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EXPLORING FACULTY ADOPTION AND UTILIZATION OF BLACKBOARD AT A COMMUNITY COLLEGE IN THE KENTUCKY COMMUNITY AND TECHNICAL COLLEGE SYSTEM

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EXPLORING FACULTY ADOPTION AND UTILIZATION OF BLACKBOARD AT A COMMUNITY COLLEGE IN THE KENTUCKY COMMUNITY AND TECHNICAL COLLEGE SYSTEM

DISSERTATION

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Educational Policy Studies and Evaluation in the College of Education at the University of Kentucky

By
Brent A. Eldridge
Lexington, Kentucky

Director: Dr. Kelly Bradley, Associate Professor of Educational Policy Studies and Evaluation
Lexington, Kentucky
2014
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EXPLORING FACULTY ADOPTION AND UTILIZATION OF BLACKBOARD AT A COMMUNITY COLLEGE IN THE KENTUCKY COMMUNITY AND TECHNICAL COLLEGE SYSTEM

The study explored the faculty adoption and use of a Blackboard at a community college in the Kentucky Community and Technical College System. A cross-sectional survey design was constructed through the lens of Rogers’s Perceived Attributes of Innovations and Chickering and Ehrman’s Implementing Seven Principles: Technology as a Lever to investigate perceptions and opinions on faculty members’ use of Blackboard in their courses. The survey was piloted, modified and deployed to a population of 932 central Kentucky community college faculty who were recruited to participate in the online survey. Descriptive demographic items (gender, age, highest degree attained, years of teaching experience, employment status, and category of instruction) were cross-tabulated with users and nonusers of Blackboard. An additional cross-tabulation was performed on faculty who did and did not teach online. A Rasch analysis with Differential Item Functioning (DIF) was used to evaluate responses to the perceived attributes and opinions about the use of Blackboard. The Rasch model was employed since the model assumes that each person is characterized by ability, that each item of the survey is characterized by difficulty and that the results of differences in the probabilities of items and responses follow along a line. Misfit of items and faculty did occur and quality control measures were applied to the collected data. A Z-Residual table for the dichotomous items was applied to remove responses that were extreme or greater than 2 ZSTD. An Outfit plot for polytomous items was utilized to remove faculty responses above 3 ZSTD. Some items were determined to be redundant according to the Wright maps and Infit/Outfit tables. The results indicated 2 or 3 levels of discrimination in person reliability and an item separation that allowed an analysis of groups. Rogers’s perceived characteristics that persuade people to adopt a new innovation were indicated as differences between users and nonusers of Blackboard. In contrast to a previous study, those faculty who responded to the survey with 0-1 years of teaching experience had the greatest ratio of nonusers to users. Those respondents who associated their teaching to categories of pre-college and language had more nonusers than users of Blackboard. An overall theme where nonusers agreed more than users was the lack of seeing Blackboard, observing how to use Blackboard and not
being able to properly try Blackboard. But users should also be encouraged to expand their use of Blackboard. The majority of users employed: syllabus, announcements, full grade center, course copy, and test and survey pool, but less than half who responded as users employed: discussion board, course calendar, and performance dashboard which may lead to increased communication between the faculty and students. The information obtained from the survey should be utilized when developing professional development activities to encourage Blackboard adoption and use. By studying the adoption and utilization of Blackboard by faculty through the lens of Rogers, the study highlighted differences in the characteristics that persuade faculty to use Blackboard. Through consistent utilization of course management systems, such as Blackboard, the hope is that communication between students and faculty will be enhanced which will ultimately help students to grow, develop and learn.

Key words:  Blackboard, Course Management System, Community College, Survey, Rasch Model

Brent A. Eldridge

November 13, 2014
EXPLORING FACULTY ADOPTION AND UTILIZATION OF BLACKBOARD AT A COMMUNITY COLLEGE IN THE KENTUCKY COMMUNITY AND TECHNICAL COLLEGE SYSTEM

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November 13, 2014
To my parents, my brother, my companion and my teachers
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No one arrives at this space in time alone. As I think about acknowledging those who have helped me along the way, who have influenced my choices, my family and my teachers come to mind. I thank you for helping me achieve my goal.

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When I entered into the EPE program, I stated in my application that I wanted to be a better writer and a better speaker. Dr. Bieber and Dr. Jensen were both instrumental in helping me self-assess my writing which ultimately guided me to see writing as a conversation and that a conversation requires more than one person. The sharing of thoughts and ideas through writing requires description and purpose.

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Alternatives, and Public Policy – I use this book to this day to begin my next campaign for change; Dr. Anglin, for his confirmation that this study had utility and purpose from a foundational educator of Instructional Technology, and Dr. Lane for his willingness to participate. I thank you all for your guidance, dedication and effort.

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Chapter 1 Introduction

Problem Statement

Despite the benefits of using course management systems to communicate with students inside and outside of the classroom, some college faculty members at a community and technical college in central Kentucky have not integrated Blackboard, a course management system, into their courses. Blackboard is required to be used by faculty to post their syllabi, but other components which may enhance communication such as announcements, gradebook, discussion board, and course calendar have mixed usage. The mixed utilization of Blackboard is perplexing in the light of the transitory nature of our students being on and off campus, the literature that supports the benefits of immediate feedback of student’s submitted work and the administrative support through individual face-to-face training and online training modules to incorporate Blackboard. Lack of incentives such as financial rewards, training, and attitudes and behaviors has been reported in recent studies to be factors that determine use of educational technology by faculty (Jackowski & Akroyd, 2010; Lee, Cerreto, & Lee, 2010).

Using the lens of Rogers’s Diffusion of Innovation theory (2003), this study explored the characteristics that persuaded faculty to incorporate Blackboard into their courses. Rogers stated that there are intrinsic characteristics that influence a person’s decision to adopt or reject an innovation. The five characteristics that were investigated are: relative advantage, compatibility, complexity, trialability, and observability. Each of these characteristics can persuade a person to adopt a new innovation. Items on the survey were developed and referenced to the five characteristics.
The study also indicated the extent of Blackboard components employed by faculty. Other comparisons were made between those faculty who teach online versus those who do not teach online. All of these comparisons were made with the knowledge that all faculty are required to use Blackboard to post their syllabi at the institution in the study.

Blackboard is a course management system, an educational tool that may be used only as a repository for information, i.e. the syllabus, but also has the ability to be a tool for communication inside and outside of the classroom. Students indicate that it is a resource for gathering information about courses in an efficient manner. When faculty use Blackboard inconsistently, then Blackboard becomes less useful to students. Blackboard is a communication tool which has the possibility of increasing the efficiency of communication by both students and faculty through announcements, discussion boards and grade books. Blackboard is an educational technology much like a calculator is an educational technology. Just as the calculator increased efficiency which allowed more complex problems to be examined in a defined amount of time, so has Blackboard increased efficiency in accessing information to allow more information to be communicated by both faculty and students.

By focusing on the characteristics that persuade a person to adopt a new technology, these characteristics may help in determining why some faculty adopt while others do not adopt. This information may help faculty in providing a more consistent experience for students taking courses at a college. A more consistent experience of Blackboard use may result in more efficient communication which could lead to a more engaging course experience for both students and faculty.
The purpose of this study was to examine the adoption and utilization of Blackboard by faculty through Rogers’s five characteristics that persuade someone to adopt Blackboard. Were these characteristics determining factors in adoption and utilization? Were there differences in these characteristics between users and nonusers? The study was not meant to discuss the merits or faults of Blackboard, the idea of Blackboard contributing to teaching pedagogy, or the efficacy of Blackboard. These ideas are for future studies.

**Research Questions**

To explore why faculty members decided to incorporate Blackboard into their courses and the extent of faculty use of Blackboard, this study tried to answer the following questions:

I. How is Blackboard usage distributed among the faculty on a campus at the community college?

II. What are the faculty’s perceptions of using Blackboard in courses at the community college?

III. What components and tools are utilized by faculty incorporating Blackboard into their courses?

IV. Is Blackboard utilization more varied in online courses versus face-to-face courses?

V. Does Rogers’s Diffusion of Innovation five characteristics elucidate the faculty members’ use of Blackboard?

VI. What attributes or perceptions that are not explained by Rogers’s Diffusion of Innovation theory play a role in the use of Blackboard by faculty?
Significance of the Study

In 1989, Steven Brint and Jerome Karabel, authors of *The Diverted Dream Community Colleges and the Promise of Educational Opportunity in America, 1900-1985*, outlined the history and development of the community college system, provided a case study of the driving forces that shape a community college system, and discussed the transformation of the community college from a 4-year college transfer program to a terminal vocational program using an institutional model as opposed to a consumer choice or business domination model. If higher education is an essential component of a democracy, then a democratic society is required to provide the opportunity for people to pursue a higher education. The provision of a higher education must address the consumer, the market, and ultimately, according to Brint and Karabel, the institution. In the context of this dissertation in a community college setting, course management systems are a key element in satisfying all three stakeholders.

The consumer or student attends a community college (initially called a junior college) to seek a better standard of living. The community college is usually an open-door institution, no admission requirements, that is less costly than 4-year institutions and can be attended part-time. In the consumer-choice model “(students) wish to obtain the highest possible rates of return for the lowest cost in time, effort, and expense” (Brint & Karabel, 1989, p. 13). Parents also want the best for their children. In the 1920s, the president of the University of Missouri commented, “Parents who could not be persuaded to send their children to a small college for four years could be induced to send them to a junior college near at home for two years, provided transfer to the university without loss of credit could then be made” (Brint & Karabel, 1989, p. 27). These ideas were the
driving forces for students and parents in choosing an education at a community college. The choice of consumers encouraged the growth of the community college. Community college growth was not due to ideas of vocational or terminal programs. Fewer than 10 per cent of the students in the 1920s thought that vocational preparation was the most important reason for attending a community college (Brint & Karabel, 1989). The Truman Commission stated, “(the community college) must not be crowded with vocational and technical courses to the exclusion of general education, but must instead aim at developing a combination of social understanding and technical competence” (Brint & Karabel, 1989, p. 70). These statements all support the concern of the consumer of higher education and the ideas of a better standard of living.

In the 1970s when the market took a downturn, unemployment was in the double digits. Students began to seek opportunities in vocational training since there was a decline in employment requiring a college degree. Although many different entities were trying to redesign the community college into a vocational training facility, it was the consumer that ultimately drove the change to vocational training. Numerous training programs allowed students to be educated for specialized high paying jobs such as nuclear medicine technician, surgical technician and dental hygienist. These programs provided opportunities for students to advance in their careers and/or to change careers. Vocational programs began to be supported not only by society and businesses, but also by the consumer. When vocational training was chosen, the consumer, the market and the institution all benefited from the choice (Brint & Karabel, 1989).

The market was also a major force in the development of community colleges in higher education. An overall theme presented in *The Diverted Dream* was using the
community college as a “shock absorber” or “sorting” mechanism because “All industrial societies face the problem of allocating qualified individuals into a division of labor characterized by the structured inequalities of income, status, and power” (Brint & Karabel, 1989, p. 7). The contributions made by the market were the channeling of students after World War II into community colleges so as not to overwhelm the 4-year university which was discussed in detail in California. Businesses wanted their employees to be dependable, social and cultural which required schooling beyond secondary school. Community colleges also acted as a sorting mechanism which in turn supported a stratified marketplace. As the recession of the 1970s was in full effect, businesses wanted the government to pay for the training and retraining of employees. Community colleges with their small class sizes and institutional flexibility could enact training and certificate programs much more readily than universities. The flexibility of community colleges became fully exploited by the market and continues to this day.

The key mechanisms in market-driven higher education that were discussed in *The Diverted Dream* were the transferability of courses and the demand for students’ knowledge and services which were gained by completing a program. If either of these components faltered, then there was a decline in the status of the college or institution. Brint and Karabel successfully combined these components into an institutional model to explain the rise and growth of the community college. The institutional model combined both consumer driven choices along with market place demands. By combining these forces, we have a more complete picture of how the community college has been manipulated to provide to a specific market of lower to middle class people for middle-level entry paying careers.
The institution is controlled by consumer choice and market forces. Most full-time faculty (be that a 4-year college, a 2-year college or a vocational school) are committed to providing the tools and support necessary to develop a student’s ability to be competitive in the market place. There are standards in the classroom that must be met by the students; without them, the market would reject the product except when there is high demand for a limited resource. So the market for the community college is an open door institution that will accept all students, sort them through testing (i.e. ACT, etc.), place them in the appropriate level of education (remediation or college), and provide a syllabus of the requirements for the courses based on competencies agreed upon by committees of educators in the community college system. The community college strives to maintain this specific market by working with area colleges, by providing services such as counseling, advising, financial aid, and tutoring, and by employment and training opportunities with local businesses. These services are all performed on a community college budget that is usually much less than a comparable 4-year college.

With the market requiring efficiency, productivity, and just-in-time training and consumers wanting higher education with the least amount of time, effort and expense, educational technology seems poised to be the next revolution in democratizing higher education. From the consumer perspective, courses can be taken and accessed any place a wired or wireless network is available. This is especially important for full-time workers, expecting parents and those with disabilities. Courses that are enhanced with course management systems, such as Blackboard, allow students to access their syllabi, communicate with their instructors, monitor their progress, and access additional
instructional materials. Students can shop for the best courses online and are not limited geographically as they are with classrooms on campuses. The Internet-based global community college seems ready to grow exponentially and a key component of this growth will be the faculty members’ use of course management systems to communicate with students.

Course Management Systems (CMSs), such as Blackboard, Angel, Canvas, Moodle, etc., are software systems installed on networked computers and servers. These educational technology tools allow faculty to integrate technology with pedagogy into a platform that supports design, delivery, and management of instruction. CMSs are generally composed of an opening homepage, followed by sections that convey daily messages, tasks, course content, discussion boards, chat rooms, assignments, quizzes, exams and grades. CMSs support communication between the instructor and the student through announcements, instant messaging, electronic mail, forums, and chat rooms. Students are able to collaborate with other students through forums. Many times students will work asynchronously, due to time and space constraints, on group projects through these forums. Virtual office hours can also be held by the instructor, where time is designated to have synchronous communication with students through the CMS. External links to libraries of content information, videos, and current research are also provided to students to enhance learning. All of these components are especially important to the mobile population of students who attend community colleges.

Although CMSs were initially developed for online courses, faculty employ CMSs in face-to-face courses to enhance student-teacher interaction and learning. Osguthorpe and Graham (2003) defined this combining of face-to-face time in the
classroom and CMS interaction outside the classroom as a “blended” course. CMSs can create a dynamic learning community that is active beyond the physical classroom. Quizzes, that once would be given in the classroom, can now be given online outside of class time, thereby freeing up additional instructional time. Videos of a lesson may be recorded, so students missing a class period can view instruction at their convenience or view a video on a concept that they struggled to grasp in the time-frame of a class meeting. These tasks would have been more difficult to accomplish before CMSs.

Community has been shown to be an important component in learning (Wenger, 1998). Instructors want students to come prepared for class, to interact with their peers and to be fluent in the terms of the discipline which allows practitioners to share their ideas and values. The language and practices of a group create organic solidarity. Organic solidarity is a concept proposed by Emile Durkheim’s *The Division of Labor in Society* (1933/1984). Organic solidarity is defined when individual personality is absorbed into a collective personality which is possible only when each individual has his own space that is unique from the collective. Ultimately, the more this space of connection extends, the stronger the cohesion of community. “Indeed, on the one hand, each one depends more intimately on society the more labor is divided up and, on the other, the activity of each one of us is correspondingly more specialized” (Durkheim, 1984, p. 8). The formation of organic solidarity creates a community. The formation of a community allows students to self-evaluate and to evaluate members’ responses. In evaluating members’ responses, students begin to develop the critical skills required in developing a conceptual understanding of the course content (Farrell, Moog, & Spencer, 1999). When instructors use CMSs effectively, the interactions of instructors and
students extend beyond the time allotted for class and increase the possibility of creating a community of learners.

**Scope of the Study**

The study sought to explore the adoption and utilization of Blackboard by faculty at a community college in central Kentucky. The purpose of the literature review was to describe the community college setting, the history of educational technology, the components of course management systems and the connections between Roger’s diffusion theory, Kuhn’s paradigm shifts, and Gladwell’s tipping point. The foundation of the study was initiated by the domains of instructional technology as expounded in *Instructional Technology: The Definition and Domains of the Field* by Seels and Richey (1994). Utilization was the specific domain that was investigated. Rogers’s Model of the Innovation-Decision Process Stage II. Persuasion and its perceived characteristics of the innovation were the foundational components of the opinions being explored to determine use of Blackboard.

The research methodology employed was a survey. The survey items were developed based on Rogers’s process and Chickering and Ehrman’s seven principles. The population of central Kentucky community college faculty from part-time to full-time was recruited to participate in the study. A cross-sectional delivery of the online survey was deployed to capture the responses of those faculty who participated. Questions posed were nominal and categorical to explore the distribution of faculty who used/did not use Blackboard, to examine what components were being used by faculty and to capture opinions and perceptions that persuaded faculty to adopt and use Blackboard.
The Rasch model was employed to develop a measurement of item difficulty and person ability based on the items posed and people who responded to the survey. The study focused on the adoption and utilization of Blackboard and not the instructional design or effectiveness of the course management system in enhancing student learning. Ideally, after using the data from this study to determine the characteristics that influenced adoption and utilization, additional studies could be used to determine the effects of adoption on instruction by both students and faculty.

**Summary**

By examining survey data of community college faculty’s use of CMSs, information may be discovered to achieve the following goals:

I. Tailor individualized training experiences to introduce faculty to CMSs.

II. Assist faculty in integrating CMSs into their courses.

III. Apply the various tools available in CMSs to improve student learning.

IV. Enhance instruction of the objectives of the course using CMSs.

In general, this study is intended for faculty or administrators who are interested in exploring the adoption and use of Blackboard by faculty.

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Chapter 2 Review of the Literature

History of Technology in Education

Technology is derived from Greek roots of tekhnē, skill + -logiā, -logy: teknologiā, systematic treatment of an art or craft. A historical analysis of the literature illustrates that technology (the use of tools) came before science (Latin scientia, from sciēns, scient-, present participle of scīre, to know), but as time progressed science and technology have become intertwined. Science, a systematic way of gaining knowledge, and technology, a systematic use of tools and techniques to apply science, have been integrated to give a formal definition of technology.

The official inception of the definition of educational technology began in 1963. In this year, the Department of Audiovisual Instruction (DAVI) Commission on Definition and Terminology in association with the National Education Association, and supported by the Technological Development Project, published a monograph of the first formal definition of audiovisual communication. The formal definition of audiovisual communication was later accepted by the Association for Educational Communications and Technology (AECT, which was formally the DAVI) in 1977. This definition of educational technology is also inclusive of instructional technology.

The current definition of educational technology, which was approved by the AECT in 2008, is: “Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources” (Januszewski & Molenda, 2008, p. 1).

Educational technology arguably represents technology in education and instruction. The
AECT does not distinguish a difference in instructional technology and educational technology; they are one and the same. This formal definition reflects the history and practice of instructional and educational technology.

The history of educational technology began as early as the last half of the fifth century with Elder Sophists. One of the Elder Sophists basic tenets was “Man evolves through technology and social organization to a state of civilization where he can guide his affairs effectively” (Saettler, 2004, p. 24). Another contributor to the history of educational technology is Comenius’s Orbus Pictus, which was a visual aid used to help students study Latin and science in the mid-1600s. Many of Comenius’s ideas have been incorporated in modern instructional technologies.

The era of modern science and technology as related to educational technology began at the turn of 20th century with developments in psychology and philosophy. Edward L. Thorndike’s theory of connectionism, where repetitive stimulus-induced responses increase retention, was part of the first scientific learning theory developed in the early 1900s. John Dewey contributed to scientific learning theories with his reflective method of instruction. Although he attacked Thorndike’s connectionism, Dewey supported hypothesis testing and verification of the results in a logical framework. B. F. Skinner used the theory of connectionism to develop a psychology based on the science of behavior for the purpose of achieving predictability and control. The development of behaviorism heavily influenced developments of programmed instruction in the late 1950s and early 1960s.
Jean Piaget, who was most intrigued by epistemology, produced a cognitive development model with four successive chronological stages: sensory-motor, preoperational, concrete operations, and formal operations. This model has contributed significantly to learner-centered models of educational technology. The developments of Piaget’s theories in educational technology are most often seen in instructional design. Activities are designed for the appropriate stage of the learner’s development. The learning environment becomes a very important component since learning is based on cognitive processes.

Educational technology is also closely associated with industrial technology. The term educational engineer was born by the industrial arts. Scientific management of education was implemented to aid in the “skyrocketing enrollment in U.S. urban public schools, primarily because of the influx of immigrants from Europe and the industrial revolution.” (Januszewski, 2001, p. 3). Scientific management, an industrial technique, increased efficiency by carefully measuring the processes of production. James Munroe is considered the first person to actually apply scientific management to education. Munroe’s ideas of production through scientific methods were influenced by Dewey. Munroe advocated an assembly line production for education. Seeking to improve education, W.W. Charter applied this scheme, which was defined as a systematic application of science to improve efficient utilization of resources that ultimately leads to wealth (Saettler, 2004).

