AN ABSTRACT OF THE DISSERTATION OF

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Title:

Understanding Factors for Innovation Adoption in Higher Education Courses: A Case Study Approach

Abstract Approved:

Technology use in the online, face-to-face, or blended classroom offers many methods for presenting learners with content that is geared toward improving their mastery of a concept, process, or procedure. Recent advances in technology have given learners the ability to access this content at any time and from any place they have an Internet connection. Not all faculty members use technologies for the classroom, or use them at a level they find satisfactory. The problem is that little is known about what factors influence the innovation adoption process. This case study uses exposure to the Quality Matters (QM) rubric standards as a common frame of reference from which the adoption or rejection of educational innovation is examined. Case study methodology is used to examine the context and conditions surrounding knowledge of QM materials and a comparison of courses is made to determine changes that occurred prior to and following introduction to the rubric. Grounded theory methods were used to discover themes that emerged from experiences reported by members of the faculty who attended learning sessions that discussed the quality classroom and QM rubric. This study produced an enhancement to Rogers' (2003) innovation-decision model to inform the development of

theory regarding the innovation implementation process in higher education. It suggests supports for teaching faculty as they work to effect change in their courses and improve the instruction they offer to students.

Keywords: diffusion of innovation, higher education, technology adoption, rubric use

# Understanding Factors for Innovation Adoption in Higher Education Courses: A Case Study Approach

By

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Table of Contents

# List of Tables

List of Figures

# Understanding Factors for Innovation Adoption in Higher Education Courses: A Case Study Approach

## Background

Using technology in education can be as simple as using a stick or rock to draw lines in the earth or as complex as virtually connecting several sites where one or more people attend; in either case, learning, that elusive, somewhat permanent change in behavior that allows us to expand our mental horizons, has traditionally occurred in a synchronous environment. This setting is conducive to the demonstration, practice, discussion, and assessment activities that have historically been the basis for classroom work. Not all learners, however, are able—or wish—to do their educational work in this traditional environment for any number of reasons. Today, adults increasingly need to reinvent themselves to remain relevant in the marketplace and improve their prospects for promotion or advancement; in many cases, though, people who feel they need to further their education are unable to attend classes in a face-to-face classroom environment because their days are already scheduled at their primary jobs. Conventional college students, faced with rising education costs and reduced monetary support from their parents, are often forced to juggle scholarship, employment, and extracurricular activities requirements. Davis (2012) notes:

> In 2011, of the 19.7 million students aged 16 and over enrolled in undergraduate college, 72 percent worked (20 percent full-time, year-round workers and 52 percent less than that). Of college students who worked less than full-time, year-round, more than half of them worked more than 26 weeks, and of those, half of them worked over 20 hours. (p. 1)

In addition, students in the elementary through high-school grades sometimes benefit from instruction delivered outside the established norm. Hancock (2014) outlined several instances in which he taught high-school students who benefitted from a virtual education, including children who are athletes or who perform, special needs children, children with behavioral issues, children who travel with their parents, and generally, children who need the flexibility of time the online classroom provides. Hancock reported that current research evidence has not shown a bricks-and-mortar approach to education to be more or less effective than an online education.

Recent technology developments such as high definition, live-streamed video and audio make it easy for learners to view and respond to content via text or voice (Bissili, 2008; Fill & Ottewill, 2006; Nicholson & Nicholson, 2010). Recording features allow the content to be revisited (Kahn, 2011). These additional tools provide for the implementation of asynchronous discussion and assessment strategies (Baran & Correia, 2009; Chen & Wang, 2009; Darabi, Arristia, Nelson, Cornille, & Liang, 2011). The advent of Internet access (Leiner et al., 2009), and the textbooks and instructional content available online within that medium, are also relatively new innovations. These added capabilities form the basis of an educational platform able to remove the boundaries of time and space in the teaching and learning environment.

The pace of technology growth does not slow. More technology developments have arisen in the recent past (Keller, 2008). The learner's ability to view content on ultra-small Smart phones or hear it on mp3 players, tablets, and other mobile devices can provide constant, immediate access to educational content. The use of social networks, currently in such ubiquitous use by learners, can place learning opportunities directly into

the daily lives and social consciousness of learners of all ages (Veletsianos & Navarrete, 2012).

Videography, once the domain of the professional craftsperson, requiring expensive equipment and production facilities, can now be created, shared, and then mixed and remixed—even by small children. Document saving and sharing was once accomplished only through the use of physical devices such as a machine's hard drive or the more portable floppy disk, CD, or computer flash drive. Today, content may be stored on virtual servers such as Google Drive or iCloud and shared via a hyperlink. The advent of cloud saving, storage, and sharing on Internet-capable devices enables all of these activities to occur in an anytime, anyplace environment (Parry, 2012). This moves education from the here-and-now restrictions of the classroom of the past to the "on demand" realm of today's digital mobile natives (Rovai, 2007).

The inclusion of real-world problem solving activity in course curricula serves to move learning away from static reading and rote repetition to the realm of doing, touching, experiencing, and creating. While the notion of real-world problem solving is not new, the application of new technologies to the learning environment offers the ability to record notes via audio and video, use simulations to test hypotheses in a safe environment, and to conduct these activities within the context surrounding the problem (Yun-Jo & Reigeluth, 2008).

The changes noted can be applied to higher education learners in every segment of the population. The label "nontraditional" has been applied to older students returning to the classroom, but this appellation begins to lose meaning in a society experiencing an employment shift from a manufacturing base to that of information and service. "The

shift to a service and information society, and consequent changes in the configuration of the labor force" (Merriam, Caffarella, & Baumgartner, 2007, p. 15), increasingly requires older learners to refresh and upgrade skillsets in order to remain relevant and upwardly mobile in the workplace. Just as the returning learner has multiple responsibilities outside of the classroom, younger learners also must increasingly manage stressed and stretched schedules. Regardless of an individual's age or place in the higher education spectrum, technology offers a bridge to quality education for all.

Another aspect of the current educational landscape is the continued move to online learning (Allen & Seaman, 2013). In this environment, technology must be used to connect learners with their peers and their instructors, as there are fewer opportunities for physical interaction, or none at all. "Strong feelings of community increase the flow of information among all learners, the availability of support, commitment to group goals, cooperation among members, and satisfaction within group efforts" (Rovai, 2001, p. 33).

To teach, some might argue, is to model. Learners need knowledge of and practice with innovations relevant to their disciplines as a part of the coursework so that they may eventually come away from formal education with the skills needed to succeed in today's changing world. Learners today require more than the lecture, more than the multiple-choice quiz, and more than office hours on Tuesdays between 1:00 and 2:00, or by appointment. Instructors who teach online (or use the flipped education model) need to stay abreast of not only the technologies available for adaptation and use in today's ever-evolving learning environment, but also those that relate specifically to assorted disciplines. Various barriers, however, challenge individual members of the faculty in the

transfer of information they receive regarding the adoption and use of technology in instruction. This study examines how members of one university's faculty address barriers to successful adoption of innovative technologies.

**Problem Statement**

While technology innovations continue their inexorable advances and online and blended learning environments establish themselves as a viable alternative to the face-to-face classroom, not all faculty members use available technologies to adequately support their teaching efforts, even though extant tools are available to guide and support teaching and learning. It is also a problem that many members of the faculty come to higher education with little or no formal training about how to teach in the higher education environment, or any educational environment.

Often, a new member of the faculty has learned to teach only by watching his or her professors' efforts. For members of the faculty who began teaching more than ten years ago, that almost certainly means no online experience was available to them from a student perspective. Coupled with the lack of coursework regarding teaching best practices, they come to the higher education instructional environment with apprehensions about teaching as well as a lack of knowledge regarding the tools available to them.

Little research has been conducted to describe changes in course construction based upon faculty application of course construction standards or to understand the attitudes and perceptions of members of the faculty who are introduced to them. Quality Matters (QM) employs a set of evidence-based standards for course creation designed to assist in the development of high quality courses for the online, face-to-face, and blended

classroom (MarylandOnline, 2011), as will be explained in the next chapter. Although the QM standards themselves were developed based on established research, it is important to understand how members of a faculty interpret and implement suggestions for course improvement (if, in fact, they do), and the ways those changes manifest themselves in the learning environment.

To better understand the factors surrounding classroom innovations and their use or non-use, introduction to the QM classroom standards and associated rubric are used as a foundation from which grounded theory discussion and examination of course components help illuminate the decision-to-implementation process. This study also brings to light issues faced when higher education faculty are required to move their instruction to the online environment or wish to update their delivery models to utilize available technologies to support the needs of today's learner.

A faculty development learning initiative named *U-Innovate* was conducted at a small, Midwestern university during the fall semester of 2012. The learning initiative gave members of the teaching faculty the option to attend sessions based on tracks. One of the tracks, the Quality Classroom, focused on quality course construction for the virtual education environment. For this study, participants were selected based upon their completion of the Quality Classroom track of sessions. These sessions contained information on QM concepts and how the ideas might be translated to the learning environment. It also included a session that covered flipped classroom ideas and management.

Each participant in this study attended all of the five one-hour sessions covering QM materials and concepts and the flipped classroom session, and some members of the

faculty chose to attend additional sessions as well. The institution under study adopted QM and became a part of the local consortium group in early fall of 2012, but application of the rubric and its associated standards was not required, nor were any courses formally reviewed through QM as a part of the professional development process. Faculty participation in all sessions offered was optional.

This case study uses exposure to the QM standards and rubric as a foundation from which the adoption or rejection of innovation is examined. It seeks to determine whether information regarding the standards influences adoption of innovative technologies in learning management systems.

**Research Opportunity**

A Midwestern university recently conducted an intensive, semester-long set of faculty education sessions titled the *U Innovate* learning initiative. The learning sessions were designed to provide instruction to faculty members regarding educational technologies and how they might be applied in various types of classroom environments. During the same time period, the university became a member of the local QM consortium, and the *U Innovate* initiative included instructional sessions regarding implementation of the rubric standards. The researcher, a QM-qualified peer reviewer, provided a series of five one-hour sessions to examine the QM rubric and explore the potential for inclusion of its various standards in online, blended, and face-to-face teaching environments. An opportunity existed to extend current understanding of the decision process involved in faculty members' technology use and how content from the QM rubric transferred to their specific course environments.

Adoption of innovation is reliant on many factors, as is the discontinuance of use of an innovation, and it is known that rejection can occur at any time (Rogers, 2003). Investigation of rejection behavior has not received much scholarly attention in the past (Rogers, 2003), and Joseph's (2010) report on active and passive resistance to instructional technology adoption, states, "It is important to understand the subtle nuances of technology resistance and actively engage in strategies to better understand the needs of users" (p. 145). Initially, only use/non-use factors of technology integration were considered; however, data collected indicate that a much broader mix of variables make up the use/non-use decision for instructors, including choices based upon the perceived technology mastery, or its lack, of the students being instructed.

**The Quality Matters rubric and participation.** Employing a technology tool merely for the sake of using it can confuse learners, as the technology becomes the focal point of instruction while displacing the instructional objectives set forth for achievement by learners (Ward, 2012). "Technology is not to be used simply for the sake of using technology" (MarylandOnline, 2011, p. 15). Rather, technology use should serve to support specific instructional objectives. Using the rubric might guide a faculty member to incorporate some of the advantages of technology, while allowing for the exercise of academic freedoms in the deployment of course content (MarylandOnline, 2011).

Another intended use for the rubric is to ensure high quality in instructional course offerings. The University of Maryland developed the QM rubric with that end in mind, as well as to prepare for anticipated questions from regional accreditors. One tenet of the process included course peer review done by faculty persons experienced in teaching online (Shattuck, 2007). The Council for Higher Education Accreditation

(CHEA) played a major role by sponsoring a series of studies intending to foster "the remarkable degree of consensus regarding the fundamental components of responsible, high quality distance learning programs" (Legon, 2006, Introduction para.). Another key set of guidelines used by the University of Maryland group were those established by Chickering and Ehrmann (1996) and Chickering and Gamson (1999) (Shattuck, 2007).

In 2003, the group wrote a grant proposal to the US Department Fund for the Improvement of Postsecondary Education (FIPSE) in an effort to fund continuing development of standards criteria. This proposal, *Creating a Pathway to Credible Inter-Institutional Quality Assurance in Online Learning*, became known as *Quality Matters: Inter-Institutional Quality Assurance in Online Learning* (Shattuck, 2007). The 2004 rubric that was generated as a result of this continued development was divided into eight general standards for review. After undergoing revision again in 2008-2010 (another revision was released in 2014 but that set of standards was not in place at the time of this study), the eight general standards comprised the following:

1. The **Course Overview and Introduction** standard is used to evaluate initial information given to learners in a course to aid their understanding of course navigation. The standard also seeks to ensure the instructor describes the ways the course would be used as a learning tool, and provides a personal introduction of him/herself for students.
2. **Learning Objectives** (competencies) seek out measurably-based objectives that are explained well for learners to guide them as they encounter the activities presented to them.

3. **Assessment and Measurement** standards are used to provide a lens through which learner assessments are compared directly to the stated objectives to ensure alignment.
4. The **Instructional Materials** general standard ascertains whether the course content as a whole provides the instruction needed for learners to achieve stated objectives and seeks to ensure that the instruction was sourced from competent educators/experts in the field.
5. **Learner Interaction and Engagement** inspects the communication in the course to ensure it is meaningful and represents interactions that enhance learner motivation and development.
6. **Course Technology** reviews the various technologies used in the course to ensure enriched instruction, quality interactivity, and alignment with stated objectives.
7. **Learner Support** mechanisms are reviewed, seeking to ensure that help and other support resources are available to learners.
8. **Accessibility** standards ensure universal design considerations provide course accessibility to all learners. (MarylandOnline, 2011)

General Standards Two through Six specifically seek to “reinforce one another to ensure that learners achieve the desired learning outcomes” (MarylandOnline, 2011, p. 2).

As noted in the QM workbook (MarylandOnline, 2011), each of the 21 standards considered to be Essential (valued at three points each, and defined as most critical to learner success) must be observed within the course to earn recognition as having met QM Review expectations, and therefore to be eligible to bear the QM symbol of quality

course construction. Additionally, among the remaining Very Important (two points) and Important (one point) standards, points totaling at least 81 of the 95 points available must be assigned to the course, indicating standards compliance at the 85% or better level in the course submitted for review.

To implement the QM rubric at this institution, consortium membership in the Kansas City Regional Access Consortium for Higher Education (KC REACHE) group was obtained. This consortium serves as an alliance between Kansas City Public Television (KCPT) and colleges and universities in the Kansas City region. "Together their goal is to provide awareness of and access to distance education opportunities in the KC area and to provide distance learners with easily accessible learner services" (KC REACHE, n.d., Welcome). KC REACHE is a recognized consortium group within the QM organization. Once membership in the consortium group was obtained and instructional materials received, the tenets described in the eight QM rubric standards formed a part of the instruction delivered to members of the campus faculty in the Quality Classrooms track of the *U Innovate* initiative.

QM currently offers educational courses and materials designed to inform instructors who teach in a virtual environment of the peer-review process. QM also creates and sells materials for sharing that content with others who are among their member institutions. While QM offers a one-page summary of its rubric for free online, information contained in the full workshop booklet and other QM materials must be purchased for use.

The formal review process for QM is highly structured. Reviews are conducted by a group of three peers, one of them being a subject matter expert in the discipline/field

of the course being examined. It should be noted that no courses were submitted for formal review, partially because QM recommends that only mature courses, developed over more than one teaching semester, be submitted for review. Additionally, participating faculty members were new to the quality rubric and, in all but one case, had not been exposed to any type of quality course construction metrics in the past. Learning about the QM rubric was occurring at all levels during the *U Innovate* initiative. The faculty members, who were new to the rubric, progressed through the 2011-2013 workbook. Also, the researcher became a peer reviewer early in the process, and was the institutional representative for QM at the university being studied.

It should be noted that no effort was made as a part of this study to suggest compliance levels for a course review. Rather, changes that occurred in courses compared before and after the faculty member attended the Quality Classroom sessions were sought. The researcher was not a subject matter expert in most of the courses being compared, and the focus of this research was not quality course construction, but rather how information on the topic was or was not used, or transferred, to the classroom environment.

**U Innovate.** Administrators at the university that served as a location for this case study had turned their attention to increasing the number and quality of online offerings available for learners. The university's provost expressed an interest in providing educational technology learning opportunities such as those suggested in the *Horizon Report, Higher Education Edition* (Johnson, Adams, & Cummins, 2012) and other literature for faculty development. In response, an initiative was designed to support members of university faculty in their efforts to improve their technology skills

with regard to face-to-face, online, and blended course delivery strategies, and with an objective of continuing the institution's long-standing tradition of teaching excellence. In order to provide this guidance to faculty members, a track-based program of faculty instruction called *U Innovate* was developed by the Learning Technologies unit within the Information Technology (IT) Department and funded by that office and the Office of the Provost.

The *U Innovate* initiative, conducted during the fall semester of 2012, offered faculty members an average of three to five learning sessions per day. Sessions were repeated at various times to accommodate teaching, advising, and other service schedules, with each session offered an average of three times. Instruction was presented as part of eight content "tracks" (see Schedule A for tracks and courses). Members of the Learning Technologies team had previously been advised that members of the faculty were sometimes unsure regarding which tool, technology, or application might benefit a particular teaching situation. The track arrangement provided some structure for faculty participants who wished to focus their efforts on one type of course deployment or technical mastery type over another. Three members of the Learning Technologies team, one instructional designer from the graduate office, and faculty from the university's academic library conducted the sessions. Eight tracks were offered:

- Online Teaching
- The Face-to-Face and Blended Classroom
- Multi-Media
- The Quality Classroom
- Information Literacy

- Social Media
- Mobile Technologies
- A “New 4 You” track that featured technologies new to the campus

A total of 187 sessions covering 61 content topics were offered over a 12-week period from September 17 to December 7, with sessions scheduled to end immediately prior to finals week.

Members of the faculty were offered incentives to help support the additional time and effort required to attend the sessions and to demonstrate clear financial support from the university’s administration. Among other issues, literature shows support from the administration, recognition for faculty, and monetary support to have an impact on the technology decision process (Anderson, Varnhagen, & Campbell, 1998; Beggs, 2000; Muilenberg & Berge, 2001; Ndahi, 1999; Spodack, 2003; Spotts, 1999). As a result, members of the full-time teaching faculty were offered a $1,500 development stipend toward conference fees, travel, and lodging to the annual EDUCAUSE Learning Initiative (ELI) conference or the regional Sloan-C conference, both held in the spring semester of 2013. To qualify, members of the faculty were given two options. One option was to attend the five QM sessions offered within the Quality Classroom track plus one session on how to use flipped classroom concepts, a total of six one-hour sessions. Another option was to choose among all offerings, with a minimum attendance of five of any type of session plus the flipped classroom concept session. There was no cap on the number of sessions that any one member of the faculty might attend and, in fact, one online professor attended 26 separate sessions.

**Raise the Bar.** The *U Innovate* initiative was directly followed in Spring of 2013 by the "*Raise the Bar*" challenge, during which time the Office of the Provost offered an additional stipend for reworking an existing course or developing a new one, with a goal of meeting QM standards. This challenge was open to all members of the teaching faculty regardless of session attendance, and provided an incentive that recognized members of the faculty who were long-time online instructors by providing financial support to update and refresh the technology in an existing, ongoing course or to convert a new course to an online format. Redesigning a course also served to help members of the Quality Classroom track apply the content from the learning sessions they attended, helping to ensure that the instructional content was incorporated into their newly designed or redesigned Blackboard learning management system course shells. A brief written description describing the changes made and how they related to improvement guidelines accompanied each course submission to the office of the provost. The first 50 such course modifications meeting stated requirements would earn individual submitters a $2,000 stipend for their efforts. Nine courses were eventually submitted for approval and payment made to faculty participants within this portion of the initiative. The researcher also submitted a redesigned course for approval during the *Raise the Bar* initiative.

These reworked courses were not evaluated as part of this study. Faculty members submitting some of the courses that were reworked were not members of the faculty who attended the Quality Classroom track. This meant that no common framework instructional information was shared. Also, a before and after comparison of courses constructed and taught before and after exposure to QM materials was sought.

The fact that a member of the faculty offered a course for payment did not necessarily mean that the course shell was actually used. Another problem in evaluating these courses stemmed from the fact that faculty were making changes and updates mid-course in some cases, making the comparison of a course taught before and after exposure to the rubric information problematic.

**Research Questions**

- Does the use of the QM rubric improve the transfer of learning between knowledge of a technology innovation and its use?
- With regard to the adoption/rejection decision for instructional technologies, what factors impelled faculty members to come to the conclusions they did regarding use/non-use or continuance/discontinuance?
- Did knowledge of the QM rubric and its suggestions for technology use have an impact on technology selection or refusal?
- How did faculty members interpret the rubric and translate the new ideas that resulted from their exposure to the content in their course environments?
- Once a technology component was put into place, did that member of the faculty feel more or less comfortable about continued use of the technology?
- What technologies, once accepted, were later rejected?
- What other factors influenced course decisions for this group?

Within the particular context of this initiative, this study explored “how and why” questions of technology adoption/rejection, as well as “what” and “how many” questions of its subsequent use. Considering the depth and breadth of focus being brought to a single initiative at a single university, case study methodology provided

the most appropriate overarching research strategy (Bryman, 2008; Creswell, 2007; Yin, 2009) upon which to base this exploration.

As part of the case study evidence, grounded theory methods are used as a discovery mechanism. Grounded theory, conceptualized by Glaser and Strauss (1967), examines data from the grassroots up, an inductive process that begins with the exploration of specific situations and events. It is "the discovery of theory from data systematically obtained from social research" (Glaser & Strauss, 2008, p. 2). This is in contrast to "theory generated by logical deduction from *a priori* assumptions" (p. 3).

The result of this study enhances Rogers' (2003) original diffusion of innovation model by providing foundational guidance for the teaching and learning environment. The expanded model also proposes a more complete framework for the effective transfer of innovation to the learning environment.

**Study Significance**

The QM rubric was developed in order to improve the quality of online courses, and is implicit in its assertion that any technologies used in the course-building and implementation process should support the courses' stated objectives and outcomes, rather than being used for its own sake. Improved understanding of the factors that influence various members of the faculty to implement or decline to implement various technologies vis-à-vis the rubric standards was identified. Also, the need for higher education faculty to have knowledge of fundamental best practices in teaching is incorporated. The phenomenon of technology selection based not upon the faculty user's own skills, but rather his or her personal, unproven estimation of the skill levels students bring to the online environment, is reviewed. As a result, a modification to Rogers'

(2003) model regarding decision-making factors for adoption and continued use (if any) of technologies is set forth. This is an introductory step in understanding factors that influence faculty members' adoption of innovative technologies and the barriers they face.

**Definitions**

What defines educational technology? "The word 'technology' (the Latin form is *texere*, to weave or construct) does not necessarily imply the use of machines…but refers to any practical art using scientific knowledge" (Saettler, 1968, p. 5-6). Cuban (1986) agreed: "What I define as useful instructional technology, then, is any device available to teachers for use in instructing learners in a more efficient and stimulating manner than the sole use of the teacher's voice" (p. 4). Reiser (2001) provided a slightly modified description, saying, "'instructional media' will be defined as the physical means, other than the teacher, chalkboard, and textbook via which instruction is presented to learners" (p. 55). "Any given technology can be supported by a number of contrasting technologies (old and new), just as any given technology might support different instructional strategies" (Chickering & Ehrman, 1996, p. 3). Given the rise of e-book and other mobile technologies, Reiser's (2001) "teacher, chalkboard, and textbook" definition becomes too narrow; thus, Cuban's (1986) "any device available" definition will be used here.

The word classroom, or phrase "classroom setting," is used to describe the blended, face-to-face, or online classroom, embracing the full continuum of courses offered 100% face-to-face, 100% online, or any blended models falling between the two. The fully face-to-face classroom is included due to the notion of the flipped or inverted

classroom (Ash, 2012; Houston & Lin, 2012; Kahn, 2011; Lage, Platt, & Treglia, 2000). In this scenario, a learner consumes content at home (or any other environment) that has traditionally been delivered within the classroom. Because recorded lectures, video, and other types of content are now viewed before coming to class, what was once homework becomes an in-class activity. This allows for instructor and peer interaction in the classroom. Using this model, instructors are able to spend valuable "together" time with students exchanging ideas, offering alternate viewpoints, and answering questions that arise. The students also now have an opportunity for repeated at-home content viewing and can practice activities as needed for mastery (Kahn, 2011). Using the technologies required to successfully "flip" a classroom offers the same challenges as many of those used in the online learning environment.

The learning management system licensed by the university in this case study is *Blackboard Learn* version 9.1.6x. A learning management system is a repository for course documentation, and can serve as an asynchronous communication site. Several types of content may be housed within the learning management system, including: audio, video, image, and text content; tests, essays, and other assignments; spaces for student journals, blogs, and wikis; group project sites; discussion and other communications areas (Beck & Black, 2012). The standardized navigation system provides consistency for learners. The campus licensed *Blackboard Learn* version 9.1.6 during both semesters under study.

**Summary**

The roots of technology are as ancient as the men and women who have adapted them for use over time, and this most recent explosion of available technologies

combines with shifts in the culture of learners. Educators themselves are called upon to be continuous learners of technology, pedagogy, and outcomes as they step down from the stage and assume a guiding role for learners within the construct of their courses. As part of this process, it becomes important to understand the barriers educators face as they attempt to transfer their learning about educational technology and to seek ways to bridge the gap between knowledge and adoption.

In the ensuing pages, a brief scrutiny of the history of technology in education is reviewed. This is followed by a discussion of reported data observing the current ways and types of learner technology consumption, along with the inherent social and educational trends forecasted. A review of the literature revealed a particular uneasiness of many members of today's faculty in the realm of technology. The sources of this unease and review past attempts to ameliorate them are described. A framework for understanding the adoption of innovation process is provided, including a look at the specific portion of the adoption model describing the use or rejection of an innovation. Some examples of research regarding the use of the QM online teaching rubric are presented.

