support tool.	1	2	3	4	5
25	Most colleagues, who I know have used Discussion Board to teach courses, have had positive experiences.	1	2	3	4	5
Blackboard Messages Questions						
26	Blackboard Messaging has advantages over the conventional e-mail system.	1	2	3	4	5
27	Teaching with Blackboard Messages would enhance communication among my students.	1	2	3	4	5

28	Using Blackboard Messages in class activities Stimulates communication with my students.	1	2	3	4	5
29	Using Blackboard Messages in class activities Is NOT an effective way of communication.	5	4	3	2	1
30	Students using Blackboard Messages in class activities learn better.	1	2	3	4	5
31	I value (or believe) in Blackboard Messages.	1	2	3	4	5
32	Blackboard Messaging can be incorporated as a teaching tool in any academic course.	1	2	3	4	5
33	Using Blackboard Messages for courses dehumanizes the teaching-learning process.	5	4	3	2	1
34	I am not comfortable with the idea of having to work with Blackboard Messages in courses.	5	4	3	2	1
35	Using Blackboard Messages for courses goes against the professional values of the instructor.	5	4	3	2	1
36	The complexity of Blackboard Messages makes it difficult to understand and use.	1	2	3	4	5
37	The lack of technical expertise and necessary support for Blackboard Messages results in professors not using it.	1	2	3	4	5
38	I understand the technical aspects for using Blackboard Messages in my courses.	5	4	3	2	1
39	I understand how to communicate in my courses using Blackboard Messages.	5	4	3	2	1
40	Learning to use Blackboard Messages as a classroom tool is easy.	5	4	3	2	1
41	Blackboard Messages could be tried on a small scale first.	1	2	3	4	5
42	I would enjoy the challenge of trying to teach my courses with new approaches, such as Blackboard messages.	1	2	3	4	5

43	Blackboard Messages can be tried if necessary support is available	1	2	3	4	5
44	I would like to try Blackboard Messages in my teaching activities.	1	2	3	4	5
45	I would feel confident trying Blackboard Messages.	1	2	3	4	5
46	Other Colleagues are using Blackboard Messages in blended courses.	1	2	3	4	5
47	There is a good amount of journal articles discussing the use of Blackboard Messages in courses.	1	2	3	4	5
48	I learned ways of using Blackboard Messages from another professor.	1	2	3	4	5
49	A good number of blended courses use Blackboard Messages as a class communication tool.	1	2	3	4	5
50	Most colleagues, who I know have used Blackboard Messages to teach courses, have had positive experiences.	1	2	3	4	5

	Survey Participant Demographics
51	Age:
	21 - 30
	31 - 40
	41 - 50
	51 - 60
	61 - 70
	71 – 80
	81- more
52	Gender:
	Female
	Male
53	Your status as faculty
	Tenured
	Tenure track
	Non tenure track
	Lecturer

	Adjunct Faculty
	Visiting Professor
	Other
54	Years of experience as faculty member (all institutions included)
	0 - 1
	2 - 4
	5 - 8
	9 - 15
	16 - 25
	26 - 35
	36 – more
55	Course levels taught
	Undergraduate
	Graduate
	Other
56	Your educational level
	Ph. D.
	Ed. D.
	Master
	Other
57	Your College or School:
	College of Liberal Arts
	College of Science, Mathematics, & Technology
	School of Business
	School of Education
	School of Health Sciences
58	Please select ALL kinds of courses you teach:
	Face-to-face courses (NO technology included)
	Blended courses (face-to-face plus technology)
	Online courses

	Other					
59	Do you use (or have used) Discussion Board as a teaching tool in your courses?					
	No Yes					
60	Would you be willing to use Discussion Board in your courses within the next 5 semesters?	Totally Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
		1	2	3	4	5
61	Would you be willing to teach with Discussion Board if you have access to qualified training and support?	Totally Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
		1	2	3	4	5
62	Do you use Blackboard Messages to communicate with students in your courses?					
	No Yes					
63	Would you be willing to use Blackboard Messages in your courses within the next 5 semesters?	Totally Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
		1	2	3	4	5
64	Would you be willing to teach with Blackboard Messages if you have access to qualified training and support?	Totally Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
		1	2	3	4	5
65	Open ended space for comments:					

Appendix 8

Informed Consent

Research Project Title:

Perception on Discussion Forums and Messages by University Professors who Adopted Course Management System for Blended Classes

Background: This study is intended to explore and provide information about university professors' perceptions, regarding Blackboard features. Participation of faculty already using Blackboard platform is invited.