Another major influence on the development of educational technology is from the audiovisual education movement. This movement began in the 1920s with the use of film to instruct students. Thomas Edison was a strong advocate of using film to educate
and believed that film would make textbooks obsolete. Radio was also used in the 1920s to instruct, but radio was used more as a supplement before being supplanted by television. In 1932, the Department of Visual Instruction (DVI) of the National Education Association was formed to promote the use of visual aids in school. At the time, visual aids were considered a supplement to instruction but that changed with the texts by Charles F. Hoban *Visualizing the Curriculum* (1937) and Edgar Dale’s *Audiovisual Methods in Teaching* (1946). Dale’s “cone of experience” model represented how learning could progress from the concrete to the abstract through direct experiences of symbolic communication. Hoban and Dale developed audiovisual methods of instruction which created a field that was more than just hardware, but a field which emphasized scientific methods, processes, systems, and technology to improve instruction.

In the 1960s, educational television emphasized the importance of audiovisuals. New ideas were emerging about what the field of audiovisuals encompassed. Ideas about audiovisuals instigated a shift in the paradigm of considering audiovisuals as merely hardware. Discussions about audiovisuals began to emphasize processes instead of products. Messages and media-instrumentation were becoming more commonly used words to describe educational technology as opposed to materials and machines. The introduction of communication and learning theories was beginning to be incorporated into audiovisuals. As learning theories incorporated audiovisuals, the paradigm shifted to dynamic processes and continues to impact how we assimilate audiovisuals.

The acceptance of the conceptual shift of audiovisuals, that audiovisuals were not just static images or machines, lead to a definition of audiovisual communication. In
1963, the Department of Audiovisual Instruction Committee defined the term and the profession of audiovisual communications which later was renamed educational technology (Januszewski & Molenda, 2008).

In 1970, the personal computer by Hewlett-Packard was introduced to the market which was the beginning of the possibility of an interactive form of media and hardware. People could input and receive information from a machine that was programmed with software (i.e. computer-assisted instruction). The University of Phoenix began in 1976 which broke with several academic traditions by being a for-profit institution with a focus on working adults (EDUCAUSE, 2003). The World Wide Web was developed when Transmission Control Protocol and Internet Protocol were developed in 1992. Between the PCs, for-profit institutions and the Internet, the birth of online learning began in the 1990s. The first CMS called, SoftArc, was launched in 1990 for the Macintosh platform. Blackboard LLC was formed and merged with CourseInfo LLC in 1998 and released their first software product for online learning. Blackboard merged with WebCT in 2005 and is estimated to control up to 80% of the course management market in North America. Over 70% of U.S. colleges and universities use Blackboard as their course management system. (Bradford, 2007, p. 302)

Common themes as to what educational technology encompassed began with three domains: foundational research and theory, prevailing values and perspectives, and the capabilities of the technologies. In the 1960s, DAVI of NEA conducted an analysis as to the practice of Instructional Technology. The report was entitled Jobs in the Instructional Media. The information from this study was used to develop the 1972 AECT definition of the functions of educational technology which consisted of three
domains: Management functions, Development Functions, and Learning Resources.

Many were unsatisfied by this definition and the limited domains.

A new definition emerged from the 1977 meeting of the AECT. In this revised definition the distinction between instructional technology and educational technology was integrated into educational technology using the following logic:

…because instruction was considered a subset of education, then instructional technology was a subset of educational technology…educational technology was involved in aspects of human learning…instructional technology was involved in the solution to problems where learning is purposive and controlled (Januszewski, 2001, p. 78)

But many argued that the 1977 definition was too broad and could mean anything to anybody in education, so a new definition emerged in 1994 that separated theory and practice in the field of educational technology. But as this definition was being accepted, constructivist theories were beginning to be used in education. Learner-centered methodologies were beginning to be implemented. Computer usage was evolving from high tech overhead projectors to instruments for reviewing, searching, and problem solving. The 1994 definition became too restrictive in its systematic analysis of educational technology and in 2008 the current definition emerged. Out of this new definition came new domains of studying educational technology which are pulled from the definition.

Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources. (Januszewski & Molenda, 2008, p. 1)

Facilitated learning is founded in learning theories from behavioral to constructivist. Behavioral methods based on B.F. Skinner’s work led to ideas and applications in programmed instruction (knowledge defined by correct responses) and
computer-assisted instruction (where incorrect responses lead to remediation). Cognitive theories based on Piaget (assimilation and accommodation), information processing theory (stored memory) and schema theory (organizational structures of long term memory), have led to developments in instructional sequencing. The instructional sequences can be based on deductive or inductive reasoning.

Many constructivist theories are based on the work of Lev Vygotsky who believed cognition begins with social interaction. Ernst von Glaserefeld in developing his theory of knowledge stated “experiential world is constituted and structured by the knower’s own ways and means of perceiving and conceiving, and in this elementary sense it is always and irrevocably subjective…” (Januszewski & Molenda, 2008, p.32). Constructivism in educational technology is highlighted by the development of problem-based learning projects (PBL). In PBL, the learner develops understanding by working as a group on a complex problem in a simulation (POGIL, an NSF initiative for teaching chemistry). Behavioral theories are in contrast to cognitive and constructivist theories. Behavioral theories emphasize direct instruction and repetition in order to affect learning, whereas the cognitive and constructivist believe that learning lies within the learner. These differences are seen as either teacher-centered or learner-centered teaching, respectively.

Improving performance is another goal of educational technology. Many ideas of improving performance come from industrial technology, where the goal is to increase productivity. Efficiency and effectiveness are the goals of improving productivity. Educational technology increases performance by designing innovative systems of
learning. The domains of psychomotor, affective, and cognitive are all used to produce a more productive educational environment.

Creating new technologies to aid in educating is another focus of educational technology. These new technologies can be in the form of hardware (radio, television, computer, etc.), software (programs), instructional design, and systems of implementation and evaluation. When a new technology is developed, the technology will feature new applications which may develop new systems of learning. A paradigm shift may occur in the practice of disseminating information. Once a technology is created, it must be evaluated to determine its usefulness. Using newly created technology for educational purposes is another goal of educational technology.

There is a considerable body of theory and research to guide utilization, with current practices favoring an eclectic approach, using behaviorist, cognitivist and constructivist techniques as dictated by the learning goals and needs of the learner (Januszewski & Molenda, 2008, p. 168).

Utilization of technology is determined by cultural, social, economic, and competency theories that ultimately determine the effective use of the technology. The goal of the researcher is to determine what factors will influence the use of the technology.

Managing the use of educational technology occurs at different levels. Much of the work done in this area of educational technology is based on marketing principles of product, price, place, and promotion. The focus of much of the research is based on leadership in the integration of technology in a particular environment. Effective analysis of the stakeholders and their needs is an important part of managing technology. The end goal is to help develop policy that will direct, align and inspire the practitioner.
Processes are another domain of educational technology. Process theories are prescriptive theories used in developing results. Process theories that are applied to educational technology are generally concerned with practice, ethics, study, improving performance, facilitating learning, and utilization of technology in education. Current research on process in educational technology includes the ubiquitous use of computers in society, distance learning, and systems that effectively use resources.

Resources are people, tools, materials, devices, and an environment that facilitate learning and performance. Resources are typically identified by the technology that is currently being used. The growth in educational technology from radio to current simulations of life-like environments over the Internet is the identity of resources. Most studies on resources focus on using communication and learning theories, as well as appropriate and ethical use of resources to aid in facilitating learning.

The seven domains from the AECT definition of educational technology (facilitating learning, improving performance, creating, using, managing, processes, and resources) guide the research that occurs in educational technology. This study will use an inductive approach of gathering information from a survey to explore opinions and characteristics of community college faculty who use and do not use Blackboard. By investigating the responses to items on the survey, a pattern may emerge that relates to the characteristics that Rogers’s has stated influence adoption and use of technology.

**Diffusion Theory**

Diffusion is the scattering of light, the intermingling of solutes and solvents, or “the spread of cultural or technological practice or innovations from one region or people
to another” (Agnes, 1999, p. 402). Diffusion research began in the 1940s and 50s to understand the spreading of agricultural innovations and new teaching ideas (Rogers, 2003). Rogers’s *Diffusion of Innovations* was first published in 1962 to describe a diffusion model that could be used to determine why certain ideas and technologies are accepted and flourish while others are not accepted or tend to terminate over time. Most diffusion research involving people is based on communication. Rogers informs, “Communication is a process in which participants create and share information with one another in order to reach a mutual understanding” (Rogers, 2003, p. 5). This study investigated how many faculty were using Blackboard and if any of the five Rogers’s characteristics were indicators of Blackboard use or nonuse by faculty at a community college.

Rogers states the five attributes of an innovation that determine the rate of adoption are: relative advantage, compatibility, complexity, trialability, and observability. Relative advantage is the perceived idea that the innovation is better than the current process. Does the innovation improve communication, learning or in the case of business, profitability? Compatibility defines the method by which a new idea integrates into the existing paradigm of the adopter. Innovations can be perceived as being compatible or incompatible with a person’s past experiences and beliefs and are dependent on the person’s needs for a new avenue of thinking. Complexity describes the way a person perceives the difficulty of adoption or use when compared to the existing paradigm. The more complex the innovation is perceived to be, the less likely it is to be adopted. Trialability is the ability to experiment with the new innovation, to gradually accept and implement a new idea. Rogers (2003) explains that innovations must be tried
out under the adopter’s own conditions and tend to be much more readily adopted when
installed in steps rather than complete systems. Observability expresses just how visible
the innovation is to others. Rogers states, “The software component of a technological
innovation is not so apparent to observation, so innovations in which the software aspect
is dominant possess less observability, and usually have a relatively slower rate of
adoption” (Rogers, 2003, p. 259). All of these attributes are important for innovations to
be perceived as useful by the adopter. Adopters must go through stages in the innovation-
decision making process. These stages in order are: Knowledge, Persuasion, Decision,
Implementation, and Confirmation. Rogers states “Using a communication channel that
is inappropriate to a given stage in the innovation-decision process (such as an
interpersonal channel at the knowledge stage) was associated with later adoption of the
new idea by an individual because such channel use delayed progress through the
innovation-decision making processes” (Rogers, 2003, p. 206). These stages of the
innovation-decision making process are supported by Thomas Kuhn’s description of the
acceptance of a new paradigm.

A paradigm, according to Kuhn (1962/1996), is defined by two essential
characteristics of achievement: That achievement is unique enough to attract new
scientists away from competing models and the new paradigm allows these new scientists
to solve other problems. Kuhn calls this switching from one set of laws, theories, facts
and instrumentation to another, a revolution where:

The transition from a paradigm in crisis to a new one from which a new tradition
of normal science can emerge is far from a cumulative process, one achieved by
an articulation or extension of the old paradigm. Rather it is a reconstruction of
the field from new fundamentals, a reconstruction that changes some of field’s
most elementary theoretical generalizations as well as many of its paradigm methods and applications (Kuhn, 1996, pp. 84-85).

When a new paradigm begins to emerge, it becomes successful if it breaks with tradition (Stage I: Knowledge), it is able to solve problems the old paradigm had failed to do (Stage II: Persuasion), it develops a following of new scientists and it changes the scientists’ view of the universe (Stage III: Decision). This change in perception of the universe could be explained in psychological terms as a gestalt shift, which occurs when one sees a different image upon reorientation. Kuhn argues that it is not a gestalt shift by stating “Scientists do not see something as something else; instead, they simply see it” (Kuhn, 1996, p. 85). Kuhn calls this a “Scientific Revolution.”

Kuhn (1996) calls this shift to a new paradigm a revolution instead of a progression because he believes it is “a noncumulative developmental episode in which an older paradigm is replaced in whole or in part by an incompatible new one” (Kuhn, 1996, p. 92) (Stage IV: Implementation). He believes polarization occurs between those of the old paradigm and the new paradigm, much like opposing political parties. The criteria for legitimacy of problems and solutions changes when those with opposing viewpoints “talk through each other when debating the relative merits of their respective paradigms” (Kuhn, 1996, p. 109). Kuhn believes this leads to circular arguments where each paradigm will satisfy the criteria that it defines and has difficulty in satisfying all the criteria of the competing paradigm (Stage V: Confirmation). Kuhn argues that science does not progress linearly that “the normal-scientific tradition that emerges from a scientific revolution is not only incompatible but often actually incommensurable with that which has gone before” (Kuhn, 1996, p. 103).
Adopters of innovations have been classified by Rogers to fall into one of five categories: Innovators, Early Adopters, Early Majority, Late Majority and Laggards. Rogers states:

The adoption of an innovation usually follows a normal, bell-shaped curve when plotted over time on a frequency basis. If the cumulative number of adopters is plotted, the result is an S-shaped curve (Rogers, 2003, p. 272).

Examples of this distribution are illustrated in Figure 2.1 (Rogers, 2003, p. 273). Since the distribution of the adoption rate follows an S-shaped curve, Rogers states that an approximation of a normal distribution of the types of adopters can be divided by using the mean and the standard deviations on either side of the means. The five types of adopters under the normal distribution curve are illustrated in Figure 2.2. From this distribution, innovators are the most venturesome and the laggards are the most traditional. Rogers states the innovators are the least likely to be respected by members in a local system and are considered risk takers. Laggards are usually very cautious in accepting new ideas possibly to be sure the idea will not fail because their resources are limited or because they are ingrained in the local system. Kuhn states the conversion of scientists is usually done by those entering the profession of science, rather than those who are already established and follow a historical paradigm. As time, facts, and theories progress, the older paradigm fades as language and algorithms align with the new paradigm. This supports Rogers’s idea of innovators who possibly have little to lose at the beginning of their careers versus an established scientist who operates in the traditional paradigm along with his colleagues, who have similar beliefs.

Socioeconomics, personality traits and communication behavior have been accumulated and summarized by Rogers in generalizing what types
Figure 2.1. Number of new adopters each year and the cumulative number of adopters, of hybrid seed corn in two Iowa communities.

The cumulative number of adopters of hybrid seed corn approaches an S-shaped curve over time, while the frequency distribution of the number of mean adopters per year approaches a normal, bell-shaped curve. Early in the diffusion process, relatively few individuals adopt in each time period. Gradually, however, the rate of adoption speeds up until all (or almost all) members of the system adopt the innovation.

Source: Based on Ryan and Gross (1943).
of people fall into each category (Rogers, 2003). These theories will be important in
developing survey questions to help categorize people into adoption categories.

**Previous Innovation Studies**

Less (2003) conducted a survey of North Carolina Community College System
full-time faculty, n = 5202 and a response of 579. The community college system
consisted of “59 independent two-year public institutions” which differed in size, mission
and cohort population (Less, 2003, p.14). Less’s study was to determine if “demographic
variables of age, gender, race/ethnicity, teaching experience and highest degree attained
would sort faculty into 1 of 5 Rogers’s adopter categories. Less found that only teaching
experience and highest degree obtained affected placement in the Rogers’s categories.
Less’s recommendations to improve current practice was to incorporate technology for
instruction in each college’s mission statement, develop plans for maintaining and
upgrading computer activities for faculty and for presidents to take a more active role in
technology (Less, 2003).

Cynthia Roberts (2008) stated that in order for faculty to adopt a new technology,
a strategy that addresses individual barriers to adoption of technology must be overcome.
The individual barriers listed were: lack of technological literacy or competency, fear,
traditional methods of teaching, belief that learning is more effective in the classroom,
time commitment, and threat to academic freedom. Some of the organizational barriers
included: a culture strongly rooted in traditional delivery methods, lack of incentive to
adopt, institutional policies which limit experimentation, quality assessment procedures
Figure 2.2. Adopter categorization on the basis of innovativeness (Rogers, 2003, p. 281).

The innovativeness dimension, as measured by the time at which an individual adopts an innovation or innovations, is continuous. The innovativeness variable is partitioned into five adopter categories by laying off standard deviations (sd) from the average time of adoption (\(\bar{x}\)).
that encourages uniformity and inhibit risk taking, lack of faculty involvement in the selections and implementation process, and lack of infrastructure (Roberts, 2008).

Roberts goes on to state that organizational factors shown to enhance adoption include: support by authority figures, high regard for teaching within the institution, high degree of sharing of learning outcomes within the college, and support of e-learning activities via resource allocation (Roberts, 2008).

In 2005 Penberthy and Millar published an article based on a National Science Foundation funded project “New Traditions: Revitalizing the Curriculum” initiative that argues:

The successful dissemination (of an innovation) is unlikely if a faculty change agent or professional developer tries to modify a colleague’s practice by promoting his or her own approach and simply telling a potential adapter how to implement the changes, leaving the colleague to reproduce the strategies on his or her own. To promote the use of innovative teaching strategies among more faculty, it is essential to foster a situation in which adapting faculty members choose to adapt innovations based on their own interest and excitement, select innovations to address student learning problems that immediately concern them, experiment with innovations in a gradual way, and receive support throughout the process (Penberthy and Millar, 2002, p. 252).

The conclusion of the article states, “That “adoption”, a term that implies taking a fully formed innovation and simply plugging it into an existing course or program is not viable” (Penberthy and Millar, 2002, p. 252). Although, this study was based on new pedagogical methods, these same ideas are important to any adoption or adaptation of an innovation. This study also illustrated how optional and collective types of innovation-decision making allow groups to migrate toward adoption versus an authoritative adoption, where a single person makes the decision for all.
Course Management Systems and Best Practices for Student Learning

Chickering and Ehrman in Implementing the Seven Principles: Technology as a Lever (1996) which is a take-off from their 1987 book the Seven Principles of Good Practice state:

I. Good Practice Encourages Contacts between Students and Faculty

Course management systems allow the student and faculty to interact beyond classroom time. “Total communication increases and, for many students, the result seems more intimate, protected, and convenient than the more intimidating demands of face-to-face communication with faculty” (Chickering & Ehrman, 1996, p. 2)

II. Good Practice Develops Reciprocity and Cooperation Among Students

As much as CMSs contribute to interaction between students and faculty, there is equal opportunity for students to interact with one another through study groups, group projects, and discussion boards. This is especially important for students attending community colleges where students are only on campus for a short period of time.

III. Good Practice Uses Active Learner Techniques

CMSs allow faculty to post a variety of resources in one place that allow students to access at any time. Active learning by students can be encouraged by these resources. Chickering and Ehrman believe many active learning resources can be placed in one of three categories: “learning by doing, time-delayed exchange, and real-time conversation.” (Chickering & Ehrman, 1996, p. 4) Learning by doing is having students focus on apprentice-like activities
in researching a current problem and looking for causes and solutions by using the Internet to search for information.

IV. Good Practice Gives Prompt Feedback

CMSs allow prompt feedback of student assessment, whereas in a traditional classroom the earliest feedback might be given at the next class meeting where students may or may not attend. CMSs can incorporate quiz and test software that will provide immediate feedback with a narrative of common errors, so students can assess their work immediately and make corrections before the next class meeting or at least have questions to ask.

V. Good Practice Emphasizes Time on Task

CMSs are especially good for busy commuting students whose education is secondary to their family or work. CMS allow faculty to post lectures, post important documents and videos that save students time in commuting to the campus. CMSs allow students to stay on task even though they may not be able to attend college.

VI. Good Practice Communicates High Expectations

CMSs can be used to increase the expectations of everyone in the course. By posting finished projects on the CMS, students can view examples of exemplary work to poor work. Students can be required to post their final work on the CMS for everyone in the class. Students’ work can be critiqued by classmates and the professor.
VII. Good Practice Respects Diverse Talents and Ways of Learning

CMSs allow faculty to post all course material online at the beginning of the semester which could allow for differentiated learning. Highly motivated and intelligent students could work quickly through the material of the course and students who are struggling could move at a slower pace and be identified by the instructor. The instructor could then structure the learning to assist those students who are struggling beyond the time spent in the classroom.

**Rasch Model**

The numbers 1 and 0 are used to label true and false, on and off, or present and absent; 1 and 0 are exact numbers. It is these two simple numbers that determine a computer’s output. The invariant nature of numbers allows people to create a construct of the universe. The invariant nature of these numbers on a ruler allows for precise measurements of length to be made that are reproducible from person to person with different ability levels and in vastly different situations, such as at home versus on the moon. The length of the object being measured may change, but the ruler remains invariant. The model that was be used to interpret the data collected by the survey instrument in this research is also approximated as invariant. The data may change from person to person, but the assumption is that the data will fit the model, just as the length of an object will fit the ruler. This assumption is called item fit. If the data does not fit the model then the model has little utility, similar to using a balance to measure length.

Traditionally, survey data has been analyzed using a classic statistical approach to assess the particular construct of the research. A statistical model does provide a descriptive summary of the data; however, the model may not provide the best
measurement of progression from the simple to the complex. Classic statistical methods are dependent on the size and characteristics of the sample, which include the following: The respondents ability to endorse an item on the survey, the equivalency of the interval between choices on a survey item and the consistency of the comprehension of the directions and the interpretation of each item (Bond & Fox, 2001, Sampson & Bradley, 2003, and Smith, 2004). Statistical methods are also affected by missing data. Due to these dependencies, a better model for interpreting survey data is required.

The Rasch model focuses on measurement. Just as a ruler must delineate the length, a model must fit the data. If the ruler does not encompass the length of the object or the model does not fit the data, the instrument is replaced. As stated in the Respondent in the Spring of 2005, “Specific to rating scale data, Rasch analysis connects observations of respondents and items in a way that indicates the occurrence of a certain response as probability rather than a certainty and maintains order in that the probability of providing a certain response defines an order of respondents and items” (Sampson & Bradley, 2005, p. 12-13). In other words, respondents should endorse items relative to one another on a progressive scale. If a respondent chooses an item at the high end of a scale, then the items below the high-end item should have also be chosen, furthermore, items that are easy to endorse should be chosen by all respondents. For items on a survey instrument that do not fit the Rasch model, a misfit occurs.