## Literature Review

To build upon the knowledge base regarding faculty perceptions of technology when using a rubric to guide the construction of online content, these topics bear scrutiny:

- A brief history of educational technology and an understanding of current learner and faculty technology usage trends in higher education.
- The innovation-adoption process and how it might translate to technology use.
- Components of information transfer.
- Barriers to the adoption of technology noted in past programmatic attempts to help foster its use.
- A review of current QM rubric literature.
- Teacher preparation for the higher-education environment.
- Emotions relating to teaching and technology.

### Educational Technology

In the early- to mid-1800s in New York and Pennsylvania, the Lancasterian system attempted to provide education with economy. In these large schools, sand was spread in a thin layer on each desk when writing was practiced; a pointed stick was used for the writing and a long, straight stick made erasures (Saettler, 1968). Such considerations aside, school museums were among the first to prepare exhibits for the purposes of instruction (Cuban, 1986; Saettler, 1968). As early as 1783, the Dartmouth College Collection served to display educational content related to the natural sciences, and museums increasingly provided instructional materials. In 1880, when the

Metropolitan Museum of Art opened in New York City, museums were “declared to be social instruments for the educational progress of the masses” (Saettler, 1968, p. 86).

In the first decade of the 1900s, motion picture technology was next to be used with an eye to instruction. By 1913, Thomas Edison predicted that “scholars will soon be instructed through the eye” and that “books will soon be obsolete in the schools” (as cited in Cuban, 1986, p. 11). Although this did not prove to be the case, motion picture films were used in the classrooms with some success; however, not without drawbacks. As early as the mid-1940s, one barrier to the use of film was shown to be teachers’ lack of skills in using equipment and film (Cuban, 1986). By the early 1930s, audio-visual enthusiasts were hailing radio, calling it the medium that would revolutionize education (Reiser, 1991). Instructional television was introduced to the classroom in mid-1953 in Houston, Texas (Cuban, 1986).

Reiser (1991) reported that during the time of World War II, the use of audiovisual media slowed in the classroom, but not in the military or in industry, where soldiers were trained for war and civilians for work in the job force. Also appearing at this time were the use of graphics, mockups, slides, posters, and other descriptive media, along with simulators, which were employed in flight training (Reiser, 1991, Saettler, 1968). Bachman (1956) discussed the use of audio-visual materials for the classroom, including slides, filmstrips, television, radio, motion pictures and opaque materials. Bachman noted,

> Essentially, audio-visual materials can be helpful because of one basic characteristic: They can provide sensory experiences. Whether they are offering a new experience or recapturing a forgotten one, they may convey, through eyes and

> ears, a more realistic and vivid impression that words alone are likely to create or recollect. (p. 3)

Cook (1964) thought a misconception existed regarding the growing breadth of available "new media" technologies in education. They were often considered as a group, he wrote, rather than individually. He saw them as individual tools having in common newness and dependence on electronic technology. "What is happening, I believe, is not a single revolution of one sort, but several, with various currents and counter-currents going on at the same time" (Cook, 1964, p. 32). Cook recognized such new media tools as:

- Display devices (film strips, overhead projectors, etc.)
- Library technologies (micro recorders and collection organization and access tools)
- Responsive devices (devices that elicit student response, requiring participation prior to moving forward)
- Machines (computers for administrative and teaching purposes)
- Simulations (games and scenarios that allow the student to act in the role of business manager, to predict the evolution of a species, or to run a mock election campaign).

By 1977, the Apple II computer, the Tandy TRS-80, and the Commodore Pet were introduced for consumers and small business (Computer History Museum, n.d., "Timeline '77"). This device, too, was brought to the classroom and was heralded by many as the next game-changer for education. Starkweather (1977) wrote, "Ten years ago, most people thought of the computer pretty much as an experimental instrument….

Now we are moving very rapidly toward regarding the computer much more as a tool, moreover as one that students are expected to use" (p. 74).

The TCP/IP (transmission control protocol/internet protocol) network structure, which allowed individual networks to communicate with one another, emerged and was developed from the late 1970s to the early 1980s. Its structure was recognized in 1986 by the National Science Foundation Network (NSFNET) program as needed to support the academic community (Leiner, et. al, 2009); since this time, Internet operating standards have become ubiquitous.

Eisele and Eisele (1990) described three types of educational technology. Traditional products, including movie film, slides/filmstrips, projections, charts and graphs, television, and printed/programmed text; contemporary products, defined as microcomputers, main-frame computers, modems, telecommunications, electronic bulletin boards, voice synthesizer, optical discs, video discs, interactive video, CD ROM, and CD-I; and future products: voice control, televideo, advanced networks, knowledge bases, laser, advanced supercomputers, and interactive computer aided instruction.

The discussion of educational technology and its uses continues today. A recent Worldcat.org search for the keywords "computers + education" returned 435,095 results. A similar search, limiting the years published to 2010 or later, returned 49,122 results, pointing to the continued interest and currency of the topics. The relatively recent development of the mobile telephone, and later, Internet-capable Smart phones and tablet devices bring a wealth of media types to the instructional arsenal. Telecommunications advances allow for individual users to connect via voice and image on a free basis over the Internet (Skype, etc.), and advances in portable storage devices, from the floppy drive

through the CD, DVD, flash drive, and cloud storage capabilities have brought the notion of mobility to the educational environment in ever increasing adaptations. The iPad, introduced as recently as April, 2010, offered 9,579 apps keyword-connected to education, while 12,100 such apps were available for the iPhone (Apple App Store, March 12, 2013).

In a 1996 interview, Seymour Papert spoke of technology use and methodologies for learning in schools. In doing so, he used a humorous parable of pencil-and-tablet adoption in a land called Foobar to explain how political bureaucracy and educational administration had quashed more widespread technology adoption in the classroom. He finished his parable by noting that while previous researchers had only theory to support their notions for change, "the present day movement for change has an army of agents. The ultimate pressure for the change will be child power" (para. 12). This statement is supported by Dahlstrom and Bischel, (2014), who reported that 90% of college learners own a laptop and 86% own a Smartphone, up from 55% in 2011.

The advent of computer-based online education in the early 1980s heralded a new era for educational technologies, and enrollments, as reported in Table 1, illustrate the steady increase of online course participation by learners.

With millions of students entering the online course ranks, faculty must effectively use technology and stay abreast of developments within their disciplines. This translates to the requirement of a time investment for maintaining currency regarding available technology, especially considering the new ways educational technologies can be employed. This is true of both the online and the face-to face environment, as all

learners enter a technology-based job market upon graduation and need to have developed a skillset accordingly.

One document used to inform current issues in the realm of technology and higher education is the higher education version of the *Horizon Report*, published annually with support from the New Media Consortium (NMC) and the EDUCAUSE Learning Initiatives group. The report is part of the Horizon Project, a comprehensive research undertaking started in 2002 that identifies and describes emerging technologies, specifically those that are considered to have a large impact in education over the upcoming five years (Johnson, Adams, & Cummins, 2012). Contributors to the report represent experts from education, technology, and other relevant fields worldwide. These experts explore a broad variety of research, current practice, and other resources to identify those trends that represent the current features and challenges of the educational environment. Focus is on three separate groups: higher education, primary education, and secondary education. The resulting report describes those trends and issues as defined by strong agreement among the experts. Of particular interest in the 2012 Executive Summary for the report are three key trends:

1. People expect to be able to work, learn, and study any time and in any place.
2. Workers must be increasingly collaborative. The structure of learning projects is changing as a result.
3. The role of the educator must be reviewed in light of the abundance of resources and relationships the Internet makes ubiquitously available..

Two significant challenges are also identified:

1. Digital media literacy continues its rise in importance as a key skill in every discipline and profession.
2. New modes of scholarship are presenting significant challenges for libraries and university collections, how scholarship is documented, and the business models to support these activities. (Johnson, et al., 2012)

The Sloan Consortium, Pearson, and the Babson Survey Research Group inform the topic of issues in technology and higher education as well. Allen and Seaman (2013) authored the 10th such annual report when it was published. This report was based upon a survey instrument created, deployed, and reported upon by Babson researchers. The 2013 version provided information on survey responses collected from 2,800 colleges and universities. The number of learners taking online courses is relevant to this discussion (Table 1). The authors stated that while "overall enrollments for higher education dipped this year for the first time in years, the number of learners taking at least one online course increased by over 570,000 to a new total of 6.7 million" (p. 4). Institution leaders recognize this shift in student enrollment. More than two thirds of those reporting deemed online learning to be a critical component of their course offerings (Allen & Seaman, 2013).

Johnson et al. (2013) indicated in their executive summary that a disconnect exists between faculty and technology, noting among its significant challenges the fact that many academics do not use technologies for learning and teaching, nor do they employ them for organizing their own research. The researchers made this statement:

> Many researchers have not had training in basic digitally supported teaching techniques, and most do not participate in the sorts of professional development opportunities that would provide them. This is due to several factors, including a lack of time and a lack of expectations that they should. Many think a cultural shift will be required before we see widespread use of more innovative organizational technology. Some educators are simply apprehensive about working with new technologies, as they fear the tools and devices have become more of a focus than the learning. Adoption of progressive pedagogies, however, is often enabled through the exploration of emerging technologies, and thus a change in attitude among academics is imperative. (p. 10)

**Adoption of Innovation**

Technology adoption has been studied as a concept of diffusion of innovation. The adoption process, as discussed by Rogers (2003), is subjective in nature and is dependent upon “a series of choices or actions over time through which an individual or a system evaluates a new idea and decides whether or not to incorporate the innovation into ongoing practice” (p. 168). This is recognized from the onset (prior conditions) in Rogers’s (2003) model (Figure 1), where the adopter’s context is considered prior to that of the innovation. The user’s prior practice and experience, perceived gaps or problems to be resolved by the use of an innovation, the inherent innovativeness of the potential adopter, and the current societal norms of the adopter all have an impact on how the adopter might potentially view the use of an innovation. As an example, if a user perceives no problem requiring a resolution via innovation, a technology may not be

adopted, even when the user has been made aware of its existence. Rogers (2003) defines other steps in the innovation decision process, including:

- Knowledge. It is at this stage that a person becomes aware of the existence of an innovation and learns how it functions. Using the adopter's unique context and already realized world-view prior to knowledge of the new innovation provides a grounding point for the innovation-decision process to begin.
- Persuasion. The innovation is now considered within the realm of the user (or organization). Will some advantage be gained for implementing the innovation? Is the innovation compatible with the user's principles? Is the innovation too complex or too simple for use? Can the innovation be safely evaluated prior to acceptance? A user might try to project how use of the innovation might hypothetically fill the need. During the persuasion phase, the person forms an opinion about the innovation, and develops an attitude toward it. While the knowledge stage tends to be cognitive in nature, emotions become involved at the persuasion phase. A judgment point follows persuasion phase (the decision stage).
- Decision. The best course of action (as decided by the person or organization) is acted upon. Adoption chooses to fully use an innovation, while rejection chooses not to use it. Rejection accidentally occurs when a user forgets about an innovation.
- Implementation. The innovation is put into use. Prior to the implementation phase, the decision process has been a mental exercise only. It is at this phase that problems with the innovation often become apparent. Some uncertainties

about the innovation still exist at this phase. It is at this stage that re-invention of an innovation might occur to accommodate specific needs or solve specific problems.

- Confirmation. The person (or organization) often still has questions at this phase, and may continue to ask questions about its implementation. Reinforcement for the innovation decision is sought at this point, and discontinuance may occur as a result. Once confirmation is achieved, the innovation continues in use until it is supplanted by a better innovation or becomes obsolete.

Rogers (1958, 2003) also discusses adopters' tolerance for innovation. A standard bell curve measures the population and describes the innovation tolerance for each group. Rogers' five groups, as described in Figure 2, are:

- Innovators. The innovator category includes those on the leading edge of innovation adoption. Innovators relish invention, often have the monetary resources required to support failed attempts at innovation adoption, and are able to deal with concepts both technical and complex.
- Early Adopters. Not quite as venturesome as their innovator peers, early adopters are frequently the go-to person for advice about an innovation topic or issue. This adopter will evaluate an innovation and then offer use/non-use/modification opinions about the innovation to others.
- Early Majority. These adopters are deliberators and want to see the success of an innovation prior to making a personal use/non-use/modification decision. Early majority adopters spend more time in the innovation-decision portion of

the innovation timeline. This category of adopters represents more than one-third of all adopters.

- Late Majority. The late majority adopter is skeptical of innovation in general. Caution guides the late majority adopter, and innovation changes made by this group are often due to incompatibility issues (which require a new tool or innovation) or peer pressure to adopt. Most of the uncertainty about an innovation must be removed before this group will find it prudent to adopt.
- Laggards. The laggard tends to tradition. This group tends to be suspicious of innovation and the change agents who support them. Laggards often socialize with others who hold the same view.

It should be noted that the term laggard is not intended to be deleterious or have a negative connotation. Extreme economic limits may drive the laggard's position, and other social factors may also influence a reluctance to adopt.

Viewing the innovation-decision process as it relates to QM, the stated goal of continuous course improvement begins to play a role (Maryland Online, 2011). In addition to the natural evolution of a course as an instructor continues to teach it, new educational technologies are introduced frequently. This requires a continuous review of available innovations for the educational environment. Also, innovations that have been once tried may fail the continued use test at any point from decision to confirmation. For these reasons, the selection of educational technologies is iterative in nature.

**Information Transfer**

The question of classroom technology use is many-faceted, and includes such considerations as which technologies are considered to be beneficial, whether

technologies are beneficial at all, and how technologies might be leveraged for teacher use. As these debates continue, however, many institutions require a certain level of technology competency among members of higher education faculty. The way information regarding new technologies is received by the user and transferred from the user to implementation in the learning environment represents an interconnected cycle of information movement.

Each innovation comes with its own set of challenges as users adapt the technologies and are changed in some ways by their use. "A system is like a bowl of marbles; move any one of its elements and the positions of all the others inevitably change also" (Rogers, 2003, p. 449). Geohegan (1994) noted that unintended consequences of adoption might involve the lack of fulfillment when unrealistic expectations are not met, and a lack of resource availability once an innovation has been selected for use. He also recognized the possibility that the elite social position of the technology fluent instructor, when compared to others, can create an additional barrier to information transfer, saying technologists in general comprise a group that appeals to early adopters, but one that has the potential to alienate more mainstream users.

Belkin (1984) identified information transfer as occurring within an information system that involves interaction among three components: the user, the knowledge resource, and the intermediary mechanism that connects the first two components. Selection of knowledge resources appropriate to the user's situation, resources that result in a better understanding for the user regarding the problem being addressed, is a hallmark of effective information transfer.

Information transfer from the standpoint of the knowledge resource can be described as the definition of a single individual's perspective in the context of his or her environment (Greer, 1981). "This environment context is examined by means of the function, or, broadly speaking, as assigned role of the individual" (p. 5). Identifying users as having amassed a personal "data base" of information, to which data are constantly being added, revised, and sometimes deleted or moved into long term storage, Greer speaks to the cyclical nature of information transfer as it occurs within the role of the user, in this case, within an educational environment. Approaching technology transfer from the perspective of the role of educator gives a broad base from which specific technologies might be selected. The particular world-view of each instructor, occurring within each individual classroom setting, narrows the selection of optimal technologies for a specific use. In an effort to maintain quality in the learning environment, each new teaching opportunity offers a chance for inclusion of newly-introduced, or as yet untried, educational technology innovation, representing the cyclical nature of transfer of technology knowledge to the new learning environment.

**Barriers to Adoption**

Attempts to bring technology to education have been fraught with difficulty since the creation of electronic educational tools. Inventions such as the radio and record player have been scrutinized closely by educators, and have not always been seen to be effective. Cuban (1986) describes the meeting of education and technology as "a 'fickle romance'" that "attempts to capture the paradox of stability and change in the classroom" (p. 4), and quotes a poem attributed to a teacher circa 1920, called "Antiquated":

Mr. Edison says

That the radio will supplant the teacher.

Already one may learn languages by means of Victrola records.

The moving picture will visualize

What the radio fails to get across.

Teachers will be relegated to the backwoods,

With fire-horses,

And long-haired women;

Or, perhaps, shown in museums.

Education will become a matter

Of pressing the button.

Perhaps I can get a position at the switchboard. (as cited in Cuban, 1986, p. 4-5)

The ultimate irony of this particular verse is the fact the there is no longer a switchboard position available, as this job, too, has become outmoded. This speaks to the iterative, ever-changing nature of technologies. Considering such a long-standing history of attempts to insert current technologies into the classroom experience, and more lately into the virtual classroom experience, one might find it easy to believe that a structured, cohesive plan for educating post-secondary faculty on classroom technology has long since been developed and by now rests firmly in place. This is not, however, the case. Johnson et al. (2012) highlighted the continued need to provide technology education for both the face-to-face and online classroom was highlighted as foremost among the challenges currently facing educators. The authors stated:

> The role of educators continues to change due to the vast resources that are accessible to learners via the Internet. Institutions are now faced with a critical shift as learners engage in more informal learning outside of the classroom, and are using always-connected devices to surf the web, download apps, and read articles. Educating learners on how to decipher credible resources and aggregate content has become imperative, and there is a need for university educators to fulfill the position of content guide. (p. 8)

One reason widespread adoption of current technology not been achieved involves the rapid upward spiral of technology availability and growth, concepts that have not been embraced by all faculty users. Allen and Seaman (2012) combined the results of two separate, but related, surveys. The first of the two surveys was directed toward a group of teaching faculty, composed of a total of 4,564 faculty from all types of higher education institutions (community colleges, graduate schools, etc.); most in this group (roughly 75%) of respondents reported they teach full-time, with slightly more than a fourth reporting they teach online. The second survey focused on "academic administrators–in particular those responsible for academic technology at their institutions" (Allen & Seaman, 2012, p. 4). Many of the same questions were posed to this group (*N*=591) as those directed toward the teaching faculty, with a goal of comparing the two groups to pinpoint commonalities and differences.

When defining their survey methods, Allen and Seaman (2012) noted that it is difficult, on occasion, to prompt faculty into "providing unambiguous responses without qualifications" (p. 5) to some questions. To eliminate prevarication, the authors framed an either/or-type question to force a response for perceived levels of comfort for online

teaching. The question “Does the growth of online education fill you more with excitement or with fear?” allowed only one of two responses: “more fear than excitement” and “more excitement than fear” (p 5.) While only 20% of administrators viewed the prospect of online growth with more fear than excitement, the majority of faculty, roughly 58%, viewed the growth of online education with more fear. Approximately 42% of faculty viewed the prospect of teaching as it relates to online growth with more excitement than fear, and 80% of administrators shared this view.

Causes for this trepidation about technology and online teaching have been studied from various viewpoints seeking different types of understanding about the topic. Results have been consistent over the decades. Kleine, in 1910, offered the first instructional film catalogue in the United States and promoted it that same year (Cuban, 1986). Saettler (1968) noted that, despite Kleine’s “impressive presentation” of film clips from his catalogue to the New York City Board of Education, it was “a lack of inexpensive, portable motion picture projection equipment” (p. 98) that initially precluded its adoption. The public school system of Rochester, New York, however, became the first system to adopt the use of film technologies for regular classroom use later that year (Saettler, 1968).

Cuban (1986) reported that evidence of and statistics for film use were sketchy and flawed, but wrote, “if the fragmentary and indirect evidence is to be believed, one must wonder why teachers used film so infrequently” (p. 17) in the first forty years of its existence. From the literature of the day, Cuban offered four reasons commonly

attributed to a lack of widespread usage:

- Teachers' lack of skills in using equipment and film
- Cost of films, equipment, and upkeep
- Inaccessibility of equipment when it is needed
- Finding and fitting the right film to the class (p. 18)

Technology proponents have also seen a long tradition as having a dubious voice in the adoption process. Bachman (1956) said of the audio-visual materials adoption decision that, "some enthusiasts seem to look upon film projectors as intellectual sun lamps and upon television sets as emotional X-ray machines," and suggested proponents might be "simply intoxicated by the glamour of gadgets" (p.1). Bachman also listed equipment issues (a blown fuse, bad splices on a video reel, a skip in a phonograph) as a barrier to continued technology adoption, and cautioned that time given the materials selection process must be considered, as well as student seating, provisions for sight and sound, and preparation for the introduction to, and follow up for, the materials used.

MacIntyre (1963) discussed the inclusion of locally recorded video content for higher educational in a phrase of understatement: "Assuming that the participating faculty can be provided with suitable incentives to use the new instructional media, consideration must also be given to motivating the departments and individuals who do not directly participate in their use" (p. 90). Within that realm, he cited fears from faculty that any costs savings realized by the use of the technology would be spent in other places than the cost center that realized the savings as a potential barrier. In addition, a concern was expressed that video content would be reused after it had become obsolete, that teaching assistants might lose their positions due to the ability to use one senior

faculty member's content repeatedly, and that other faculty, who did not serve as video lecturers, would lose touch with students.

Time was again listed as a factor to the adoption process for teachers and institutions in Cook's (1964) discussion of new technologies and educational decisions. To use the new technologies, teachers would require more preparation and "keeping-up" time to select and implement the technologies (p. 159). The same collection of essays (de Grazia & Sohn, 1964) contains references to administrative issues such as "school administrators who sometimes force programs on teachers without bothering to explain to them how they work or why they should use them" (Margolis, 1964, p, 119); financial issues and "also in the time required for the preparation and evaluation of materials by the teachers (Ely, 1964, p. 45); issues of displacement by machines, where "an organization of machines, such as a television system, removes control of the educational system from local, professional or professorial levels and moves it to someone else—to the state or federal government….(Finn, 1964, p. 23). A keen insight to the dynamic changes occurring in education at the time was given by Evans (1964), who pointed out the unlikelihood that "any man or woman will be able to go through life with his original potential of new discoveries. Retraining, which we now consider a remedy for the few, will become a matter of course for all" (p. 60). This statement has proven to be true over and over again as new educational technologies have added to or supplanted older tools.

Sonquist (1977) noted that educators and institutions tended to be reactionary, rather than proactive planners of educational technology use. Participants identified factors associated with faculty adoption of technologies including "awareness, understanding, perception of its relevance, perception of social support, and adequate

technical support" (p. 70). These issues were framed within the scope of power issues in the institution, fear of computer centralization, the political nature of equipment purchase decisions, having equipment availability for all, and the organizational policies in place for dealing with these issues.

In a 1998 study of 557 teaching faculty at a large Canadian research university, the greatest barrier to achieving quality learning and communications technologies was lack of institutional or departmental funding (Anderson, Varnhagen, & Campbell). Faculty participants in this study noted they experienced conflicts in demands on time and resources, and also mentioned a lack of ability to apply technology skills to teaching and obtaining information about the technology. Greatest incentives identified by this group were having training and support resources in place and tenure and promotion considerations for teaching with educational technologies. This group named their colleagues on campus as providing their greatest leadership source.

Meyer (1998) conducted a study of faculty workloads in her report, sponsored by the Office of Educational Research and Improvement. Meyer believed there were several barriers to improved faculty productivity and workload issues, some based in long-held perceptions she called increasingly questionable, "that teaching equates with lecturing and that the classroom is the only place where learning occurs" (p. 6). Seat time and credit hours for students, she noted, was often a measure of student achievement, although she did mention more critics to those notions were raising their voices at the time.

Meyer (1998) also found growing competition from new educational providers, a lack of perceived leadership, and a misplaced notion that faculty members were

responsible for all of higher education's problems. "New technologies will allow learning to occur at the time, place, and pace preferred by students rather that the institution. Technology can help improve productivity as well as make education available on every desktop" (p. 7). In order for these changes to occur, would "require the minds, hearts, and emotions of all institutional members. Assumptions must be rethought, processes revised, behaviors relearned" (p. 8), Meyer noted, in order for institutions of higher education to cope with increased need for access to education, to counter institutions' rising costs, and to meet the need for additional productivity.

Algozinne et al., (1998) described their efforts to use state-accepted competencies to address the use of instructional technologies among faculty and students at a teacher's college. Existing facilities and resources were used, coupled with the competency matrix, to insert technologies into instructional content as well as instructional methods. "Too often, technology innovations go unnoticed, ignored, or seldom used in today's schools; and, the effects of failing to keep up continue to downgrade America's educational system" (p. 1). The authors noted that, while their approach to technology integration showed promise, more research was needed regarding this and other similar methods of technology incorporation.

Considering distance learning technologies, Ndhahi (1999) conducted a quasi-experimental study among industrial and technical education faculty. He found there were enablers (desire to improve personal skills, a desire to reach remote students, the opportunity for more pay, and a need to increase enrollments) to technology use. Additionally, he identified barriers to technology use that included difficulty in conducting demonstrations with video technologies, locus of control issues regarding the

assignment and selection of technologies, poor teaching skills, lack of a clear organizational policy regarding technology use, lack of recognition and support for technology use, fear of change, and lack of involvement in the planning process. Adequate training on the technologies they were expected to use would be important to boost confidence levels by faculty members and lessen the chances of resistance to participation. Ndahi also noted that faculty members would be more likely to attempt to use new technologies given the proper levels of encouragement and support from the institution and administrators.

Spotts (1998) examined factors for use of instructional technology in higher education. Issues of perceived value were brought to light, along with a need for members of the faculty to have more support, time, and recognition. Equipment availability frustrated one study participant, who said, “the university encourages you to use the technology, and then there are only three classrooms on campus where you can utilize the presentations you’ve developed” (Facilities para.). Spotts identified three user levels of faculty technology implementers: high level, medium level, and low level, but noted, “The most evident factor differentiating high from low users was the perceived value or benefit from using instructional technology. It was the one consistent thread running throughout the different sections of the interview. (Perceived Value para.).