Procedure: If you choose to participate in the study, you will be asked to log on to a secure website where the survey is available. You will spend approximately 10 minutes completing a 65-question survey. You may refuse to answer any question and may withdraw from the survey at any time. All responses will be kept both anonymous and confidential. You should not include your name or any identifying information on the survey.

Risks or Possible Discomforts Associated with the Study: There are no anticipated risks associated with your participation in this study.

Benefits of Participation: Whereas participation in this study will have no direct personal benefit to the participants, it is hoped that the knowledge gained will serve to improve faculty-training programs.

Voluntary Participation: Your participation in this study is voluntary; you may discontinue your participation at any time without penalty. If for any reason you

decide that you would like to discontinue your participation, simply log off the survey website.

Anonymity and/or Confidentiality: This study is being conducted through the use of a secure sever where all responses will be maintained. There is no place in the survey for a participant to attach their names or identifying data, and no email address is logged with any response. Everything reasonably possible will be done to keep the way you fill out the survey completely anonymous and confidential.

Who to Contact for Research Related Questions: For questions about the research itself, or to report any adverse effects during or following participation, contact the researcher, Ignacio E. Rodriguez, at the following address:80 Fort Brown, Brownsville, TX 78520. Phone number 956-793-7981.

Who to Contact Regarding Your Rights as a Participant: If you have any questions about your rights as a participant, or if you feel that your rights as a participant were not adequately met by the researcher, contact the Institutional Review Board-Human Subjects at 956-882-7524.

Signatures: Because this is an internet survey, signatures are waived. Your consent to the survey is assumed by your completion of it.

Payment for Participation: There is no payment for participation in this survey.

Number of Participants Involved in the Study: Approximately 250 faculty members have been invited to participate in this survey.

Appendix 9
Comments from the Survey

	College/School	Comments
		On Discussion Board
1	Business	One very important aspect about using Blackboard is that students learn to be more specific in their writing. Today's students are technically advanced; however, their writing communication skills are diminishing the more they use Text Messages via phone. I have started to put in the syllabus that U.S. English is required on Blackboard Messages, not their hybrate Text Message system. Also to be very specific in what they are communicating to me.
2	Business	I use it to supplement class participation in face-to-face courses. I also use it for participation in online courses.
3	Business	I use DB in my classes. The students and myself have benefited greatly by having on-line discussions. It allows flexibility and gives the sensation of true "freedom" to the classroom atmosphere. I believe everyone would benefit if our institute would provide better technical support for this.
4	Education	I haven't used discussion board at UTB but have used something similar (WebBoard) at another university. We used it to discuss readings and class projects.
5	Education	All students within these groups have the opportunity to discuss, which many times they are not able to do is in a regular classroom setting. They also learn to improve their technology skills.
6	Education	Have students react to each other's reflections about course content.
7	Education	Across group sharing when professor not available.
8	Education	Once I use it and didn't work for me. Still learning about technology, my problem is mostly finding the time to learn all that Bb has to offer.

9	Education	Try to stimulate class discussion outside course time - was unsuccessful. I will greatly depend on the course content if I teach a course that models instructional method, Blackboard is not effective.
10	Health	BB Discussion board is technically very nice-all the 'bells and whistles' included-however it is extremely BORING! It's not customizable with backgrounds, colors, emoticons, and so on, so it's much less engaging/fun to use. This matters to me because my students are reluctant to use technology in the first place, so I currently link to a commercial discussion board that I pay for each semester myself.
11	Health	Debate issues; answer questions posed; share websites for review.
12	Health	Simulate and expand on classroom discussion.
13	Health	I like using the Discussion board area but feel the upgraded version in blackboard is cumbersome. Threaded discussions in open forums are so easy to use. Blackboard seems to put so many steps into its features that it becomes problematic for students that do not have high-speed internet access. I guess it is the design of the blackboard discussion area that presents problems for me and not the idea of using a discussion board. I feel that discussion boards increase discussion in a class.
14	Health	I would love to learn more about it. One to one training.
15	Health	I use it to get students to start writing clearly about various topics. It gets them involved in their learning.
16	Lib Arts	Faculty in my department find discussion board to be more time consuming than it is worth. Many of us have concerns about replacing personal interaction with virtual interaction. The skills required for face-to-face interaction are not the same as those required for cyber communication. Most students use cyber interaction and abbreviated cyber language effectively already. They need to develop their use of standard, professional