When a misfit of an item occurs, the item does not support the construct that is being investigated. The Rasch model provides quality control of the respondents and items by incorporating fit statistics. Fit statistics are a summary of the discrepancies between what is observed and what is expected to be observed; the statistics indicate how
accurately the data fit the model. The two most common fit statistics used in the Rasch model are infit and outfit. Infit is an information-weighted fit and is sensitive to the pattern of responses to items by the respondent of the survey or the pattern of the respondents to a particular item on the survey. The infit statistic is usually of greatest concern in determining if the model fits the data. The outfit statistic is sensitive to outliers, which are items that are difficult for the respondents to endorse because of the respondents abilities and experiences. Outfit problems tend to be easier to fix in a model than infit. Both infit and outfit can be standardized. The mean-squared form of the fit statistic is unstandardized and the implications of mean-squared values are: “greater than 2.0 distorts or degrades the measurement system (underfit), 1.5-2.0 unproductive for construction measurement, 0.5-1.5 productive measurement, and less than 0.5 less productive for measurement, but not degrading –may produce misleadingly high reliability and separation coefficients (overfit)” (Linacre, 2002). Standardized fit statistics are t-tests of the hypothesis “Do the data fit the model perfectly?” These are reported as ZSTD scores, i.e., unit normal deviates - standardized values are positive and negative. If the data fit the model then 0.0 would be the expected values, less than 0.0 would indicate the data is too predictable and greater than 0.0 indicates a lack of predictability (Linacre, 2002). These fit statistics were used to evaluate the Rasch analysis of the survey.

The Rasch model was chosen to evaluate the survey instrument data to map the progression of faculty in the decision making process of utilizing Blackboard in their courses. The assumption is the progression is unidimensional and that those who are more advanced in utilizing Blackboard will endorse more items on the survey. There are two groups of questions that will be evaluated using the Rasch model. A dichotomous
Rasch model was used for those items that have responses of yes or no and agree or disagree. A polytomous model was used for those questions based on opinions. Faculty members who have adopted the CMS should endorse more items on the survey than nonadopters and those who teach online should probably be further along in the adoption process than those who do not teach online.

In general, the Rasch model seems best suited for dichotomous data, but there are also advantages for using the Rasch model for polytomous data. One difference or advantage of the data generated by Likert-type questions is the ability to detect subtle differences in responses by respondents. A dichotomous question would not provide as much information on Blackboard facilitating contact between students and faculty; the answer would be agree or disagree. A polytomous question (Likert) allows investigator to see the degree of endorsement of the question and/or the construct.

The purpose of the Rasch analysis of the survey data was to capture the progression of use of the CMS. The assumption was there should a greater number of attributes being endorsed by adopters versus nonadopters, and maybe a greater number of attributes between those who teach online versus those who do not teach online. If these assumptions hold, then the start of a model to gauge faculty members stage of adoption could be determined and professional development activities could be created that are tailored to the faculty members’ stage of adoption. The demographic questions were to help support previous research findings and the extent of adoption at the institution being studied.
Summary

Community colleges are dynamic institutions, where students come and go throughout the day. Many students have full-time careers outside of being a student. Students demand efficiency in their education with the lowest costs in time, effort and expense. Most students take classes that they believe will lead to a better paying career and a better life.

Community colleges are under constant pressure to meet the demands of the consumers. Additionally, the market demands require innovative systems of education. One such system of innovation in education has been online courses. Online courses have had an explosive growth rate over the last decade by both for-profit institutions and public institutions. The consumers demand anytime, anywhere access to education. The institutions demand the economy of offering courses that do not require a classroom, parking, lighting and other overhead costs. The faculty members are given the task to create an environment where all needs are met.

Faculty know that very little learning can occur without the formation of a community. Community can be the environment created in the classroom or the environment created by the gathering of students outside the classroom. Education does not always have to be inside the classroom and the sharing of ideas outside the classroom can also have value. There may be very little face-to-face interaction with students outside of the classroom to share these ideas, especially at a community college, due to the transitory nature of the students. Faculty require tools to expand the classroom beyond the walls of the institution and one of those tools is course management systems.
Technology has been used in education since the beginning, but the study of the systematic use is a product of the 20th century. Radio, film, and television have all had a place in advancing education, but they were for the most part a one-way form of communication. The creation of the personal computer, hardware, software and the Internet have led to great advances in expanding an environment where two-way communication can occur in real-time. CMS is an educational technology that allows faculty to develop, organize, and archive meaningful instructional materials and to communicate using multiple pathways including e-mail, instant messaging, and voice.

Course management systems allow communication beyond the classroom. Students cannot only interact with their instructor, but also fellow classmates outside of formal classroom time. An expansive environment is created through CMSs, where information can be shared, researched, and presented to all participants. Procedural activities, such as announcements and assignments can be deferred to the CMS which allows more time on instruction in the classroom. A CMS gives faculty another tool in creating and organizing their course and guiding students to understanding the material. CMSs are a tool, much like the calculator, and as a tool CMSs have the ability to improve efficiency and performance by creating, using, and managing resources used for learning.

With all of the demands by the consumer, the market, and the institution, why are faculty not fully integrating course management systems into their courses? Students complain when faculty do not use a CMS to communicate. Institutions require that some information, i.e. syllabi, be posted on a CMS, and Information Technology provides the training. How do faculty members perceive the use of a CMS in their courses? What are some of the faculty attributes that may influence the use of some or many of the
components of a CMS? These are a few of the questions that would be helpful in
designing faculty development programs to encourage multi-component integration of a
CMS into courses instructed by faculty.

There are many theories and models that could be used as a lens for a theoretical
framework: activity theory, human encounters with technology model, technology
acceptance model, and concerns-based adoption model, but Rogers’s theory has been
used many years in various situations and focuses on the innovation, the communication
channels, and the social system. Rogers determines that an innovation is most readily
adopted when the innovation is perceived to have a greater relative advantage,
compatibility, trialability, observability, and less complexity than other innovations.
These ideas seem connected to the same ideas that Kuhn discusses when a paradigm shift
occurs and new theories are established. Understanding and identifying social channels
within an institution can help agents encourage adoption of a new educational
technology, a course management system. By using Rogers’s theory and combining the
five attributes, the communication channels, and the categories of adoption by faculty,
information can be gathered which may be useful to introduce, support and develop
faculty use of a course management system. The use of a survey instrument will be
helpful in gathering information and developing ideas on how to help faculty integrate a
course management system into their courses, so that students have an expanded learning
community beyond the classroom.
Chapter 3 Methodology

Research Design

A cross-sectional delivery of an online survey was employed for both the pilot and the full study. The online survey was administered one time in a defined space to record current use of Blackboard by faculty at an institution in the Kentucky Community and Technical College System (KCTCS). Attitudes, perceptions, and reported practices were recorded to draw conclusions for the research questions posed in the introduction. Demographics were also collected to determine relationships between demographics and Blackboard use by faculty.

An online survey was chosen over other investigative techniques based on the following factors: time required to conduct interviews or mail responses, expenses required to travel to different campuses, and cost of paper, envelopes, and postage for mailed surveys. Consideration was also given to the possibility that face-to-face interviews may be difficult for faculty members, particularly by those who do not use Blackboard. Telephone interviewing was determined to be inefficient due to the number of questions.

One weakness of the online survey was the possibility of not capturing responses from the entire population, especially those people who were not using computer and Internet technology. In addition, there tends to be a lower level of confidentiality since most networks are open and not secured. Despite these inherent weaknesses, the online survey is the best choice in capturing cross-sectional data of the population since e-mail
and the posting of syllabi on Blackboard are required methods of communication and course management by KCTCS.

An analysis of the data collected could be used to create better faculty development programs and policies that encourage a higher degree of Blackboard integration. Consistent use of Blackboard by faculty may have an impact on student learning by allowing students to access materials for their courses anytime and anywhere. With consistent Blackboard use by faculty, students would be able to review archived assignments and feedback, and to self-assess their progress in their courses by viewing the gradebook and calendar pages for all of their courses on one website.

**Objective**

The objective of the online survey was to collect data that consisted of descriptive variables, which have been studied by other individuals in different places, from a 2-year community college located in central Kentucky (Less, 2003; McQuiggan, 2006; Tabata & Johnsrud, 2008; Robertson, 2007). The descriptive variables were: gender, age, years of teaching experience, highest degree attained, full-time or part-time employment, and rank. Self-reported initial deployment of Blackboard and the utilization of course tools in Blackboard were also recorded. These variables were used to answer the research questions stated in Chapter 1.

**Pilot Study of the Survey**

**Population and procedure.**

A pilot of the survey was conducted at a northern Kentucky community college in the Kentucky Community and Technical College System with the following
demographics: 34 Instructors, 36 Assistant Professors, 18 Associate Professors, and 5 Professors; Gender: Female 52 full-time and 120 part-time, Male 41 full-time and 96 part-time; Minorities 10 full-time and 15 part-time; Total 319 with 93 full-time, 216 part-time faculty. Before deploying the web-based survey on SurveyMonkey, approval was given by the college president of the pilot site, the KCTCS Human Subject Review Board, and the University of Kentucky Institutional Review Board. After final approval, the college president was contacted and a date for deployment was determined.

The Dean of Institutional Research, Planning and Effectiveness was selected by the president of the college to oversee the deployment of the recruitment letter. The recruitment letter, (see Appendix A) contained information about the survey, the required information by the various Institutional Research Boards, and a link to the survey on SurveyMonkey. SurveyMonkey was set up to receive only one response from each IP address which may have contributed to a lower response rate since multiple faculty may have tried to use the same computer to respond to the survey. The Knowledge Analyst, selected by the Dean, sent the recruitment letter, the reminder letters and the thank you letter to the faculty at the pilot site. The recruitment letter and the survey were deployed on a Tuesday after spring break (March 19, 2013) to full- and part-time faculty with reminders sent on Friday and the following Tuesday. The final reminder was sent on a Thursday before the closing of the survey at 12:00 a.m. on Saturday, March 30. The last response was collected on the day of the final reminder, Thursday, March 28. The next day, Friday, March 29, was an academic holiday for the college. The read receipt function, which allows faculty to send a response that an e-mail was received, was used when sending the first recruitment letter to the faculty in this pilot study. Out of 319
faculty, 96 faculty returned the read receipt and a total of 52 responded to the survey. No one faxed the completed survey, which was an option. The overall return, which was based on 319 faculty, was 16.3%.

**Piloted survey.**

The responses collected on SurveyMonkey from the piloted survey (see Appendix B) were downloaded to a personal computer and formatted for use with Excel spreadsheet software. Upon opening the data in Excel, the data were coded into numerical values to prepare for analysis to help answer the research questions.

Question 1, “Do you utilize Blackboard in the course that you teach?” was completed by all 52 respondents with a frequency of 44 responding “Yes” and 8 responding “No”. Faculty who responded “Yes” to utilization were coded with odd numerical values in sequence (range = 1 - 87) to distinguish from those who answered “No” (range = 2 - 16). Those who answered “Yes” to Question 1 were asked the following questions:

2. How long have you used Blackboard?
3. Which components of Blackboard do you use?
4. You started using Blackboard after a fellow faculty member was using it.
5. You have had many technical problems with Blackboard.
6. The only reason you use Blackboard is it is required by your institution.

Those who answered “No” to Question 1 were directed to Question 7.

Questions 2 and 3, Figures 3.1 and 3.2 respectively, were asked to indicate Rogers’s stage of adoption, implementation stage, and extent of use (Intharakas, 2009;
Figure 3.1. Years of Blackboard use by faculty (Pilot).

Figure 3.2. Components of Blackboard used by faculty (Pilot).
Rogers, 2003). The responses to these questions contributed to an understanding of where faculty were in the stage of adoption or implementation of Blackboard in their courses. The choices selected in question 3 were used to organize, by popularity, the Blackboard components on the final study survey.

Questions 4 - 6 were based on one of Rogers’s five attributes that persuade someone to adopt a new technology. In question 4, status was being explored which is a subcategory of the attribute, relative advantage. Of those who use Blackboard, 63.6% (n=28) disagreed with question 4. Question 5 was based on another attribute, compatibility. Most respondents, who had indicated they used Blackboard, 60.3% (n=26), disagreed that they had many technical problems. Question 6 was used to parcel out those who use Blackboard by choice versus those who use Blackboard because it is required by their institution. Rogers states that the requirement by an institution is a type of authority innovation-decisions which are common in factories, schools, and government. Authority-innovation decisions generally encourage the fastest rate of adoption (Rogers, 2003, p. 28-29). Most respondents who indicated Blackboard use, 77.3% (n=34) disagreed with question 6 which indicates that their decision to use Blackboard was not solely based on an authority decision-innovation process. Questions 2-6 were answered by all of the 44 respondents who had indicated that they used Blackboard in question 1.

To determine if respondents were using other course management systems (CMSs) more than Blackboard, question 7 probed, “Is there another course management system that you use more than Blackboard?” with the option to post additional CMSs other than those stated in the question. The majority of the respondents chose “No”, 84.4% (n=38). The second choice by respondents was the Pearson products MyLabs/Mastering at 8.9%
(n=4). There were 7 responses in the “Other” category, but no two responses were the same.

To help answer Research Question IV., question 8 asked, “Do you teach online courses?” There was a split of 42.3% (n=22) and 57.7% (n=30) responding “Yes” and “No” respectively.

**Rasch analysis of the pilot study questions 9 and 10.**

Question 9 on the piloted survey queried which of Rogers’s five attributes help explain faculty members’ use of Blackboard. There were nine items in question 9 with dichotomous response of Agree or Disagree. Each item investigated a specific attribute.

Question 9. The following statements gain a general view of your Blackboard practices. (Please rate each statement, Agree or Disagree)

1. You have observed how to use Blackboard in your courses.
2. You have hands-on experience using Blackboard.
3. You have attended a Blackboard workshop/professional development
4. Students expect your materials to be posted on Blackboard
5. Blackboard allows your students to access course materials outside of the classroom.
6. Blackboard is compatible with your teaching practices.
7. Blackboard increases your workload.
8. Blackboard reduces the amount that you are printing.
9. Blackboard is difficult to use.

A Bond’s Logical Operations Test (BLOT) was employed to see how the measures of item difficulties, item fit, person ability, and person fit were modeled using Rasch. Data from SurveyMonkey for question 9 was coded using 1s and 0s for Agree and Disagree, respectively. Items skipped by the respondents were coded with a letter designation of “M” for missing data. Items 7 and 9 were reverse coded, where Disagree was considered the better answer for those who believe that Blackboard has useful
advantages. The data was then saved as a space delimited text file and imported into Winsteps 3.81.0 for analysis.

Upon Winsteps analysis of the data, the results listed person reliability and separation of 0.36 and 0.75 respectively which indicated that the model was not reliable in differentiating faculty’s abilities. The item reliability and separation were more promising at 0.84 and 2.29, respectively. A quick review of the item fit order indicated that item 3 of question 9 was not fitting the model; the workshop item had a mean-squared value of 1.50 for the infit and 1.88 for the outfit. Linacre states that if the mean-squared value is between 1.5 and 2.0 then the item is unproductive for construction of a model measurement. With the ZSTD score being 2.1 and 2.4 for the infit and outfit measurements, Linacre would conclude there is a lack of predictability in the measurement of this item (Linacre, 2002). The negative values of the ZSTD scores indicated the data is too predictable, especially for the Item 8, “Blackboard reduces the amount that you are printing”.

The person fit order was also examined. The general interpretation of the mean squares is that a number greater than 1.3 for the outfit would indicate that the response pattern was too haphazard (too much variation) and therefore unpredictable. This type of misfit is called underfit. Responses with mean squares of 0.75 or less are generally interpreted as too determined with too little variation and are described as an overfit. So, persons 71, 29, 8, and 16 were underfitting the model. The majority of people are overfitting the model (Bond & Fox, p. 240). A reasonable mean square range for surveys is 0.6-1.4 (Bond & Fox, p.243). Only persons 71, 8, 16, and 43 are problematic on the infit. Infit is a greater concern since it indicates a problem with the model.
Creating a Wright Map for Question 9, which plots item difficulty against faculty ability, more faculty placed above the items which indicates faculty ability was greater than item difficulty. The best model would have had a varied range of people’s responses with a wide range of items. There would also be items at each end of the plot which would frame the people’s responses. Since this is not the case, the data indicated that most faculty have adopted Blackboard and/or indicates that more difficult items to endorse should be added to question 9 to create more differentiation in the responses.

Question 10 was employed to capture faculty members’ opinions about Blackboard and to help answer questions about faculty members’ perceptions of Blackboard. Responses were based on a 4 point scale from Strongly Disagree to Disagree to Agree to Strongly Agree. The Rasch model was used to analyze the data collected. Again, users were coded with odd numerical values ranging from 1-87 and nonusers were coded with even values ranging from 2-16. Responses were coded 0, 1, 2, and 3 respectively for Strongly Disagree, Disagree, Agree, and Strongly Agree.

In question 10, person reliability and separation were 0.86 and 2.45. Item reliability and separation were 0.85 and 2.39. These values indicate that the questions have utility in discriminating between 2 or 3 levels of ability. None of the items were misfitting although 3 of 4 items had negative ZSTD Outfit scores which indicated the items were too predictable and that 19 faculty were outside the reasonable range of 0.6-1.4 for a survey. The problem with question 10, as with question 9, there were not enough items with varying degrees of difficulty to frame faculty responses. The problem was determined in a Wright map. The items were not framing the faculty’s responses or significantly distinguishing users from nonusers of Blackboard. These results indicated
that more items were needed for each question with variable degrees of endorsement to frame and distinguish the user from the nonuser.

Additional items were developed for question 8 and question 9 of the study. Table 3.1 was constructed to illustrate the changes in the Rogers’s theory based items in question 8. Additional items based on Chickering’s 7 Principles of Implementing Technology were created for the opinion based items in question 9. The purpose of the additional items was to distinguish the user from the nonuser of Blackboard in the study so as to determine what characteristics persuaded faculty to use Blackboard.

Modifications of the Study Survey Based on the Results of the Piloted Survey

After analyzing the results of the piloted survey, modifications to the final study survey were made (see Appendix C). Besides the expansion of items to questions in which a Rasch analysis was performed, other modifications were made before deploying the study survey. These modifications were made to elicit and collect more responses which aided in the analysis of the responses by faculty in the final study.