Ertmer (1999) continued the identification of technology adoption, having named two main drivers. Called first-order and second-order barriers to change, Ertmer described the barriers to be intrinsic versus extrinsic in nature. First-order barriers are extrinsic; therefore, they do not touch the educator’s personal value system. Such issues as lack of organizational vision, equipment availability, and other such problems can be

resolved without requiring any real change in an individual's belief system. Second-order barriers, however, confront fundamental beliefs about the practice and conduct of teaching. This can lead to new personal goals for technology use and might include management of personal fears regarding confidence levels, decisions regarding when to incorporate technologies, and other pedagogical changes of perspective. While first-order barriers might be overcome with additional resources or more training, second-order barriers were at once more difficulty to identify, perhaps because they are less tangible.

It was roughly at the turn of the 21st century that a shift occured in research: a move from reviewing computer-based technologies in general to a more focused review of the online technology environment, but barriers and enablers remained the same. Rogers (2000) identified external and internal barriers to adoption, similar to those brought to light by Ertmer (1999). Rogers named socio-cultural barriers of economics and location among others outside the control of the instructor. Among instructors, Rogers identified "personalogical" barriers of instructor attitudes, beliefs, and teaching philosophies, as well as subjective levels of individual faculty member's levels of technology acceptance with adoption. Time and funding levels were also listed as having bearing (Rogers, 2000).

Insufficient time, equipment, and training (Beggs, 2000) were listed as the top three barriers to University of West Georgia Faculty (*N*=157) when asked about negative

influences to technology adoption. Muilenberg and Berge (2001) identified as many as ten barriers to technology adoption:

- Administrative structure
- Lack of organizational change
- Lack of technical expertise
- Social interaction and quality issues
- Access issues
- Faculty compensation and time considerations
- Technology threat
- Legal issues to technology use
- Perception of the effectiveness of the use of technologies
- A need for improved student support services

Spodark (2003) named five obstacles to technology adoption at a small liberal arts university. A technology facilitator, Spodark was charged with helping faculty include technology in their course offerings. She cited a lack of vision as a barrier, along with a lack of leadership (not even the vice president of academic affairs could be convinced to use the Blackboard learning management system to deploy a course), equipment issues, a lack of incentive for change and low faculty participation as obstacles. A small qualitative study conducted by Finley and Hartman (2004) identified issues related to adoption of technology as a digital divide; philosophical issues, where faculty members felt there was too much reliance on technology; anxiety due to lack of training; and institutional culture issues provided the main barriers to technology inclusion.

Maguire (2005) completed a literature review that aggregated information regarding faculty barriers and influences on teaching with technology that was collected from studies conducted from 1998-2002. Her review of 13 higher education studies selected "tended to focus on identifying factors that either motivated or deterred faculty participation in online teaching" (Purposes of and Participants section, para. 1) and showed faculty perceive "a lack of standards for an online course, the threat of fewer jobs, and a decline in usage of full-time faculty" (Findings, para. 1), as well as the inhibiting factors of lack of time, lack of institutional support, and lack of training, and including a lack of scholarly respect in the areas of promotion and tenure.

In 2007, Pajo and Wallace studied barriers to the application of web-based technologies by university instructors. Collected from 34.8% of 719 faculty ($n$=249) surveyed in three colleges, data indicated a large majority (72.4%) cited time as the greatest obstacle to adoption: time to learn to use technologies, time and effort to develop courses, and time needed to use and monitor the use of technologies. Pajo and Wallace noted several other barriers, including: lack of resources, lack of knowledge/skill, no recognition for technology use, lack of teaching support, equity of student access, lack of role models, software and hardware access, a lack of perceived value to using technology, and a fear that technology would replace instructors, threatening job security.

Data collected from 237 higher education faculty serving at the 15 peer institutions of the University of North Dakota offered 16 general technology recommendations for faculty development (Georgina & Hofstra, 2009). The top three items named were "release time for training, technology mentors for peer-to-peer

discussions and innovations, and supplemental pay increases to faculty who are the most involved with the evolution of the integration of technology into pedagogy" (p. 695).

A 2012 study reported that the most difficult barrier to overcome, however, "may be technology anxiety which primarily arises from the design and teaching of online courses, but can be extended to include technology in general" (Johnson, Wisniewski, Kuhlemeyer, Isaacs, & Krzykowski, p. 63).

Lane (2011), who used a focus group method to interview a purposive sample of 40 faculty from a total population of 900, reported that "technology itself, whether in regards to access or sufficient infrastructure, was not the most significant obstacle reported by faculty; instead, the most significant obstacles involve time or lack of knowledge" (p. 43).

"Instructional technology is always a moving target, ever in flux, and constantly requiring regular investigation" (Jurowski & Kerr, 2010, p. 73). The technology portion of online teaching, however, is only part of the puzzle and, as research has shown, fomenting a change among faculty based on technology considerations alone is not sufficient in today's academic environment. Time and infrastructure support, among others stated, also have bearing.

**Teacher Preparation for Higher Education**

Studying the science community of educators, Gardner and Jones (2011) discussed the role science graduate teaching assistants (GTAs) play in the educational environment. They noted that,

> Given that the amount of contact that science GTAs have with undergraduate science students and the apparent role they have in defining the quality of

> instruction, it would seem that their pedagogical training might hold high priority in academic settings. This is not often the case. (p. 32)

Harris, Froman, and Surles (2009) found a similar situation to be the case in mathematics departments. They discussed the need to involve students more frequently in the science, technology, engineering, and mathematics (STEM) fields in relation to teacher preparation, and noted that little attention at the tertiary level had been given to the pedagogical qualities the teacher brings. Harris, Froman, & Surles described sufficient content knowledge as the only basis by which these instructors were considered to be prepared to teach to students, to the neglect of pedagogical and other types of training.

Even when opportunities for improving pedagogical skills are made available, Whitfield and Hickerson (2013) found, “Based on the data, teaching centers are common across college campuses, but not well attended by graduate students” (p. 7). Of 83 graduate students surveyed, only 35.4% had attended the teaching development center available to them.

Houlihan, Fraser, Fenwick, Fish, and Moeller (2009) described anxiety as being a frequent factor among higher education faculty. Forty-two university faculty members from a small, undergraduate Canadian university volunteered to participate in the study, which found that instructor personality had a relationship to in-class teaching methods, especially concerning class discussion and group work. Workload, the need for members of a faculty to be proficient teachers as well as researchers, and a lack of funding were listed as stressors among the faculty group. Houlihan et al. reported that a lack of teacher

preparation was a part of the problem, and that disruptive students were another cause for anxiety in the classroom.

**Emotions Related to Teaching and Technology**

Johnson, Wisniewski, Kuhlemeyer, Isaacs, and Krzykowski (2012) conducted boot camp style faculty development sessions at their institution. They found learning for faculty to be often disregarded or ignored, and said, "The most difficult barrier to overcome, however, may be technology anxiety, which primarily arises from the design and teaching of online courses, but can be extended to include technology in general" (p. 63).

Beaudry and Pinsonneault (2010) studied the effect of emotions of users as they related to the implementation of new information technologies (IT). A survey employed Likert-scale ratings to determine emotions evinced by employees of two banks, which were changing IT platforms. Emotions can have important subsequent implications for users. Their study found, among other emotions, that "anxiety is positively related to psychological distancing which is negatively related to IT use" (p. 705). They also found that if anxious users were able to reach out to the community for support, these negative feelings could become positive.

Kidd and Larke (2012) conducted a phenomenological study among faculty. Among their findings was the fact that their faculty experienced fear and other emotions as a part of their feelings of being unprepared to teach online courses. "Attitudes towards technology, self efficacy, and computer anxiety played an important role in shaping one's use and experience of the public health faculty who engage in the activities of online teaching, as well as their emotional reactions and responses" (p. 516).

An electronic survey was used in a public southwestern university to survey 87 members of the teaching faculty. Of that group, only 30 percent believed they had had enough training to teach online (Fish & Gill, 2009). However, they also learned that those faculty members who taught online found the experience to be a satisfactory one, and that often, instructors were using peer learning and trial-and-error methods to supplement the formal training given for online teaching.

The literature review includes sources that were identified as themes began to develop from the interviews conducted as part of the case study process. Grounded theory research is an inductive, rather than a deductive, process. Rather than test a hypothesis for fit, grounded theory seeks to understand a concept or activity from the themes that emerge throughout the research. Basing newly constructed theories directly on observed and reported behaviors can allow information to be recognized in new ways, as opposed to attempting to prove a theory or force responses into a pre-conceived format (Charmaz, 2006; Corbin & Strauss, 2008; Glazer & Strauss, 2008). Grounded theory will be discussed further in the Methods chapter.

**The Quality Matters Rubric**

Although the QM rubric has been in existence for some time and is itself based upon research, a better understanding of the process and its acceptance by faculty users is needed, as little research currently exists on the topic. A WorldCat.org search conducted on July 29, 2013, returned only 12 unduplicated results. Zimmerman (2011) examined the process as it regarded rater reliability for the rubric standards, and Greenberg (2010) examined the adoption of the rubric at a community college, using activity theory to study all stakeholders involved in course design.

Conference proceedings described QM using the lens of Community of Inquiry (Bogle, Boles, Day, Matthews, Swan, 2011) as it relates to improved learning outcomes for students. Learning outcomes are also considered by Ni, Diomede and Rutland (2012), who view the success of the QM rubric as identified by improved student grades and retention. Wright (2011) used Bandura's theoretical framework of self-efficacy to view faculty learners' perceptions about their own ability to design. Wright's (2011) study used action research to measure the perceptions of 17 members of the college of education faculty who were exposed to QM standards and its associated rubric. Wright used Bandura's theoretical framework of self-efficacy in the large metropolitan southeastern university he studied to gauge faculty members' perceptions of their ability to construct and deliver online courses. The study did not, however, speak to actual transfer of learning as described by the evidence of technologies used in a course. Articles regarding student and faculty comparisons (Eskey & Schulte, 2012; Lewis, Baker, Britigan, 2011) of course offerings based on the use of the QM rubric also do not touch on whether the rubric helps faculty include technologies based upon its use.

**Summary**

The adoption/rejection points that coincide with the decision process of the communications channels were of specific interest in this case study. How did the use of the QM rubric influence these decisions, if it did at all? With regard to the adoption/rejection decision for technologies in general, what factors impelled faculty to come to the conclusions they did regarding use or non-use? Also, once a technology component was put into place, did that member of the faculty feel more or less

comfortable about continued use of the technology? Was comfort with one technology generalized to the use of others?

This chapter reviewed the literature regarding the barriers and, in some cases, supports for the use of educational technologies, and, more recently, web-based and online learning technologies. Time, resource allocation, administrative support, and issues of perception and pedagogical stance are themes presented throughout the literature. Little research regarding use of the QM rubric has been conducted, calling for a need to continue to explore this rubric as it relates to the acceptance or rejection of learning technologies.

Methods for the collection and reporting of data are discussed in the upcoming chapter, along with a brief review of case study methodology and the use of grounded theory as a means to attempt theory development. The role of the participant-observer is presented with its inherent benefits and drawbacks. Study limitations define the scope of the research.

## Methods

This research was designed to use a case study approach and employed a mixed method format to explore the perceptions of faculty regarding QM and the adoption or rejection of innovation and technologies in the classroom environment. "There is a recognition that quantitative and qualitative research are each connected with distinctive epistemological and ontological assumptions, but the connections are not viewed as fixed and ineluctable.... As a result, mixed methods research becomes both feasible and desirable" (Bryman, 2008, p. 43). Content changes were examined in courses that used the Blackboard learning management system prior to and following completion of the *U Innovate* faculty development program, which included the introduction of the QM rubric. "Better understanding of the multifaceted character of educational and other social phenomena can be obtained from the use of multiple approaches and ways of knowing" (Greene, 2007, p. 20). This approach allowed for examination of not only the number and types of changes in teaching strategies implemented after QM sessions were attended, but also allowed for the consideration of faculty perceptions of the process, how and why changes were or were not implemented within courses, and the opinions of members of the faculty regarding the QM concept and its use overall.

Fifty-eight participants attended a total of 368 instructional sessions as part of the *U Innovate* initiative. Of those who attended sessions, 34 members of the faculty qualified for the $1,500 conference stipend. Eighteen faculty members chose non-QM based sessions to qualify for the stipend, and 16 opted to attend the five quality classroom sessions (all participants, to meet the stipend criteria, were required to attend one session on the topic of flipped classrooms). It was among the Quality Classroom sessions that

the QM booklet and rubric were discussed, as well as ways the rubric standards might be met in the classroom environment. From the 16 who qualified for a conference stipend, an interview group of 10 was selected. Criteria for selection included current teaching responsibilities at the time of the interviews, as broad a selection as possible across disciplines, and a representation of both on-ground, blended, and online teaching duties.

**The Case Study Method**

"The basic case study entails the details and intensive analysis of a single case" (Bryman, 2008, p. 52.) This case study examined "how and why" questions regarding diffusion of information as it pertained to the adoption of innovation by higher-education faculty members. The case study method allows for several sources of evidence to be used. Of the six sources of evidence Yin (2009) identifies to support the case study, five were used:

- Documentation: the letters, memos, agendas, e-mails, and other correspondence that surrounded the project and its conclusion
- Archival records: university policy, learning opportunities calendars, Blackboard course archives
- Interviews with faculty members
- Participant observation, as I was involved in the *U Innovate* process and also attempted to apply the rubric to my course delivery
- Direct observation of interview participants' body language, facial expression, and voice as they shared their histories, knowledge, and teaching backgrounds

Faculty members who construct courses at the university upon which this study is based generally create content on their own, as the institution employed only one

instructional designer at the time of the study. All other members of the Learning Technologies staff within the IT department combine some aspects of course design with technology education, documentation, and Tier II educational technology product support. At the time of this study, there were no mandates in place requiring the use of the learning management system, or any type of quality assurance rubric for course development. These differences in requirements for rubric implementation and technology use required additional investigation into the topic from within a more local, context-based setting.

**Quantitative Data collection**

In the first step of the data collection process, quantitative data was extracted from information contained within Blackboard course shells and courses' associated syllabi. Participants gave permission to the researcher, using her administrator's Blackboard access designation (part of her role within IT), to archive the content from a pair of courses they taught, one before and one after exposure to the QM rubric information given during the *U Innovate* initiative. Data was extracted from September 9—November 15, 2013. The archives were run only once, as the courses had been completed and therefore not subject to change. These archives are stored on university servers and on the researcher's computers. The archive process preserves all course information, including discussion content and grade information (grades were not consulted and used as part of the study, and the grade center information was only used as an aid in determining assessment types). The syllabus for each course, when available, was also downloaded and saved as part of this data collection. Syllabi were saved into a separate file with other documents relating to the study.

An open-source informational tool was also used as a part of data collection. The Advanced System Tracking and Reporting tool (ASTRO) was designed to "show you how your system is being used in relation to course, instructor, student and tool adoption across multiple semesters and departments" (Nucifora & Kunnen, 2009, p. 1). The tool provides summary information collected from content within a course, such as how many course folders exist; how many video items were used; the number of discussions forums, quizzes, and assessments; and other countable content types. ASTRO had previously been installed as a building block on the university's installation of the Blackboard learning management system. ASTRO summaries were run on each of the courses individually, and the resulting reports were saved via screen capture as image files into a folder with other collected data.

Investigation proved the ASTRO data could not be taken at face value. As course content was examined, comparing actual course content to the information reported using ASTRO, grade center totals and other course discrepancies became apparent. These could be based on duplicated assignment columns that weren't used, as well as duplicated weighted total, external totals, and totals columns in the grade centers. In other parts of the courses, if content had been copied from previous semester(s) and not removed, these tallies were also skewed. For that reason, while data was reported using ASTRO as a basis, visual verification of the contents of each course was included as part of the analysis.

Other quantitative results, if taken at face value, also did not provide complete evidence in all cases. For example:

- Other issues might have an impact on course redevelopment. These might include issues in an instructor's personal life, departmental requirements, or other motivators.
- In some classes, students bring a higher level of involvement or commitment, and their increased participation encourages others to do the same. This can have a particular impact on the number and quality of discussions.
- Even after participating faculty attended *U Innovate* sessions, not all of their syllabi were available online.
- Using a new tool can have an apparent negative impact on another tool. Moving to a course wiki, as an example, might demonstrate a change in technology use, but this will likely be reflected in a lower number of discussions and related posts.

The Blackboard learning management system was used to deploy content in each course, except where otherwise noted above.

Members of the university faculty group were offered instruction regarding several aspects of the teaching and learning environment as a part of the *U Innovate* series from September 17 to December 7, 2012. A portion of the attendees chose to attend the Quality Classroom track of sessions; in doing so, they qualified for a stipend of $1,500 toward travel, registration fees, and other expenses incurred as a part of attendance of either the EDUCAUSE regional conference or the Sloan Consortium emerging technologies conference. (Members of the faculty could attend five other sessions plus a flipped classroom session to earn the stipend also, but these attendees were not included in the study.) Contents of a course taught prior to session attendance

have been compared with the materials contained within a course taught after session attendance for nine of the ten of the participants (one participant was new to the teaching environment and had not taught prior to QM exposure). The Blackboard course shell for each of these courses was visually examined for such quantifiable measures as:

- Clear instructions regarding how to get started in the course and where materials were located
- The number and types of discussions and their associated word counts
- A tally of various types of technologies employed in the courses, in what way, and how often
- The use, or lack, of learning outcomes
- Alignment of course and unit objectives
- The number and types of assessments used to measure learner success

In order to provide reporting on the discussions forums available within each course, Blackboard's Performance Dashboard was used to identify individual users' participation in forums and their subordinate threads. The Performance Dashboard, built into Blackboard, is used as an aid in measuring student progress through a course. Only the discussions portion of the page content was used, however, as individual student information was not a part of the study. The following measurements, available within the performance dashboard, were reviewed on a per-user basis:

- A list of forums (the original question or theme of a discussion)
- The number of posts (individual messages) found in each forum
- The average post length, in characters

- The minimum number of characters used in a post
- The maximum number of characters used in a post

It was discovered when carrying totals to a spreadsheet that some discussions were logged, but showed zero characters submitted. Exploration of these posts showed they resulted when students posted a web link only, with no additional content or commentary. In order to provide a numeric tally for these links, all characters counted in the first 10 links of the first course where they were encountered were totaled and averaged. That average character number was used in place of zero for a better representation of participation. Visual verification was also required regarding discussions posts showing zero characters: sometimes a web link was included, but other times, the post had been created but contained no content, resulting in a true zero value.

Descriptive statistics were used to compare changes in content from a numeric standpoint. No attempt to measure causation or correlation has been made due to the number of confounding variables present in the course creation process. Issues such as personal life events, changes in department course requirements, equipment changes, and other changes to courses that might have been made without regard for instructor choice are some of the variables that confound the question of technology selection. "The benefit of these types of descriptive statistics is that they describe where a particular observation lies compared with everyone else" (Wheelan, 2013, p. 22), or in this case, compared over time. Only courses offered in the same format type were compared (i.e., both courses had the same online, blended, or face-to-face delivery method). Permission was obtained from all instructors whose courses were reviewed (Appendix B), and no

attempt was made to evaluate actual content of any course, the course delivery itself, or any type of student information or specifics of interaction with students.

A total of nine course pairs were evaluated as part of this case study (one comparison could not be made, since the faculty member did not teach until after exposure to QM information). Course instructor interviews provided context and triangulation for the innovation decisions made, as described in the following section.

**Qualitative Data Collection**

Semi-structured interviews were conducted from January 20—March 31, 2014 to ascertain perceptions regarding QM and other factors regarding technology adoption. How the information contained within the materials, the five one-hour learning sessions, and the discussion that evolved as part of the learning process formed the basis of the interview. Participants were asked how they believed they transferred the information received to their courses. The questions also sought to understand the prior teaching and learning environments experienced by each participant to place each user in his or her context (Appendix C). The questions sought to determine those factors that drive selection and/or discontinuance of the use of a technology or innovation for each instructor. The observed in-course application of QM standards also provided a basis for the exploration of such concepts as course navigation and student support.

Interviews were selected as a data collection method, as “it is generally believed that the interview is better at revealing information that is complex or emotionally laden” (Powell & Connaway, 2004, p. 150). Guiding questions were employed to allow each faculty member to describe the course building process with regard to structure and

innovation. Similarities and differences of views regarding the learning environment were explored.

All interview sessions with participants were conducted in a face-to-face setting. The interviewer and each participant met in offices on the university campus, either at that of the researcher or the participant, at the location deemed most convenient by the participant. This pattern held true with the exception of one interview, as that person had recently left the university and was then teaching in another state. Four participants were interviewed in the researcher's office (Kay, Jay, Dale, Lane), five in the participant's office (Dee, Pat, Ash, Kai, Syd), and one participant (Bay) met via Connect Pro, at a distance. All interviews were recorded on the researcher's computer, using Adobe Connect Pro to digitize content. In addition to the voice recording, the researcher made hand-written notes of each interview as it progressed. The researcher first transcribed each recording, and then went through each a second time for accuracy, and yet again to appreciate the inflection and emotions each interview revealed. Interviews continued as transcription was in process, and the resulting transcripts were uploaded into a qualitative software tool called N-Vivo.

Copies of the original audio recordings, the text transcripts, and notes taken as part of the interview process have been collected and digitized for preservation. They are passcode protected on the researcher's laptop computer, stored externally on a flash drive, and are contained within the researcher's NVivo file for the dissertation. The original recordings are also password protected and stored on the university's servers in the Adobe Connect Pro environment and within the researcher's computer files. The recording files and transcripts, as well as all other collected data, will be housed in

password-protected locations both on the researcher's computer and in virtual storage, and will be retained only until this research and any resultant publications are completed. They will then be destroyed.

To maintain the anonymity of all participants, random unisex names were used as identifiers. Because of a large imbalance of female to male participants, the study did not attempt to view innovation incorporation by gender; therefore, each name selected was arbitrarily assigned a masculine or feminine designation. No surnames were used. Each individual was a tenured or tenure-track professor at the time of interviews, with the exception of one. This individual left the university for personal reasons the semester following exposure to the *U Innovate* series, but continued to teach on an adjunct basis. No course comparison information was available for Jay, as his teaching did not begin until after he had completed the Quality Classroom sessions. The university being studied houses four schools and an academic library; all are represented in at least one department:

- The Teachers College - 3
- School of Library and Information Management - 3
- School of Business – 1
- School of Liberal Arts and Sciences – 1
- University Library and Archives – 2

**Grounded Theory**

Grounded theory research methods were used to evaluate the qualitative information given by interviewees. When employing grounded theory research, interview details are broken down into component parts that are then compared and categorized as

new relational concepts within and among themselves. This is in contrast to the testing of a theory, where data is compared to previously posited ideas or notions. The inductive nature of this process allows theoretical frameworks to evolve, rather than requiring the researcher to force data into already-constructed models. The resulting framework may complement an existing model, and can be used to extend it (Strauss & Corbin, 1990). "Allowing substantive concepts and hypotheses to emerge first, enables the analyst to ascertain which, if any, formal theory may help him generate his substantive theories. He can then be more faithful to his data, rather than forcing it into theory" (Glaser & Strauss, 2008, p. 34). Grounded theory building was chosen in this case to attempt to determine the underlying causes for the inclusion (or lack) of innovation in the classroom environment. The QM rubric and associated standards provided a structure by which to view changes that occurred in courses; grounded theory use allowed those changes to be explained beginning at the source and working toward a testable model.

A caution of this grounded theory approach involved the need to examine collected interview data without bias or previous assumptions. The researcher was active in the development of the materials that supplemented the QM booklet and rubric, as well as all other parts of the *U Innovate* sessions. Among the techniques offered by Strauss and Corbin (1990) to improve these conditions, the researcher:

- Used questioning to deeply examine various aspects of a passage or phrase. This involved applying who, what where, how, and why to look at all angles of a statement.
- Applied concepts of temporality, such as frequency, duration, rate, and timing of occurrences reported.

- Scanned the transcripts' words and phrases that appeared to be significant, and then applied all possible meanings to them.
- Applied the opposite meaning to a situation or event, or examining both extremes of a dimension (Strauss and Corbin term this as the "flip-flop" technique).
- Made comparisons, both close to and far from the concept under study.
- Attempted to recognize bias indicators revealed by the use of such words as always, never, or can't.

A coding matrix developed as interview data was analyzed. Nodes, or topics, were assigned as they arose. These were revisited, using the constant comparison method, as interviews, transcriptions, and coding continued. A list of themes and subthemes appears in the Results chapter.

**Reporting**

Quantitative data is reported using descriptive statistics. The number of confounding variables surrounding course construction precludes the use of correlation measures. Confounding variables include:

- Technology use requirements put into place at the direction of a department chair or school dean, versus the instructor;
- Personal issues the instructor faced at the time that might have had an impact on the changes in course construction;
- Unintended effects of technology choices, which could inflate or reduce the correlation being sought.

Qualitative data is reported based upon the constant comparative method for development of grounded theories. These results are analyzed through the lens of the diffusion of innovation model introduced by Rogers (2003).

**Study Limitations**

One limitation of the study surrounds the issue of participant observation as an evidence source. The researcher in this case:

- Provided the instruction for the Quality Classroom sessions, which included introduction to QM materials;
- Also redesigned a course and submitted it to the provost as part of the *Raise the Bar* initiative;
- Had a working relationship with the faculty involved in the study, due to duties carried out as a part of the Learning Technologies team.

The participant-observer role required vigilance as data was transcribed and coded to ensure that bias was removed where possible and theories were allowed to develop organically.

This is due to the potential for researcher bias to be introduced due to direct involvement in the study and its outcomes; however, the participant-observer role also allows the researcher to better understand the topic, the study participants, and their environs. Schwartz and Schwartz (1955) offered three strategies for the participant-observer to cope with the issues of bias.