		writing and speaking to others personally. Many students lack both confidence and basic skill in personal communication. They will not become more confident or more skillful by avoiding practice. They need to develop the etiquette of professional communication. A speech class isn't enough.
17	Lib Arts	Extend in-class discussion activities, allow my Composition students to post writing practice activities, allow my undergrad and grad students a place to share comments about items related to the class topics.
18	Lib Arts	To discuss special topics taught in class, then asking students to write own points of view and then making comments to other students input.
19	Lib Arts	Create a forum for students to use as a student-to-student communication and discussion forum for class-related or class-unrelated items create forums for students to post reading responses, or post questions for students to respond to that are related to course topics. I use the Discussion Board extensively in my classes. Prep for face-to-face class discussion, is a need to extend class.
20	Lib Arts	Use Discussion Board to Continue class discussion outside of class.
21	Lib Arts	Blackboard is a nice tool for posting info to students, but if students do not read the material, any online instruction become useless. Most of my students do not read or write well and online discussion and messaging will not help that.
22	Lib Arts	In graduate class. Worked fine but it is extra work.
23	Lib Arts	Some, (agree) if limited # of students.
24	Math	I assign the students six discussion board questions over the course of the semester. The students respond to questions based on website or article that I assign them to review.
25	Sci Math	Discussion Board is a waste of time.
26	Sci Math	Group discussion

27	Sci Math	I know nothing about discussion board. Used it once or twice - had no responses. I have not used messages. My answers on Q1 to Q50 reflect my answers to Q59 and Q62.
28	Sci Math	So far, I am content to use announcements, e-mail and assignments for the bulk of my communications with students, with extra materials in weekly modules.
		On Messages
29	Business	I dislike using the message board for hybrid courses as this requires checking for emails in as many as 5 or 6 places each day along with our regular email accounts. Therefore, I request that on-campus students use only my regular email while my online students may use both. One further limitation of the messaging service is the lack of attachment options for some sending configurations.
30	Education	Regarding messages.-I cannot teach w/o it.
31	Health	Messages would be better if it showed whether you had any messages without so many checks getting to your inbox only to find it empty.
32	Health	Works very well. It would be nice if it were possible to write a message to a student and be able to 'cc it to their regular e-mail as well. Also, it would be nice if the INBOX displayed the sender's name on each message before opening it. Additionally, I haven't found out how to back up all of the mail to my hard drive- it should be obvious how to do this without having to search around the user manual.
33	Lib Arts	I have used Discussion Board and Blackboard Messages, but am currently only using Messages occasionally. I am content with e-mail most of the time. I don't think most of my students read the messages, and I forget too.
34	Lib Arts	All students also need to be trained on how to use Blackboard in general and within specific areas.

35	Lib Arts	It takes too long to check messages for each individual course section. Is there a way to make the messages go to our regular e-mail account?
36	Lib Arts	I prefer web mail/e-mail.
37	Lib Arts	Messages are much slower than regular e-mail. I do not like to log-in to each individual course to check the messages.
38	Lib Arts	I have support and I use it (Messages) from time to time. It's another thing to check, so I seldom look for messages.
39	Lib Arts	I do not like to use Blackboard messages or email. I tried it last year and found it cumbersome. Other faculty have found it to be far less convenient than regular email.
40	Sci Math	I tried using Messages exclusively, but students weren't checking it. Now I use Bb e-mail and I get a better student response when I need to get something to them right away.
41	Sci Math	The great burden of Blackboard messages system are the malfunctioning of the system (when using multiple recipients) and the fact that students don't use the email address they provide when registering in Blackboard as their primary email account. It seems to me that, at this point, the learning process must target the student population rather than the faculty.
42	Sci Math	While I post messages in blackboard, I prefer to receive messages through e-mail.
43	Sci Math	Most of the student -mails used in messages are incorrect. When I tried to use it, it didn't get messages to me correctly. I would forget to check the messages. I prefer working with my normal e-mail.
44	Sci Math	I see Blackboard Messages as ineffective since many of the email addresses of the students are addresses that don't work or the students don't check.
45	Sci Math	Messages doesn’t work better than e-mail.

		Comments on Blackboard
46	Business	I don't want to use more technology as we do not get support for what we already use.
47	Education	Blackboard does not work well enough.
48	Health	I have such limited knowledge of how Blackboard works. I really cannot answer this survey knowledgeably.
49	Lib Arts	Discussion Board and/or Messaging shouldn't be required...but should be an available option. Some profs and some students are willing and able to use it, others are not. Again, it should at least be an available option.
50	Sci Math	Blackboard is non-intuitive and very difficult to use. Everything takes too many clicks. I am very concerned about the trend to solve everything on this campus with Blackboard. It is not everything to everyone. The support from DE is useless. I have had a lot of experience with teaching online and have entirely given it up because of the system at UTB/TSC.