These modifications included a pre-wave letter sent to the Assistant Deans of each department to announce the upcoming survey during division meetings. The return receipt used for the piloted-survey recruitment letter was dropped since it may have had an adverse effect on participation since respondents’ names were divulged. SurveyMonkey was modified to allow multiple submissions from one IP address. The thought was that more than one faculty member may have submitted their responses from the same computer (IP address), especially part-time faculty. An incentive to participate in the survey was also deployed in the final study. Participants were instructed in the
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<th>Study Questions</th>
<th>Research Question</th>
<th>Literature Review</th>
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<tr>
<td>To establish Blackboard use</td>
<td>Knowledge/Behavioral/Descriptive/Dichotomous</td>
<td>Do you utilize Blackboard in the courses that you teach?</td>
<td>Do you use Blackboard in the course(s) that you teach?</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>Intharaksa, Rogers</td>
</tr>
<tr>
<td>To establish duration of Blackboard use; Rogers Stage of Adoption and Stage of Decision to Implement</td>
<td>Knowledge/Behavioral/Descriptive/Dichotomous</td>
<td>How long have you used Blackboard?</td>
<td>No change</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>Intharaksa, Rogers</td>
</tr>
<tr>
<td>To establish extent of Blackboard use and Rogers Implementation Stage</td>
<td>Knowledge/Behavioral/Descriptive/Multiple Selections</td>
<td>Which components of Blackboard do you use?</td>
<td>No change</td>
<td>What components and tools are utilized by faculty incorporating Blackboard into their courses?</td>
<td>Intharaksa, Rogers</td>
</tr>
<tr>
<td>Rogers Relative Advantage-Status</td>
<td>Knowledge/Behavioral/Descriptive/Dichotomous</td>
<td>You started using Blackboard after a fellow faculty member was using it?</td>
<td>Rate your agreement with each statement below. You started using Blackboard after a fellow faculty member was using it?</td>
<td>Does Rogers Diffusion of Innovation five attributes explain faculty members’ use of Blackboard?</td>
<td>Intharaksa, Rogers</td>
</tr>
<tr>
<td>Rogers Compatibility</td>
<td>Knowledge/Behavioral/Descriptive/Dichotomous</td>
<td>You have had many technical problems with Blackboard?</td>
<td>Rate your agreement with each statement below. You have had many technical problems with Blackboard?</td>
<td>Does Rogers Diffusion of Innovation five attributes explain faculty members’ use of Blackboard?</td>
<td>Intharaksa, Rogers</td>
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<tr>
<td>To determine if only use for Blackboard is what is required-Rogers Type II: Authority</td>
<td>Knowledge/Behavioral/Descriptive/Dichotomous</td>
<td>The only reason you use Blackboard is it is required by your institution?</td>
<td>Rate your agreement with each statement below. The only reason you use Blackboard is it is required by your institution?</td>
<td>What are the faculty’s perceptions of using Blackboard in courses at the community college?</td>
<td>Intharaksa, Rogers</td>
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<tr>
<td>To determine alternative CMS use</td>
<td>Knowledge/Behavioral/Descriptive/Multiple Choice</td>
<td>Is there another course management system that you use more than Blackboard?</td>
<td>No change</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>Intharaksa, Rogers</td>
</tr>
<tr>
<td>To determine if faculty teach online which would correlate with required Blackboard use</td>
<td>Knowledge/Behavioral/Descriptive/Dichotomous</td>
<td>Do you teach online courses?</td>
<td>No change</td>
<td>Is Blackboard utilization more varied in online courses versus face to face courses?</td>
<td>Intharaksa, Rogers</td>
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<tr>
<td>Purpose of Question</td>
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<td>Research Question</td>
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<tr>
<td>To determine if faculty who teach only online would correlate with Blackboard use</td>
<td>Knowledge/Behavioral/Descriptive/ Multiple Choice</td>
<td>Not present in pilot</td>
<td>Which of the following best describes your primary mode of instruction?</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>Intharaksa, Rogers</td>
</tr>
<tr>
<td>To determine Rogers Confirmation Stage</td>
<td>Knowledge/Behavioral/Descriptive/ Multiple Choice</td>
<td>Which of the following best describes your utilization of Blackboard?</td>
<td>No change</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>West, Rogers</td>
</tr>
<tr>
<td>Rogers Trialability</td>
<td>Knowledge/Behavioral/Dichotomous</td>
<td>You have hands-on experience using Blackboard.</td>
<td>Before deciding to use Blackboard, I was able to try it out.</td>
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<tr>
<td>Rogers Relative Advantage</td>
<td>Knowledge/Behavioral/Dichotomous</td>
<td>Students expect your materials to be posted on Blackboard</td>
<td>Using Blackboard enables me to accomplish tasks more quickly.</td>
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<td>Blackboard allows your students to access course materials outside of the classroom.</td>
<td>Using Blackboard improves the quality of work that I do.</td>
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<td>Using Blackboard makes it easier to do my job.</td>
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<td>Using Blackboard enhances my effectiveness on the job.</td>
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<td>Students expect my materials to be posted on Blackboard.</td>
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<td>Blackboard allows my students to access course materials outside the classroom.</td>
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Table 3.1. Continued

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<tbody>
<tr>
<td>Rogers Relative Advantage - Economical</td>
<td></td>
<td>Blackboard reduces the amount that you are printing.</td>
<td>Blackboard reduces the amount of paper I use for printing.</td>
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<tr>
<td>Rogers Relative Advantage - Status</td>
<td></td>
<td></td>
<td>Blackboard is the best course management system.</td>
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<tr>
<td>Rogers Relative Advantage - Status - Continued</td>
<td>Knowledge/Behavioral/Dichotomous</td>
<td>People at my institution who use Blackboard have more prestige than those who do not.</td>
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<tr>
<td>Rogers Compatibility</td>
<td>Knowledge/Behavioral/Dichotomous</td>
<td>Blackboard is compatible with your teaching practices.</td>
<td>Blackboard is compatible with my teaching practices.</td>
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<td></td>
<td></td>
<td>Blackboard increases your workload.</td>
<td>Blackboard increases my workload.</td>
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<td></td>
<td>(Reverse Coded)</td>
<td>(Reverse Coded)</td>
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</tr>
<tr>
<td>Rogers Complexity</td>
<td>Knowledge/Behavioral/Dichotomous</td>
<td>Blackboard is difficult to use.</td>
<td>My interaction with Blackboard is clear and understandable.</td>
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<td></td>
<td>I believe that it is easy to get Blackboard to do what I want it to do.</td>
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<td>Overall, I believe that Blackboard is easy to use.</td>
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<td>Learning to operate Blackboard is easy for me.</td>
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</thead>
<tbody>
<tr>
<td>To determine correlation between sex and usage of Blackboard</td>
<td>Demographics/Descriptive/Dichotomous</td>
<td>Are you male or female?</td>
<td>No change</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>Less, Rogers</td>
</tr>
<tr>
<td>To determine correlation between age and usage of Blackboard</td>
<td>Demographics/Descriptive/Multiple Choice</td>
<td>What is your age?</td>
<td>No change</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>Less, Rogers</td>
</tr>
<tr>
<td>To determine correlation between degree attained and usage of Blackboard</td>
<td>Demographics/Descriptive/Multiple Choice</td>
<td>What is your highest degree attained?</td>
<td>No change</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>West, Less, Rogers</td>
</tr>
<tr>
<td>To determine correlation between years of teaching experience and usage of Blackboard</td>
<td>Demographics/Descriptive/Multiple Choice</td>
<td>How many years of teaching experience do you have?</td>
<td>No change</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>Less, Rogers</td>
</tr>
<tr>
<td>To determine correlation between employment status and usage of Blackboard</td>
<td>Demographics/Descriptive/Multiple Choice</td>
<td>What is the status of your employment?</td>
<td>No change</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>West, Less, Rogers</td>
</tr>
<tr>
<td>To determine correlation between program/area and usage of Blackboard</td>
<td>Demographics/Descriptive/Multiple Choice</td>
<td>Which category do you most associate with your instruction?</td>
<td>No change</td>
<td>How is Blackboard usage distributed among the faculty on a campus at the community college?</td>
<td>West, Less, Rogers</td>
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</table>
closing statements of the survey to send contact information with the word “prize” in the subject line of an e-mail to be eligible for the drawing of three $50 gift cards. The e-mails were assigned a number and a random number generator was used to sequentially pick the three winners. These modifications substantially increased the percentage of participants in the study (n = 932, 38.4%) when compared to the pilot (n = 319, 16.3%).

The survey questions were also modified based on the pilot. Question 2 about the length of use of Blackboard was divided into more categories. The components of Blackboard were arranged based on the results of the pilot from most selected to least selected components. Statements 4-6 on the pilot were reduced to one question with 3 items. The open response option was removed as a choice when listing other course management systems used more than Blackboard. An additional question was added to the study survey asking faculty to choose their primary mode of instruction in question 7. In questions 8 and 9 of the study survey, selections were changed from agree and disagree to disagree and agree. The choices of category of instruction were expanded in question 17. These adjustments were made to ease the navigation and hopefully increase the number of responses to the survey.

**Target Population for Study**

A recruitment letter with a link to the online survey was sent as an attachment through an e-mail to the faculty at a central Kentucky community college with campuses in Anderson, Boyle, Clark, Fayette, and Washington counties. The population contained full-time faculty with the ranks of Instructor (n=31), Assistant Professor (n=33), Associate Professor (n=114), and Professor (n=58). The characteristics of the full-time faculty were: Gender (Female=127 and Male=109), Minority Faculty (n=16), Tenured
(n=115), Tenure Track (n=23), and Non-Tenure Track (n=98). Part-Time Faculty (n=696) demographics were not readily available according to the Office of Research and Policy Analysis for the year of 2011.

**Census Design for the Study**

The faculty were sent the link to the online survey (n=932). Due to the size of the population, all full- and part-time faculty members were sent the recruitment letter with a link to the online survey. The advantages of a census would be the elimination of a sampling error and the data would reflect the population of those who participated which is important when developing policy and procedures. Response rate was determined by the number of people who submitted the completed survey divided by the total number faculty. The return receipt function was not used on the recruitment letter sent to the faculty.

The results of this survey cannot be used to generalize other populations, but the data collected represent those who participated. The exploratory and descriptive nature of the data should give faculty, faculty development administrators and information technology administrators information that could be useful to customize practical applications for helping faculty to advance the integration of Blackboard. To insure a high response rate by faculty, a pre-wave letter (see Appendix D) was sent to the Assistant Deans at the college before the recruitment letter was sent to the faculty. This pre-wave letter asked Assistant Deans to announce the upcoming deployment of the recruitment letter (see Appendix E), survey and the random drawing of one of three $50 gift cards as an incentive to participate in the survey. On April 22, 2013, the recruitment letter was attached to an announcement (see Appendix F) that was sent through e-mail to
faculty. After the recruitment letter was sent, follow-up messages were sent through e-mail stressing the importance of completing the survey. The survey was deployed on April 22, 2013 with follow-up messages to faculty sent on Tuesday, April 30, 2013 (see Appendix G), Monday, May 6, 2013 (see Appendix H), and Monday, May 13, 2013 (see Appendix I) to encourage participation. The survey concluded at 12:00 a.m. on May 14, 2013. A response rate of 30% is acceptable for an online survey (Instructional Assessment Resources). A total of 358 faculty responded to the survey for a 38.4% return rate.

**Organization of Data Management**

The survey system that was used to collect data was SurveyMonkey. There was an option for faculty to fax their responses, but I received no faxes. No personal identifying data was collected in this survey. The data collected remained on the SurveyMonkey site under password protection until the conclusion of the approval of the defense of the dissertation. The data was also downloaded to my personal computer that required a password to access and an additional copy was uploaded to Microsoft OneDrive which is also user id and password protected. The data will be removed from OneDrive at the conclusion of the defense. Data from the survey will be stored for 10 years under password protection as stated in the University of Kentucky Institutional Research Board Application.

The data from SurveyMonkey were converted from alpha responses to numerical responses and download into Excel spreadsheets for both the pilot and study. The data from the Excel spreadsheets were read and arranged into space delimited files. The space delimited files were read by Winsteps 3.81.0 in order to do the Rasch analyses of the
data. All outputs saved were stored on my personal computer, a flash drive, and OneDrive and will be saved under password protection on my personal computer for no longer than 10 years.

The results from the analysis of the data will be submitted as a part of this dissertation, as well as presentations and papers to help others who are using course management systems. A hyperlink of the final approved dissertation will be sent to those who requested a copy for participating in the pilot and study. The conclusions made from the analysis of the data may be used to refine the survey for future research projects on how to improve adoption of technology.

**Data Analysis**

After the survey was closed, data analysis began with the conversion of categorical responses into numerical responses in an Excel 2013 spreadsheet. Question 1 was a nominal categorical variable with a dichotomous response. The responses coded yes or no were converted to 1 or 0 in the spreadsheet. If yes was answered, the participant was considered to be an adopter and user of Blackboard. If the response was no to question 1, then the nonuser’s next question on the survey was number 5. Question 1 was important in cross-tabulating the responses to the categorical questions 2 through 7, the demographic items in questions 11 through 16 and the Rasch analyzed questions 8 and 9. Questions 2, 3 and 10 were used to determine adoption stage by faculty. Question 2 indicated when Blackboard was adopted. A pie chart was used to illustrate the data collected from question 3 as to which components of Blackboard are being used by the respondents which was used to answer Research Question III. Question 4 response counts were used to determine Rogers’s characteristics and innovative-decision making
process of those faculty who responded that they used Blackboard. Question 4, item 1 determined if faculty started using Blackboard after a fellow faculty member used it. If the response was, agreed, then this would indicate that Rogers’s relative advantage-status was a possible component of the adoption of Blackboard. To investigate if Blackboard was compatible with users, question 4, item 2, inquired if “(faculty) have had any technical problems with Blackboard”, with response choices of Disagree or Agree. To determine the innovative-decision making choice that Rogers’s describes as either optional, collective or authority, question 4, item 3, was used to indicate if the only reason faculty were using Blackboard was it was required by their institution. If the faculty agreed, then the response indicated that it was an authority innovative-decision (Rogers, 2003). To determine if nonusers of Blackboard were using other CMSs was the purpose of question 5. Choices on question 5 were based on the results of the piloted survey. Question 6 and 7 were used to help answer Research Question IV. “Is Blackboard utilization more varied in online courses versus face-to-face courses?” The purpose of question 10 was to determine future utilization of Blackboard. Questions 11-16 were demographic questions. A descriptive statistic of counts was used to indicate if these variables had a relationship with Blackboard use (question 1). Since the Rasch analysis was used for inferential analysis, no Chi-square tests were performed on count data.

A Rasch analysis was performed on the items in questions 8 and 9. In both questions the data was downloaded in numerical form into an Excel spreadsheet. The data in Excel were then converted to a space-delimited file which was the format used to import the data into a Rasch analysis program, Winsteps version 3.81.0. Once imported,
labels were made for each item in the analysis, rows were identified with person labels and columns were identified with item labels, valid codes in the data file were listed and item mean and user scales for logits were automatically prescribed by Winsteps. Items where the most appropriate answer for users would have been answered disagreed were reverse coded. The responses of one person were removed from the Rasch analysis since the faculty member did not indicate if they were a user or nonuser of Blackboard. Each question was treated differently in the analysis since question 8 was a dichotomous agree or disagree question, whereas question 9 was a Likert-type opinions question with responses ranging from strongly disagree to strongly agree with no neutral response. Person reliability and item separation were used to indicate the quality of the analysis, along with Infit and Outfit tables or plots. Differential Item Functioning (DIF) was used to indicate differences in responses to items of users and nonusers of Blackboard.

There were 31 items in question 8. All except for item 1 were based on Rogers’s five characteristics that persuade someone to adopt a new innovation. Item 1 was removed from the Rasch analysis since it was based on the innovation-decision making process of adopting an innovation constructed on an optional, a collective, or an authority choice. Items 1, 12, and 27 of question 8 were reverse-coded since the disagreed choice was a more valid choice for users. After the Winsteps process, a summary of statistics was used to determine the quality of the Rasch measurement. Specific components of the statistical summary were person reliability, item separation, count of lack of responses, and percent valid responses. Item and person fit statistics were used to measure how the items were fitting with the model. After a parsimonious control measure of removing responses by faculty with Z-Residuals that were extreme or greater than 2 ZSTD units,
Wright maps of person ability and item difficulty were generated to see distribution of responses by the faculty and distribution of the items. These maps are important in comparing ordering of the items and the means of the people and the items. Finally, a Differential Item Functioning (DIF) analysis was applied to determine difference between the users and nonusers in perceptions about using Blackboard (Research Question II.) and determining if Rogers’s five characteristics elucidated faculty members’ use of Blackboard (Research Question V.). DIF contrasts greater than 0.64 and with Rasch-Welch probabilities of less than 0.05 were considered significant (Boone, Staver, & Yale, 2014).

Question 9 had 18 polytomous-response items which were employed to answer faculty’s perceptions of using Blackboard (Research Question II.) and attributes or perceptions that are not explained by Rogers’s characteristics that persuade someone to adopt an innovation. An analysis similar to question 8 was performed. Summary statistics, item and person fit and quality control measures were used before utilizing the DIF analysis to determine differences in users and nonusers of Blackboard. Since the responses to the items had a range from strongly disagree to disagree to agree to strongly agree some items (5, 14, 16) were removed based on Outfit MNSQ of 2.00 or above. Wright maps of users and nonusers were constructed to see if the order of the items were invariant and to view differences in the means of items and person ability. An Outfit plot of persons was constructed and those people who had responses 3 ZSTD units from the mean were removed before the DIF analysis. A DIF analysis was implemented to determine differences in perceptions and attributes of users and nonusers based on Chickering and Ehrman’s Implementing the Seven Principles: Technology as a Lever
(1996). Again, DIF contrasts of 0.64 or greater and Rasch-Welch probabilities of less than 0.05 were considered significant (Boone, Staver, & Yale, 2014).

The data collected were used to develop the results and discussion in the following chapters. One of the goals was exploring what components worked and what components of the survey need further refinement to develop a viable instrument. A viable instrument would be used to assess current perceptions, attributes and to create professional development activities to encourage the use of Blackboard.

**Summary**

The purpose of this study is to determine the utilization of the course management system, Blackboard, by faculty members at a central Kentucky community and technical college. Rogers’s theory on the innovation-decision making process was chosen as the lens to explore the adoption and utilization of Blackboard. The focus of Rogers’s theory was ideal in capturing faculty members’ use of the CMS without getting bogged down in each individual’s choice to adopt or whether faculty disliked Blackboard or CMSs. Relative advantage, compatibility, complexity, trialability, and observability are attributes that contributed to the decision to adopt a new idea or invention. An online survey, with the least amount of time and expense, is appropriate in capturing the responses of faculty members who wish to participate. Descriptive statistics and the Rasch model are befitting methods to measure the unidimensional progression of adoption through item difficulty and the respondent’s abilities. The results of the analysis should be beneficial to those creating professional development activities to encourage adoption of a course management system. As a body of work, the hope is that the results will contribute to improving the introduction and adoption of new ideas and technologies that ultimately
could improve student learning and support the ideas disseminated in Rogers’s *Diffusion of Innovations*, Kuhn’s *The Structure of Scientific Revolutions*, and Gladwell’s *The Tipping Point*.
Chapter 4 Results

The online survey in Appendix C, which was modified after the pilot study, was administered one time in a defined space to record Blackboard use by faculty at a central Kentucky institution in the Kentucky Community and Technical College System (KCTCS). Attitudes, perceptions, and practices were recorded to draw conclusions for the research questions posed in the introduction.

I. How is Blackboard usage distributed among the faculty on a campus at the community college?

II. What are the faculty’s perceptions of using Blackboard in courses at the community college?

III. What components and tools are utilized by faculty incorporating Blackboard into their courses?

IV. Is Blackboard utilization more varied in online courses versus face-to-face courses?

V. Does Rogers’s Diffusion of Innovation five attributes elucidate faculty members’ use of Blackboard?

VI. What attributes or perceptions that are not explained by Rogers’s Diffusion of Innovation theory could play a role in the use of Blackboard by faculty?

This chapter is organized by the stated research questions with data collected from the survey.
The population of faculty who participated in the study was 358 out of 932 (38%). Out of the 932 faculty employed by the community college, 158 out of 236 full-time faculty (67%) responded to the survey. The study lacked participation from part-time faculty. Only 163 out of 696 part-time faculty (23%) responded to the survey. The return rate is of concern since 15% of the full-time population indicated that they did not use Blackboard, whereas 22% of the part-time faculty who participated indicated that they did not use Blackboard.

**Research Question I: How is Blackboard usage distributed among the faculty on a campus at the community college?**

With 358 respondents, 290 faculty stated that they used Blackboard in the courses that they taught while 67 respondents selected “No” to the use of Blackboard which is 81.2% and 18.8% respectively. Of those who responded “Yes” to the use of Blackboard, the most popular choice for how long they had used Blackboard was 5-6 years at 20.5% (58 out 283). The next choice was 18.7% (53 out 283) at more than 7 years followed by 15.9% (45 out 283) at 3-4 years. The responses indicated that adoption of the use of Blackboard is near the latter stages with approximately 4 out of 5 faculty who responded using Blackboard. Of note, since the 2012 academic year, all faculty are required to use Blackboard to post their syllabi, but according to the responses about 20% indicated they did not use Blackboard. Of the 290 respondents who indicated that they used Blackboard, only 259 responded that they use the syllabus component of Blackboard out of the 284 who answered the question, “Which components of Blackboard do you use?”

The data from the survey was used to investigate the distribution of Blackboard use which was correlated to the demographics. Out of the 116 males that responded to
Figure 4.1. Cross-tabulation of age versus Blackboard use.

Figure 4.2. Cross-tabulation of highest degree attained versus Blackboard use.
the survey 19.8% stated that they did not use Blackboard. Females (n=201) had a nonuse response of 12.4%. As indicated by Figure 4.1, the majority of the faculty who responded are greater than 60 years old and are using Blackboard based on the responses from question 12. Blackboard use was also cross-tabulated with question 13 in the survey, Figure 4.2. Teaching experience was also stated as an indicator of CMS use in a previous study, so a cross-tabulation of question 14, “How many years of teaching experience do you have?” to Blackboard use was used to develop the chart in Figure 4.3. Other demographics used to determine the distribution of Blackboard use among faculty were question 15, “What is the status of your employment?” (See Figure 4.4) and question 16, “Which category do you most associate with your instruction?” (See Figure 4.5).

When investigating the primary mode of instruction that faculty used in their courses, the data was cross-tabulated between users and nonusers of Blackboard. Figure 4.6 illustrates that the majority of faculty indicated that their primary mode of instruction was face-to-face (214 out of 321), with “online instruction only” being the second most selected mode. Those who do not use Blackboard indicated that their primary mode of instruction is face-to-face (48 out of 52 with the other 4 selecting hybrid/blended instruction).

**Research Question II: What are the faculty’s perceptions of using Blackboard in courses at the community college?**

Several questions were employed to capture faculty members’ perceptions of using Blackboard. Most faculty, 61.8% of 280 responses, disagreed to question 4 item 1, that they started using Blackboard after a fellow faculty member was using it. In item 2 of
Figure 4.3. Cross-tabulation of years of teaching experience and Blackboard use.

Figure 4.4. Cross-tabulation of status of employment and Blackboard use.
Figure 4.5. Cross-tabulation of category most associated with teaching and Blackboard use.

Figure 4.6. Cross-tabulation of categories of instruction and Blackboard use.
question 4, 64.2% disagreed that they had many technical problems with Blackboard and they also disagreed (74.1%) with item 3 which stated “The only reason you use Blackboard is it is required by your institution.” These items in question 4 were helpful in elucidating reasons for adoption and use of Blackboard. Of the other course management systems used, Pearson MyLabs/Mastering LMS was selected by 30 faculty out of the 322 who answered the question which was compared to the 211 people who only use Blackboard. There were another 20 faculty who selected other as another course management system used more than Blackboard.

Perceptions and opinions about the use of Blackboard were captured in question 8 with 31 items and question 9 with 18 items. The data were cross-tabulated with those identifying as users or nonusers. Out of the 358 faculty who participated in the survey, 323 (272 users/51 nonusers) answered question 8 and 312 (269 users/43 nonusers) answered question 9. In question 8, space was provided for comments on the item ratings or to offer any additional insight; those comments are located in Appendix J for users and Appendix K for nonusers. In Figure 4.7, the y-axis represents values between 0 for disagree and 1 for agree in the dichotomous choices in question 8. Figure 4.8 has a scale from 0 to 3 for the choices of strongly disagree (0) to strongly agree (3). Of note in question 8, nonusers responded that the institution does not require the use of Blackboard when the policy of the institution states that all syllabi are to be posted on Blackboard. The average line in both Figure 4.7 and 4.8 indicates the trend to disagreeing with items in both questions. Those items in question 8 that indicate a much higher level of agreement for nonusers warrant further investigation, Table 4.1.
Figure 4.7. Perceptions of Blackboard (Users/Nonusers)

Figure 4.8. Opinions of Blackboard (Users/Nonusers)
Table 4.1. Items in question 8 where nonusers agreed more than users.