> The observer must (1) be motivated to look for his biases; (2) look for them actively and, having come upon a bias, explore its meaning and ramifications; and

> (3) look upon the uncovering of his biases as a continuous process of discovery-as an ongoing process to which there is no end. (Schwartz & Schwartz, 1955, p. 353)

One of the ways that I coped with the issue of bias was to transcribe my own interviews, and to replay them afterwards. I replayed them the first time for accuracy, but once coding began to uncover the emotional aspects related to teaching, technology, and innovation I listened to them again for tone of voice. All but one of the interviews was conducted in person as well as being recorded, and both the participant and I used cameras during the one web-conference interview. The face-to-face interview, in conjunction with repeated listening, allowed me better understanding of the nuances of voice, gesture, and language that continued to form the basis of the coding process. Throughout coding and later reporting, I was cautious to keep the context of each comment in mind, so as not to incorrectly report on the statements participants made.

Another study limitation involved the inability to generalize, based upon the small sample size and contextual nature of the study, as well as the relatively short duration of the exposure to QM materials, which may not have been enough given enough time for participants to fully translate the new learning into observable content within their course environments.

Last, an attempt was made to compare only one set of parallel courses at one institution as part of the study. This also results in an inability to generalize to a larger population.

**Summary**

Methods for data collection and reporting were discussed in this chapter. Case study methodology for the project was described. Faculty interview transcripts, it was

noted, were evaluated using constant comparison methods within a grounded theory approach. A grounded theory approach was used to explore the adoption of innovative technologies by faculty members who have a knowledge of the QM rubric. Data collection occurred from September, 2013 to March, 2014. The pros and cons of the participant-observer were discussed, and some study limitations presented.

## Results

In all but one case (Jay, who did not teach a regular semester course until after the conclusion of the *U Innovate* series of instruction), comparisons were made from a class taught prior to exposure to QM and the same course number, taught in the same environment (online, face-to-face, or blended), taught following exposure to QM as outlined in Chapter 3.

### Quantitative Data Examination

**Kay, Blended Format (Fall 2012, Fall 2013).** Prior to her experience with QM materials, Kay did not use a "get started here" tab or other type of document/direction to orient the students to the course. She did, however, make a first-day announcement directing students to post to an introductions discussion board, and to look at the boards for additional course information. In the course taught after QM materials were reviewed, Kay also got students started with an announcement and directions for them to familiarize themselves with the course and to review the content located on a course timeline document.

Both of these courses used discussions as a peer learning tool, as well as a place where Kay was able to respond to student questions. Her syllabi, both before and after QM exposure, stated, "I expect **at least one post** [sic] to Blackboard each week. A post may be a question, answer to a classmate's question, opinion, etc. They do not have to be substantive comments." Reviewing the Blackboard course shells, this proved to be the case both before and after exposure to QM. Students asked and answered questions among and between themselves; also, the instructor stepped in to provide support or other information as needed. Table 3 provides character counts for discussions in the course.

The courses used the following technologies (Table 4):

- Lecture notes and other documents (before, after)
- Two websites for problem-solving/practice work were used in each course

Course outcomes were used for the course overall; however, neither the course taught before nor the one taught after QM exposure used specific objectives for each unit's work.

Practice homework, homework, and tests aligned with the stated course outcomes, and were used in both courses. An evaluation rubric for each task type was included with the syllabus, describing criteria for successful completion of each.

Assessment tools for each course are listed below. Following the assessment type, numeric values indicate counts for each type of assessment prior to and following QM exposure, divided by a comma.

- Practice homework (2, 0)
- Homework (11, 9)
- Tests (2, 2)
- An essay assignment (1, 0)
- A group essay assignment (0, 1) (the group assignment was cancelled and all points awarded, based on instructor illness)

With few exceptions, the course taught after receiving QM information replicated closely the course taught previous to QM exposure. Kay defined herself as a late majority adopter and defined time as a major issue as she attempted to incorporate new technologies.

**Dee, Face-to-Face Format (Fall 2012, Spring 2013).** Dee's course taught prior to *U Innovate* attendance did not use the Blackboard environment at all to convey information to students, other than their grades. Therefore, no "get started" or roadmap information was provided to students, no discussions (Table 5) were used, no syllabus was available via the LMS, and no technology use was visible prior to exposure to QM. No unit or course objectives were observable. Whether course objectives or outcomes were used is unknown. However, the course shell was used to record grades for each course (Table 6).

Grade Center columns used (the first number represents columns before QM; the second number, columns after):

- Quiz (10, 10)
- Exam (4, 4)

As no quiz or test content appeared in the courses, these columns appeared to be manually generated to hand-key paper quiz and exam results. Grade Center categories indicated that this series of quizzes and exams comprised assessment for the course. This is also the case in the second course reviewed.

In her new course, launched following QM, Dee created a series of eight pre-recorded tutorial sessions on various key course points and included them in the course, as well as providing a PowerPoint presentation and two documents that summarized content given. These changes, while relatively small, marked a change in Dee's teaching philosophy, as she reported in our interview. Pointing out her change in perspective following not only the *U Innovate* sessions but also after attending the Sloan-C

conference, Dee said, "What I said at that time about that conference was that it was the best experience that I never expected to have."

Placing herself in the early majority group on the adoption curve, Dee stated she continues to work on course content, applying some of the recommendations from QM and others in her course environments. At the time of the interview, Dee was reworking another class incrementally. "I did some things that for me, were very new. But I still stuck to stating the objectives, and using rubrics, and so forth. And I followed the objectives and to some extent, follow the program." She said of QM, "It completely caused me to rethink and transform the way I teach, and I don't teach that way anymore.

**Dale, Fully Online Format (Spring 2012, Spring 2013).** Prior to QM information, Dale's course was organized well. An initial announcement gave textbook and other basic course information (start and end dates, syllabus information). This announcement also directed students to "Help with Blackboard" materials contained in the Course Content tab of the course. Tutorials located in this folder covered:

- Assignment submission
- Discussions participation
- Online test taking
- Navigation
- File uploads (assignment attachments)

Following QM exposure, a Start Here link in the course menu was used to tell students exactly what materials were due for the first week of class, and when. This appeared in addition to the initial announcement that was sent out, as was seen in the "before" course. The second course included a slightly expanded instructor introduction

than the first, and provided contact information for the course librarian. The how-to Blackboard tutorials were also included.

Content in each course was organized by week. Prior to QM, each unit contained a named folder link. Following QM, each unit folder displayed the week's objectives (Emphasis for This Week), deliverables (Tasks for This Week) with due dates, and an image that represented the topic of each week's study. These "snapshots" gave a clear summary of what was to be accomplished in the unit.

Discussions were also used in each course periodically (Table 7). In the "after" course, one forum was set up as a place for students to ask questions of the course librarian. Discussions were held more frequently after QM review (Table 7), but this could be due to the larger enrollment size in the "after" course (15 versus 3).

Both before and after QM, Dale's courses used a variety of technologies to convey content (Table 8):

- A lecture document in each week's folder that contains original content, cited content, additional article/readings links, and a list of assignments
- Discussions forums
- YouTube video
- Web content links
- Homework assignments
- Tests (including a syllabus quiz in each course)

While student outcomes were listed on the front page of each syllabus, only the "after" course listed weekly course objectives (Emphasis for This Week). These aligned

with the stated outcomes and unit name. The "after" course also used two collaboration sessions (Blackboard's live meeting room).

In the course offered after QM instruction, Dale added an embedded librarian to her course. One discussions forum was dedicated to "Questions for our Librarian."

Dale provided students a rich online experience, both before and after her exposure to QM and *U Innovate.* She placed herself as an early majority adopter. Dale was especially cognizant of her students' preferences, and has, on occasion, polled them to ask whether a technology she added to the course was well or poorly received.

Assessments in the courses included:

- Written assignments (6, 6)
- Graded discussions (6, 8)
- Tests & Quizzes (4, 4)

Few changes appear between courses. The syllabus was reorganized, but contained essentially the same information from semester to semester.

**Pat, Online Format (Fall 2012, Spring 2013).** Pat's course shells both prior to and following her attendance in the quality classroom sessions contained a recorded syllabus review, using Adobe Connect Pro in the former case and Panopto lecture capture in the latter. Students were notified about this content via announcement. In her first course, Pat's introduction appeared as the first lecture recording among Course Content, but in the second course the recording was available only via the Tools link in Blackboard. It is possible this information was e-mailed to students so they would know where to get to this information in the second course. Both courses contained a brief instructor bio under the Faculty link.

Neither of Pat's courses used discussions within Blackboard as a communication vehicle (Table 9). In the "after" course, though, Pat asked students to debate current topics relevant to the course using the Campus Pack blog tool. Here, students in small groups advanced their positions and responded to those put forth by their peers. Word counts were not available for these debates, but the content posted there is substantive in nature, running from roughly a half page to more than two pages in length.

Course learning objectives are listed on the syllabus for each course; however, unit objectives were not stated in either. Scoring rubrics provided students with grading guidance in each course, but they are given after the fact, along with answers to the questions posed.

The following technologies were used in the courses (Table 10):

- Adobe Connect Pro-lectures (before, after)
- PowerPoint files associated with lectures (before, after)
- Panopto Lecture Capture-introduction (after)
- Tests & Quizzes (before, after)
- Online assignment submission (before, after)
- Campus Pack-debate blog (after)

Students are evaluated based on:

- Written assignments (10, 5)
- Debate this! Blog (0, 5)
- Multiple choice quizzes (4, 4)
- Final exam, multiple choice (1, 1)
- Essay (1, 1)

Pat said some things bothered her after QM exposure. "One of them is course objectives, and are assessments tied to course objectives," she said. "And I know my learning objectives need to be improved."

The two courses, and their syllabi, were very similar. However, the Campus Pack blog represented the use of a new technology to create student-to-student communication in the course, something it had lacked prior to QM exposure.

**Ash, Blended Format (Fall 2012, Fall 2013).** Ash's course shell prior to QM used an initial announcement to orient users as they got started in the course. Although it did not give a roadmap for where items were located, it did provide clear direction about first steps in the course (read syllabus and assignments, order textbook, go to discussions for introduction, etc.). After reviewing QM materials, Ash simply used her announcement to direct learners to a course documents page, where similar information was placed. In the newer course, she added an introductory video welcome for her students.

Course outcomes were listed in the syllabus for each course. They were aligned not only to assignments in the course, but the same assignments were also aligned to professional core competencies. Additionally, each assignment contained objectives and a grading rubric. The "after" course included these and added a page of commonly seen style errors and how to fix them.

Discussions (Table 11) were used in Ash's "before" course as a social-introduction platform and to provide a space for students to share information within their respective assignment groups. Also, one discussion was used toward the end of the course for students to share resources located within groups with all in the class. In the

second course, only one discussion forum was used for full class participation. This discussion forum served as a question hub for students with technology questions. It contained one post from a student who was seeking better assignment organization from the Blackboard system. These character counts are not included in totals (Table 11). Other discussions, where they occurred, took place in various assignment groups. Three of the five groups didn't use discussions at all, and of the remaining nine posts, only one student posted more than once.

The course published prior to QM did not use folders to organize course content. The Course Content link contained a series of documents including weekend agendas, a print copy of the syllabus, and two content articles. In the "after" course, meeting agendas and other face-to-face content were located in separate files.

The course used the following technologies (Table 12):

- A video introduction (after)
- Discussions
- A course reserves link housing two journal articles
- Assignment links
- Groups (after)
- Collaboration sessions

The collaboration sessions reported by ASTRO (Table 12) were created by the Blackboard system when the instructor created groups for the course. No recordings were created in these sessions, and it is not discernable whether the "rooms" were used at all.

Each course used a series of written assignments for student evaluation. The "after" course assignments contained detailed objectives for the student (both courses included anticipated outcomes for assignments). The objectives aligned with stated course objectives. Each course also used participation scores, with one being used in the first course and two in the second.

Ash sees herself on the adoption curve as an innovator. "I have been on the frontlines of trying to figure out how to do it and was doing it even when it was unpopular and not even really available," she said.

The major changes to this course were: use of objectives at the assignment level, the use of groups, and a video introduction. It may be that an unanticipated effect of using groups was to lessen conversation between and among peers, but this is difficult to verify, as students may have moved to email to communicate.

**Bay, Online Format (Fall 2012, Spring 2013).** Before attending the quality classroom sessions, Bay's course used a "Starters" link in the sidebar menu to orient students to the course. The page included information on how students submit assignments, use discussions, view video lectures, and a brief Netiquette statement. After attending QM, Bay used a "Let's Get Started" link (it housed an introductory video and the syllabus), but also added a "GPS for this Course" link (it contained Blackboard information, technology information, and blog information), and a sidebar link for "Policies, guidelines, and the like" (it included Netiquette information, writing and attendance guidelines, statements regarding accommodation and student conduct, and the academic dishonesty policy). Regarding the announcements Bay used, some of them, in

both courses, were in video format. He used Panopto lecture capture as the recording tool.

In the "before" course, Bay used discussions (Table 13) as a communications vehicle for the whole class as well as small group postings. Students were asked to practice a concept in some cases and to respond questions that integrate course readings concepts in others. After QM, some discussions are still used, but a Campus Pack blog is also used as a discussions point. Blog contributions were substantial and substantive (no word or character counts were available for these). Also in the "after" course, live Adobe Connect sessions were used.

The following technologies were used (Table 14):

- Panopto Lecture Capture
- Documents, .pdf files, spreadsheets, and PowerPoint files
- Discussions
- Campus Pack blogs (after)
- Adobe Connect live web conference sessions (after)
- YouTube video
- Online assignments
- Online exams
- External site links

Neither course's syllabus contained a list of course outcomes; rather, information was given regarding programmatic outcomes for the school. Prior to QM, some assignment requirements were listed, along with rationale for their inclusion in the course. Following QM, this information was repeated and expanded upon slightly. No

unit objectives were listed within either course. Therefore, alignment of course and unit objectives is unclear. However, the first content item in each folder of the "after" course provided a succinct list of tasks that needed to be accomplished for that week's unit.

Assessment of learning was evaluated using:

- Writing/evaluation assignments (4, 5)
- Discussion assignment (9, 4)
- Blog assignment (0, 3)
- Exams (2, 2)
- Syllabus quiz (1, 1)
- Self-check quiz-no points (0, 7)

Bay was interested in improving the sense of personal presence in his courses. During his interview, Bay talked about attending a Google Hangout hosted by the Museum of Modern Art as part of a MOOC (massive open online course). Approximately 1,000 people attended. "I really just wanted to see how they were using a Google Hangout with 1,000 people, and I couldn't have cared less about the content for that day," he said. "But [seeing the presenter] did make me feel a little bit closer." Stopping to consider for a moment, Bay continued, "I don't know if we are hardwired for that. I imagine to a degree we probably are, but I think it does bring a level of intimacy. Whether it's huge or not, I don't know."

The biggest changes to Bay's course were the use of the blog, adding live Adobe Connect sessions, adding self-check quizzes, and listing unit requirements each week.

**Kai, Blended Format (Fall 2012, Fall 2013).** Kai did not use a "start here" menu option or give specific instructions about where students should begin working in

the course either before or after exposure to QM. In the course taught after QM, the course was set to open to a "Weekly Course Content" link. The link itself was positioned at the top of the course menu. The weekly post contained announcement-type comments ("I've moved some content"), but also contained a list of items students needed to accomplish to complete each week's module.

Kai's courses, both before and after QM, used a "Help, Tutorials, and Samples" or "Help, Samples, and Tutorials" link. These links provided discussions guidelines, gave information on retrieval and use of research articles, and offered instruction on matters of style and grammar. In the "after" course, he added a course roadmap to offer navigational information to students. Also, support resources and specific assessment helps were given. A "Schedule" link in the "after" course menu gave students a week-by-week assignment summary.

Course content in the "before" course was arranged in folder by topic (lecture notes, etc.). Readings for this course were housed under a separate course link and were not organized by folder or date. Subsequent course content was arranged into weekly folders, as mentioned above. The folder descriptions provided links for readings, video content, discussions requirements, Adobe Connect meeting information, and other relevant course information. The folders themselves, however, were empty in most cases. It is not known whether this decision was by design or represented a misunderstanding of folder use.

Each assignment in the "before" course contained a rubric and instructions for assignment completion. In the "after" course, objectives for each assignment were given that aligned with those stated at the course level.

Both courses used discussions (Table 15) as a communications hub for the course. Forums were created to ask and answer course questions; also, a general student discussion forum and content discussions asked students to answer opinion questions, discuss current events, and share information gleaned from interviews conducted with those in the profession. In the course taught after QM exposure, Kai included a large number of additional video and external link resources (62) for student viewing and use. These included poster images, lectures, and interviews.

Kai's courses used the following technologies (Table 16):

- Discussions
- Document and lecture uploads
- External web links
- Panopto video recordings (after)
- Adobe Connect sessions (after)
- Google survey, Survey Monkey survey (after)
- Blackboard collaboration (after)

Learning outcomes were given at the course and assignment level in each course, although not for units in general. Alignment to professional competencies was also provided.

The number and types of assessments used to measure learner success in the course included:

- Course participation grades (1, 1)
- Writing assignments (4, 1)
- Poster assignment (0, 1)

- Group assignment (1, 1)
- Quizzes (0, 5)

Kai was especially concerned about being available to students for his office hours. In our interview, he mentioned trying the built-in blackboard collaboration feature, Skype, and Adobe Connect. Of the process, he said, "I knew there was one other thing I tried also for my office hours, and that was Skype. Nobody ever—zero—contacted me via Skype. Adobe Connect, I have to say, is really working pretty well."

Several changes were made to improve this course. First, better-organized content helped students easily locate and use the materials they needed to be successful. The second course also added a broad range of videos, images, and other links to help students comprehend the materials. Also in the second course, real-time meetings were held and recordings posted to the Blackboard environment for later student review.

**Syd, Face-to-Face Format (Fall 2012, Spring 2013).** Neither of Syd's courses used a "start here" or course roadmap, nor did either course include any kind of course introduction or faculty contact information.

Syd's syllabus changed little from one semester to the next. The syllabi contained a listing of both course objectives and student outcomes for the course. No individual unit objectives were observed. Reviewing course materials themselves, however, each required lesson contained a brief description of the anticipated outcomes for the lesson, and clear instructions on how to complete them. This also remained constant between courses. A printable calendar in each course clearly outlined assignment expectations.

Discussions (Table 17) were used in both courses, but two forums were added to the course taught after exposure to QM materials, with one of the additions providing

information on creating a cover page for a paper in the writing style of the discipline. With the exception of one web link, students did not post to this discussion. One discussion was used in the "before" course for students to post an original video and offer constructive commentary on their classmates' videos. In the second course, two discussions were used. The video creation link post and evaluation were still present, and the second added a link post and critiquing comments surrounding the creation of a "how-to" video project.

Each course used some folders to organize the content found there. In the "before" course, three folders were used to give lecture notes, assignment details, and final project information. The after course also used folders; here, they were arranged around unit topics. One assignment was included in a content folder rather than the assignments page, which could have been confusing for students, as it did not link to the assignments page where the rest of the content was housed.

The courses used the following technologies (Table 18):

- Discussions
- Online quizzes
- Online assignments
- iPads/iMovie
- Camtasia video (after)
- Uploaded content—instructions, notes, etc.)

These courses required that students use of a number of technologies. They included Blabberize, Prezi, and Microsoft Publisher, and required that students create a

web page. In the second course, technology use was more open to the student, and the list added information on QR codes and various gaming devices.

Assessments used were similar in the two courses, but in the "after" course assessments tended to be combined into projects. These projects are listed using their component parts:

- iMovie creation (1, 1)
- Video introduction (1, 1)
- Productivity tools assignments (5, 5)
- Worksheet completion (5, 5)
- Daily Homework (1, 0)
- Online exams (2, 2)
- Attendance/participation (1, 1)
- Final project (1, 1)
- Peer evaluation (1, 1)

Syd described himself as an early adopter, and enjoys trying and using new technologies. He indicated during our interview that he would like to try innovations as they became available, but that cost was a factor in his decision-making.

There were few changes to the courses Syd created before and after exposure to QM. Both courses required students to use numerous technologies as they completed their coursework. One change in the way his folders were grouped actually made it more difficult for a student to find an assignment than was needed.

**Lane, Online Format (Spring 2012, Fall 2013).** Lane's course, taught prior to attending the quality classroom sessions at *U Innovate,* contained a "Start Here!" tab that

included syllabus links, an introductory video using xtranormal (a moving cartoon application), a “my role as instructor” statement, and locations for contents in the course, along with information regarding visibility of units and timing for discussions. In the “after” course, this content link no longer appeared. Instead, the content was arranged within module folders, and appeared as the first part of the module one activities.

The modules folders in each course gave a brief overview of the module topic, along with stated objectives. Inside the modules, a syllabus quiz was used for each course in the first module. Each module in the “after” course additionally contained a video overview of module materials. Each module, in both courses, gave students a list of the activities they would need to complete to finish the module. YouTube video was used as part of module content, and links were given to guide the student for the discussion associated with the module. The assignment link also contained materials organized by folder and based on the assignment to which it pertained.

Discussions (Table 19) were used in every module in the “before” course. In the “after” course, students instead used a journal to communicate with the instructor. Unlike discussions or blogs, journal content is visible only to the instructor and the student who posts content.

Course outcomes were listed as a part of each syllabus, and as mentioned above, unit objectives were used in each module. The objectives aligned with those listed on the syllabi. The “after” course also used a survey to measure student satisfaction and suggestions for future course development.

Courses used the following technologies (Table 20):

- An introductory video/presentation (after)
- Discussions
- Document uploads—lectures, instructions, etc.
- YouTube video
- Campus Pack journals (after)
- Prezi
- Xtranormal video cartooning (before)
- Panopto lecture capture (after)
- Online quizzes
- Online survey (after)
- External web links

The number and types of assessments used to measure learner success increased in the "after" course, while the number of discussions decreased. Assessments included:

- Graded assignments and worksheets (9, 10)
- Quizzes (1, 4)
- Survey (1, 2)
- Concept map (0, 1)
- Discussions (8, 3)
- Journal assignments (0, 10)
- Peer review (1, 0)
- Online presentation (1, 1)
- Web page assignment (0, 1)

During his interview, Lane stressed that active learning for students was something he consistently tried to improve. He mentioned the fact that this was an undergraduate course. "I think in an online course that's the hardest thing to do, is to get them engaged so that they're willing to put out the effort and want to continue through with the course. Also, so that they're successful in it. Some are. Especially with [this course], we're dealing with undergraduates. Many of them don't have the time management skills or the internal persistence skills to keep going through the course."

**Building Grounded Theory**

An initial review of the data collected during the interview process revealed the common themes that might be anticipated when discussing the topics of innovation and education. Additional underlying themes became prevalent during the process of examining the data, using the basis of constant comparison. "The purpose of the constant comparative method of joint coding and analysis is to generate theory more systematically…by using explicit coding and analytic procedures" (Glaser & Strauss, 1967, p. 102). Using the constant comparative method, the researcher attempts to generate plausible categories, hypotheses, and properties of general problems; however, the researcher does not attempt to prove them. Rather, new theories may be creatively generated that are fully rooted in the data examined; these new theories may then be tested and proven or disproven as a further step in the research process.

Constant comparison involves first coding each incident described in the data to as many categories of analysis as might apply. A defining part of this procedure requires that the researcher actively compare incidents among and between interviews, reviewing coding as data analysis continues. Coding begins with the first interview captured, and

continues while interviews continue. Comparisons continue throughout the process. As categories develop, the researcher begins to make personal notes about how the data and incidents compare among interviews. These notes provide continued insight into as coding continues (Glaser & Strauss, 1967).

As the interviews progressed with participating faculty, themes began to take shape, some of them resonating strongly. Of all faculty members interviewed, only one had any prior experience with QM or any other type of measurement tool for quality course construction. All others indicated they had no knowledge of any way to assess the effectiveness of their teaching practices, except for information gathered from student evaluations and the opinions of their peers and chairs. Only those faculty members who held degrees in education (three of the ten interviewed) had any sort of training to teach. More than one of the participants had never taken an online course during their programs of study. Because the topic of this study centers on innovation, technology issues that surfaced were not surprising in and of themselves; however, some of the emotional reactions attached to teaching and technology were unexpected. The consistent consideration of the needs of these educators' students was also evident throughout and added a new dimension to the innovation diffusion equation. Table 21 represents themes and subthemes that presented themselves as data was analyzed and coded.

**Rubric considerations.** Of the ten professors interviewed, only one had seen a quality course measurement rubric. Ash, a longtime member of the faculty, was the single participant who had at one point received information regarding quality course construction. It, too, was based on QM, but used an earlier version of the rubric. Aside from that exposure, this professor had developed her own schema, based on concepts and

values she learned as part of her undergraduate work majoring in education. “I actually drew out what I thought was a model based on some theories that I had learned that influenced my thinking,” she said. Ash used the rubric somewhat differently than others, saying, “The thing that I have always benefitted from, where QM is concerned, is the rigor that it imposes to make sure the language of outcomes, for example, is really what it ought to be.”

Ash continues to use her personally generated model for course construction, but feels that referring to the rubric helps her to better define her instructional goals. She also talked about the process of submitting a reworked course for a monetary stipend that was made available to faculty who chose to do so. The reworked courses submitted by various members of the faculty were made available to the university provost, along with a brief document that outlined the changes made to the course and why they felt the changes brought the course into better alignment with QM. Ash found constructing the document, and returning to it, were valuable. “It reminds me of where I am in this process, which I think is never done. It's always evolving. One of the things that I learned from that writing phase was that I think that maybe Quality Matters may assume a fairly linear process that kind of mirrors the format of the course management tool.”

For the other nine participants, exposure to the QM rubric elicited varying responses, most of which were positive. Only one, Kay, expressed a disdain for the QM rubric and rubrics in general: “I think they kind of tie me down too much.” However, as our discussion continued she pointed out areas in her courses where she had made changes based on information contained in the QM materials.