<table>
<thead>
<tr>
<th>Item Number in Question 8</th>
<th>Statement</th>
<th>Rogers’s Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>I have observed how to use Blackboard in my courses.</td>
<td>Observability</td>
</tr>
<tr>
<td>12</td>
<td>Blackboard increases my workload.</td>
<td>Compatibility</td>
</tr>
<tr>
<td>29</td>
<td>Before deciding to use Blackboard, I was able to properly try it out.</td>
<td>Trialability</td>
</tr>
<tr>
<td>1</td>
<td>My institution does not require me to use Blackboard.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Having Blackboard is a status symbol for my institution.</td>
<td>Relative Advantage</td>
</tr>
<tr>
<td>16</td>
<td>People in my organization who use Blackboard have a high profile.</td>
<td>Relative Advantage</td>
</tr>
<tr>
<td>15</td>
<td>People at my institution who use Blackboard have more prestige than those who do not.</td>
<td>Relative Advantage</td>
</tr>
<tr>
<td>26</td>
<td>Blackboard is not very visible at my institution.</td>
<td>Observability</td>
</tr>
</tbody>
</table>
In question 9, those items where nonusers agreed more than users included statements:

- Blackboard encourages the students to search the Internet for answers.
- Blackboard causes the students to become more isolated.
- Blackboard causes students to skip class.

These responses should be noted in developing strategies to encourage Blackboard use by faculty.

**Research Question III: What components and tools are utilized by faculty incorporating Blackboard into their courses?**

Of the 290 faculty who agreed with question 1, “Blackboard is used in the courses that you teach”, 285 of the faculty responded that they use at least one component in Blackboard. The policy of the college is that all faculty are required to post their syllabi on Blackboard. Out of 285 who responded to question 3, “Which component(s) of Blackboard do you use? (Click all that apply)”, Figure 4.9, 260 out of the 285 faculty who responded indicated that they use the syllabus component. Other popular components included Announcements (n=259), Full Grade Center (n=221), Course Copy (n=168), and Tests, Surveys, and Pools (n=145).

**Research question IV: Is Blackboard utilization more varied in online courses versus face-to-face courses?**

In this study about half the faculty who responded taught at least one class online (n=136) and about half did not (n=134). Of those who taught online all but 2 respondents used Blackboard. Of those who did not teach online, 49 did not use Blackboard. In
looking at how long faculty had used Blackboard, those who had used Blackboard 3 or more years made up 84.6% (115 out of 136) of those faculty who stated they taught at least one course online. For faculty that had used Blackboard for 3 years or less, 58.2% (78 out of 134) did not teach online. Online faculty used more of the components in Blackboard, except for the syllabus requirement, as illustrated in Figure 4.10. More full-time faculty taught online 57.2% (79 out of 138), while more part-time 52.5% (95 out of 181) did not teach online. As shown in Figure 4.10, online faculty indicated use of Blackboard Course Copy, Test and Surveys, Discussion Board, Export/Archive Course, Performance Dashboard, Import Course Cartridge, Course Reports, and Soft Chalk much more than those faculty who indicated that they did not teach online.

**Research Question V: Does Rogers’s Diffusion of Innovation five attributes explain faculty members’ use of blackboard?**

Rogers’s states that there are five perceived characteristics of an innovation that persuade an individual to adopt a new technology. These five attributes are Relative Advantage, Compatibility, Complexity, Trialability, and Observability. In Question 8 of the study survey (see Appendix C), these five attributes were incorporated as multiple items in the question. Items 2 through 31 in question 8 can be referenced to one of the Rogers’s five characteristics as illustrated in Table 3.1. Respondents were given the dichotomous choices of Disagree and Agree to the items presented in the question. The data collected from the survey were exported to Excel and then processed using Winsteps Rasch 3.81.0.
Figure 4.9. Components of Blackboard used by faculty.

Figure 4.10. Components of Blackboard used by faculty who teach/do not teach online.
Data downloaded from the SurveyMonkey website was exported into Excel. The value assigned for Disagree was 0 and for Agree was 1. The first item in question 8, “My institution does not require me to use Blackboard”, was reverse-coded, where Disagree was the more likely answer, since the community college requires all faculty to submit their syllabi on Blackboard. This item was not used in the Rasch Analysis since it does not fall into one of the five attributes used to measure persuasion to adopt. Items 12 and 27 were also reverse-coded in the control file since the Disagree response was the best choice for the model. Each item of question 8 was given a short description. Each response was recorded as a zero or one. For missing data, asterisks were assigned. Of the 358 faculty responses, 36 faculty were lacking responses and 1 score was deleted since the faculty member did not indicate if they used Blackboard (Person 72). A total of 321 faculty, both extreme and non-extreme, were measured by Winsteps Rasch 3.81.0.

Upon the Winsteps analysis, the Item Fit table was produced. Items 27, 15, 17, and 16 have an Outfit MNSQ above 2.0 which Linacre states has “off-variable noise greater than useful information and degrades measurement” (Linacre, p. 211 of Winsteps Manual). Items 30 and 12 have noticeable off-variable noise that neither constructs nor degrades measurement. MNSQ values less than 1 indicate dependency in the data (Linacre, p. 210 of Winsteps Manual), which is expected since multiple questions are tied to each of Rogers’s characteristics that persuade people to adopt. The Infit MNSQ for the items fall in between 0.5 and 1.5 which indicates a productive measurement; although the negative values of the ZSTD scores indicated that the items are too predictable.

The person fit order was also examined. Respondents with an outfit of greater than 2.0 degrade the measurement, between 1.5 and 2.0 did not add to the measurement
and those who had responses of less than 0.75 were overly predictable. A MNSQ range of 0.6 to 1.4 is reasonable for a survey (Bond & Fox, 2007). Since there were so many faculty not fitting the model, item and person fit must be evaluated for quality control.

Item Outfit MNSQ values with mean square values above could have been removed, but these items had importance in framing the responses by the faculty. A quick look at the Wright Map (Figure 4.11) indicated that the mean ability of people (M) on the right hand side of the map is greater than the mean difficulty of the items (M) on the left hand side. There was an improvement from the piloted study in framing the responses by faculty. The map illustrated that one of the easiest items was “Blackboard allows my students to access course materials outside of the classroom (Item 7)” and that one the most difficult items was Item 15, “People at my institution who use Blackboard have more prestige than those who do not” which was an expectation when constructing the survey. The map also indicated redundancy since many items were on the same line on the right hand side of the map.

For quality control purposes, the extremely misfitting data must be evaluated. There are several methods for evaluating the model for quality control purposes. Item removal based on outfit is one method, but this method could eliminate the survey of some of the best items (Bond & Fox, 2007). Items 27, 15, 17, and 16 all have an outfit that is much greater than 1.3 and much greater ZSTD units of 2.0 which indicated too haphazard of a measurement. These questions could be eliminated but they do frame the responses at the most difficult end which was expected. Another method of quality control would be to eliminate those respondents that were extremely misfitting the model.
Figure 4.11. Wright map of question 8.
in the person misfit order, but that would eliminate a large number of people who participated, even though there is a high probability that a portion of the population haphazardly participated in the survey for the incentive of completion. This method can be graphically illustrated by looking at the outfit ZSTD scores of the respondents versus the person measure, drawing a line at the 2 or 3 ZSTD units from the mean and eliminating those respondents (Figure 4.12).

A more selective approach described in *Rasch Analysis in the Human Sciences* (Boone, Staver, and Yale, 2014) is to look at the responses given by faculty to those items that are misfitting. A Z-Residual was provided for responses that were unexpected based upon the respondent’s responses to other items in the survey. The responses by faculty to a particular item that were unexpected as indicated by Z-Residuals of -2 or less or 2 or more or extreme (x) were selectively removed and replaced by “m” for missing data in the Winsteps control file. This operation increased the person and item reliability by 0.01 and the separation in measurements for person and item by 0.005 and 0.78 respectively, without removing persons or reducing the items in the survey. A person reliability of 0.8 allows discrimination of 2 to 3 levels and a person separation of 2.00 represents a good level of separation. With this modified control file, the person reliability is 0.86 and the separation is 2.45 with an item reliability 0.99 with a separation of 8.85.

A Wright map (Figure 4.13) of this modified control file indicates a similar display as Figure 4.11. Figure 4.13 also indicates that the mean ability of the respondents (M, left side) is greater than the mean difficulty of the items (M, right side) which demonstrates that items that are less challenging than respondents’ abilities. Item and
Figure 4.12. Person outfit plot of question 8.
Figure 4.13. Wright Map of question 8 with Z-Residual modification.
person fit was also carried out for the modified control file and the results which indicated only a slight improvement. A Wright map was also generated for users (Figure 4.14) and nonusers (Figure 4.15) to compare the ordering and means of ability of people and difficulty of items, Figure 4.14.

Based on the outcomes of the survey with the Z-Residual modification, a differential item functioning (DIF) analysis was carried out between users and nonusers to see what differences occur between the two groups. The results illustrate statistically significant differences in items 4-6, 10-12, 16-17, 24, and 29-30 (Table 4.2) where the Rasch-Welch probability was less than 0.05 and the DIF contrasts were greater than an absolute value of 0.64 (Boone et al, p. 282). The outcomes from the DIF analysis indicate that items related to all five of Rogers’s characteristics have significant contrasts between users and nonusers.

**Research Question VI: What attributes or perceptions that are not explained by Rogers’s Diffusion of Innovation theory could play a role in the use of Blackboard by faculty?**

The attributes and perceptions that were investigated in question 9 of the survey, Appendix C, were based on the Chickering’s Seven Principles of Good Practice. The eighteen items could be assigned to one of seven categories: Encourages contact, develops cooperation, uses active learning, gives prompt feedback, and emphasizes time on task, communicates high expectations, and respects ways of learning. The responses assigned to each item were Strongly Disagree, Disagree, Agree, and Strongly Agree with numerical values assigned from 0 to 3, respectively. Questions 5 and 14 were reverse-
Figure 4.14. Wright map of users of Blackboard from question 8.
Figure 4.15. Wright map of nonusers of Blackboard from question 8.

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X  | I Hv Tght Pcty Hw
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X |
T |

2 + Bb Is Bst CMS
X |
| Bb Cnptbl W All Asp
X |
| X |
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1 + Epl Org Wh Us Bb Hv Us Bb Enhnc Effctv
| Bb Cnptbl Wth Tchng Us Bb Mks Eer T D J
| Us Bb Enbls Accmp T
| I Blv Esy T Gr Bb T
XXX |

0 X  | Hvng Bb Stts Symbll Ovrl Bb Ery T Us
X  | My Intctn Bb Clr &
X  | Hlts Usng Bb Apprn Stds Expcnt Mtrls T
XX  | Bb Inc Wxl T I Ws Fnttd T Us Bb Lrntng T Cpr Bb Esh
| Bfr Dcng T Us Bb I I Wld Hve N Dffclty
XXX X | Bb Is Wth Cat Obsvd Hw T Us Bb I
XXXX X | Bb Rdes Asmt Prntng
XXX | I Blve I Cld Crmnct
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Table 4.2. Significant DIF contrasts between users and nonusers for items in question 8.

<table>
<thead>
<tr>
<th>Item</th>
<th>Statement</th>
<th>DIF Contrast (abs)</th>
<th>Rasch-Welch Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Using Blackboard makes it easier to do my job</td>
<td>1.11</td>
<td>0.0318</td>
</tr>
<tr>
<td>5</td>
<td>Using Blackboard enhances my effectiveness on the job</td>
<td>1.15</td>
<td>0.0325</td>
</tr>
<tr>
<td>6</td>
<td>Students expect my materials to be posted on Blackboard.</td>
<td>0.92</td>
<td>0.0456</td>
</tr>
<tr>
<td>10</td>
<td>I think that using Blackboard fits well with the way I like to work</td>
<td>1.34</td>
<td>0.0177</td>
</tr>
<tr>
<td>11</td>
<td>Blackboard is compatible with my teaching practices</td>
<td>1.94</td>
<td>0.0003</td>
</tr>
<tr>
<td>12</td>
<td>Blackboard increases my workload</td>
<td>1.02</td>
<td>0.0182</td>
</tr>
<tr>
<td>16</td>
<td>People in my organization who use Blackboard have a high profile</td>
<td>2.21</td>
<td>0.0001</td>
</tr>
<tr>
<td>17</td>
<td>Having Blackboard is a status symbol for my institution</td>
<td>3.15</td>
<td>0.0000</td>
</tr>
<tr>
<td>24</td>
<td>I have taught faculty how to use Blackboard.</td>
<td>2.70</td>
<td>0.0000</td>
</tr>
<tr>
<td>29</td>
<td>Before deciding whether to use Blackboard, I was able to properly try it out</td>
<td>2.10</td>
<td>0.0000</td>
</tr>
<tr>
<td>30</td>
<td>I was permitted to use Blackboard on a trial basis long enough to see what it could do.</td>
<td>2.69</td>
<td>0.0234</td>
</tr>
</tbody>
</table>
coded, where Strongly Disagree was assigned a value of 3 to Strongly Agree being assigned a value of 0. The responses were recorded by SurveyMonkey and were downloaded into an Excel spreadsheet. Missing data were assigned with asterisks.

A Rasch analysis was used to evaluate the responses. The control file for question 9 indicated the values assigned to the responses, the reverse-coded items, the deletion of person 72, and a conversion of MNSQ to ZSTD values. Of the 358 faculty who participated, 45 lacked responses and 1 person was eliminated (person 72) due to not indicating if they were a user or nonuser. A total of 312 faculty’s responses to question 9 were measured using Winsteps 3.81.0.

The Rasch analysis of question 9 computed a person reliability of 0.85 with a separation of 2.40 and an item reliability of 0.99 with a separation of 9.53. A person reliability of 0.8 to 0.9 allows discrimination of 2 or 3 levels and person separation of 2.00 represents a good level of separation and a separation of 3.00 represents an excellent level of separation. Item reliability depends on a wide range of challenging items and sample size. An item separation of at least 2.5 is required for the analysis of groups (Boone et al., 2014).

An item fit table was produced to determine how the items of question 9 were fitting the model. Looking at the mean square (MNSQ) outfit, item 14 degrades the model with an MNSQ of 2.09 and item 5 is outside the acceptable range for a survey at 1.43. Both of these items were reverse-coded items and these items seem not to fit the model. The Infit MNSQ (1.90) for item 14 also indicates that this item is not working in this model. Many items have a negative ZSTD score which again indicated that the items
were too predictable, but was somewhat understandable since many faculty have adopted and were using Blackboard. A person fit table was also produced which indicated that 36 faculty were about an MNSQ outfit of 2.00 or above which degraded the measurement out of 312 faculty with recorded responses. Since there were many faculty degrading the model and a couple of items were not functioning correctly, the reverse-coded questions 5 and 14 were removed before another analysis was performed. There was an improvement in person reliability and separation, 0.87 and 2.57 respectively and an improvement in item separation from 9.53 to 10.59. Afterwards, a person Outfit plot was generated to visually determine people who were 3 standard deviations from the mean. From the plot those faculty were selected to be removed from the data along with item 16 which had an Outfit MNSQ of 1.53 which was above the accepted standard of 1.4 for surveys.

After the removal of 16 additional faculty and 1 additional item, another analysis was performed. The person reliability increased from 0.87 to 0.88 with a slight increase in person separation from 2.57 to 2.66 and item separation from 10.59 to 11.07. All remaining items on the survey had a MNSQ Outfit between the acceptable range of 0.6 and 1.4 (Bond & Fox, 2007) and there was a decrease in person misfit.

To visually determine the range of users and nonusers, with respect to the items in question 9, Wright maps of users (Figure 4.16) and nonusers (Figure 4.17) were constructed. From the Wright map of the users (Figure 4.16), the mean of the ability of the persons was greater than the mean of the items which was expected. The Wright map of the nonusers (Figure 4.17) illustrates that the mean of the nonusers ability is less than the mean of the items as also was expected. Both Wright maps illustrate similar patterns
Figure 4.16. Wright map of users of Blackboard from question 9.

---

```
MEASURE Person - MAP - Item
  <more> |<rare>
  8     +   
    #    |
  7     +   
    .    |
  6 .    +   
    .    |
  5 .    +   
    .    |
  4 .    +   
    .    |
  3 . .  +T  
    . S  | St Ask Mr Qstns
  # #    |
  2 # #   |
  ## #   |
  ### #  |
  ###### |
    | Eb Enc St Ask Qstns  Eb Imp St Tm on Tsk
  1 .##### | S Eb Dvlps Coop  Bb Imp St Tm on Tsk
       ###### | St Lzs Intmdtd
       .######## | Eb Enc St Srch It
       .#####  | Eb Allws Inc Inst Spprt
       .##### | Bb Prvds Eq  Eq Op
  0 # # # | S Eb Enc Actv Lrag
    # # # | Eb Allws Pac Cstm Inst
    . # # |
-1 .### | S Bb Allws Prmpt Fb  Bb Allws St Sty Cnctd
    . # # | Bb Allws St As Prg  Bb Folts Cnctd
-2 . # |
    . # |
-3 . # |
    . # |
-4 . # |
-5 . # |
-6 . # |
-7 . # |

<less> |<frequent>

EACH "#" IS 3; EACH "." IS 1 TO 2
```

85
Figure 4.17. Wright map of nonusers of Blackboard from question 9.
for easiest to hardest items to endorse. Both maps have the easiest item being Item 7, “Blackboard allows faculty to post a variety of resources in one place” and the hardest item being Item 2, “Students tend to ask more questions on Blackboard than in class”. Both Wright maps show a failure in the questions to contain all responses from the survey even after an initial round of outliers (n=16) were removed, although there is an even distribution of items to just outside one standard deviation unit (S) for those who stated they were users of Blackboard. Out of 297 faculty who completed the question and who were not deleted, 257 stated they were users and 40 stated they were nonusers. Those items between the means of both the users and nonusers could be of interest in determining attributes or perceptions that are not explained by Rogers.

A Differential Item Functioning (DIF) analysis between users and nonusers of Blackboard was also employed to determine if there were significant differences in the attributes and perceptions of using Blackboard. Significant differences (p<0.05 and DIF contrasts>0.64) occurred for items 8-10 and 17, Table 4.3. These items warrant further investigation in distinguishing users and nonusers.

Although the preceding results look promising in detecting Rogers’s characteristics and additional opinions by Chickering and Ehrman in determining differences between users and nonusers of Blackboard, the results were dependent upon the reliability and validity of the study. Winsteps provides reliability estimates which were labeled as model or real. In education it is recommended that the real person reliability be used. The Rasch technique also provided an item reliability in the form of item separation which was used to determine item hierarchy which leads to construct validity of the survey (Boone et al., 2014).
Table 4.3.  Items with significant DIF contrasts and probabilities.

<table>
<thead>
<tr>
<th>Item</th>
<th>Statement</th>
<th>DIF Contrast (abs)</th>
<th>Rasch-Welch Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Blackboard encourages active learning, such as learning by doing, time-delayed exchange, and real-time conversation.</td>
<td>1.04</td>
<td>0.0049</td>
</tr>
<tr>
<td>9</td>
<td>Blackboard encourages students to search the Internet for answers.</td>
<td>1.72</td>
<td>0.0000</td>
</tr>
<tr>
<td>10</td>
<td>Blackboard allow prompt feedback of students’ submissions.</td>
<td>1.22</td>
<td>0.0011</td>
</tr>
<tr>
<td>17</td>
<td>Blackboard allows faculty to customize instruction to different groups of students.</td>
<td>1.04</td>
<td>0.0067</td>
</tr>
</tbody>
</table>
Reliability and Validity of the Study

The reliability and validity of the study is based on the information obtained from questions 8 and 9 which were deployed in a cross-sectional survey in a defined time and place. In Table 4.4, the person separation and reliability are high enough to distinguish between 2 or 3 levels of faculty who responded and to represent a good level of separation between faculty. Person reliability “is independent of test length and is largely uninfluenced by model fit” (Boone et al, 2014, p. 230). The scale available for person and item reliability is from 0-1.00. Person and item separation indicate the “signal to noise ratio in the data…the separation coefficient gives us the square root value of the ratio between the true person variance and the error variance in the data” (Boone et al., 2014, p. 222). The scale available for separation is 0 to infinity. The real person separation in question 9 allowed for the analysis of groups, in this case users and nonusers of Blackboard.

The Item Characteristic Curves (ICC) were used to determine if items were functioning as expected to the model. Question 8 item 15 was a difficult item for those even with high ability to choose Agree, Figure 4.18. Similar results were observed for items 16 and 17 but were kept in the analysis since the items were tied to Rogers’s theory and were expected to be difficult to endorse. Items 5, 14 and 16 of question 9 indicated that they were not functioning well at either end of the expected score curve and were removed in the final analysis which helped improve the person and item statistics represented in Figures 4.19 - 4.21. The probability curves for both questions 8 and 9 were inspected, Figures 4.22 and 4.23 respectively. Both curves indicated that the dichotomous
Table 4.4. Summary of Rasch statistics for questions 8 and 9.