Regarding the course overview and introduction, Kay reviewed her online teaching experience and realized, “Okay, I do need to say these things. I can't assume that everyone will know this.” I asked Kay whether she ever returned to the materials or reviewed the rubric. “No, I never went back to it. It was again, a situation where, okay this makes sense, but it's the middle of the semester.” She added, “I think that actually some of them, some of the QM sessions, I took toward the end of the semester and it's just too crazy to try to do anything then. I just never did go back to it.” The topic of time will be visited later in these results, as others agreed that the cyclical nature of higher education brought up specific pressure points, such as mid-term and end of term grading.

Kay’s opinion of the rubric was also overlaid by her long-standing concept of the student-teacher relationship. Motioning at the rubric summary, which was given to each interview participant as we began our discussion, she said, “And don’t give me all of this from the rubric. I am not a ‘spoonfeed the students every step of the way’ kind of faculty member. You’re an adult, you’re in graduate school, and this is a shared responsibility.”

For Jay, exposure to the rubric began before he realized he would be teaching more than the occasional “one-off” kind of instruction offered to undergraduate students to introduce them to library services. In these cases, information is presented to a group of students, but not on a semester-long basis. Instead, instructors give these sessions once only. Jay initially attended the *U Innovate* sessions because he felt they offered an interesting set of guidelines for future use. Soon after attending the sessions, however, Jay found he would have the opportunity to teach an online course for the library school’s masters program. Jay, “never having taken or taught an online course,” found that the rubric offered a roadmap that “helped me figure out what I definitely wanted to have in

the course." When the time came to actually begin the course, though, the rubric was pushed to the side. "I was so anxious to get everything up and running, and I was nervous, and…I never pulled the book out."

An imminent change in learning management systems, though, influenced Jay to refer back to the rubric and its associated descriptions. When moving a course from one LMS to another, Jay said, "I did pull the book out and started looking. Do I have this, do I have this? And I will admit, there were some things like the measureable objectives, where I was just like, I don't have time to try to figure out how to use the new technology, and copy everything over from one to the other, and to rewrite everything." He added, "It's gotten me thinking about certain things that I don't think I would have thought about otherwise."

Lane wanted to be sure a clear distinction was made regarding his view of the utility of the QM rubric as it related to the use of technology. "I don't see the rubric as being necessarily tied in with technology," he said. "To me, QM is a good way to check my course to be sure I'm hitting all the different pieces of it." Continuous course improvement was an important factor in Lane's teaching. Although he had not yet made a direct comparison of one of his courses to the QM rubric, he intended to do so in the near future. "That's one thing I really want to do. I want to look at that and try to match it into all the different things to make sure I'm doing what I should be doing… to get a quality course."

For Dee, exposure to the rubric was transformational with regard to the way she approached the classroom experience. "What I've said about the program is that the University really did a good job of tricking me. They tricked me into using it," she said,

grinning widely. Like many others interviewed, Dee had had no previous experience in the online classroom or learning how to teach; neither had she been exposed to any quality guidelines for course construction. But, although Dee found that, "in the ideal world this would be an excellent way to create courses," she recognized the use of the rubric as an isolated metric when considering the evaluation of the instructor's teaching. Dee is in the process of reworking her courses according to new ideas for student scholarship, but sees a lack of institutional support for the extra time needed to adapt content from a classroom-based scenario to a blended or fully online model. "I think, unfortunately, the way we assess our performance in the classroom has nothing to do with what were supposed to be doing in the classroom." For her, that means the focus is in other areas, such as student evaluations. "So we tend to focus on those types of things."

Another strong proponent of rubric use, Dale found the information contained within the QM materials to be valuable. She was required to convert all of her on-ground courses to an online format in one semester. "When I look at this rubric, first I think what a wonderful resource for any professor to have! I had no guidelines. I had no mentor." Dale is tireless in her desire to improve her courses each time she teaches them. "It's only been in the last two years that I've been doing an overview, and introduction. And I got these points from one of your workshops on QM." Interestingly, after an initial introduction to, and application of, the rubric's standards, Dale also stopped referring to the booklet or the summary provided to all participants. "But now that you've reintroduced me to it, I'm definitely going to look at it for my fall classes," she said.

Pat, another higher-education professor with no formal training in teaching, viewed the rubric as "more of a teaching tool." When talking about her preparation to

teach, Pat said, “I did a pedagogical article with a couple of my colleagues about utilizing certain teaching methodologies. And we did a data-driven study; I mean, not a lot of data, but I used that to my influence my face-to-face classes.” She didn’t, however, come across a rubric or other set of standards to evaluate her course materials. Pat is especially concerned with appropriately evaluating student work. She notes, of her course preparation, “There are some things that we talked about [at the QM sessions] that bother me every time I draft a syllabus. Every semester. One of them is course objectives, and are assessments tied to course objectives.” Her continued goal is to try to think of something new or different that might allow her, “to utilize a technology, or better utilize a technology, to encourage interaction and engagement.”

Like Lane, Kai disassociated the rubric from technology, but did so in a different fashion. It supported his idea of not implementing technology for its own sake. “The very first thought I had when looking at them was, oh, good. I do a lot of these.” He also recognized the scope of the rubric structure might be intimidating for others new to the QM process. “I can imagine someone looking at them [the standards] who doesn't do any of them being really discouraged, and thinking, oh, my gosh. I have to make all these changes at once?” For his purposes, Kai plans to tackle the rubric related to classroom issues. “I set a goal for the year to work on and improve the assessment and measurement piece of the Quality Matters rubric.” Kai is another participant who had no preparation to teach as part of his graduate studies and finds his buy-in to the standards at a high level.

Syd, the third participant with an education degree, found the rubric to be based on common sense. A recent master’s graduate currently working on his doctorate, Syd

noted, “Many of them [the standards] were just good practice in teaching. Having taken online classes myself, I looked at some of them and thought, ‘This would've been nice for my teachers to follow.’ I still think that.” Syd sees the rubric as a good way to reinforce what he knows about course development. “It brought … an awareness to the things that were on my to-do list. Is this a better strategy or a quality strategy to spend my time on?” By understanding the rubric and reviewing his course materials, “It gave me some of the confidence I needed to say, ‘Yep. I need to spend time on that.’”

Bay, who also earned an education degree, noted that exposure to the rubric offered “the first time somebody really outlined some standards of how online learning can be evaluated.” Speaking of his experience at a previous institution, Bay noted, “Of course, I sometimes find that the online teaching isn’t for a particular community or out of a particular desire of a university, but more of a need in the sense of ‘we’re out of classroom space.’” Prior to learning about QM, Bay said, “I was asked, ‘Can you teach online?’ and I said, ‘Well, I guess I can, but let’s talk about the content.’ But no one’s ever interested in that.”

Even though Bay had earned a bachelor’s degree in education and spent time teaching at the K-12 and higher education levels, he said of the rubric, “It was the first time someone really outlined some standards of how online learning can be evaluated.” He felt the rubric gave him the opportunity to check his course structure and materials against a list of best practices. In some cases, it helped him extend or enlarge on something he had done previously. As an example, instead of a brief introduction, Bay created an introductory video for his distance students. He also felt QM could benefit instruction in the courses he experienced as a doctoral student, saying of the instructor,

“This teacher was getting off easy. She just posted some articles and had someone else do the Power Points. I really didn't think about this until I started teaching online but I thought, ‘Wow. That is real laziness.’”

**Teaching issues.** Student considerations pervaded the discussion at every level, but initial coding also revealed a recognized lack of training to teach in a higher-education environment as a concern for many.

For the most part, exposure to the QM rubric represented the faculty members’ first glimpse of any kind of formalized evaluation tool to determine how one might approach the course development process, even for those professors whose scholarship was education based. The three professors who hold teaching degrees have experience in writing lesson plans, creating objectives and anticipated outcomes, and developing other classroom materials, but with one exception, had not seen any sort of a rubric by which to evaluate the quality of the higher education classes they taught. Of the seven who do not hold education degrees, none had received formal instruction on how to teach.

Lane talked about a recent learning environment where he had participated as a student, saying of the course that, “I still feel it was almost a glorified correspondence course where you did the readings and then you had to write a reflection on the reading. And then, you had some questions in the discussion board.” He continued, “The only time within that course we got the instructor was just a few comments on our reflections.” This experience drives him to provide a more personal environment. “I try to figure out how to connect with the students. I think in an online course that’s the hardest thing to do, is to get them engaged,” he said. In contrast, Syd, who holds a degree in elementary education and spent 10 years teaching in the middle school environment, helps his

students understand innovation in a positive light. “I tell them don't be intimidated when your fifth-grader knows how to do something on a computer, on an iPad, whatever, and you don't. Learning from each other is part of the process.” Ash had a similar background. She said, I only have only taught a little bit in K-12, and the majority of my work has been in higher education.” Ash also served as director of a special information center and supervised instruction.

Dee, when asked, spoke of a model common for the group. “I didn't have any training. The first time that I taught, I was a graduate student. The minimal training that you got was that you apprentice yourself – and I think we still do that here – you apprentice yourself to a professor.” As is also common, she said, “I was teaching classes as a PhD student, but no, I've never taken an education course, or a how-to, or anything like that. The Quality Matters program would be the first time that I had any kind of formal instruction on how to teach.” Kay had a similar experience. “I really had no training in teaching. I learned by watching when I was a student. I did have other faculty… [to] talk to about how to do things–how to set up a syllabus, those kinds of things. It was informal, sort of a mentoring situation.” Jay had even less guidance. “I hadn’t taught at all undergrad or graduate before that,” he said. “My mother is a teacher, and I saw kind of that elementary teacher side of things.”

Dale talked about another common problem faced by faculty, that being the need to move from a face-to-face to an online format. She said, “My first semester of teaching here, in Fall of 2006, was all classes face-to-face. And immediately, the next semester, I had to transfer all my face-to-face classes to online classes. Each one of them. Without any training.” She felt completely unprepared to move to the online environment, and the

frustration in her voice was clear. "How do you get into Blackboard? How do you have a discussion in Blackboard? I had no clue, but I just had to switch over all my classes to online."

Bay was another professor with a strong background in education. "I was certified as a teacher in elementary education and in special education. I also have a Masters in special education." For Bay, teaching opportunities were provided (and required) as part of his PhD program. "I also taught elementary and middle school for years," he said. Even with this extensive teaching background, Bay noted, "But as far as the Quality Matters stuff goes, it was the first time that somebody really outlined some standards of how online learning can be evaluated."

Two members of the faculty reacted strongly to their lack of training to teach, but in different ways. "It's incredible, the amount of trust that our institutions place in us when we don't have that," Kai mentioned, with wonder in his voice and eyebrows raised. Pat agreed, although her judgment of the situation was terse and to the point. "It's ridiculous. We have no pedagogy at all."

**Barriers.** As has been reported, time is an important consideration among teaching faculty, although time issues manifest themselves in varying degrees and surrounding different topics. For some, finding the time to learn how to create and deploy certain types of innovation was a nearly insurmountable obstacle. "More often than not, it was just trying to get from one semester to the other and not having the time to use technologies, or how to learn them well, or how they could really improve my class and teaching," said Kay, who felt the impact of time to a greater extent than others. Kay continued, saying,

> I can see things and I think they could really work, but there's just no time. I always wanted to do a video of 'here's how to do this' because I know some would appreciate that better. But again, I never had time.

Others agreed. Ash said,

> As teachers, we have so much on our minds. And this is an easy piece to just let go. I'm sad to say that I'm afraid that it kind of sometimes is just let go because there is so much pressure about other aspects of what you're doing that take up your time.

Jay also viewed time as a challenge: "Some things, like the measurable objectives, I just don't have time to figure out how to use with the new technology."

When talking about her own challenges with new technologies, Pat commented, "It's just the time. And I'm not a digital native, so it takes me longer to figure out." The need to discriminate among time expenditures to one's best advantage was also brought up. Dee's time issues surrounded the fact that her efforts in course improvements would not be rewarded. "As a faculty member, I feel if I spent the time to develop a course according to these standards there would be no real benefit to me."

For Dee, not only was there no personal return on the time investment in terms of tenure and promotion, getting just-in-time information on an as-needed basis was also problematic. Presuming she saw the notification for a learning session of interest, Dee worried whether the tool or product being described would even be helpful in the course environment. "If I did set aside the hour to go learn it, would it really substantially change the way that I'm teaching?" she asked. "Or, if I learn something and then don't use it right away, it [how to use the innovation] goes away."

Others saw the time trade-off as important for learning new technologies. "It probably isn't that I couldn't figure out an awful lot about it myself, but I really don't have time to just learn it on my own. I need assistance…so I'm not spinning my wheels, by-guess-and-by-golly trying to figure out what the thing can do." Without support from the institution, Ash noted, instructors suffer. "They have to find things on their own and find venues slotted at a convenient time for them," which creates another time deficiency.

Implementation of the technology or innovation, once its benefit has been decided, also takes time. Kai noted an effort to find work-life balance when teaching, and Bay pointed out the fact that an exceptionally busy schedule for a semester also plays a role. "I knew what my schedule was going to be like and I was not going to have time to deal with the technology issues that always seem to come up." The semester's cycle of midterms, finals, and breaks impose their own implementation considerations. "I know we all have good intentions, like over the summer or winter break we plan to do all these things, but then time goes by and you come back," Syd's smile was wry. "It's January 1, and suddenly you have to get your syllabus done." At such times, innovation is given a lesser priority. "Time seems to always be a challenge with everything that's new or to try as something new," said Syd.

One participant, Jay, found a gift of time from his Dean to be especially beneficial. Because his first teaching assignment was upcoming, the Jay was allowed scheduled work time for course preparation:

> My dean was concerned that since this was the first time I was teaching in the profession, he wanted to give me the time to really build the course and learn the

technology and kind of put everything together so that I was going to be happy with it.

Lane mentioned the fact that other responsibilities sometimes get in the way of the time it takes to incorporate innovations into the classroom. He said, speaking of a voice-comment-over-image technology, “I've just never incorporated it. I haven't had the time. Like I said, I started using Camtasia, I think I did one practice video there. I just haven't taken the time to do it yet, either.” He noted that meetings, student questions, and other day-to-day occurrences and interruptions made him wonder where his time had gone some days. Regardless of other responsibilities, courses begin on a schedule. Lane noted, “When time gets there and you just have to put the course up, you put the course up.”

The realized amount of time required to teach in an online environment was also discussed. “I truly do believe that teaching online takes much more out of you than if you teach face-to-face, because it’s so precise.” That comment was from Dale, who noted her students face time constraints as well. “Whatever I’m doing in the classroom, they first have to learn the technology and then learn the content and *then* perform. They don’t have the time or the patience for this.”

**Support.** Support for faculty was cited as being helpful, nonexistent, or insufficient. “I wish we truly had an instructional design department for the faculty,” said Kay. She spoke of her work at a previous institution, where more technical support was offered, then compared that to her current teaching role. “Here, I'm having to teach, learn about the technology stuff, and all of that, and I can't make myself and my classes better by myself.”

Dee talked about a general lack of familiarity with technologies among those in her department, and shared a general sense of unease. “I know, with me trying to experiment with it and hearing from other faculty that aren't—I don't know the words—as comfortable with it as we need to be.” When trying to translate what she had learned to one of her courses, she had an “aha!” moment: “I recognized that frustration because it's the same one that I felt when [one of the *U Innovate* instructors said, basically, go look this up. And I was like, we're here to learn and you didn't tell me what I was supposed to learn. This experience helped Dee realize students had the tools to accomplish exploration themselves, without having every piece of content spelled out.

Ash talked about peer learning among faculty members. She said, “Very early on, I listened to my colleagues talk about what they were doing in their experiences; I also listened to students and what they said it was like for them.” She lamented the loss of a technologist assigned to the department, which put their GAs in more of a support role and removed a ready resource for technology. “It's going to mean that if our graduate assistants aren't able to be as up-to-date with IT as we need to be I'll have to reach out on my own.” Finishing her thoughts on faculty success with technology, she said, “So I guess in summary I'm saying that in-house kinds of leadership and support for technology is yet another piece of helping faculty to do the very best that can be done.”

Pat also wished for more support for technology. “More support would be tremendously helpful in terms of, here are some different things you could try. Here is what is out there.” She expressed a need to have someone help her when she needed to choose one technology over another. “And ranking, prioritizing—utilizing an

instructional design person to advise the subject matter expert. To say, here are five options."

Lane said little of support, but did mention that she could use guidance in improving her use of some technologies.

> It's just a matter of sitting down and having somebody help me put those together and helping me do a quality job on that. Knowing that we don't really have great facilities over here, that I have to go somewhere else to do it, and as I just said, taking the time.

Kai spoke of a lack of formal mentor, but mentioned that she had formed her own relationships in that regard.

> I tend to develop a mentoring relationship on my own in a much more informal way. So, along those lines, I can say that I feel as if I do have a mentor in [my department] with whom I can talk, particularly about teaching and improving and being a better teacher, which is one of my big goals.

Syd's department works closely together to learn new technologies, as well as understanding how they might be implemented, "We have a technology leader or leaders that share that information and set up times so that at times we can come in and learn, but this could also be very informal." This involves classroom technologies, but has also included productivity applications. "They have said, here, let's all get together; and we synced calendars when we had the changeover for the new e-mail, we all got together and learned it together so that we could talk, which was incredible."

**Students and technology.** Members of the faculty wove issues, ideas, and concerns surrounding students throughout each interview. Various aspects of student

interaction, communication, and other matters would naturally be a part of any discussion of classroom environments, but this emphasis on the student was prevalent throughout each interview.

The qualitative research tool N-Vivo, chosen for data collection, memo writing, and the coding process, allows the researcher to query for word-use frequency. Using parameters of five-letter words or greater and including stemmed words (learn, learned, learning), a query was run to determine the frequency rate of word use for all interviews transcribed. The query returned results that identified the word student or one of its stems (students, student's, students') in first position, being used a total of 280 times in the course of the interviews.

In discussing some of the drivers for the adoption of an innovation, student engagement was frequently cited as a factor. Dale was concerned about her students' perceptions regarding a new blog and wiki tool that she incorporated, so she asked them for their opinions via an electronic survey. "I asked them some questions about what they liked, this or that, and what they felt about these changes. I was surprised to see that they did not like the new things that I was using." Monitoring student peer-to-peer activity also brought about changes. "I did not find students commenting on each other's profiles as much as they normally do on Blackboard," she said, discussing the use of a blog/wiki tool.

Pat was also interested in her students' level of engagement. Talking about course preparation and syllabus development, she said, "I think, you know, in terms of assessment measurement that doesn't bug me all the time," she said, feeling comfortable with those metrics. She continued,

> But learner interaction and engagement? All the time. Again, every time I'm putting together my assignments, particularly for my online courses, every time, I'm trying to think of something else. To utilize a technology or better utilize a technology to encourage interaction and engagement.

Pat finds it difficult to determine what it is that students find engaging. "I want my students to have an idea about instructional technologies and to comment on that, but… I get very few student evaluations back, let alone if I asked them additionally to fill out a form about technology."

For Ash, too, student engagement is an important consideration. "I know that people experience a deficit where reciprocity in communication is concerned, and my interest in using gadgets is really driven very much straight at that need to be better connected and more engaged with them." She feels that "creating better ways to help them, to feel that they're getting started in the right place and that they're not missing anything throughout the semester is a big part of what I always hope to be doing."

Jay, although quite new to the teaching environment, continues the theme of instructors' desire for strong engagement and interaction among and between students. "I think in today's world it is so much about interacting and technologies that are available," he said. "I want to be able to offer that to students, to make sure that they are able to go beyond just articles and discussion posts." When asked for his first driver for technology inclusion, Bay said, "My drive, if you will, is to help bring the content alive, bring it closer. That would be the driving force," his opinion echoing that of others.

In some cases, inconsistent skill levels students bring to the educational environment were highlighted. "I thought that, when people signed up for an online

master's course, it was because they had some experience with technology," Bay remarked. "I have since learned that that is not the case; people sign up for online Masters courses because of the convenience." This inconsistency of skillsets was not necessarily related to age or academic standing. Lane gave a video introduction assignment to an undergraduate student group that comprised mainly first- and second-year students. This seemed to be appropriate: nationally, 86% of undergraduates report owning a smartphone (Dahlstrom & Bichsel, 2014); at this institution, students who responded to an electronic 2014 technology survey reported a similar level of ownership, at 87% (unpublished raw data). "They're videoing all the time on the phone–my children are–so I know that holding their phone up and recording a one or two-minute video to introduce themselves wasn't going to be that hard for them to do." Instead, the assignment submissions received were surprising. Lane went on, "I'm kind of surprised that more of them didn't take me up on the video option."

Bay reported a similar situation that occurred as part of a video assignment for his graduate students, saying he had misinterpreted students' ability to complete it. "You always think about how your students are going to do something. I thought everyone was going to record themselves on the phone and then upload that to YouTube. I don't think I had one student use their phone to do that," he said.

A newer member of the faculty, Jay agreed that technology selection requires a student focus, and voiced concern over students' tolerance for technology. "I think everybody needs to have a webcam. But if you go much more advanced than that, you start losing people. And since our program is so diverse in terms of people coming right

out of undergraduate school, or people coming in from first careers or second careers, we don't want to completely freak people out."

Depth of technical knowledge (or its lack) was also described. "There are students that come in with such limited experience with technology, and then you have the students that could stand up and teach the class with you," said Syd, who noted that student self- reporting of skills could be misleading. "You get a pre-survey from a student where they say they are comfortable with Word…. But then, we go to do some specialized things and they don't know all those features." And frequently, no assessment for student technology preparedness is given prior to attending courses in an online environment. Jay said, "I had a student this past summer who didn't know what 'track changes' were. I mean, I explained it, but…"

The student's place in learning and society is not lost on those reporting. "My students are teachers who have been teaching for 20 years. They are older, they're traditional, they are not really into all this technology," said Dale. "So, whatever I'm doing in the classroom, they first have to learn the technology and then learn the content and then perform. They don't have the time or the patience for this." Whether this is fact or presumption, though, is questionable. Unpublished data collected via a 2013 electronic survey of graduate students at the institution being studied asked the question, "How important is it to you that you were better trained or skilled at using available technologies to learn, study, or complete coursework?" Only 8.48% of those responding indicated it was either not at all or not very important.

When discussing the drivers for technology selection, Bay noted, "my drive, if you will, is to help bring the content alive, bring it closer. That would be the driving

force." Michael Moore (1980) defined the term transactional distance to describe not only the actual physical space that exists among distance learners, but also the perceived sense of separation that can occur in any online environment. Each person interviewed, in one way or another, echoed a need to bridge this gap. "In a face-to-face classroom you can see that sort of 'aha!' look, or they can ask questions that will take you down a path that they really need for the information. In an online environment, you really can't do that," reported Kay. Pat talked about student interaction, and, when prompted for clarification regarding the reasoning behind utilizing a debate format in a course, was asked if the concern regarded student assessment. Was assessment the issue? The response was quick and decisive. "I mean the engagement piece," she said firmly. "The engagement piece. It's so tough for me to figure out."

Comparisons were frequently made of the face-to-face and online environments, particularly as it relates to faculty attempts to replicate the face-to-face environment in the online classroom. "The class I'm teaching was such a practical, hands-on [topic of] arrangement and description. It's difficult to describe something if you don't have some kind of face-to-face, some kind of connection," Kay noted. Pat agreed, "I really wanted to make my online sections work just as closely as possible as I could to my face-to-face. Because, I thought, the face-to-face is working well and I'm getting good evaluations, which is good." Pat discovered, however, that a straight move from the on-ground to online classroom materials didn't really translate, finding "they just weren't as interesting to me—or the students, obviously."

An important part of student engagement involves the peer-to-peer, instructor-to-student, and student-to instructor communication process. Kai described "a big

difference between [students'] willingness to engage with me in the two different environments. They are still, most of them, much more comfortable engaging with me face-to-face."

Dee, who teaches general education courses, must consider the size of the class in question. When asked which technologies were selected when revising a course, it was noted that favor was given to "those technologies that allow students to interact. Probably what's always in the back of my mind when looking at these technologies is how does this fit with a class of 40? How does this fit with a class of 70 or 80? And how does this fit with me?"

The need to prepare students for upcoming careers was voiced as in important driver for the inclusion of innovation in teaching environments. "I want the students to have a comfort level with it so that wherever they go, whatever technologies they have there, they're going to be able to jump in and have that ease-of-use, …because I serve a variety of future majors and degrees" said Syd. The students in Syd's program used a wide variety of technologies in preparation for the future, including laptop devices; productivity applications; mobile devices and their associated applications; and gaming devices, including Wiis.

**Emotions relating to teaching/technology.** "I was terrified!"

"Well, in the fall, I was very nervous about teaching, and it was about everything. And it was about the technology: is it going to work?"

"I think what scares faculty is that they weren't trained to teach students to teach themselves. We were trained to teach students what they need to know."

"That made me mad."

"You don't want to step on anyone's toes."

These comments begin to relate the many emotions that were evidenced as the interview process unfolded.

In several cases, a desire for continued improvement created tension for the instructor. "I'm trying to figure out how to build in the assessments. …I still want to make it so that you're actually connecting with the students and the students are able to connect with you," said Lane. During his interview, Lane frequently spoke to a lack of satisfaction with his own progress regarding technology use. "I'm still not where I want to be," "I'm trying to figure out how to," I'm still not exactly where I want to be," "I think I could do better," "I've not gotten into really using it" were all phrases used by Lane to describe this gap between intention and adoption.

Several participants also tended to downplay their accomplishments. This was evidenced by such repeated statements as "I have only," "I just," "I need to do more," "It's not much, but I tried," "I could do this better," as we discussed the application of innovation in the classroom environment. One of these was Pat, who felt she should have done more, and said of her early attempts at teaching online, "they just weren't as interesting to me—or the students, obviously."