<table>
<thead>
<tr>
<th>Question</th>
<th>Responses</th>
<th>Real Person Separation</th>
<th>Real Person Reliability</th>
<th>Real Item Separation</th>
<th>Real Item Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>8, Dichotomous Responses</td>
<td>N = 358</td>
<td>2.40</td>
<td>0.85</td>
<td>8.07</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>Measured =</td>
<td>321</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8, Z-Residual modification</td>
<td>N = 358</td>
<td>2.68</td>
<td>0.88</td>
<td>10.20</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>Measured =</td>
<td>320</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9, Polytomous Responses</td>
<td>N = 358</td>
<td>2.40</td>
<td>0.85</td>
<td>9.53</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>Measured =</td>
<td>312</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9, Person &amp; Item Modification</td>
<td>N = 358</td>
<td>2.66</td>
<td>0.88</td>
<td>11.07</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>Measured =</td>
<td>297</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 4.18. ICC of item 15 of question 8.
Figure 4.19. ICC of item 5 of question 9.
Figure 4.20. ICC of item 14 of question 9.
Figure 4.21. ICC of item 16 of question 9.
Figure 4.22. Probability curve for question 8.

INPUT: 358 Person 31 Item REPORTED: 320 Person 30 Item 2 CATS WINSTEPS 3.81.0

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Figure 4.23. Probability curve for question 9.

INPUT: 358 Person 18 Item REPORTED: 297 Person 15 Item 4 CATS WINSTEPS 3.81.0

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question 8 and the polytomous question 9 are functioning well. These results warrant further investigation as to the order and spacing of the items as observed in the Wright maps which compared users and nonusers of Blackboard, Figure 4.16 and 4.17. These items should remain invariant from one group to the next. Also of particular interest were those items that fall between the means of the users and nonusers in Figure 4.16 and 4.17. These items have the most potential in differentiating users and nonusers.

In summary, the survey which was constructed of questions that were based on Rogers (2003) and Chickering and Ehrman (1996) has utility in exploring perceptions and attributes that determine Blackboard use by faculty at a community college. The survey which modified after being piloted to increase person reliability and item separation was successful. Participation in the study was 38% which was a substantial improvement over the 16% who participated in the pilot. The low response rate may have been attributed to a choice of only one submission of the online survey per IP address. The data collected, described and analyzed from the responses indicated that there were differences between user and nonusers of Blackboard even though we were in the latter stages of adoption where 18.8% of those responded indicated that they did not use Blackboard even though it was a requirement at the college.
Chapter 5 Summary and Discussion

Summary

The goal of the study was to explore faculty adoption and utilization of the course management system (CMS), Blackboard, at a community college. To explore faculty adoption, research questions were formulated to elucidate adoption and utilization of the CMS. The questions were based on characteristics that persuade people to adopt something new which were developed in Rogers’s Diffusion of Innovations tome. Those characteristics are: relative advantage, compatibility, observability, complexity, and trialability. Additional questions were based on Chickering and Ehrman’s Implementing the Seven Principles: Technology as a Lever along with demographic questions to describe the faculty who participated in the study. A cross-sectional delivery of an online survey was created with these questions. The survey was piloted and modified before being deployed for the study. The Rasch model was used to evaluate two questions within the study that were based on Rogers’s Innovation-Decision Process and Chickering and Ehrman’s Seven Principles. The results and discussion that follow summarize the findings and implications of the study.

Despite the benefits and supports of using a course management system to communicate with students inside and outside of the classroom, many college faculty members have not integrated the course management system, Blackboard, into their courses. This lack of use is especially perplexing when the system requires that Blackboard be used by the faculty to post their syllabi. As a quantitative study, a cross-sectional survey was employed to collect responses from the population of community college faculty.
The survey was developed to explore the current use and opinions of community college faculty about Blackboard. The survey was piloted at a community college in northern Kentucky after the approval by the president of the college. The population of faculty were recruited to participate in the pilot. After analyzing the results of the pilot, the protocol and the survey were modified to address the paucity of participation, the insufficient number of items and the design of the survey.

After modifying the pilot survey, the survey was deployed to the study population of 932 faculty at a central Kentucky community college. Faculty were encouraged to participate through a series of recruitment letters with a link to the survey which was located at SurveyMonkey, an online survey network. An incentive of winning 1 of 3 gift cards in a random drawing was also used to encourage faculty to participate. The survey was open for a period of 22 days.

With a response rate of 38% (358 out of n=932), the data from the survey item responses were stored on the online survey network and cross-tabulated into two categories, users and nonusers of Blackboard. An additional cross-tabulation was done between those who teach online and those who do not teach online. The data were then converted to numerical values and downloaded to an Excel spreadsheet to undergo further parceling into a space-delimited format which was required for the Rasch analysis software, Winsteps 3.81.0.

The faculty who indicated 0-1 years of teaching experience responded with the lowest percentage of Blackboard use at 55%, followed by those with 16-17 years of teaching experience at 75% and finally those with 10-11 years at 79%. All other
categories of experience had a use of greater than 80%. Only 70% of those with a Bachelor’s degree used Blackboard, followed by 84% of those with a Master’s degree and 89% of those with a Doctoral degree. Those with Associate’s degree indicated 100% that they used Blackboard. The majority of faculty, whether part-time or full-time, responded to the survey that they used Blackboard 81% and 87% respectively. Those whose instruction is only online responded at 100% that they used Blackboard, while those who indicated that their mode of teaching was hybrid/blended responded that 92% used Blackboard, followed by the third category of face-to-face instruction where 78% selected that they used Blackboard. Categories that faculty most associated with their instruction indicated varying amounts of Blackboard use. Cross-tabulation of categories with use indicated that only 20% used Blackboard with those who identified their instruction as pre-college curriculum, followed by language at 44% and technology by 57%. Those instructional categories with highest Blackboard use included communication and heritage categories at 100%, computer information at 94%, allied health at 95%, social science at 93%, followed by science at 92%. Age did not seem to be a significant issue in determining use of Blackboard.

The most popular Blackboard components used by faculty were the syllabus (as required by the college), announcements and grade center at 91%, 91% and 78%, respectively. The grade center was used slightly more for those who indicated that they teach online (n=127) than those who do not teach online (n=82). Overall, more of the Blackboard components were used by faculty who teach online compared to faculty who do not teach online.
To address Research Questions II. and V., a cross-tabulation of users and nonusers and a Rasch analysis of the data from questions 8 and 9 were performed. The results of the cross-tabulation of question 8, which were used to investigate Research Question V., indicated that the following items were agreed by more nonusers than users:

- I have observed how to use Blackboard in my courses.
- Blackboard increases my workload.
- Before deciding to use Blackboard, I was able to properly try it out.
- My institution does not require me to use Blackboard.
- Having Blackboard is a status symbol for my institution.
- People in my organization who use Blackboard have a high profile.
- People at my institution who use Blackboard have more prestige than those who do not.
- Blackboard is not very visible at my institution.

After the Rasch model was applied to question 8, a Z-Residual quality control measure was used to parsimoniously remove responses that were erroneous to other responses by the faculty member. This quality control measure allows most of the faculty responses to the items in question 8 to remain versus a complete removal of the faculty responses from the items in question 8. A Differential Item Functioning (DIF) analysis was also applied to distinguish item function between users and nonusers of Blackboard. The following items indicated a Rasch-Welch probability of less than 0.05 and differential item functioning (DIF) contrast greater than an absolute value of 0.64 which denoted significant differences between the 2 groups:
• Using Blackboard makes it easier to do my job.
• Using Blackboard enhances my effectiveness on the job.
• Students expect my materials to be posted on Blackboard.
• I think that using Blackboard fits well with the way I like to work.
• Blackboard is compatible with my teaching practices.
• Blackboard increases my workload.
• People in my organization who use Blackboard have a high profile.
• Having Blackboard is a status symbol for my institution.
• I have taught faculty how to use Blackboard.
• Before deciding whether to use Blackboard, I was able to properly try it out.
• I was permitted to use Blackboard on a trial basis long enough to see what I could do.

Question 9, which was developed to explore Research Question II., asked opinions about Blackboard. Each item in the question had a response range of strongly disagree, to disagree, to agree, to strongly agree. A cross-tabulation of the responses by users and nonusers indicated that nonusers agreed with following items more than users:

• Blackboard encourages students to search the Internet for answers.
• Blackboard causes students to become more isolated.
• Blackboard causes students to skip class.

After the Rasch model was applied to question 9, a misfit table was constructed to determine which items were not fitting the model. The following items were removed from the final Rasch analysis of question 9:
• Blackboard causes students to become more isolated
• Blackboard causes students to skip class
• Blackboard allows faculty to post examples of poor and exemplary work for communicating expectations to students.

An Outfit table was also produced to cull those people who were misfitting the model by more than 3 ZSTD units. Beyond the 45 faculty who lacked responses and the one faculty member who did not indicate if they were a user or nonuser of Blackboard, 16 additional faculty members responses to question 9 were eliminated. A DIF analysis of the remaining items and faculty indicated that each of the following items had a significant contrast:

• Blackboard encourages active learning, such as learning by doing, time-delayed exchange, and real-time conversation.
• Blackboard encourages student to search the Internet for answers
• Blackboard allows prompt feedback of students’ submissions
• Blackboard allows faculty to customize instruction to different groups of students.
A summary of the Rasch statistics results for question 8 and 9 were:

- Question 8, a person reliability of 0.88 and an item reliability of 0.99 with a person separation of 2.68 and an item separation of 10.20.
- Question 9, a person reliability of 0.88 and an item reliability of 0.99 with a person separation of 2.66 and an item separation of 11.07.

These statistics supported the ability of the instrument to distinguish between 2 or 3 levels of faculty and the analysis of groups, in this case users and nonusers of Blackboard. Additional outcomes of the survey were those items in question 8 and 9 that fall between the mean abilities of the users and nonusers. These items warrant further study since the items indicated a gap in ability between users and nonusers.

**Discussion**

Students stating that their professors were not using Blackboard were a common occurrence both in the classroom and in the office. These statements were the impetus for this study. The exploratory research was designed to record the adoption and utilization of Blackboard by faculty at the community college. Students wanted one place on the Internet to view information about all of their courses. These statements by students were supported by the literature (Cunnane, 2010; Jones & Jones, 2005). By the time the survey was deployed, the community college required all faculty to post their syllabi on Blackboard. Of those who responded to the survey, 358 out 932 (18.8% of the faculty) selected that they did not use Blackboard. This compares to previous studies of 15.6% who did not use Blackboard (n = 154) at a Midwestern university (Chang, 2008, p.
Rogers’s Innovation-Decision theory (2003) states that the following characteristics must be perceived in order for someone to be persuaded to adopt a new idea or technology: relative advantage, compatibility, complexity, trialability and observability. These characteristics had utility in discerning those who have or have not adopted the use of Blackboard. Of the population of the faculty that answered the survey, nonusers indicated that Blackboard would increase their workload and they agreed more than users that Blackboard had relative advantage as a status symbol for the institution or for the people. The fact that nonusers agreed more than users on Blackboard being a status symbol may indicate that some of the nonuser have advanced beyond the Persuasion Stage of Rogers’s Innovation Decision making process and have determined to reject Blackboard. Rogers’s theory was supported by the results of this survey in discerning the characteristics that persuade adoption by both users and nonusers.

The opinions about Blackboard based on Chickering and Ehrman’s Implementing the Seven Principles: Technology as a Lever (1996), which were incorporated into question 9 of the study, suggested that nonusers had concerns that Blackboard may encourage students to search the Internet for answers, cause students to skip class and become more isolated more than users. Although, causing students to skip class and to become more isolated were misfitting the Rasch model. Blackboard encouraging students to search the Internet, allowing prompt feedback and allowing faculty to customize instruction showed significant DIF between users and nonusers. These
differences in responses between users and nonusers illustrate that the teaching practices of users and nonusers may determine faculty perceptions of the benefits of Blackboard.

The survey also highlighted the extent of Blackboard use by faculty who teach online versus those who do not teach online. As a majority, faculty who do not teach online use the Syllabus, Announcements and Full Grade Center. Online faculty use the preceding and Course Copy, Tests, Discussion Board, and Export/Archive course. As a category, online faculty used all the components of Blackboard more than those who did not teach online except for the required syllabus and the course calendar. The increased usage of components was expected by online faculty since online faculty instruct via the Internet and not in a physical space on campus. Course management systems allow for more and varied types of communication.

Comparing the results of this study to a previous study by Less, Less states financial reward is a second-order factor and “appeared to be more important as a contingency for adopting technology in instruction for non-users than for users” (Less, 2003, p.98). This statement could be tied to item 12 of question 8 of the survey (Blackboard increases my workload) which revealed a significant DIF contrast (p = 0.0182 and DIF contrast of 1.02) between users and nonusers. Less reports that, “Only 1.5% of user faculty reported adopting technology to gain financial reward” whereas “17.5% of non-users cited a lack of financial reward for not adopting technology of instruction” (Less, 2003, p. 95). Less also stated:

When asked what would encourage them (nonusers) to adopt technology in their classrooms, training was a frequent response. Faculty members indicated that they wanted additional professional development focused on technology in instruction as well as individualized training with either another faculty member
or information technology staff. A quicker response from an information technology specialist was also noted as a method by which participation could be encouraged. (Less, 2003, p. 95)

This information seems relevant to the significant DIF contrasts between users and nonusers of items based on Rogers’ trialability in question 8 (Intharaksa, 2009; Tabata & Johnsrud, 2008; Weston, 2005):

- Before deciding whether to use Blackboard, I was able to try it out properly
- I was permitted to use Blackboard on a trial basis long enough to see what it could do.

Roberts (2008) stated that the individual barriers to adoption of technology were lack of technological literacy, fear and time commitment among others which point to additional characteristics that persuade us to try something new - compatibility, complexity, and relative advantage. The results of the study appear to contribute to these previous studies and the ideas of diffusion theory (Anderson, 2003; Blin, 2008; Chang, 2008; D’Silva & Reeder, 2005; Schneckenberg, 2009).

Limitations of the Study

The population participated was one of the limitations of the study. Out of the 932 faculty employed by the community college, 158 out of 236 full-time faculty (67%) participated in the survey. More troubling was only 163 out of 696 part-time faculty (23%) participated. The return rate is troubling since 15% of the full-time population indicated that they did not use Blackboard, whereas 22% of the part-time faculty who participated indicated that they did not use Blackboard. The incentive of the drawing of a gift card may have increased participation, but only 312 out of the 358 faculty who
completed the survey answered question 9 and an additional 16 faculty were at least 3 ZSTD units from the mean.

Another limitation was the use of a cross-sectional survey viewed through the lens of a diffusion theory. Diffusion occurs over time and the survey only captured a moment in time. The survey would be best used in a longitudinal study where one could measure changes in attitudes and opinions over time. At the time of this study, based on the responses, the faculty seemed to be in latter stages of adoption and use of Blackboard.

The Rasch model was chosen for the idea of invariance and the ability to handle missing data. The model must fit the data. The Rasch model handled missing data very well and the person and item reliability and separation indicate the ability to analyze differences in groups (users and nonusers). But whether the items in the survey are invariant or not remains to be seen. It would be difficult to compare the sparse number of items in questions 9 and 10 of the pilot to the responses of the equivalent items in the study. Comparing the responses to the items between users and nonusers of the study, there is not an absolute delineated scale from least difficult items to more difficult items nor an equal spacing between the items.

The dichotomous responses to the items based on Rogers’s characteristics that persuade someone to adopt a technology were coded Agree and Disagree. Faculty had the option of those two choices or not answering the question. The data indicates an internal reliability that is able to distinguish between 2 or 3 groups, but may harm the validity of the responses. Expansion of the responses by either making them open-ended or Likert-like may shed light on if the reliability and validity hold.
Additional concerns about the Rasch model were the quality control measures of eliminating items and people from the study and the redundancy of the items on the survey. A few items and people were removed since they degraded the model. Many items had a negative value for outfit which indicates the items were too predictable or redundant. Cross checking the items in question 8, using Rogers’s theory as a lens, many items do fall into the same characteristic categories. The same redundancy was revealed with items based on Chickering and Ehrman in question 9. The Wright maps also illustrated multiple questions that were at the same level on the logit scale. Additional studies with fewer items are warranted.

**Conclusion**

While this single cross-sectional survey cannot provide sweeping recommendations to all users and nonusers of Blackboard, the survey would suggest that professional development address the differences between users and nonusers of Blackboard. Since faculty who have 0-1 years of teaching experience had the largest percentage of nonusers, it is important that professional development resources be available immediately to assist in providing knowledge and demonstrating the benefits of using a course management system. Part-time faculty need additional support since they are the majority of the faculty who are teaching, yet have a lower percentage of Blackboard users.

The Rasch model was beneficial in creating a measurement scale that indicates differences in mean difficulty of items and mean ability of people who responded to the survey. The Rasch analyses of the data indicated significant differential item functioning (DIF) contrasts between users and nonusers by Rogers’s categories of relative advantage,
compatibility, complexity, and trialability. Professional development activities should address concerns of Blackboard being not compatible with teaching practices, increasing workload, students’ expectations that faculty members’ materials be posted on Blackboard, and providing a trial period of use before requiring use in courses. DIF contrasts based on opinions in question 9 signify that professional development activities should give examples of how Blackboard can be used to enhance communication to students by allowing prompt feedback after students’ submissions, by creating customized instruction for different groups of students and promoting active learning techniques like learning by doing, time delayed exchange and real-time conversation.

The survey constructed, piloted and employed in the study which was based on Rogers’s Model of the Five Stages of the Innovation Decision Process (2003) and Chickering and Ehrman’s Implementing the Seven Principles: Technology as a Lever (1996) has utility in discerning users from nonusers. More work is required to reduce the redundancy of items in questions 8 and 9 and to insure the items are invariant so that an instrument can measure and determine what metrics need to be addressed to encourage use of Blackboard.

The purpose of constructing a survey was to collect information on the level of adoption and use of Blackboard and to identify characteristics that should be addressed in persuading faculty to employ Blackboard in their courses. Whether the survey is deployed to all faculty or a few, the instrument could be employed as a starting point in developing a comprehensive plan to persuade faculty to integrate Blackboard into their courses. By creating an environment where faculty may observe and experiment with the many components available, the initial complexity of Blackboard could be abated.
Professional development activities and working with colleagues who have extensive Blackboard experience should develop a technological literacy that will aid in reducing the lack of incentive to adopt and use Blackboard.

Future studies are needed in reducing the number of items and by changing the dichotomous items to polytomous items to develop more depth in responses. Items with DIF and the qualitative data collected could also be used in the initiation of a qualitative study which would provide more information as to faculty members’ decision to accept or reject the use of Blackboard. It may be that some nonusers have passed through the Stage II. Persuasion and have decided to reject the adoption of Blackboard which is beyond the scope of this study, but would be an interesting avenue for future studies. Although this study focused on the domain of utilization in instructional technology, other studies will be needed in domains of design and evaluation to determine the efficacy of Blackboard or other CMSs in teaching pedagogy.

In conclusion, the purpose of this study was to explore the adoption and utilization of Blackboard by faculty in a community college setting to facilitate the advancement of integrating the course management system into faculty members’ courses. The information gleaned from the survey indicates that most faculty who responded are using Blackboard and are complying with the requirement of the posting the syllabus. Many faculty are using multiple components of Blackboard, especially those who teach online, but more information is needed from nonusers as to what specifically is required to help them either to choose to adopt or to support their decision to not adopt Blackboard.
Educational technology is an essential tool to engage, communicate and extend instructional materials beyond the walls of the institution. Course management systems, such as Blackboard, are an educational technology that provide a central location for students and faculty to enhance communication of information in an efficient manner that is only limited by access to a network. By studying the adoption and utilization of Blackboard by faculty through the lens of Rogers, the study highlighted differences in the characteristics that persuade faculty to use Blackboard. Through consistent utilization of course management systems, such as Blackboard, the hope is that communication between students and faculty will be enhanced which will ultimately help students to grow, develop and learn.
Appendix A Recruitment Letter for Pilot Study

Subject: Survey on Blackboard Utilization by KCTCS Faculty

Dear KCTCS Faculty member,

My name is Brent Eldridge, I am finishing up my twentieth year in the Kentucky Community College System. I am currently a doctoral candidate in the Educational Policy Studies and Evaluation Department in the College of Education at the University of Kentucky. My doctoral research is on the attributes that affect Blackboard utilization by community college faculty.

Please acknowledge the return receipt to establish the population that has received this letter.

Below is the link to a survey that is part of my research for my doctoral dissertation. It is a short 10 minute survey about Blackboard utilization that is posted on SurveyMonkey at the following link http://www.surveymonkey.com/s/5CG9R73 (cut & paste in Browser if URL does not open). If you would prefer to answer these questions on paper, then please e-mail me at brent.eldridge@kctcs.edu and I will send you a copy. The completed survey can be faxed to (859) 257-4243. Your participation is critical to the success of this research whether or not you use Blackboard.

Although you will not get personal benefit from taking part in this research study, your responses may help us understand more about Blackboard utilization among community college faculty. We hope that you will indicate receipt of this recruitment letter which will establish the population that has received this announcement and that you will participate in this survey. Your responses are important to us. Of course, you have the choice about whether or not to complete the survey/questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time.

There are no known risks to participating in this survey and your responses are anonymous which means no names will appear or be used on research documents, or be used in presentations or publications. The research team will not know that any information you provide came from you, nor even whether you participated in the study.
Please be aware, while we make every effort to safeguard your data once received. Given the nature of
online surveys, as with anything involving the Internet, we can never guarantee the confidentiality of the
data while still on the survey/data gathering company’s servers, or while in route to either them or us.
SurveyMonkey’s Terms of Service Policy may be accessed at the following URL
(http://www.surveymonkey.com/mp/policy/terms-of-use/?ustems=1) and was last updated on 12/12/11.
SurveyMonkey’s Privacy Policy can be accessed at http://www.surveymonkey.com/mp/policy/privacy-
policy/ and was last updated on 2/5/13.

If you have questions about the study, please feel free to ask; my contact information is given below. By
completing the survey the subject is giving permission to have access and usage to the data submitted. If
you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in
the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428.

To ensure your responses/opinions will be included, please complete the survey located at the above link on
SurveyMonkey or fax the completed paper survey at the designated location before March 30, 2013.

Thank you in advance for your assistance with this important project.

Sincerely,

Brent A. Eldridge

Associate Professor of Chemistry, Bluegrass Community & Technical College

Doctoral Student, Educational Policy Studies and Evaluation/College of Education, University of Kentucky

PHONE: 859-246-6462

E-MAIL: brent.eldridge@kctcs.edu
Appendix B Pilot Survey

Blackboard Utilization

Welcome!

Have you ever wanted to know how many people use Blackboard or which Blackboard components are used the most? Are there alternative Course Management Systems employed by faculty? The purpose of this survey is to determine Blackboard utilization and to help determine if Blackboard is compatible with your teaching practices.

Your responses are important whether or not you use Blackboard. Responses are confidential - no names, IDs, or direct identifying information are asked in this survey. All submissions are voluntary.

If you would prefer to answer these questions on paper, then please e-mail me at brent.eldridge@kotos.edu and I will send you a copy. The completed survey can be faxed to (856) 257-4243.

The estimated time to complete this survey is 10 minutes.

Thank you for your time and effort.
<table>
<thead>
<tr>
<th>Blackboard Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Do you utilize Blackboard in the courses that you teach?</strong></td>
</tr>
<tr>
<td>☐ Yes</td>
</tr>
<tr>
<td>☐ No</td>
</tr>
</tbody>
</table>
Blackboard Utilization

2. How long have you used Blackboard? (Please check your records on Blackboard)
   - 0-1 years
   - 1-2 years
   - 2-3 years
   - 3-4 years
   - More than 5 years

3. Which components of Blackboard do you use? (Click all that apply)
   - Announcements
   - Course Calendar
   - Discussion Board
   - Journals
   - SoftChalk
   - Tests, Surveys, and Pools
   - Wikis
   - iTunes U
   - Course Reports
   - Early Warning System
   - Performance Dashboard
   - Full Grade Center
   - Course Copy
   - Export/Archive Course
   - Import Course Cartridge

4. You started using Blackboard after a fellow faculty member was using it.
   - Agree
   - Disagree

5. You have had many technical problems with Blackboard.
   - Agree
   - Disagree

6. The only reason you use Blackboard is it is required by your institution.
   - Agree
   - Disagree
Blackboard Utilization

7. Is there another course management system that you use more than Blackboard?
   - No
   - McGraw-Hill Connect
   - Pearson MyLabs/MyLab/Learning Management System
   - Moodle
   - Desire2Learn
   - Adrenia Academic
   - Other (please specify)

8. Do you teach online courses?
   - Yes
   - No

9. The following statements gain a general view of your Blackboard practices. (Please rate each statement, Agree or Disagree)

   (You have observed how to use Blackboard in your courses. 
   You have had hands-on experience using Blackboard.
   You have attended a Blackboard workshop/professional development.
   Students expect your materials to be posted on Blackboard.
   Blackboard allows your students to access course materials outside of the classroom.
   Blackboard is compatible with your teaching practices.
   Blackboard increases your workload.
   Blackboard reduces the amount that you are printing.
   Blackboard is difficult to use.

   Use the space below to comment on your ratings above, or to offer any additional insight.

Page 4
## Blackboard Utilization

### 10. The following statements are opinions about Blackboard. (Please rate each opinion)

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackboard facilitates contact between students and faculty.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Blackboard develops cooperation among students.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Blackboard allows prompt feedback.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Blackboard improves student's time on task</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### 11. Which of the following best describes your utilization of Blackboard?

- [ ] I will begin to use Blackboard in my courses.
- [ ] I will continue using Blackboard in my courses.
- [ ] I will reduce using of Blackboard in my courses.
- [ ] I will discontinue using Blackboard in my courses.
- [ ] I have never used Blackboard in my courses.
<table>
<thead>
<tr>
<th>Blackboard Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic Information</td>
</tr>
</tbody>
</table>

The following questions will be provide information about who uses Blackboard or another course management system. The information will be combined and will not be used to identify individuals.

12. **Are you male or female?**
   - [ ] Male
   - [ ] Female

13. **What is your age?**
    - [ ] Less than 21
    - [ ] 21-25
    - [ ] 26-30
    - [ ] 31-35
    - [ ] 36-40
    - [ ] 41-45
    - [ ] 46-50
    - [ ] 51-55
    - [ ] 56-60
    - [ ] Greater than 60

14. **What is your highest degree attained?**
    - [ ] Associates Degree
    - [ ] Bachelors Degree
    - [ ] Masters Degree
    - [ ] Doctoral Degree
    - [ ] Other (please specify) [ ]

Page 6
## Blackboard Utilization

### Demographic Information

The following questions will be provide information about who uses Blackboard or another course management system. The information will be combined and will not be used to identify individuals.

**12. Are you male or female?**

- [ ] Male
- [ ] Female

**13. What is your age?**

- [ ] Less than 21
- [ ] 21-25
- [ ] 26-30
- [ ] 31-35
- [ ] 36-40
- [ ] 41-45
- [ ] 46-50
- [ ] 51-55
- [ ] 56-60
- [ ] Greater than 60

**14. What is your highest degree attained?**

- [ ] Associates Degree
- [ ] Bachelors Degree
- [ ] Masters Degree
- [ ] Doctoral Degree
- [ ] Other (please specify)
## Blackboard Utilization

### 15. How many years of teaching experience do you have?

- [ ] 0-1
- [ ] 2-3
- [ ] 4-6
- [ ] 8-9
- [ ] 10-11
- [ ] 12-13
- [ ] 14-15
- [ ] 16-17
- [ ] 18-19
- [ ] 20+

### 16. What is the status of your employment?

- [ ] Full-time
- [ ] Full-time temporary
- [ ] Part-time
- [ ] Other (please specify)

[Blank space for other]
Blackboard Utilization

17. Which category do you most associate with your instruction?

- Allied Health
- Arts
- Business
- Communication
- Computer Information
- Education
- Heritage
- Humanities
- Mathematics
- Science
- Social Science
- Technology
- Other (please specify)
### Blackboard Utilization

**Thank You For Participating In The Survey!**

If you have questions, then please contact me at brent.elridge@kctcs.edu. The data collected from this survey will be aggregated, analyzed, and presented as part of the requirements for completion of a dissertation. If you would like to see a summary of the results of the survey, then please e-mail me a request with your preferred e-mail address.
## Appendix C Study Survey

Welcome! Please Complete The Survey on Faculty Use of Blackboard

The purpose of this survey is to determine Blackboard use by BCTC Faculty. Your responses are important, whether or not you use Blackboard.

Responses are confidential - no names, IDs, or direct identifying information are asked in this survey except for contact information for the prize award which is requested at the end of the survey. All submissions are voluntary.

If you would prefer a pencil-and-paper copy of the survey, no problem. Just email me at brent.eldridge@kctcs.edu and I will send one your way. The completed survey can be faxed to (859) 257-4243 Attn: Brent Eldridge, or mailed to 131 Taylor Education Building, Lexington, KY 40506-0001, again to my attention.

The survey will only take about 10 minutes to complete. Upon completion, you will be eligible for a random drawing of one of three $50 Amazon gift cards as a thank you for completing and submitting the survey.
<table>
<thead>
<tr>
<th>1. Do you use Blackboard in the course(s) that you teach?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>
2. How long have you used Blackboard?
- 0-1 years
- 1-2 years
- 2-3 years
- 3-4 years
- 5-6 years
- 6-7 years
- More than 7 years

3. Which component(s) of Blackboard do you use? (Click all that apply)
- Syllabus
- Announcements
- Full Grade Center
- Course Copy
- Discussion Board
- Tests, Surveys, and Pools
- Export/Archive Course
- Course Calendar
- Import Course Content
- Journals
- Course Reports
- Performance Dashboard
- Early Warning System
- iTunes U
- Wikis
- SoftChalk

4. Rate your agreement with each statement below.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>You started using Blackboard after a fellow faculty member was using it.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>You have had many technical problems with Blackboard.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The only reason you use Blackboard is it is required by your institution.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Is there another course management system that you use more than Blackboard?
- No
- McGraw-Hill Connect
- Pearson/MyLab/MyLab/LMS
- Moodle
- Other

6. Do you teach online courses?
- Yes
- No

7. Which of the following best describes your primary mode of instruction?
- Face-to-Face Instruction - Online instruction may supplement, but does not replace face-to-face classroom time
- Hybrid/Blended Instruction - Some face-to-face classroom time is replaced with online instruction.
- Online Instruction only
8. The following statements give a general view of your perceptions of Blackboard.  
(Rate each statement)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My institution does not require me to use Blackboard.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using Blackboard enables me to accomplish tasks more quickly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using Blackboard improves the quality of work that I do.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using Blackboard makes it easier to do my job.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using Blackboard enhances my effectiveness on the job.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students expect my materials to be posted on Blackboard.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard allows my students to access course materials outside of the classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard reduces the amount of paper I use for printing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using Blackboard is compatible with all aspects of my work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think that using Blackboard fits well with the way I like to work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard is compatible with my teaching practices.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard increases my workload.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard is the best course management system.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard is worth the cost to the institution.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People at my institution who use Blackboard have more prestige than those who do not.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People in my organization who use Blackboard have a high profile.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Having Blackboard is a status symbol for my institution.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My interaction with Blackboard is clear and understandable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe that it is easy to get Blackboard to do what I want it to do.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall, I believe that Blackboard is easy to use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning to operate Blackboard is easy for me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would have no difficulty telling others about the results of using Blackboard.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe I could communicate with others the consequences of using Blackboard.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have taught faculty members how to use Blackboard.</td>
<td></td>
<td></td>
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<tr>
<td>The results of using Blackboard are apparent to me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At my institution, one sees Blackboard on many computers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard is not very visible at my institution.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have observed how to use Blackboard in my courses.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before deciding whether to use Blackboard, I was able to properly try it out.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I was permitted to use Blackboard on a trial basis long enough to see what it could do.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have had hands-on experience using Blackboard.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use the space below to comment on your ratings above, or to offer any additional insight.
9. The following statements are opinions about Blackboard. (Please rate each opinion)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackboard facilitates contact between students and faculty outside the classroom.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students tend to ask more questions on Blackboard than in class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students are less intimidated by asking questions on Blackboard versus face-to-face.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard develops cooperation among students outside of the classroom.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard causes students to become more isolated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard provides equal opportunity to interact with one another through study groups and discussion boards.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard allows faculty to post a variety of resources in one place.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard encourages active learning, such as learning by doing, time-delayed exchange, and real-time conversation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard encourages students to search the Internet for answers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard allows prompt feedback of students' submissions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard encourages students to ask questions in class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard allows students to assess their progress in the course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard improves student's time on task.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard causes students to skip class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard allows students to stay connected to class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard allows faculty to post examples of poor and exemplary work for communicating expectations to students.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard allows faculty to customize instruction to different groups of students.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard allows increased instructional support for struggling students.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Which of the following best describes your use of Blackboard?

- I will begin to use Blackboard in my courses.
- I will continue using Blackboard in my courses.
- I will reduce using Blackboard in my courses.
- I will discontinue using Blackboard in my courses.
- I have never used Blackboard in my courses.
### Demographic Information

Information from the following demographic questions will be aggregated and will not be used to identify individuals. The information gathered will help describe the population who use or do not use Blackboard.

#### 11. Are you male or female?
- [ ] Male
- [ ] Female

#### 12. What is your age?
- [ ] Less than 21
- [ ] 21-25
- [ ] 26-30
- [ ] 31-35
- [ ] 36-40
- [ ] 41-45
- [ ] 46-50
- [ ] 51-55
- [ ] 56-60
- [ ] Greater than 60

#### 13. What is your highest degree attained?
- [ ] Associates Degree
- [ ] Bachelors Degree
- [ ] Masters Degree
- [ ] Doctoral Degree
- [ ] Other
14. How many years of teaching experience do you have?
- 0-1
- 2-3
- 4-6
- 8-7
- 8-9
- 10-11
- 12-13
- 14-15
- 16-17
- 18-19
- 20+

15. What is the status of your employment?
- Full-time
- Full-time temporary
- Part-time
- Other

16. Which category do you most associate with your instruction?
- Allied Health
- Arts
- Business
- Communication
- Computer Information
- Education
- Heritage
- Humanities
- Language
- Mathematics
- Pre-College Curriculum
- Science
- Social Science
- Technology
- Other
Thank You For Participating In The Survey!

If you have questions, please feel free to contact me at brent.eidridge@kctcs.edu.

The data collected from this survey will be aggregated, analyzed, and presented as part of the requirements for the completion of my dissertation.

Please encourage your colleagues to take the survey.

To be entered into a random drawing for one of three $50 Amazon Gift Cards as a thank you for completing and submitting the survey, please send an an e-mail with the Subject Line - Prize and a message which includes contact information of an e-mail address and a phone number to brent.eidridge@kctcs.edu.

If you would like to see a summary of the results of the survey, then please e-mail me a request with the Subject Line - Request Survey Results and your preferred e-mail address.

Thank you,
Brent
Appendix D Pre-wave Letter for Survey

Dear Colleagues,

Have you ever wondered how many people are using Blackboard? What attributes encourage adoption and use of Blackboard? Are there alternatives to Blackboard? Are there differences in Blackboard utilization between faculty who teach online versus those who teach face-to-face? Or part-time compared to full-time faculty? All these questions and more will be addressed in my doctoral research, with your help!

On Monday, April 22nd, you will receive a recruitment letter that will have a link to the Blackboard Use Survey. The information you provide in this survey will help to answer the posed questions.

The survey will only take about 10 minutes to complete. Upon completion, you will be eligible for a random drawing of 1 of 3 $50 Amazon gift cards as a thank you for completing and submitting the survey.

If you would prefer a pencil-and-paper copy of the survey, no problem. Just email me at brent.eldridge@kctcs.edu and I will send one your way. The completed survey can be faxed to (859) 257-4243 Attn: Brent Eldridge, or mailed to 131 Taylor Education Building, Lexington, KY 40506-0001, again to my attention.

Your participation is critical to the success of this research whether or not you use Blackboard.

Sincerely,
Brent A. Eldridge
Associate Professor of Chemistry, Bluegrass Community & Technical College
Doctoral Student, Educational Policy Studies and Evaluation/College of Education, University of Kentucky
PHONE: 859-246-6462
E-MAIL: brent.eldridge@kctcs.edu
Appendix E Recruitment Letter for Study

Subject: Survey on Blackboard Use by BCTC Faculty

Dear BCTC Faculty members,

My name is Brent Eldridge, I am finishing up my twentieth year in the Kentucky Community College System. I am currently a doctoral candidate in the Educational Policy Studies and Evaluation Department in the College of Education at the University of Kentucky. My doctoral research is on the attributes that affect Blackboard use by community college faculty.

Below is the link to a survey that is part of my research for my doctoral dissertation. It is a short 10 minute survey about Blackboard use that is posted on SurveyMonkey at the following link: http://www.surveymonkey.com/s/BCTCBb (cut & paste in Browser if URL does not open). If you would prefer a pencil-and-paper copy of the survey, no problem. Just email me at brent.eldridge@kctcs.edu and I will send one your way. The completed survey can be faxed to (859) 257-4243 Attn: Brent Eldridge, or mailed to 131 Taylor Education Building, Lexington, KY 40506-0001, again to my attention. Your participation is critical to the success of this research whether or not you use Blackboard.

Although you will not get personal benefit from taking part in this research study other than a chance at a randomly drawn prize, your responses may help us understand more about Blackboard use among community college faculty. Your responses are important to us. Of course, you have the choice about whether or not to complete the survey/questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time.

There are no known risks to participating in this survey and your responses are anonymous which means no names will appear or be used on research documents, or be used in presentations or publications. The research team will not know that any information you provide came from you, nor even whether you participated in the study.

Please be aware, while we make every effort to safeguard your data once received, Given the nature of online surveys, as with anything involving the Internet, we can never guarantee the confidentiality of the
data while still on the survey/data gathering company’s servers, or while in route to either them or us.

SurveyMonkey’s Terms of Service Policy may be accessed at the following URL
(http://www.surveymonkey.com/mp/policy/terms-of-use/?usterm=1) and was last updated on 12/12/11.

SurveyMonkey’s Privacy Policy can be accessed at http://www.surveymonkey.com/mp/policy/privacy-
policy/ and was last updated on 2/5/13.

If you have questions about the study, please feel free to ask; my contact information is given below. By completing the survey the subject is giving permission to have access and usage to the data submitted. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428.

To ensure your responses/opinions will be included, please complete the survey located at the above link on SurveyMonkey, fax, or mail the completed paper survey at the designated location before May 14, 2013.

Thank you in advance for your assistance with this important project.

Sincerely,

Brent A. Eldridge

Associate Professor of Chemistry, Bluegrass Community & Technical College

Doctoral Student, Educational Policy Studies and Evaluation/College of Education, University of Kentucky

PHONE: 859-246-6462

E-MAIL: brent.eldridge@kctcs.edu
Appendix F Announcement to Faculty of Study

From: Eldridge, Brent A (Bluegrass)  
Sent: Monday, April 22, 2013 10:35 AM  
To: BCTC_Faculty  
Subject: Faculty Use of Blackboard Survey  
Importance: High

Hello Colleagues,

Attached is the official recruitment letter for the Faculty Use of Blackboard Survey that you may have heard about at your Division Meeting this past Friday. The recruitment letter explains the purpose of the survey and answers questions you may have about the survey.

The survey should only take about 10 minutes. In order for the survey to represent the entire faculty population at Bluegrass Community and Technical College, a high response rate is required of both part-time and full-time faculty.

Please take the survey on the Faculty Use of Blackboard which is located at this link:  
http://www.surveymonkey.com/s/BCTCBb

For completion and submission of the survey, you will be eligible for a random drawing of one of three $50 Amazon Gift cards by following the directions at the end of the survey.

In honor of Earth Day, please complete the survey today. This will save the printing of paper surveys and the driving to each campus later. :)

Good luck on the drawing - the odds are much better than any state or clearinghouse lottery!

Thank you for time and effort,

Brent Eldridge  
Associate Professor of Chemistry  
470 Cooper Drive  
236A Oswald Building  
Lexington, KY 40506  
859-246-6462  
brent.eldridge@kctcs.edu
Appendix G Follow-up Message to Faculty of Study

From: Eldridge, Brent A (Bluegrass)
Sent: Tuesday, April 30, 2013 9:56 AM
To: BCTC_Faculty
Subject: Please Complete Survey on Faculty Use of Blackboard

I want to thank the 140 colleagues who have taken the Faculty Use of Blackboard Survey! I appreciate your support!

I need 160 more survey submissions to have a good representation of the population of all faculty at Bluegrass Community and Technical College.

Click on the following link to take this survey:  http://www.surveymonkey.com/s/BCTCBb

For the completion and the submission of the survey, you will be eligible for the drawing of 1 of 3 $50 Amazon Gift Cards by following the directions at the end of the survey.

The survey takes about 10 minutes.

It is important that I receive responses by both nonusers and users of Blackboard and by both part-time and full-time faculty.

I have attached the formal recruitment letter for this survey for additional information. If you have additional questions, please contact me at brent.eldridge@kctcs.edu

Please let me know if there is anything I can do to help you take this survey today.

Again, click on the following link to start the survey:  http://www.surveymonkey.com/s/BCTCBb

Thanks,
Brent
Appendix H Second Follow-up Message to Faculty of Study

From: Eldridge, Brent A (Bluegrass)  
Sent: Monday, May 06, 2013 10:25 AM  
To: BCTC_Faculty  
Subject: Do not forget to take survey for a chance to win Amazon Gift Card

How would you like a chance to win a $50 Amazon Gift Card? For the completion and the submission of the survey, you will be eligible for the drawing of 1 of 3 $50 Amazon Gift Cards by following the directions at the end of the Faculty Use of Blackboard survey.

Click on the following link to take the survey:  http://www.surveymonkey.com/s/BCTCBB

The survey takes about 10 minutes.

It is important that I receive responses by both nonusers and users of Blackboard and by both part-time and full-time faculty.

I have attached the formal recruitment letter for this survey for additional information. If you have additional questions, please contact me at brent.eldridge@kctcs.edu

Please let me know if there is anything I can do to help you take this survey today.