Pat was very frustrated by a lack of available video content to support her instructional goals. "You can find video and podcasts and stuff, but in my opinion they tend to be so far off base that they're not teaching much. You know, a 10-minute story with one sentence that's true to the [topic]." Even the textbook publisher resources she tried to use were a source of frustration: "That kept breaking down. It was not well supported, and the students who got the textbook second-hand the next year couldn't

access it." Pat continued to look for video content, saying, "I spent a LOT of time on that. I mean, there just isn't that much interesting, lively stuff out there about [this topic]!

Time was also a frustration point for Pat. Speaking of teaching methods, she said, "I intuit if it is deficient. I know posting a PowerPoint slide is deficient, right? I know that, but still it's the time thing."

Frustration with the rapid advance of technology was also voiced. Kay wished "people would just take one thing and stick with it. It's sort of like the management fad of the week, well there's the technology fad of the week. By the time I'm ready to try Fad A, the technology has moved on to Fad D. or you taught me about A three months ago and I'm ready to use it now, but you have already moved to C. Kay also said,

> There were times that I would go to training and, okay it makes sense and I would like to use it but I can't do it right now. So then, you just forget all about it and then another new little whiz-bang tool has come along that you have to learn about it and it does the same thing as the old whiz-bang tool.

When we discussed where she would place herself in the adoption curve, Kay said, "I want to put myself in the early adopters, but I think that more often than not I belong in the late adopters."

Jay talked about his discomfort regarding the university's impending switch from the Blackboard learning management system to a new platform, Canvas. He asked, "How can you think of everything you could possibly need to know and troubleshoot it all before the semester starts? You know, learning all the little tricks and things that go along with it." He also voiced apprehension about using new tools in his courses, saying of a blog and wiki tool he attempted to use, "It has been challenging, just in terms of

learning as we go and trying to be proficient as quickly as possible, knowing that you're going to run into issues." Jay also talked about his peers' reaction to his plans for web meetings. " I didn't really have a lot of apprehension other than what other people were giving to me because that was making me start to second-guess myself." These thoughts were compounded by the fact that Jay was already unsure about his teaching effectiveness. "I guess another aspect of the dimension is because I was so nervous about, "Am I going to do it properly? Am I going to teach something worthwhile?"

Not all emotions expressed were negative. One example of this involved Dee, who teaches large, face-to-face introductory courses. About his delivery methods, she said

> Traditionally, that was a lecture style class where students had to come listen to me give lectures and then regurgitate the information on a multiple-choice exam. I knew that that wasn't the best way to teach, but that's what I learned in graduate school; and with the size of and class without any graduate assistants to help with grading, I simply had no other choice.

Dee's attendance at the quality classroom sessions earned her a travel stipend to the Slone-C conference. It was a game-changer for her:

> I was in Las Vegas, and I did not anticipate going to very many sessions. But I went as soon as they started until they were over. I went to as many sessions as I possibly could. I was just eating it up—I didn't realize that there were this many opportunities out there, that there are this many technologies available.

Ash voiced a need for a certain amount of tension when course delivery is concerned.

> I think that even for teachers, like me, who have taught a long time and don't have to be persuaded about a need for learning outcomes, measurable learning outcomes, that there is still the need for having a mechanism whereby you question yourself and your decisions about what you're writing in your syllabi and evaluating in all of the related assessments.

She continued talking about the need for rigor in one's self-evaluation of courses. "It reminds me of where I am in this process, which I think is never done. It's always evolving."

Bay, who was new to the institution at the time of the U Innovate initiative, was concerned about peer pressure, and found QM provided some reassurance about his teaching methods.

> The outcomes of most of the courses… are typically not written in a measurable fashion. So I felt like this gave me permission. Because I was new last year, and when you're new, you don't want to upset anyone, you don't want to step on anyone's toes, because that doesn't get you anywhere.

Bay also felt that a certain amount of frustration was inherent in technology use. Asked what factors might cause him to abandon an innovation or technology, he said, "If it's causing too much frustration. Too much–not a little–too much frustration on my part or the students' part. There would have to be another tool out there that would be available."

Syd echoed the frustration factor when considering technology use. "There are many times that I've been frustrated, and left it and thought, 'I'll come back to it,' and sometimes I do and sometimes I don't." On the other hand, Syd employs a wide variety of technologies in her courses. "I want the students to have a comfort level with it so that

wherever they go, whatever technologies they have there, they're going to be able to jump in and have that ease-of-use," he said. Syd also felt that using the QM information helped him prioritize, and gave him confidence that the steps he was taking were the right ones.

> It brought more of an awareness to the things that were on my to-do list," he said. Things that I was wondering, would this be better? Is this a better strategy or a quality strategy to spend my time on? So it gave me some of the confidence I needed to say, "Yep. I need to spend time on that."

Kai was generally upbeat about his technology experiences, even though he had not had an education background. "The fact that I have no training, no formal training as a teacher, made it all the more exciting and unbelievable that [this institution] would hire me and say, 'Okay go teach.'" But even with his voiced enthusiasm and appreciation for the rubric ("I really want some external validation"), a few fears and frustrations slipped through. "I fear sometimes that I'm implementing technology just for technology's sake," was one comment. He also mentioned some apprehension about technology selection. "I'm anxious to see how they use the tool," he said of a using the Groups tool within the learning management system.

Dale came to the institution as a face-to-face instructor, but within one year was directed to deploy her courses online. "At that time, [the university] did not have any training sessions, they did not have any kind of help." She continued, "So, it was intuitive what I started doing in online classes. It was trial and error – trying to do my best to envision what I could to do help my students and what I could do for them to make it easy for them to learn." When instructional help did become available, Dale felt

pressured by some regarding technology choice. “I have found some proponents [here] saying, “Do this! Do this! Do this! It’s really good; it’s really nice. It’s the in thing; it’s the latest thing. And if I don’t try it, I feel I am lagging behind.” Dale also felt pressured to put video online, but was uncomfortable doing so. “I know I have to get out of my comfort zone, and that’s the basic thing. I have to get out of my comfort zone.”

**Summary**

This chapter described the quantitative and qualitative results collected during the survey process. It outlined specific course changes, and highlighted relevant discussions that occurred as part of the interview process. Themes of rubric considerations, teaching issues, barriers, support, students and technology, and emotions related to teaching emerged.

Technology considerations also emerged as a theme. Because these issues pervade all themes, they are not reported on separately. Comments instead are intermixed with topics relevant to the particular technology issue (e.g., teaching issues).

Chapter 5 draws conclusions from this evidence and Rogers’ (2003) model is enhanced to include foundational guidance for the diffusion of technology innovations for higher education.

## Discussion

This study attempted to determine factors for innovation adoption in higher education courses. To that end, examination of courses taught using the Blackboard learning management system before and after introduction to QM materials was conducted. Interviews were used to broaden the depth of understanding for faculty members' later use or non-use of information gained during the quality classroom sessions offered as part of the *U Innovate* initiative.

The original research proposal suggested the incorporation of QM rubric standards into Rogers' (2003) diffusion of innovation model. This was intended to serve as a bridge to move members of the faculty from the knowledge phase through decision and to implementation (and later continuance or discontinuance), of innovation in the classroom environment. It was anticipated this additional input would position faculty to make course improvements that were guided by QM and based upon the body of literature that was used in the development of QM to establish its standards and its rubric.

As the study progressed, it became clear that this model was inadequate.

Interviews with instructors revealed several flaws in this model. The stated lack of preparation for the teaching environment described by seven of 10 of those interviewed exposed a different kind of gap in the decision process. The 2011-2013 QM rubric gives heavy weight to matters of alignment among and between department, course, and unit or module objectives. General Standard 2, Learning Objectives, contains five specific review standards, each worth three points. Course review and interviews showed that many faculty struggle with the creation of objectives, and do not know how to correctly construct them. This was true of faculty with formal education training as

well as those who had none. Undoubtedly, these faculty members are experts in their subject matter realms, but such concepts as the use of objectives and outcomes, and alignment among and between them, is often a new area for those who to teach. This study found that only 3 members of the faculty had received any sort of background for the educational environment other than what was learned by watching others, or in a few cases, by observing the instruction they received in their own online course experiences. A review of the literature suggested this is not out of the norm.

Many objectives found in the comparison courses were incorrectly stated both before and after QM sessions. Some of the objectives were too vague or not measurable. In at least one case, an objective was centered on the course instructor ("to facilitate development of the student…"), as learning objectives should reflect a measurable, demonstrable student outcome. Facilitating the development of the student is the instructor's objective rather than that of the student. "An objective always states what a learner is expected to do and/or produce to be considered competent" (Mager, 1997, p. 46). Most courses reviewed could benefit from the use of objectives that were well written and contained the correct component parts. General Standard 2 tells us, "The learning objectives establish a foundation upon which the rest of the course is based" (Maryland Online, 2011, p. 7). Without having this skill firmly in place, an appropriate foundation for course assessments and materials is made more difficult when implementing the rubric standards.

Another issue with the originally proposed revision to Rogers' (2003) model concerned faculty members' reported concerns for students' abilities to tolerate and successfully use technologies. This additional layer of complexity also renders the

proposed revision unusable. Knowledge of an innovation is the first stepping-stone of the decision process. In many of these cases, knowledge of the innovation was overlaid with the perceived skill of students and their technology capabilities, even though no measurement of student expertise was known.

**Question 1: Does the use of the QM rubric improve the transfer of learning between knowledge of a technology innovation and its use?**

Knowledge of technologies alone did not prove to be sufficient for members of the faculty to incorporate them in their courses, nor did QM knowledge play a role for instructors in technology selection. If an instructor had knowledge about a tool or innovation but did not know how or why its use would be beneficial in a particular teaching environment (the persuasion stage of adoption), that knowledge became disjoined from what was considered to be viable for classroom use. Similarly, if a tool or innovation was selected based on knowledge alone, its inclusion in a course might actually impede progress, as happened to Dale when she attempted to use a blog utility in her course and found it to be ineffective for her students.

Faculty members did not mention the QM standards themselves as being a driver for technology innovation choice; rather, most indicated that when the *U Innovate* sessions were finished, they set the materials aside. Only two mentioned returning to them at a later date. Simple exposure to the rubric and resource suggestions, even though the content was introduced in 5 separate, one-hour sessions, did not provide enough impetus for the study participants to report using the materials after the events.

Although five of the eight QM rubric standards speak to alignment of unit, course, and department objectives, the objectives themselves were poorly written in many cases,

and did not exist at all in others. Also, only one course was reviewed that displayed a change in the way objectives were presented occurred. Faculty themselves, when interviewed, said they didn't really use the objectives (Kay), didn't have time to incorporate them properly (Jay), knew the learning objectives needed to be improved (Pat), said they had always used objectives (Lane, Ash).

**Question 2: With regard to the adoption/rejection decision for instructional technologies, what factors impelled faculty members to come to the conclusions they did regarding use/non-use or continuance/discontinuance?**

In almost every case, interviewees stated a need to bridge gaps of distance, time, and lack of physical presence with their students. They often mentioned having a need for instruction to "come alive" for their students, although this was not an issue for those who taught in a face-to-face environment. One technology that faculty members frequently mentioned employing was the addition of an introductory video in their courses. One of the face-to-face instructors was also interested in improving communication methods with students, to find a communications point that students already used. She reported using Facebook as a communications method, although this information was not reflected in her course information. Syd specifically wanted his students to have knowledge of a breadth of technologies, and to incorporate hands-on technology practice, which would allow his students to enter the job market with the technology skills current to his profession. Lane stressed the fact that his technology selections had nothing to do with the QM rubric. He saw rubric use as being a way to improve his courses, but at the time of his interview had not used it outside of the quality classroom sessions.

Study participants generally mentioned using technologies made available by the university, although some (Pat, Syd, Lane, Bay) also mentioned using ideas from colleagues, conferences, or other contacts.

**Question 3: Did knowledge of the QM rubric and its suggestions for technology use have an impact on technology selection or refusal?**

Comments from interview participants indicated they were more likely to consider those technologies licensed and/or supported by the university than information about technologies contained in QM as they made technology selections.

Pat was able to use blogs to good advantage, giving her students a place that they might debate various issues. This was done in an attempt to provide a parallel to the live debates she conducted in her face-to-face courses. In Pat's case, the blogs added student-to-student communication that had not existed prior to exposure to QM. Dale tried this as well, but after surveying her students found they preferred the discussions built into Blackboard. Dale also felt pressured to use one tool over another, and in her case made the modification to her course tool based on this perceived pressure. Kai enriched his course by adding a number of URLs that included images, video, and recorded lecture content from others. Whether or not these changes would have taken place without knowledge of QM is not known, as Kai mentioned no association between the two. Technology refusal was not much mentioned in the interview process, except as time issues had precluded users (Pat, Jay, Kay, Lane, Ash) from seeking out or mastering new educational technologies for incorporation into their courses.

Participants generally voiced such comments regarding usage as, "Well, and to keep up with students, too. I mean, it's one thing for faculty, but to keep up with what

students are doing and what they're used to – they have a whole different standard" or "I would probably just keep an eye out for what's being circulated at the university."

The introductory video and expanded course introduction represented two items that participants generally associated with exposure to the QM materials, however their use was not evident in all courses where faculty noted their value.

**Question 4: Once a technology component was put into place, did that member of the faculty feel more or less comfortable about continued use of the technology?**

Once technology components were put into place, members of the faculty discussed no change in comfort levels about using them, except where they were discontinued for poor fit, student use issues, or other causes. In one case, Syd's students used a 3rd party website to create course introductions, but they day they were to be presented, the tool's website was down, precluding students from delivering them. This caused a disruption in the class schedule, as the presentations had to wait for another day when the tool's site was back up. Downtime issues with a textbook publisher's study and testing site that Pat attempted to use caused students problems in two ways: first, students who purchased used copies of the text could not obtain a key code to access the site's materials; and second, site downtime prohibited students from accessing the content at any time, as was anticipated. Bay tried having his students upload work examples to Panopto (a lecture capture and video repository utility), but eventually abandoned this practice. He did not have strong enough product knowledge to troubleshoot student problems with recording and uploads (or chose not to support students in this way), and students felt frustrated by their own technical difficulties with the product, especially as

they were associated with a lack of IT support during evening and weekend hours, when his students were most likely to be working on their projects.

Ash mentioned having used a list of technologies at various times in her courses, but in the two courses compared for content before and after reviewing QM materials (Ash was the only person to have previous knowledge of and instruction regarding the QM rubric), none were evident. Ash, however, did report that she had used Blackboard's blog and wiki tool in the past, and said her students found the tool that had "a tendency to interfere more than help." She moved content to the open-source PBWiki platform (a third party blog and wiki tool) in response.

**Question 5: How did faculty members interpret the rubric and translate the new ideas that resulted from their exposure to QM content in their course environments?**

The ways that faculty members interpreted the rubric and translated new ideas into their course environments proved uneven and sporadic. In many cases, the only changes in courses was to change syllabus dates and wording (not always substantially). Two of the course sets were near carbon copies of one another—even semester dates remained the same on one syllabus which had obviously been copied verbatim for use the next term. Occasionally, unintended consequences were introduced as part of reworking a course: using folders in one course, Syd put a lone assignment in with reading materials for his students, but didn't link it to the assignment page, where all other assignments were listed. This change stood to cause more confusion than benefit for students. Ash moved a discussion from the full course roster to individual groups, which reduced participation substantially, from 8,957 average characters per student to just 402, and reduced the total average posts made per student in the course from 7.3 to 1.1. Kai

used folder “faces” to list weekly objectives, readings, and other course requirements, but did not always put content inside the folder, again creating a point of confusion for students.

Dee incorporated the use of video recordings to help explain concepts in her face-to-face course. These were placed online in the Blackboard course shell, the first time this instructor had used the learning management system for anything but recording grades.

**Question 6: What technologies, once accepted, were later rejected?**

Faculty members reported accepting, and later rejecting, an image-animation software, the Blackboard IM (instant messaging) tool, Skype (a video conference tool) for office hours, the Blackboard blog and wiki tool, and Panopto lecture capture for student project submissions. Reasons given were site downtime, a misfit of application (or lack of use, as was the case with Skype for office hours), and in the case of Panopto, student frustrations/difficulty using the tool. One instructor (Pat) continues to struggle with providing up-do-date video content for her students.

Overall, few new technologies were introduced to the courses observed. Comfort levels with technologies seemed to go hand-in-hand with the time needed by members of the faculty to achieve their own perceived mastery of use.

**Question 7: What other factors influenced course decisions for this group?**

Many other factors influenced course decisions for this group. Time issues were repeatedly indicated as being a deciding factor in course redesign. The good intentions members of the faculty had for accomplishing revisions were later outweighed by the more pressing need to put up the course and teach it. Most who were interviewed had not

returned to the rubric to review it, although the interview process itself occasioned at least two to do so. For most, quality classroom course materials were put aside directly after the sessions were completed, and the immediacy of a need for course redesign faded.

Issues of student success, their expectations with regard to technology use, students' need to come away from the education environment having the technology skills they needed for success in their selected professions, student peer-to-peer communication, and especially student engagement were repeated considerations for members of the faculty.

Dale was especially concerned by the fact that her students (according to her perception) were not, themselves, technically proficient. She worried that the time it took students to become familiar with a technology tool took time away from the study of the content itself in her course.

The members of faculty involved in this study were all interested in improving their courses to the benefit of their students. This was made evident not only by their attendance at the Quality Classroom sessions that contained QM content, but also by their interview statements. The students they taught held a high position in their decision-making processes for the use or non-use of technologies.

Surprisingly, a number of emotions came to the surface during the interview process. The range of emotions—from frustration, to anger, to fear, to self-questioning—had not been anticipated. Many of these members of the teaching faculty had been doing so for years, so the their continued unease, as well as the general strength of emotion, had not been anticipated. Unease about a lack of technology knowledge in general,

frustrations with technologies, fear of first time teaching, anxiety regarding student reactions to technology, a need to conform to the teaching styles of others in the department, and worries about student support, self-deprecation regarding the amount of technology incorporated, and a general irritation with the iterative nature of technology advancement were all stated. Very frequently, interview conversations were peppered with such statements as “I know it’s not much,” “I’d like to do more,” “I wish I had time,” “I know this could improve,” “I’ve tried, but I don’t have time to do it right.” “I can’t figure it out on my own.” These and other self-deprecating statements conveyed a lack of self-assurance and perceived personal inadequacy regarding course technologies.

Johnson, Adams Becker, Estrada, and Freeman (2014) sourced experts globally to discuss trends, challenges, and important developments for the higher education sector. The panel’s experts are from the fields of education, technology, and others Of the challenges listed, low digital fluency (that is, the ability to properly manage content, construct knowledge, and share ideas digitally) of faculty is listed as a problem that is solvable, but one that educational institutions seemingly lack the will to implement. Johnson et al. said, in their analysis:

> Faculty training still does not acknowledge the fact that digital media literacy continues its rise in importance as a key skill in every discipline and profession. Despite the widespread agreement on the importance of digital media literacy, training in the supporting skills and techniques is rare in teacher education and non-existent in the preparation of faculty. As lecturers and professors begin to realize that they are limiting their students by not helping them to develop and use digital media literacy skills across the curriculum, the lack of formal training is

> being offset through professional development or informal learning, but we are far from seeing digital media literacy as a norm. This challenge is exacerbated by the fact that digital literacy is less about tools and more about thinking, and thus skills and standards based on tools and platforms have proven to be somewhat ephemeral. (p. 22.)

**Enhancement to Rogers' Diffusion Model**

In order to recognize these unique issues, the previously planned extension to Rogers' (2003) model for the diffusion of innovation could not be adopted. Instead, an enhanced, parallel model (Figure 3) is proposed to guide innovation adoption efforts in the higher education environment. It is intended to provide strategic, timely support for the most efficient and pedagogically sound management of the diffusion model in higher education. By deliberately pairing steps in the diffusion model with appropriate supports, a number of benefits might occur:

- Technology selection could better match stated course outcomes and objectives,
- Time for selection could be reduced based upon a perceived match between the technology and anticipated course outcomes;
- Frustration for faculty could be reduced, as supported trials provide confidence in a tool or innovation's use;
- Time to practice the tool or innovation would preclude missteps in the instructional environment;
- Additional support offered at strategic implementation points could ease anxiety over students' ability to use the tool or innovation.

Using this model gives foundational support to respond to issues described in the literature and during the course of this study. Each step of the innovation decision process is tied to a support mechanism to help support members of the teaching faculty as they develop and/or update their courses. As is shown in Rogers' original (2003) model, each stage of the innovation-decision process is clearly demarcated. Graphically represented, these steps mark off the stages involved in the process. This is similar in the enhanced model. In actuality, this is not the functional truth, for either the original model or its enhancement. While each step appears to be discrete, Rogers (2003) noted, "Certainly the degree and nature of involvement with an innovation change as an individual (or organization) passes through the stages in the innovation-decision process. But we should not expect sharp distinctions between each stage" (p. 195).

**Pedagogical support during the knowledge phase.** This pairing ensures a member of the teaching faculty is equipped with the skills and abilities needed to create appropriate outcomes and objectives and to assess learning. It is listed as a helper to the knowledge phase of the diffusion model based upon the importance of viewing an innovation within the intended course objectives and outcomes. Interview participants voiced difficulty in setting measurable objectives, and this was visible in the courses reviewed. In order to establish a strong foundational base for the instruction being offered, teaching faculty need to know how to create measurable objectives, and then how assessments might be aligned with those identified. Comments such as, "I mean, how do you measure 'you will have an understanding of this,'" as voiced by one study participant, indicate a need for this type of instruction. Anxiety might also be alleviated,

helping an instructor answer one interviewee's question, "Am I going to teach something worthwhile?"

Pedagogical considerations are paired with knowledge in the enhanced model due to the need for a technology to have a sound basis in the instruction being offered. The QM rubric document stated, "It may not be possible to complete the course review if measureable learning objectives are not present" (MarylandOnline, p. 7). It is at the time of knowledge of a new technology that a member of the faculty might conceivably shape its use as relates to objectives and outcomes and how those student results are measured via assessment. Without this basis, members of the faculty stand to waste what was unanimously voiced as a concern: that of their time.

**Technology instruction support during the persuasion phase.** After appropriate objectives and outcomes have been determined and an overview of available tools presented for possible use, technology training would offer the point-and-click "how to" information needed to give information regarding various tools' ability to support selected objectives and outcomes. During the persuasion stage of the decision process, instructors decide whether an innovation gives advantage, can be tried, is compatible, uses an appropriate measure of complexity, and is observable (Rogers, 2003). Without understanding the features and possible benefits of a tool, members of a faculty are less able to envision its use in their own learning environment. The participant who commented, "By the time I'm ready to try Fad A, the technology has moved on to Fad D. Or, you taught me about A three months ago and I'm ready to use it now, but you have already moved to C" might feel more secure about the choices that were and were not made for a course. As one participant commented, "how does this fit with a class of 40?

How does this fit with a class of 70 or 80? And how does this fit with me? How is it going to be used by students?" Direct instruction regarding an innovation or technology can help the faculty member answer these questions in a safe environment, prior to its use in the academic environment. Benefits and drawbacks of the tool can be reviewed. This stands to lessen the apprehension experienced by the interview participant who described a conversation with his peers about the use of a technology. "They were, like, 'okay– well, good luck with that kind of a thing,' which made me unsure of the decisions I was making."

**Practice to support the decision phase.** The instructor would have the opportunity to practice using the skill with others in a safe environment (such as a sandbox course). After using the tool in this type of partial implementation, a better decision would be possible based on actual use. This step in the enhanced model, practice, not only aids in the instructor's fluency with the tool, but can also give the opportunity for development of troubleshooting strategies for the student environment. In using courses technologies, "clear information and instructions are provided regarding how the tools and media support the learning objectives. Technology is not to be used simply for the sake of using technology" (MarylandOnline, 2011, p. 15).

In the decision phase, Rogers (2003) says, "One way to cope with the inherent uncertainty about an innovation's consequences is to try out the new idea on a partial basis" (p. 177). This also aligns with Merrill's (2002) first principles of instruction. Merrill outlines commonly accepted phases of instruction and says, "Learning is promoted when new knowledge is applied by the learner (p 45). Using a sandbox environment, members of faculty would be able to test the use of a tool with others on

campus or in a support group, helping verify or reject the possibility of use. This could help members of the faculty avoid unintended consequences that occur as a result of the use of an unpracticed innovation and further ease frustration when students have questions or problems and reach out to members of the faculty for help. Or improve the confidence of another, who said, “I think the biggest thing for me is the need for more just-in-time, one-on-one instruction on how to use it, maybe some examples about how someone is using it in their class so I could see how to use it.”

**Technology supports for the implementation phase.** At the time of implementation, support mechanisms would be on hand to quickly help with questions and problems, both from students and faculty. Interviews with participants highlighted support issues for their students and their own needs. “In-house kinds of leadership and support for technology is yet another piece of helping faculty to do the very best that can be done,” Ash remarked. Working with specific faculty at specific points of implementation, response time could be managed and priority given to users who are just getting started with a technology innovation implementation. This might have helped one participant, who said, “I wanted to try to use [technology] but I wasn't sure how it would really work, and there was no help to figure out how to use it and how to implement it in a class.”

Effective technology integration needs to have support, Pat indicated. She said, “But whether it is the powers-that-be or another authority, more support would be tremendously helpful in terms of, ‘Here are some different things you could try. Here is what is out there.’” She also described the need for support based on her lack of teacher preparation, saying, “Right off the top I had no clue, except for my own classroom

experience. I just did a couple classes along with my mentor when I started. Somebody showed me what a syllabus was, and that was about it."

**Sharing of new knowledge at the confirmation phase.** If a continued-use decision is made, the instructor could serve to share his or her successes and help others begin their own course improvements. Similarly, an opportunity would then exist for the adopter to share the pitfalls faced, to help preclude others from making the same errors.

Sharing also serves the purpose of making the decision-to-use process iterative, as is needed for consistent review of technologies and their educational uses. A mentoring relationship might occur when an individual new to an innovation attempts its use. In this way, members of the faculty are able to be part of a professional growth cycle that supports peer learning and raises educational technology competencies for all who participate.

Finally, peer-learning opportunities give subject matter experts within a discipline to share relevant technologies that might be specific to their fields of interest. The instructor who has mastery of a tool, and uses it to good effect in the educational environment, can serve as a catalyst to guide others in their technology efforts. QM, since the beginning, was designed as a "faculty-centered, peer review process that is designed to certify the quality of online and blended courses" (MarylandOnline, 2011, inside cover.) Whether or not an institution chooses to select the QM standards and rubric or another such tool for quality assurance, the peer process serves to strengthen knowledge of a whole department over time, rather than that of a single member of the faculty.

**Researcher Perspective**

In retrospect, it might have been a good idea to conduct a second interview with each participant to follow up on the themes that arose during the coding process. Doing so might have provided more clarity to participants' original comments, although there is no surety that this would be the case. In addition, it might have been informative to compare more than one course offered before and after QM exposure, presuming they exist, to see whether any changes occurred in a broader range of a particular participant's courses. A future study at a larger institution might also offer additional insights into a wider comparison of courses. If this larger study were undertaken, the employment of a graduate research or other assistant would be a beneficial addition to the project.

Another way to understand this process might be through the perceptions of the students regarding the content presented, ease of navigation, and resource selection and support. The study could involve comparing equivalent sections of a course taught by the same instructor, using two identical sections of "before" courses, and keeping one of the "after" sections unchanged as a control course to determine how student evaluation of the subsequent two courses compare.

**Implications for Future Research**

This study examined the factors for innovation adoption in higher education courses. The use of grounded theory highlighted specific themes among members of the faculty. In retrospect, it was determined that the information contained in the QM rubric materials, while valuable, was not translated into the course environments offered by most of the instructors whose courses were reviewed. What happened instead was that materials were set aside in the interests of time, lack of personal support for the rubric,

and because the materials were put away and simply forgotten. To better understand innovation adoption by higher education faculty, the enhancement to Rogers' diffusion model should be tested to determine whether its use effects the desired changes over time in course offerings. It might also be valuable to conduct an action research study over a longer period of time, to measure how various support models could be applied and later adjusted for best assistance models for faculty technology endeavors.

Considering participants' stated lack of preparation to teach in the higher education environment, another possible study, conducted with a much broader participant base, could be used to determine overall teaching preparation, versus the smaller sample size used in this study. This information could then be used to develop an onboarding checklist for new faculty, giving time to fill in gaps in preparation (such as knowing how to correctly write unit and course objectives and aligning those to the assessments offered in a course).

The university studied for this research is teaching based, rather than being more research oriented. Broadening the study to understand the similarities and differences in the two environments might be accomplished. Moreover, how doctoral students are being prepared to teach in their programs of study forms the basis of yet another inquiry.

**Summary**

This study does not attempt to suggest guidelines for changes to the faculty development process. However, it does offer insight into the opportunities and challenges members of the faculty at this institution faced as they attempted to improve the quality of their course construction while continuing to manage their lives and work schedules; overcome feelings of inadequacy, anxiety, and frustration; and teach and

perform other job tasks effectively all the while. The study also incorporates Rogers' (2003) diffusion of innovation model already in place in order to suggest support steps in the process that could help ensure faculty success with technology innovations.

Quality Matters provides a research-based course improvement model that is widely used. This research has suggested that members of the faculty at this university who opted to attend sessions regarding its implementation did not always, or even often, make concrete changes to their courses, due to other challenges they faced as part of the course redesign process. The use of QM, or that of any other course design rubric, would be better incorporated into a broader discussion of the topic of teaching, its inherent pedagogical issues and constructs, matters of preparation and practice, and sure support that would form a more solid foundation upon which faculty members might base future course construction.

Possible future research streams in this topic include exploration into the enhanced diffusion model to determine whether its use can be shown to correlate with improved course delivery methods, continued exploration into the emotional drivers for technology innovation use and selection in a classroom environment, and students' reactions to technology use in the courses they take.

# References

Algozzine, B., Bateman, L. R., Flowers, C. P., Gretes, J. A., Hughes, C. D., & Lambert, R. (1999). Developing technology competencies in a college of education. *Current Issues in Education, 2*(3), 1-12.

Allen, I. E., & Seaman, J. (2003). *Sizing the opportunity: The quality and extent of online education in the United States, 2002 and 2003*. Needham, MA: Sloan Center for Online Education.

Allen, I. E., & Seaman, J. (2008). *Staying the course: Online education in the United States, 2009*. Babson Park, MA: Babson Survey Research Group. Retrieved from http://www.onlinelearningsurvey.com/reports/staying-the-course.pdf

Allen, I. E., & Seaman, J. (with Lederman, D., & Jaschik, S.). (2012). *Conflicted: Faculty and online education, 2012*. Babson Park, MA: Babson Survey Research Group. Retrieved from http://www.insidehighered.com/sites/default/server_files/files/IHE-BSRG-Conflict.pdf

Allen, I. E., & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States*. Babson Park, MA: Babson Survey Research Group. Retrieved from http://www.onlinelearningsurvey.com/reports/changingcourse.pdf

Allen, I. E., Seaman, J., Lederman, D., & Jaschik, S. (2012). *Digital Faculty: Professors, Teaching and Technology, 2012*. Babson Park, MA: Babson Survey Research Group. Retrieved from http://www.insidehighered.com/download/?file=DigitalFaculty.pdf

Anderson, T., Varnhagen, S., & Campbell, K. (1998). Faculty adoption of teaching and learning technologies: Contrasting earlier adopters and mainstream faculty. The Canadian Journal of Higher Education, 28(2, 3), 71–98.

Apple (March 12, 2013). Search on keyword education. [Apple app store search]. Retrieved from https://itunes.apple.com/us/genre/ios/id36?mt=8

Ash, K. (2012). Educators evaluate 'flipped classrooms': Benefits and drawbacks seen in replacing lectures with on-demand video. *Education Week 32*(2), 6-8.

Baran, E., & Correia, A. P. (2009). Student-led facilitation strategies in online discussions. *Distance Education*, *30*(3), 339–361.

Bachman, J. W. (1956). *How to use audio-visual materials*. New York, NY: Association Press.

Bassili, J. N. (2008). Motivation and cognitive strategies in the choice to attend lectures or watch them online. *The Journal of Distance Education*, *22*(3), 129–148.

Beaudry, A., & Pinsonneault, A. (2010). The other side of acceptance: Studying the direct and indirect effects of emotions on information technology use. *MIS Quarterly*, *34*(4), 689-710.

Beck, E., & Black, E. W. (2012). Communication is key: The role of communication in the diffusion of a learning management system into a higher education environment. *International Journal of Learning and Technology 7*(1), 4-22.

Belkin, N. J. (1984). Cognitive models and information transfer. *Social Science Information Studies 4*, 111-129.

Beggs, T. A. (2000). Influences and barriers to the adoption of instructional technology. *Proceedings of the Mid-South Instructional Technology Conference*. Retrieved from: http://scholar.google.com/scholar_url?url=http://files.eric.ed.gov/fulltext/ED446764.pdf&hl=en&sa=X&scisig=AAGBfm0n2HDUYrXHqY55g8uz51yTd2j9yQ&nossl=1&oi=scholarr

Bogle, L., Boles, E., Day, S., Matthews, D., & Swan, K. (2011, August). *Using peer review and analytics to incrementally improve online courses*. Paper presented at the 27th Annual Conference on Distance Teaching and Learning, Madison, WI.

Bryman, A. (2008). *Social research methods* (3rd ed.). New York, NY: Oxford University Press.

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Thousand Oaks, CA: Sage Publications.

Chen, F. C., & Wang, T. C. (2009). Social conversation and effective discussion in online group learning. *Educational Technology Research and Development, 57*(5), 587–612. doi:10.1007/s11423-009-9121-1

Chickering, A. W., & Ehrmann, S. C. (1996). Implementing the seven principles: Technology as lever. *AAHEBulletin.com*. Retrieved from http://www.aahebulletin.com/public/archive/sevenprinciples.asp?pf=1

Chickering, A. W., & Gamson, Z. F. (1999). Development and adaptations of the seven principles for good practice in undergraduate education. *New Directions for Teaching and Learning, 80*, 75–81.

Cook, D. A. (1964). The new technology and the educational decision. In A. de Grazia & D. A. Sohn (Eds.), *Revolution in teaching: New theory, technology, and curricula* (pp. 31-41). New York, NY: Bantam Books.

Computer History Museum. (n.d.) Exhibits: Timeline of computer history, ’77. Retrieved from http://www.computerhistory.org/timeline/?year=1977

Corbin J., & Strauss, A. (2008). Basics of qualitative research: Techniques and procedures for developing grounded theory. Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2007). *Qualitative inquiry & research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Cuban, L. (1986). *Teachers and machines: The classroom use of technology since 1920*. New York, NY: Teachers College Press.

Dahlstrom, E. (2012). *ECAR study of undergraduate students and information technology, 2012*. Louisville, KY: EDUCAUSE Center for Applied Research. Retrieved from http://net.educause.edu/ir/library/pdf/ERS1208/ERS1208.pdf

Dahlstrom, E., & Bischel, J. (2014). ECAR study of undergraduate students and information technology, 2014. Louisville, KY: EDUCAUSE Center for Applied Research. Retrieved from http://www.educause.edu/ecar

Darabi, A., Arrastia, M. C., Nelson, D. W., Cornille, T., & Liang, X. (2011). Cognitive presence in asynchronous online learning: A comparison of four discussion strategies. *Journal of Computer Assisted Learning*, *27*(3), 216–227. doi:10.1111/j.1365-2729.2010.00392.x

Davis, J. (2012). *School enrollment and work status: 2011*. U.S. Census Bureau. http://www.census.gov/library/publications/2012/acs/acsbr11-14.html

Eisele, J. E., & Eisele, M. E. (1990). *Educational technology: A planning and resource guide supporting curriculum*. New York, NY: Garland.

Ely, D. (1964). Facts and fallacies about new media in education. In A. de Grazia & D. A. Sohn (Eds.), *Revolution in teaching: New theory, technology, and curricula* (pp. 31-41). New York, NY: Bantam Books.

Ertmer, P. A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47-62.

Eskey, M. T., & Shulte, M. (2012). Comparing attitudes of online instructors and online college students: Quantitative results for training, evaluation and administration. *Online Journal of Distance Learning Administration, 15*(4). Retrieved from https://www.westga.edu/~distance/ojdla/winter154/eskey_schulte154.html

Evans, L. H. (1964). The challenge of automation to education. In A. de Grazia & D. A. Sohn (Eds.), *Revolution in teaching: New theory, technology, and curricula* (pp. 31-41). New York, NY: Bantam Books.

Fill, K., & Ottewill, R. (2006). Sink or swim: Taking advantage of developments in video streaming. *Innovations in Education and Teaching International*, *43*(4), 397–408. doi:10.1080/14703290600974008

Fish, W., & Gill, P. (2009). Perceptions of online instruction. *The Turkish Online Journal of Educational Technology, 8*(1). Retrieved from: http://eric.ed.gov/?id=ED503903

Finley, L., & Hartman, D. (2004). Institutional change and resistance: Teacher preparatory faculty and technology integration. *Journal of Technology and Teacher Education*, *12*(3), 319–337.

Finn, J. D. (1964). Take off to revolution. In A. de Grazia & D. A. Sohn (Eds.), *Revolution in teaching: New theory, technology, and curricula* (pp. 31-41). New York, NY: Bantam Books.

Gardner, G. E., & Jones, M. G. (2011). Pedagogical preparation of the science graduate teaching assistant: Challenges and implications. *Science Educator 20*(2), 31-41.

Georgina, D. A., & Hofstra, C. C. (2009). Higher education faculty perceptions on technology integration and training. *Teaching and Teacher Education*, *25*(5), 690–696. doi:10.1016/j.tate.2008.11.004

Geoghagen, W. H. (1994, July). *What ever happened to instructional technology?* Paper presented at the 22nd Annual Conference of the International Business Schools Computing Association, Baltimore, MD. Retrieved from http://eprints.soton.ac.uk/260144/1/Geoghegan-1994-WHAT_EVER_HAPPENED_TO_INSTRUCTIONAL_TECHNOLOGY.doc

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Hawthorne, NY: Aldine de Gruyter.

Green, J. C. (2007). *Mixed methods in social inquiry.* San Francisco, CA: Jossey-Bass.

Greer, R. C. (1981). Information transfer: A conceptual model for librarianship, information, and information management. In IATUL Proceedings. Presented at the International Association of Scientific and Technological University Libraries, Lausanne, Switzerland. Retrieved from http://www.whataweb.com/li803/d_course_articles_greer1.pdf

Greenberg, G. (2010). From the ground up: Conceptions of quality in course design for web-supported instruction. Columbus, OH: The Ohio State University. Retrieved from http://etd.ohiolink.edu/send-pdf.cgi/Greenberg%20Gary.pdf?osu1269520873

Hancock, T. E. (2014). Totally online public schools: Experience and insights of a teacher. *The WERA Education Journal, 6*(2), 22-28.

Harris, G., Froman, J., & Surles, J. (2009). The professional development of graduate mathematics teaching assistants. *International Journal of Mathematical Education in*

*Science and Technology, 40*(1), 157–172.

Houlihan, M., Fraser, I., Fenwick, K. D., Fish, T., & Moeller, C. (2009). Personality effects on teaching anxiety and teaching strategies in university professors. *Canadian Journal of Higher Education Revue, 39(*1), 61-72.

Houston, M., & Lin, L. (2012). Humanizing the classroom by flipping the homework versus lecture equation. In P. Resta (Ed.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2012* (pp. 1177-1182). Chesapeake, VA: AACE.

Johnson, L., Adams, S., & Cummins, M. (2012). *NMC Horizon Report: 2012 Higher Education Edition*. Austin, TX: New Media Consortium. Retrieved from http://www.nmc.org/pdf/2012-horizon-report-HE.pdf

Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., & Ludgate, H. (2013). *NMC Horizon Report: 2013 Higher Education Edition*. Austin, TX: New Media Consortium. Retrieved from http://www.nmc.org/pdf/2013-horizon-report-HE.pdf

Johnson, T., Wisniewski, M., Kuhlmeyer, G., Isaacs, G., & Krzykowski, J. (2012). Technology adoption in higher education: Overcoming anxiety through faculty bootcamp. Journal of Asynchronous Learning Networks, 16(2), 63–72.

Joseph, R. (2010). Individual resistance to IT innovations. *Communications of the ACM, 53*(4), 144-146.

Jurkowski, O., & Kerr, S. (2010). Development of an educational innovation incubator. *Tech Trends*, *54*(2), 72–77.

Khan, S. (2011, March 9). *Let's use video to reinvent education* [Video file]. Retrieved March 17, 2013, from http://www.youtube.com/watch?v=gM95HHI4gLk&feature=youtu.be

Keller, J. M. (2008). First principles of motivation to learn and e3-learning. *Distance Education*, *29*(2), 175–185.

Kidd, T. T., & Larke, P. J. (2012). The rhetoric of fear: Examining the construct of fear and computer anxiety as it relates to faculty engagement in online teaching. In P. Resta (Ed.), *Society for Information Technology & Teacher Education International Conference*: *Vol. 2012(1)*, (pp. 511-516). Chesapeake, VA: Association for the Advancement of Computing in Education.

Lage, M. J., Platt, G. J., & Treglia, M. (2000). Inverting the classroom: A gateway to creating an inclusive learning environment. *The Journal of Economic Education*, *31*(1), 30–43.

Lane, C. A. (2011). Obstacles and supports related to the use of educational technologies: The role of technological expertise, gender, and age. *Journal of Computing in Higher Education 23*(1), 38-59.

Legon, R. (2006). *Comparison of the Quality Matters rubric to accreditation standards for distance learning*. Retrieved from https://confluence.delhi.edu/download/attachments/74055682/Comparison+of+the+Quality+Matters+Rubric+-+Summary.pdf

Leiner, B. M., Cerf, V. G., Clark, D. D., Kahn, R. E., Kleinrock, L., Lynch, D. C., … Wolff, S. (2009). A brief history of the Internet. *Computer Communication Review*, 39(5), 22.

Lewis, K. O., Baker, R. C., & Britigan, D. H. (2011). Current practices and needs assessment of instructors in an online masters degree in education for healthcare professionals: A first step to the development of quality standards. *Journal of Interactive Online Learning*, *10*(1), 49–63.

Maguire, L. L. (2005). Literature review–faculty participation in online distance education: Barriers and motivators. *Online Journal of Distance Learning Administration, 8*(1). Retrieved from http://www.westga.edu/~distance/ojdla/spring81/maguire81.pdf

Margolis, R. (1964). Programed instruction: Miracle or menace? In A. de Grazia & D. A. Sohn (Eds.), *Revolution in teaching: New theory, technology, and curricula* (pp. 31-41). New York, NY: Bantam Books

MarylandOnline, Inc. (2011). *The Quality Matters rubric workbook for higher education, 2011-2013 edition.* Annapolis, MD: Author.

McIntyre, C. J. (1963). The impact of new media on college instruction: A discussion of instructional technology and the teaching profession. *The Journal of Higher Education 34*(2), 85-91.

Merrill, M. D. (2002). First principles of instruction. *ETR&D, 50*(3), 43-59.

Meyer, K. A. (1998). Faculty workload studies: Perspectives, needs, and future directions. *ASHE-ERIC Higher Education Report*, *26*(1), 1–135.

Merriam, S. B., Caffarella, R. S., & Baumgartner, L. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.). San Francisco, CA: Jossey-Bass.

Muilenburg, L., & Berge, Z. L. (2001). Barriers to distance education: A factor-analytic study. *American Journal of Distance Education*, *15*(2), 7–22. doi:10.1080/08923640109527081

Ndahi, H. B. (1999). Utilization of distance learning technology among industrial and technical teacher education faculty. *Journal of Industrial Teacher Education*, *36*(4), 21–37.

Ni, X., Diomede, S., & Rutland, S. (2012). Strategies to increase engagement, effectiveness, and meaningfulness in course management systems. In T. Amiel & B. Wilson (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2012* (pp. 1111-1118). Chesapeake, VA: AACE.

Nicholson, J., & Nicholson, D. B. (2010). A stream runs through IT: Using streaming video to teach information technology. *Campus-Wide Information Systems, 27*(1), 17–24. doi:10.1108/10650741011011255

Nucifora, S., & Kunnen, E. (2009). Project Astro v2.11 readme.txt. Retrieved from http://projects.oscelot.org/gf/project/astro/docman/?subdir=202

Pajo, K., & Wallace, C. (2007). Barriers to the uptake of Web-based technology by university teachers. *The Journal of Distance Education*, *16*(1), 70–84.

Papert, S. (1996, October 27). Computers in the classroom: Agents of change. The Washington Post Education Review. Retrieved March 12, 2013, from http://www.papert.org/articles/ComputersInClassroom.html

Parry, M. (2012). 5 ways that edX could change education. Chronicle of Higher Education, 59(6). Retrieved from http://chronicle.com/article/5-Ways-That-edX-Could-Change/134672/

Powell, R. R., & Connaway, L. S. (2004). *Basic Research Methods for Librarians*. Santa Barbara, CA: Libraries Unlimited.

Rieser, R. A. (2001). History of instructional design and technology: Part I : A history of instructional media. *Educational Technology Research and Development, 49*(1), 53–64.

Rogers, E. M. (1958). Categorizing the adopters of agricultural practices. *Rural Sociology, 23,* 326-364.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.

Rogers, P. L. (2000). Barriers to adopting emerging technologies in education. *Journal of Educational Computing Research, 22*(4), 455–472.

Rovai, A. P. (2001). Building classroom community at a distance: A case study. *Educational Technology Research and Development, 49*(4), 33-48.

Rovai, A. P. (2007). Facilitating online discussions effectively. *The Internet and Higher Education, 10*(1), 77-88.

Saettler, P. (1968). *A history of instructional technology*. New York, NY: McGraw-Hill.

Schwartz, M. S., & Schwartz, C. G. (1955). Problems in participant observation. *American Journal of Sociology, 60*(4), 343-353.

Shattuck, K. (2007). Quality Matters: Collaborative program planning at a state level. *Online Journal of Distance Learning Administration, 10*(3). Retrieved from http://www.westga.edu/~distance/ojdla/fall103/shattuck103.htm

Sondquist, J. (1977). Prerequisites for acceptance. In J. Feldman & C. Mosmann (Eds.), *Instructional computing in the university: The second decade* (pp. 70-72).

Spodark. (2003). Five obstacles to technology integration at a small liberal arts university. *T.H.E. Journal, 30*(8), 14-24.

Spotts, T. H. (1999). Discriminating factors in faculty use of instructional technology in higher education. *Educational Technology & Society, 2*(4). Retrieved from http://www.ifets.info/journals/2_4/spotts.html

Starkweather, J. (1977). The instructional interface. In J. Feldman & C. Mosmann (Eds.), *Instructional computing in the university: The second decade* (pp. 74-76). San Francisco, CA: San Francisco Press.

Veletsianos, G., & Navarrete, C. C. (2012). Online social networks as formal learning environments: Learner experiences and activities. *International Review of Research in Open and Distance Learning, 13*(1) 144-166.

Ward, C. (2012). Aligning the Quality Matters rubric to the technological, pedagogical content knowledge conceptual framework. In *Society for Information Technology & Teacher Education International Conference* (Vol. 2012, pp. 4787–4793). Retrieved from http://www.editlib.org/p/40364

Wheelan, C. J. (2013). *Naked statistics: Stripping the dread from the data*. New York, NY: W. W. Norton & Company.

Whitfield, T. S., & Hickerson, C. (2013). The difficult transition? Teaching, research, service: Examining the preparedness of communication faculty entering the academe Journal of the Scholarship of Teaching and Learning, 13(1), 1 – 23.

Wright, J. M. (2011). Effect of Quality Matters™ training on faculty's online self-efficacy. In M. Clay (Ed.), *Distance Learning Administration Annual Conference Proceedings*. Retrieved from: http://works.bepress.com/cgi/viewcontent.cgi?article=1002&context=jim_wright

Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Los Angeles, CA: Sage Publications.

Yun-Jo, A., & Reigeluth, C. M. (2008). Problem-based learning in online environments. *The Quarterly Review of Distance Education 9*(1), 1-16.

Valenti, S. (2014). [2014 Student Technology Survey]. Unpublished raw data.

Zimmerman, W. (2011). *Rater agreement and the measurement of reliability in evaluations of online course design using the Quality Matters rubric* (Master's thesis). Retrieved from https://etda.libraries.psu.edu/paper/11677/7238

Table 1

*Total and Online Enrollment in Degree Granting Postsecondary Institutions Fall 2002 Through Fall 2011*

| | Total enrollment | Annual growth rate total enrollment | Students taking at least one online course | Online enrollment increase over previous year | Annual growth rate online enrollment | Online enrollment as a percent of total enrollment |
|---|---|---|---|---|---|---|
| Fall 2002 | 16,611,710 | NA | 1,602,970 | NA | NA | 9.6% |
| Fall 2003 | 16,911,481 | 1.8% | 1,971,397 | 368,427 | 23.0% | 11.7% |
| Fall 2004 | 17,272,043 | 2.1% | 2,329,783 | 358,386 | 18.2% | 13.5% |
| Fall 2005 | 17,487,481 | 1.2% | 3,180,050 | 850,267 | 36.5% | 18.2% |
| Fall 2006 | 17,758,872 | 1.6% | 3,488,381 | 308,331 | 9.7% | 19.6% |
| Fall 2007 | 18,248,133 | 2.8% | 3,938,111 | 449,730 | 12.9% | 21.6% |
| Fall 2008 | 19,102,811 | 4.7% | 4,606,353 | 668,242 | 16.9% | 24.1% |
| Fall 2009 | 20,427,711 | 6.9% | 5,579,022 | 972,669 | 21.1% | 27.3% |
| Fall 2010 | 21,016,126 | 2.9% | 6,142,280 | 563,258 | 10.1% | 29.2% |
| Fall 2011 | 20,994,113 | -0.1% | 6,714,792 | 572,512 | 9.3% | 32.0% |

*Note*. From "*Changing Course: Ten Years of Tracking Online Education in the United States*" by I. Elaine Allen and Jeff Seaman, 2013, p.17. 

Table 2

*Interviewees, teaching experience, and sessions attended*

| Pseudonym | Gender | First year Higher Ed Teaching | Formats Taught[a] | Sessions Required | Sessions Attended[b] |
|---|---|---|---|---|---|
| Kay | F | 1991 | 1, 2, 3 | 6 | 8 |
| Dale | F | 2006 | 1, 3 | 6 | 26 |
| Dee | F | 2000 | 1 | 6 | 6 |
| Pat | F | 2009 | 1, 3 | 6 | 7 |
| Ash | F | 1993 | 1, 2, 3 | 6 | 6 |
| Bay | M | 2010 | 1, 3 | 6 | 17 |
| Syd | M | 2011 | 1 | 6 | 9 |
| Lane | M | 1992 | 1, 2, 3 | 6 | 7 |
| Jay | M | 2013 | None | 6 | 11 |
| Kai | M | 1999 | 2, 3 | 6 | 10 |

[a]Formats: 1) a face-to-face environment; 2) a blended environment; 3) an online environment.

[b] Median session attendance for all 34 members of the faculty who qualified for a conference stipend was 8. The median session attendance figure for participants in the interview group was 8.5.

Table 3

*Discussion comparisons, Kay*

| | | PARTICIPATION PER STUDENT | | | | AVG PER SINGLE POST | |
|---|---|---|---|---|---|---|---|
| SEMESTER TAUGHT | TOTAL STUDENTS | AVG FORUMS | AVG POSTS | AVG TOTAL CHARACTERS PER STUDENT | AVG CHARACTERS PER POST | MINIMUM CHARACTERS POSTED | MAXIMUM CHARACTERS POSTED |
| Fall 2012 | 11 | 8.27 | 25.91 | 25,935 | 670 | 36 | 3,092 |
| Spring 2013 | 10 | 9.10 | 28.40 | 63,536 | 1124 | 28 | 27,215 |

*Note*. All calculations for average characters have been rounded to whole numbers. Average forums and posts are rounded to two decimals.