Again, click on the following link to start the survey:  http://www.surveymonkey.com/s/BCTCBB

Thanks,

Brent Eldridge
Associate Professor of Chemistry
Bluegrass Community and Technical College
236A Oswald Building, 470 Cooper Drive
Lexington, Kentucky 40506
P: (859) 246-6462
Appendix I Final Follow-up Message to Faculty of Survey

From: Eldridge, Brent A (Bluegrass)  
Sent: Monday, May 13, 2013 9:31 AM  
To: BCTC_Faculty  
Subject: Last Day for Survey on Faculty Use of Blackboard

Thanks to all who have completed the Faculty Use of Blackboard Survey, I appreciate your support! **Today is the last day to complete and submit the survey.** The survey closes at midnight. To be eligible for the drawing of 1 of 3 $50 Amazon Gift Cards, complete, submit, and follow the directions on the last page of the survey.

Click on the following link to take the survey: [http://www.surveymonkey.com/s/BCTCBB](http://www.surveymonkey.com/s/BCTCBB)

The survey takes about 10 minutes.

It is important that I receive responses by both nonusers and users of Blackboard and by both part-time and full-time faculty.

I have attached the formal recruitment letter for this survey for additional information. If you have additional questions, please contact me at brent.eldridge@kctcs.edu

Please let me know if there is anything I can do to help you take this survey today.

Again, click on the following link to start the survey: [http://www.surveymonkey.com/s/BCTCBB](http://www.surveymonkey.com/s/BCTCBB)

Thanks,

**Brent Eldridge**  
Associate Professor of Chemistry  
Bluegrass Community and Technical College  
236A Oswald Building, 470 Cooper Drive  
Lexington, Kentucky 40506  
P: (859) 246-6462
Appendix J Comments by Users of Blackboard for Question 8 of Survey

Question 8, Item 31, “Use the space below to comment on your ratings above, or to offer any additional insight.” Comments by Users of Blackboard

A "does not apply" response would have been nice

There are other course management interfaces, like Lore, for example. Blackboard is good at some things, but exhaustingly bad at others. Downloading and grading students’ assignments takes ages and is one of the least efficient ways of grading. Conversely, the groups’ functionality and group tools, as well as discussion board options are Full Grade Center are all great.

I think some of these questions need a third answer choice.

I don't have experience using other course management systems. I have some knowledge of McGraw hill and it seems like a great system.

As a part timer I really have no idea how often Blackboard is used or how useful blackboard is to other faculty.

Since I use MyMathLab for my course I find it easier to put my grades on that system.

I have used Blackboard as a student for many years and overall had no trouble. This was my first semester as faculty and although I still find Blackboard useful in communicating with students and posting class resources and content, it was very difficult to use and set up. I often could not figure out how to do what I wanted. Overall, useful but not user friendly.

Some of the above questions I do not agree or disagree with. I chose the answer that applied most often. I believe that in some courses blackboard is helpful but in other cases it is not. I do not like giving tests in blackboard. My students report having a lot of problems. There are some functions that blackboard is not capable of doing. For example, if you have a student who needs extra time you cannot add extra time for one student without giving it to others.

I would like to learn more about Blackboard from a Danville BCTC Faculty Member.

I love using Blackboard; my students like Blackboard, But this institution does not give me any time to learn new techniques, research new materials, respond to the number of emails I get from students, etc. There is no incentive to work this hard but some of us do it because we know it is the way of the future for teachers. How about one release time for each semester you have to teach a new course on BIBd?

I don't have any idea if Bb is the most efficient system, or if it's worth the cost to BCTC, or if it confers prestige.

I began teaching online using WebCT, which was taken over by Blackboard. The greatest issues I see with Bb is simply the text editor. Under WebCT, we could design a web site; under Bb, we may have to resort to uploading content in PDF and dispense with any aspect of website construction.

Blackboards ease of use is so much better than MyDevelopmentLab's.

Several of these questions were poorly worded and seem shaded toward generating a specific response.
I started teaching classes with Bb in 2003. Am getting more comfortable with it by the semester.

Question #7 does not provide enough options. I teach both online and face-to-face; I'm not in an either/or situation. Although your question has "primary mode," I'm so split down the middle, it's hard for me to go one way or another.

Just like Microsoft Word, there are just too many options. Gets cluttered in there.

I love having Blackboard to post lots of resources for students. The journal feature is a problem because it can't be graded until the end in one mass quantity when I'm busy, so I have to set up journals as individual assignments I can grade along the way. Unfortunately, I can't copy those between courses so it takes a long time. The features in Bb are generally easy to figure out on my own, but they are time consuming sometimes, I wish there were some improvements to surveying students and copying assignments to reuse for example.

I would have liked to have had the option of N/A for the responses. For example, using Blackboard on a trial basis is not accurate because it suggests that a trial basis is something that is available and promoted. At this college, you can just start using Blackboard regardless of any sort of trial basis. The same is somewhat true of the statements that follow. Some of the questions assume that the instructor promotes asking questions in Blackboard - that is probably something more appropriate for an on-line class.

The Tech support I have received has been awesome. They are always able to solve all my issues.

Overall blackboard has been a crucial part of my current teaching. I enjoy using the set up.

Some questions could not be answered.

I have only used Blackboard as a course management system and I don't know about the costs associated with it. I think there could be easier ways to complete things, but it is functional.

my use of blackboard is limited to posting my syllabus. I would never trust Blackboard to solely communicate with my students because I find that it is down too many times to be reliable

Would love to have a full-blown tutorial on the use of Bb. For example, I haven't learned how to use the discussion board feature.

Blackboard complicates student-teacher interactions (vs. face-to-face interactions) but simplifies material availability and obviates problems cause by student non-attendance in face-to-face classes.

You need a category called "unsure/don't know," or something similar. Not all the questions fit well into a yes/no choice.

I don't have any other course management experience, so I can't say for certain blackboard is the best.

There could be shorter, more concise training for Blackboard, especially for adjuncts.

Some aspects of Bb are very easy to use, others not so much. It just depends on what you want t do.

Blackboard is not always the best solution to instruction.

Blackboard is not user-friendly - at all. I have taught online classes since 2009 and prefer other online modes of teaching and learning.
I was given no orientation to Blackboard but was expected to use it immediately upon being hired. I have learned a lot about Blackboard and have needed to teach other faculty in my group how to use portions of the program, but it has not always been easy to get answers on how to do various things in Blackboard.

I am unable to provide a valid response as to the cost to the institution, whether Blackboard is a status symbol, and the presence or absence of high profiles and prestige for those using Blackboard.

I really wish I could have answered "no idea" to some of these - I have taught online only for so long (and live out of state) that I really don't know the answers.

Very difficult for part time instructors

Other than posting my syllabus I have found not practical use for Blackboard. There are many aspects of BB for which I am completely ignorant. Without someone requiring me to learn the uses I have no current incentives to learn.

I used blackboard as a student before using it as an instructor. This, I believe, has added to my understanding of student needs.

Blackboard is the best course management system - don't know, Blackboard is the only one I have tried. I found Blackboard neither easy nor too difficult to learn or use. It takes much time to learn how to use all of the many functions, but it is not difficult learn or to use them. Writing tests on Blackboard is tedious. Uploading and deploying tests is not intuitive and was probably the most frustrating thing I had to figure out. Uploading as a pool of questions and not directly as a test, huh?

Overall it's a good program, but some things are cumbersome and more time consuming that they should be.

I wish you had used a likert scale for the previous questions...or had a N/A category...It would also have been nice to have a "neither agree nor disagree" option on the questions below.

I would be putting "I don't know" or "not applicable in the questions below (9.) if that was an option

When it works, I like it. However, there are way too many technical problems that hamper access.

I teach math classes and have not found Blackboard useful in this process. I use MyMathLab for the online portions of my courses and only use Blackboard where required - posting syllabi and grades and announcements for classes that don't include MyMathLab. I find the grade book lacks (or does not make easy to use) things that I would like to have available to me, such as an easy way to add extra credit to the grade. It is useful for being able to email students announcements though.

This comment relates to question #5 -- I use both Blackboard and McGraw Hill Connect. Connect is synced with my Blackboard course.

Blackboard is a PITA. I would NEVER open it again if not required to do so.

I find Blackboard to be helpful to both myself and my students. It offers time flexibility for the learning process.

The college has used several different course management systems as the "official" one over the years. They've all had various problems and good points.
Many basic functions of Blackboard are quite easy to use, but some features are difficult to use and implement.

I left several blank above because I had no opinion.

I love it! It saves time, paper, and is convenient for students.

Some of the questions were not relevant for me to answer. I would have liked a Not Applicable response possibility.

I would have noted "does not apply" on some of the statements.

I would like to see an addition to BlackBoard that allows Instructors to automatically import from other software programs.

My biggest issue with BlackBoard is that it is unreliable during key times of the semester. I think it is designed well, but even the best design is useless if I can't rely on it to work ALL THE TIME.

Blackboard is not as intuitive to use as one might like, but it is fairly easy to use once one gets the hang of it.

It is difficult to provide yes/no responses to most of these questions.

Blackboard is a bit of a cheat in my opinion. It saves me time, but it does not improve the quality of my instruction.

I wish they had offered an orientation on Blackboard for new teachers like myself. I had to set up an appointment and was individually instructed.

I still need help to upload material into Blackboard.

Some of the questions above should have a "unable to judge" or "prefer not to answer" option.

I've had difficulty making time for Bb training; as an adjunct, I find that my work at BCTC must be made to fit in with all of my other obligations, since my BCTC work doesn't significantly contribute to the financial welfare of my family. I've scheduled a day to take Bb training; I'm really hoping that my childcare arrangements for that day will work out. Since I don't make enough money from my employment to cover paid childcare more often, I'm relying on my spouse, who has a full-time job (which, therefore, must take precedence over my part-time work) to care for our child on the day I've scheduled training. If his work requires him to come in during that time, I will cancel my Bb training and hope to re-schedule.

I only use a small amount of the many things that Blackboard offers, but I find it helpful. It seems that Blackboard is not the most efficient system; for example, it often requires several "clicks" for even the most basic tasks (instead of just once and done).

Unnecessarily complicated for most purposes, and a silly use of funds.

Although it is easier for students to submit assignments, it's much harder to grade assignment on Bb and give feedback to students. Many students have complained that Bb is difficult to access.

Some of the questions I selected Disagree are really Don't Know.
I work at a lot of different schools and at my last school, I was the Blackboard administrator for IT. I know Blackboard very well. It is a perfectly acceptable product. However: the way BCTC has it configured is not optimal at all. It makes me unwilling to use it to its fullest potential because it is too time consuming for me.

Blackboard is what I call a clunky system. There are, for example, waaay too many steps to copy a quiz from one course section to another. Entering test and quiz questions takes hours. One of the few things I like about it is the “needs grading now” section, and it is easy to grade using dropboxes. Setting up the grade center is both a pain in the ass and confusing. The help desk at Bb is misnamed, as it offers little help. Last semester they lost my final exam grades, and it took them a long time to find them. Bb provides me with a lot of frustration. It should be easier to use, and faster.

Blackboard often seems to get bogged down and run very slowly. The course copy feature works, but some of the links and Safe Assigns do not work after being copied. I have used a few other systems that are easier to use and seem to have fewer issues and bugs.

Many of these are not compatible with the options. I may use blackboard quite a bit, but I have no way of knowing whether it is worth the money, etc.

There are many areas where Blackboard could improve. I have used various versions of WebCT, Angel and Blackboard, and I actually think Bb is the clunkiest for what I want to do (maybe I want to do odd things, but I still have been able to do them more easily in the other systems).

Would have been nice to have a N/A or don't know response

You can't get section integration into one shell, for the same course, if you don't contact the necessary supervisors early enough before the setups are performed with course shells. Then you have to perform the same setups for your course twice for the different sections, which adds time to your work load.

Since this is the only course management system i am really familiar with, it's what I use. I really don't have time to learn another!! have used University of Phoenix's proprietary system and it is better in some ways.

A response column of "I don't know" or "cannot judge" would have been helpful. I disagreed with several of the statements because I didn't have enough information to decide or I was ambivalent. I have no ide if Bb is the best management system - I've never used anything else. I don't know if Bb is worth the cost to the college - how much does it cost us to use? I don't know if Bb is on many computers - it's on my office machine and in the classroom where I teach; I don't use any other computers in the college. These are just a few of the statements I had difficulty responding to. One statement that I didn't have a problem answering is that Bb definitely increases my work load - and not in a good way.

I started teaching "green" long before I was asked to do hybrid classes. The transition was easy. I used Blackboard before we were expected to. I believe the new paradigm for teaching is online and hybrid. Therefore I agreed with many questions because my only other choice would be to disagree, which is less true than "agree".

Blackboard is useful in communicating to students outside the classroom.

Blackboard is not easy to use; frequent technical glitches and downtime make it very frustrating for faculty and students.

As I use My Math Lab, Blackboard is basically a "first day of class" product for me. I use it much more when teaching classes with non-Pearson texts. I will also use it more when/if MyLabsPlus
(MML/Blackboard integration in testing) is widely available. Regarding "Blackboard causes students to become more isolated." below, Blackboard doesn't cause students to become more isolated, but it does ALLOW them to become more isolated.

It is sometimes hard to grade papers and to teach writing on Blackboard.

While I am not convinced that Blackboard is the best LMS available, it does provide useful features.

Using 100% online platforms is NOT teaching. Bd has very high status. It is a way to DE-SKILL Teaching and undermine the power and position of teaching.

While I understand how Blackboard works, I don't believe it has helped my workload.

I do not think the organization cares if I use Blackboard or not.

I'm sure I could do more with Bb if I just knew how!

I have no idea what the cost of BB is to the institution.

I have used 3 course management systems (WebCT, Angel, and Blackboard), and I prefer Blackboard.

Blackboard administration by KCTCS needs a tune up. Bb is frequently very slow. The voice board is dysfunctional. Online face to face sessions with students are much easier with Google Hangout.
Appendix K Comments by Nonusers of Blackboard for Question 8 of Survey

Question 8, Item 31, “Use the space below to comment on your ratings above, or to offer any additional insight.” Comments by Nonusers of Blackboard

Some questions I didn't feel I could really answer agree or disagree. Also since I don't really use Blackboard, I don't really feel qualified to answer some of the questions - both above and below.

I've never been trained on Blackboard, so I really don't know what it does or how I could use it effectively in class.

Only used Blackboard to post syllabi, as required.

I do not know what blackboard is.

my approach is more process oriented....classroom is needed for my method

I have just started employment with BCTC but if given the opportunity to teach a course, I would definitely use BB. Connie Rine has given our faculty and staff training on using BB and was Excellent with the training. My daughter is a student at BCTC and she uses BB in her classes and has caught on to it quickly.

None

I don't use it, so I don't really know if "disagree," was the correct response, but there was no "not applicable."

I only put my syllabi on Blackboard because I am required to do so. Otherwise I would never go near it.

No experience with Blackboard

This entire set of questions is a farce. It is so biased toward Blackboard that it should be totally rewritten. Also, there should be a response of "Not Applicable" because many of these questions to not apply to me. Many of these questions should compare other teaching tools with Blackboard to get an accurate idea of which I believe to be the best. Again, this is an extremely poor survey; it is designed to be favorable to Blackboard and negative to other teaching methods.

Adult education students at the institution do not have access to Blackboard.

As an adjunct, I see Blackboard as one more thing to consume my time. We are poorly paid, and there is no incentive to take the time to learn an new data base. I communicate with my students via email, which they all have, check, and use. My experience is that some students think it's enough to receive instructions by email or blackboard, so they don't bother to come to class. Blackboard does not help with class attendance; it is designed for online courses.

I feel guilty that I have not learned to use Blackboard--I work about 100 hours a week (have one full-time job and two part-time jobs) and just have not found (or MADE) time to learn!

The blanks are for topics about which I have no information or experience.

I do not use Blackboard as I am an Academic Advisor and PT employee.
You really should have a "not applicable" option in your survey. Perhaps Blackboard would enhance my effectiveness, but I have not attempted to use it yet. As an adjunct instructor, it has not fit into my schedule to learn how to use Blackboard. Many of these questions ask me to judge something with which I have no familiarity.

I believe these forced choice questions do not allow for an honest answer. On most of them I would have rather said "do not know" but had to either agree or disagree. Not a good methodological design.

Working with students in English composition is labor intensive. Having a hard copy in front of me that I can mark in ink (coded colors) lets us both see what is going on. One-on-one work with individuals is the kind of personal procedure I understand. One advantage would be posting instruction sheets and grading sheets in Blackboard, which would shift the burden of printing and management to students. But they would still have management problems.

Blackboard is good for managing grades and assignments, posting quizzes and assignments. With technical programs hands-on instruction is required. Blackboard is merely supplemental.

It is buggy, slow, and not worth the money. I like using Mastering Chemistry though.

I think Blackboard, CDMs in general, are essential to education today.

I teach in a clinical lab which is a face-to-face, hands-on environment. In my responsibilities, I have minimal use of Bb.

I teach in the high school and do not use the BCTC Blackboard site.

I prefer lecture.

I would have preferred to answer NA for some of these questions but that was not an option.

The only time I really used Blackboard was for my graduate work.

I despise Blackboard. For my classes it is an unnecessarily difficult and time consuming inconvenience.

It also has service problems - going down

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References


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Vita

Education

1992  M.S.  University of Tennessee, Knoxville, Tennessee
      Chemistry: Analytical

1987  B.S.  Morehead State University, Morehead, Kentucky
      Chemistry, Mathematics, Education

Professional Positions

1996 – Present  Associate Professor of Chemistry
                Bluegrass Community and Technical College
                Formerly Lexington Community College
                Lexington, Kentucky

1996 – Present  Teacher/Educator
                Kentucky Teacher Internship Program
                Kentucky Department of Education
                University of Kentucky
                Lexington, Kentucky

1993 – 1996  Coordinator of the Chemistry Area
             Assistant Professor of Chemistry
             Southeast Community College, UKCC
             Cumberland, Kentucky

1993  Adjunct Faculty
      Alice Lloyd College
      Pippa Passes, Kentucky

1993 – 1996  Teacher/Educator
             Kentucky Teacher Internship Program
             Kentucky Department of Education
             Morehead State University
             Morehead, Kentucky

1993 – 1999  Instructor
             Federal Upward Bound Program
             Morehead State University
             Morehead, Kentucky

             University of Tennessee
             Knoxville, Tennessee
1988 – 1992 Graduate Teaching Assistantship
University of Tennessee
Knoxville, Tennessee

1988 Tutor-Counselor
Federal Upward Bound Program
Morehead State University
Morehead, Kentucky

1987 Kentucky State Police
Forensic Chemist
Frankfort, Kentucky

Educational Leadership

2013 – Present Director of the Teaching & Learning Center, BCTC

2013 – Present Co-Chair of Information Technology Faculty & Staff Advisory Committee, BCTC

2013 – 2014 Co-Chair of New Faculty Orientation, BCTC

2013 – 2014 Chair of Science Education section of Kentucky Academy of Science

2011 – 2012 Secretary of Science Education section of Kentucky Academy of Science

2008 – Present Board Member on Biotechnology Advisory Committee

2007 – 2008 KCTCS – CPE Initiative for Middle School Math and Science Education

2006 – 2008 Kentucky Community & Technical College System Senator

2004 – 2008 Faculty Council, BCTC

2004 – 2006 Chair of Student Appeals Board, BCTC

2004 – 2005 Secretary of Advisory Committee on Promotion & Tenure

2003 – 2005 University of Kentucky Senator

2000 University of Kentucky College of Education Review Committee
1999 – 2003 General Education Committee, LCC
1998 – 2006 Board member of Student Appeals at LCC, UK and BCTC
1998 – 2001 Coordinator of the Chemistry Area, LCC
1998 – 1999 Academic Council Alternate, LCC
1998 Secretary of College Rules Committee, LCC
1997 – 1998 Chair-elect of Program Development, LCC

Presentations

2013 Classroom Assessment Techniques, New Faculty Orientation, BCTC, Lexington, KY, November
2009 Sciences Unwired, Kentucky Academy of Science Conference, Murray, KY, November
2009 Sciences Unwired, Hewlett Packard International Conference, La Jolla, CA, February
2008 Chemistry Unwired Project, Poster presented at EDUCAUSE International Conference, Orlando, FL (Juried Selection and then Sponsored by HP)
2007 Chemistry Unwired, Kentucky Science Teachers Association Conference in Lexington, KY November
2007 Chemistry Unwired, Ashland Teaching and Learning Conference, Ashland, KY, October
2007 Chemistry Unwired at Laptop Institute, Memphis, TN, July
2007 Chemistry Unwired at New Horizons Conference, Lexington, KY May
2007 Tablet PCs with GPS to record water sample coordinates and to analyze for water-hardness. Poster presented at the HP International Conference, La Jolla, CA, February
Awards

2008 – 2010  Hewlett-Packard Technology for Teaching Leadership Grant

2006 – 2008  HP Technology for Teaching Grant

2004 – 2005  KCTCS President’s Leadership Seminar, Two selected from BCTC

Conferences Attended

2013  American Chemical Society National Meeting, Indianapolis, IN, September

2010  Hewlett Packard Innovations in Education Worldwide Summit, San Francisco, CA,

2007  Biennial Conference on Chemical Education, attended workshop on Learning and Data Analysis using SPSS version 12, July

2007  American Chemical Society National Meeting, San Francisco, CA, September

Workshops

2013  Conflict Resolution Workshop, University of Kentucky, October

2013  Basic Grantsmanship Workshop, University of Kentucky, October

2008  Creating Positive Communication Climates, August

2008  Lexmark Teacher Institute, Lexington, KY, July 28-August 1

2007  Bridges Out of Poverty, KCTCS, Versailles, KY November

Professional Affiliations

1988 – Present  American Chemical Society (ACS)

1993 – Present  Kentucky Academy of Science

Brent A. Eldridge

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