Table 4

*Course Comparison, Kay, Online Format*

| Tool name | Number of occurrences | | |
|---|---|---|---|
| | Before QM exposure | After QM exposure | Change |
| Announcements | 44 | 40 | (4) |
| Assignments | 19 | 14 | (5) |
| Contacts | 2 | 2 | NC |
| Content folders | 5 | 5 | NC |
| Course documents | 2 | 2 | NC |
| Discussion posts | 429 | 470 | +41 |
| Files | 37 | 30 | (7) |
| Grade center columns | 20 | 16 | (4) |
| Tracked Items | 1 | 0 | (1) |

Table 5

*Discussion comparisons, Dee*

| | | PARTICIPATION PER STUDENT | | | | PER SINGLE POST | |
|---|---|---|---|---|---|---|---|
| SEMESTER TAUGHT | TOTAL STUDENTS | AVG FORUMS | AVG POSTS | AVG TOTAL CHARACTERS PER STUDENT | AVG CHARACTERS PER POST | MINIMUM CHARACTERS POSTED | MAXIMUM CHARACTERS POSTED |
| Fall 2012 | 73 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spring 2013 | 74 | 0 | 0 | 0 | 0 | 0 | 0 |

*Note*. Discussions forums were not used in either course.

Table 6

*Course Comparison, Dee, Face-to-Face Course*

| Tool name | Number of occurrences | | Change |
|---|---|---|---|
| | Before QM exposure | After QM exposure | |
| Files | 0 | 3 | +3 |
| Grade center columns | 15 | 16 | (1) |
| URLs | 0 | 8 | +8 |

Table 7

*Discussion comparisons, Dale*

| | | PARTICIPATION PER STUDENT | | | | AVG PER SINGLE POST | |
|---|---|---|---|---|---|---|---|
| SEMESTER TAUGHT | TOTAL STUDENTS | AVG FORUMS | AVG POSTS | AVG TOTAL CHARACTERS PER STUDENT | AVG CHARACTERS PER POST | MINIMUM CHARACTERS POSTED | MAXIMUM CHARACTERS POSTED |
| Spring 2012 | 3 | 6.67 | 22.00 | 26,080 | 1,159 | 104 | 7,138 |
| Spring 2013 | 15 | 7.60 | 31.80 | 80,771 | 2,389 | 99 | 14,778 |

*Note*. All calculations for average characters have been rounded to whole numbers. Average forums and posts are rounded to two decimals.

Table 8

*Course Comparison, Dale, Fully Online*

| Tool name | Number of occurrences | | Change |
|---|---|---|---|
| | Before QM exposure | After QM exposure | |
| Announcements | 1 | 4 | +3 |
| Assessments | 6 | 8 | +2 |
| Assignments | 6 | 6 | NC |
| Collaboration sessions | 0 | 2 | +2 |
| Contacts | 1 | 2 | +1 |
| Content folders | 18 | 17 | (1) |
| Course documents | 1 | 1 | NC |
| Discussion posts | 96 | 534 | +438 |
| Files | 22 | 26 | +4 |
| Grade center columns | 17 | 19 | +2 |
| Tests | 4 | 4 | NC |
| Tracked items | 83 | 88 | +88 |
| URLs | 5 | 8 | +3 |
| YouTube video | 39 | 40 | +1 |

Table 9

*Discussion comparisons, Pat*

| | | PARTICIPATION PER STUDENT | | | | AVG PER SINGLE POST | |
|---|---|---|---|---|---|---|---|
| SEMESTER TAUGHT | TOTAL STUDENTS | AVG FORUMS | AVG POSTS | AVG TOTAL CHARACTERS PER STUDENT | AVG CHARACTERS PER POST | MINIMUM CHARACTERS POSTED | MAXIMUM CHARACTERS POSTED |
| Fall 2012 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fall 2013 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Note*. Blackboard discussions were not used in either course reviewed. (Students debated topics during the Fall 2013 course using the Campus Pack collaboration tool.)

Table 10

*Course Comparison, Pat, Fully Online*

| Tool name | Number of occurrences | | Change |
|---|---|---|---|
| | Before QM exposure | After QM exposure | |
| Announcements | 14 | 13 | (1) |
| Assessments | 5 | 5 | NC |
| Assignments | 11 | 6 | (5) |
| Campus Pack blogs | 0 | 13 | +13 |
| Contacts | 1 | 1 | NC |
| Content folders | 0 | 1 | +1 |
| Course documents | 32 | 31 | (1) |
| Discussion posts | 0 | 0 | NC |
| Grade center columns | 17 | 17 | NC |
| Groups | 0 | 4 | +4 |
| Learning modules | 7 | 7 | NC |
| Tests | 5 | 5 | NC |
| URLs | 35 | 34 | (1) |

Table 11

*Discussion comparisons, Ash*

| | | PARTICIPATION PER STUDENT | | | | AVG PER SINGLE POST | |
|---|---|---|---|---|---|---|---|
| SEMESTER TAUGHT | TOTAL STUDENTS | AVG FORUMS | AVG POSTS | AVG TOTAL CHARACTERS PER STUDENT | AVG CHARACTERS PER POST | MINIMUM CHARACTERS POSTED | MAXIMUM CHARACTERS POSTED |
| Fall 2012 | 30 | 2.83 | 7.30 | 8,957 | 1,297 | 94 | 6,750 |
| Spring 2013 | 7[a] | 1.00 | 1.14 | 402 | 370 | 356 | 385 |

*Note*. All calculations for average characters have been rounded to whole numbers. Average forums and posts are rounded to two decimals.

[a]Although 29 students were enrolled in the 2013 course, only 7 participated in discussions among group members. Only character counts for these participants are shown.

Table 12

*Course Comparison, Ash, Blended*

| Tool name | Number of occurrences | | Change |
|---|---|---|---|
| | Before QM exposure | After QM exposure | |
| Announcements | 20 | 21 | +1 |
| Assignments | 10 | 9 | (1) |
| Collaboration sessions | 0 | 10 | +10 |
| Contacts | 2 | 2 | NC |
| Content folders | 0 | 2 | +2 |
| Course documents | 17 | 16 | (1) |
| Discussion posts | 234 | 2[a] | (232) |
| Grade center columns | 11 | 10 | (1) |
| Groups | 0 | 5 | +5 |

[a]Only full-course discussion forums appear here.

Table 13

*Discussion comparisons, Bay*

| | | PARTICIPATION PER STUDENT | | | | AVG PER SINGLE POST | |
|---|---|---|---|---|---|---|---|
| SEMESTER TAUGHT | TOTAL STUDENTS | AVG FORUMS | AVG POSTS | AVG TOTAL CHARACTERS PER STUDENT | AVG CHARACTERS PER POST | MINIMUM CHARACTERS POSTED | MAXIMUM CHARACTERS POSTED |
| Fall 2012 | 22 | 9.27 | 17.41 | 57,427 | 3,307 | 213 | 16,281 |
| Spring 2013 | 29 | 2.14 | 8.07 | 34,349 | 5,717 | 1,592 | 13,555 |

*Note*. All calculations for average characters have been rounded to whole numbers. Average forums and posts are rounded to two decimals.

Table 14

*Course Comparison, Bay, Fully Online*

| Tool name | Number of occurrences | | Change |
|---|---|---|---|
| | Before QM exposure | After QM exposure | |
| Announcements | 16 | 23 | +7 |
| Assessments | 10 | 5 | +5 |
| Assignments | 5 | 5 | NC |
| Campus Pack contents | 0 | 3 | +3 |
| Collaboration sessions | 2 | 2 | NC |
| Contacts | 2 | 2 | NC |
| Content folders | 19 | 19 | NC |
| Course documents | 31 | 47 | +16 |
| Discussion boards | 9 | 4 | (5) |
| Discussion posts | 392 | 237 | (155) |
| Files | 0 | 3 | +3 |
| Grade center columns | 19 | 23 | +4 |
| Surveys | 0 | 2 | +2 |
| Tests | 3 | 10 | +7 |
| URLs | 12 | 23 | +11 |
| YouTube video | 13 | 7 | (6) |

Table 15

*Discussion comparisons, Kai*

| | | PARTICIPATION PER STUDENT | | | | AVG PER SINGLE POST | |
|---|---|---|---|---|---|---|---|
| SEMESTER TAUGHT | TOTAL STUDENTS | AVG FORUMS | AVG POSTS | AVG TOTAL CHARACTERS PER STUDENT | AVG CHARACTERS PER POST | MINIMUM CHARACTERS POSTED | MAXIMUM CHARACTERS POSTED |
| Fall 2012 | 27 | 11.30 | 39.15 | 68,165 | 1,847 | 67 | 9,939 |
| Spring 2013 | 22 | 5.45 | 17.27 | 33,934 | 1,721 | 183 | 7,389 |

*Note*. All calculations for average characters have been rounded to whole numbers. Average forums and posts are rounded to two decimals.

Table 16

*Course Comparison, Kai, Blended*

| Tool name | Number of occurrences | | Change |
|---|---|---|---|
| | Before QM exposure | After QM exposure | |
| Announcements | 14 | 0 | (14) |
| Assessments | 0 | 2 | +2 |
| Assignments | 8 | 5 | (3) |
| Blank pages[a] | 17 | 0 | (17) |
| Collaboration sessions | 0 | 9 | +9 |
| Contacts | 4 | 3 | (1) |
| Content folders | 14 | 22 | +8 |
| Course documents | 15 | 2 | (13) |
| Discussion posts | 1135 | 401 | (734) |
| Files | 51 | 56 | +5 |
| Grade center columns | 9 | 10 | +1 |
| Groups | 10 | 8 | (2) |
| Images | 2 | 0 | (2) |
| Tests | 0 | 2 | +2 |
| Tracked items | 80 | 72 | (8) |
| URLs | 1 | 63 | +62 |

[a]Blank pages were created in the 2012 course to house readings content.

Table 17

*Discussion comparisons, Syd*

| | | PARTICIPATION PER STUDENT | | | | AVG PER SINGLE POST | |
|---|---|---|---|---|---|---|---|
| SEMESTER TAUGHT | TOTAL STUDENTS | AVG FORUMS | AVG POSTS | AVG TOTAL CHARACTERS PER STUDENT | AVG CHARACTERS PER POST | MINIMUM CHARACTERS POSTED | MAXIMUM CHARACTERS POSTED |
| Fall 2012 | 20 | 1 | 3.60 | 444 | 105 | 24 | 180 |
| Spring 2013 | 17 | 1.65 | 5.18 | 1,948 | 294 | 22 | 1,229 |

Table 18

*Course Comparison, Syd, Face-to-Face*

| Tool name | Number of occurrences | | Change |
|---|---|---|---|
| | Before QM exposure | After QM exposure | |
| Assessments | 2 | 2 | NC |
| Assignments | 10 | 6 | (4) |
| Content folders | 3 | 4 | +1 |
| Course documents | 18 | 25 | +8 |
| Discussion posts | 72 | 89 | +17 |
| Grade center columns | 19 | 9 | (10) |
| Tests | 2 | 2 | NC |

Table 19

*Discussion comparisons, Lane*

| | | PARTICIPATION PER STUDENT | | | | AVG PER SINGLE POST | |
|---|---|---|---|---|---|---|---|
| SEMESTER TAUGHT | TOTAL STUDENTS | AVG FORUMS | AVG POSTS | AVG TOTAL CHARACTERS PER STUDENT | AVG CHARACTERS PER POST | MINIMUM CHARACTERS POSTED | MAXIMUM CHARACTERS POSTED |
| Spring 2012 | 8 | 10.75 | 40.25 | 38,728 | 822 | 32 | 19164 |
| Fall 2013 | 17 | 2.94 | 9.53 | 9638 | 864 | 46 | 3680 |

*Note*. All calculations for average characters have been rounded to whole numbers. Average forums and posts are rounded to two decimals.

Table 20

*Course Comparison, Lane, White Library, Fully Online*

| Tool name | Number of occurrences | | Change |
|---|---|---|---|
| | Before QM exposure | After QM exposure | |
| Announcements | 41 | 35 | (6) |
| Assignments | 19 | 19 | NC |
| Campus Pack contents | 0 | 10 | +10 |
| Contacts | 1 | 1 | NC |
| Content folders | 18 | 19 | +1 |
| Course documents | 46 | 24 | 16 |
| Discussion posts | 400 | 185 | (215) |
| Grade center columns | 22 | 36 | +14 |
| Surveys | 1 | 2 | +2 |
| Tests | 1 | 4 | +3 |
| URLs | 43 | 50 | +7 |
| YouTube video | 4 | 1 | (3) |

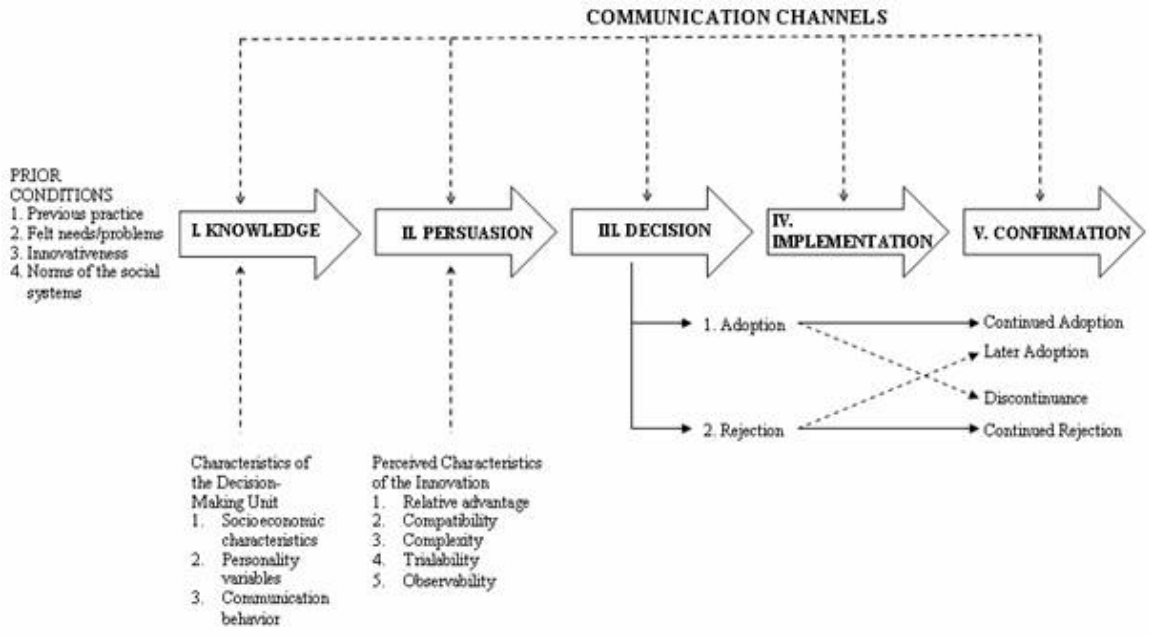
Table 21

*Themes and subthemes presented*

| | | |
|---|---|---|
| **Rubric considerations** | | |
| • Initial perceptions | • Previous experience | • Reservations about |
| • Overwhelming nature | • Implementation | • Use over time |
| • Course redesign | • Course navigation | • Perception of benefit |
| • Flipped classroom concepts | | |
| **Teaching issues** | | |
| • Teaching experience | • Teaching environments | • Assessment and outcomes |
| • Types of learning | • Changes in teaching style | • No course design instruction |
| • Teaching the technology | • Teaching ethics | • Continuous improvement |
| **Barriers** | | |
| • Barrier - Time | • Barrier - Cost | • Conflicts for learning |
| • Student skill perceptions | • Lack of appropriate tech | • Unsure what is available |
| **Support** | | |
| • Learning from other faculty | • Learning from teaching | • Mentors |
| • Need for tech growth | • IT support | • Self-study - reading articles |
| • Online student support | • Support - department | • Support - need for more |
| **Emotions related to teaching/technology** | | |
| • Affirmation of teaching | • Exploration | • Feelings of inadequacy |
| • Frustration | • Being overwhelmed | • Lack of skill |
| • Speed of innovation | • Anxiety/fear | • Anticipation |
| **Students and technology** | | |
| • Evaluations from | • Breaching distance gap | • Communication with |
| • Ease of Use | • Engagement/excitement | • Success |
| • Career preparation | • Peer interaction | • Support |
| • Expectations | • Social matters | • Tolerance/preparation to use |
| **Technology issues** | | |
| • Ease of use | • Selection | • Discovery |
| • Use | • Concerns | • Knowledge of available |
| • Modification | • Proficiency | • Management |
| • Failures | • Tolerance for | • Training |
| • Third party providers | • Successes | • Limitations |
| • Willingness to retry | | |

Figure 1

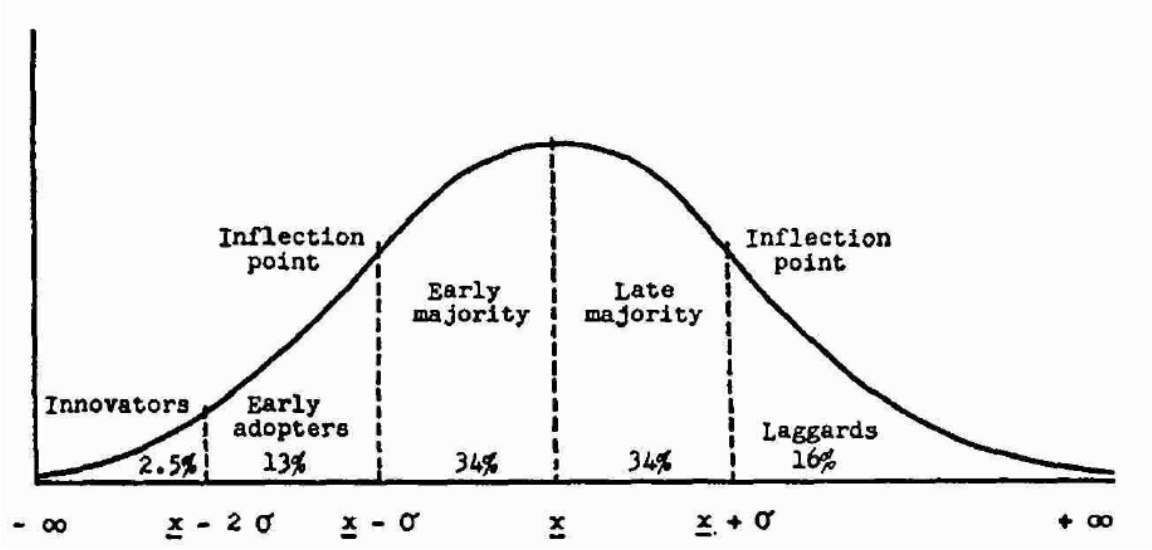
*A Model of the Five Stages in the Innovation-Decision Process*




*Note.* From "*Diffusion of Innovations*" by E. M Rogers, 2003, p. 270. Copyright 2003 by Free Press, New York, NY.

Figure 2

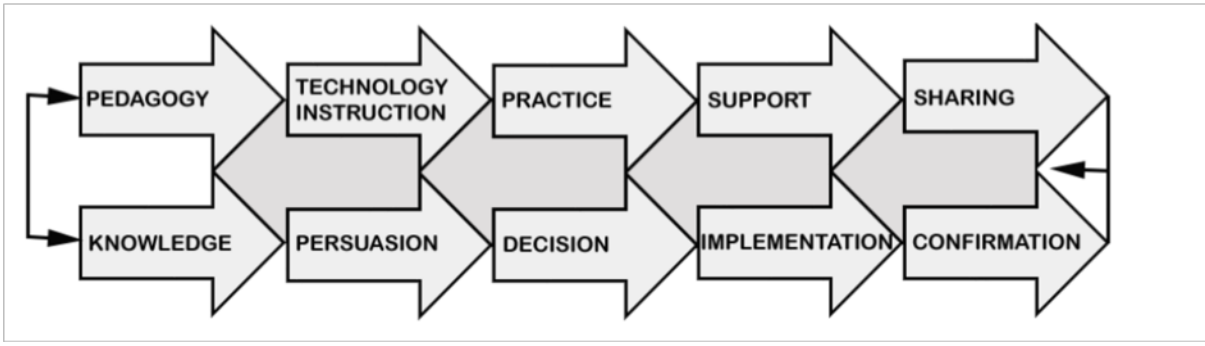
*Adopter Categorization on the Basis of an Adoption Frequency Distribution*




From "Categorizing the Adopters of Agricultural Practice," by Everett M. Rogers, 1958, *Rural Sociology, 23*, p. 346–354.

Figure 3

Innovation-Decision process with foundational guidance




*Note.* Expanded from "*Diffusion of Innovations*" by E. M Rogers, 2003, p. 270. Copyright 2003 by Free Press, New York, NY.

## Appendix A

*U Innovate* Tracks and Sessions

Some overlap in sessions occurs, as information from the subjects might be related to more than one application or topic. The Learning Technologies team identified the tracks and their component courses, as listed below. In most cases, a two-part name was used to identify the sessions, where the name of the tool or concept was given, as well as a more descriptive title designed to pique the interest of attendees.

**Quality Classroom**

The basis for all U Innovate tracks, these sessions were geared toward viewing courses from a quality standpoint as set forth by nationally-recognized rubrics for effective course deployment. (Quality Classroom sessions I through V plus the Flipped Classroom sessions were completed by all study participants.)

- Quality Classroom I - Course Overview & Introduction
- Quality Classroom II - Learning Objectives and Assessment & Measurement
- Quality Classroom III - Instructional Materials & Learner Engagement
- Quality Classroom IV - Course Technology
- Quality Classroom V - Learning Support & Accessibility
- Universal Design for Learning
- Take a Memo, Please (Dragon Naturally Speaking)
- Closed Captioning
- The Flipped Classroom

**Multi-Media Track**

For those dabblers who were into a little of everything, this track concentrated on

audio, video, images, and other media types.

- Panopto I: Record Your Lectures for Student Viewing
- Panopto II: Anything that You Can Do….
- Google + Hangouts - Let it All Hangout
- Adobe Connect Pro: Meetings Without Boundaries
- Acrobat Pro Tips & Tricks - Cirque du ESU
- Gesture Based Learning is Here: The Minority Report Meets ESU
- Camtasia Video Tutorials: They're Not Just for Breakfast Anymore
- WordPress: Powerful Websites in Minutes
- Universal Design for Learning
- Prezi: PowerPoint is so Last Year!
- Photo Basics - In 1,000 Words or Less
- Video Basics - Lights, Camera, Download!
- Google Sites - We're New Here – Let's See the Sites!
- Creative iPad Apps: I Left My Crayons at the House
- Follow Me on Pinterest: Creative uses of Pinterest in Teaching and Learning
- Advanced PowerPoint

**Mobile Track**

Ready to take your show on the road? Sessions offered in the Mobile Track were designed to help faculty members get started with mobile concepts.

- Photos on the Fly: SMILE! Smartphone Tips & Tricks for Photo Capture
- Cloud Saving and Sharing (This May Not Be Heaven, But Still I'm in the Cloud)

- Voice Thread:  Let's Get Together and Talk about This
- Google + Hangouts - Let it All Hangout
- Video on the Fly:  Lights, Camera, Let's go Mobile!
- From your Y:\ Drive and Back (or, From Here to Eternity)
- Social Networking - He Shared, She Shared
- Mobile Apps for Education:  The Hits Just Keep on Coming
- Creative iPad Apps:  I Left My Crayons at the House

**New Tech 4 U**

Some of the sessions offered in this track were new to everyone; others offered information about technologies new to us at the university being studied.

- Get Flipped!  The Flipped Classroom
- i<Clicker I - Click It:  That's the Ticket!
- i<Clicker II - Click It:  That's the Ticket!
- VoiceThread:  Let's Get Together and Talk about This
- Gesture Based Learning is Here:  The Minority Report Meets ESU
- LiveScribe – I Hear (and Write) What You're Saying
- Dragon Naturally Speaking:  Take a Memo, Please
- Augmented Reality
- Creative iPad Apps:  I Left My Crayons at the House
- Ten Instructional Technologies and Trends to Watch in 2013
- e-Textbooks: Coming to a Bookstore Near You….Soon

**Online Learning Track**

Similarities exist with the Face-to-Face & Blended track, but some of this content

was geared solely toward the online classroom.

- Blackboard Learning Management Sytem (several courses covering the LMS)
- Record Your Lectures: You'll Flip Over Panopto!
- Anything That You Can Do... (Panopto II)
- Effective Assessment Strategies: Still Using High-Stakes Exams?
- In 1,000 Words or Less (Photo Basics)
- Video Basics - Lights, Camera, Download!
- Campus Pack I – Blogs, Wikis, and Journals
- Campus Pack II - The Personal Learning Space
- Meetings Without Boundaries (Connect Pro)
- There is no "I" in Group work (Teams Best Practices)
- Advanced PowerPoint

**Face-to-Face & Blended Track**

This track was designed to help faculty leverage technologies in traditional and blended classroom settings. As indicated above, there was repetition included from the Online Learning Track, but some of the content here was specific to the physical classroom setting.

- Get Flipped! The Flipped Classroom
- i<Clicker I - Click It: That's the Ticket!
- i<Clicker II - Click It: That's the Ticket!
- Promethean I: I Gave You Fire. Now You Want Interactivity?
- Promethean II – Advanced Tools
- Blackboard Grade Center: Gimme an A…

- Safe at Home! (Safe Assign Anti Plagiarizing Tool)
- Teams Best Practices - There is no “I” in Group work
- Still Using High-Stakes Exams? Online Assessment Strategies
- Blackboard IM - Add 1 tsp. Collaboration
- Blackboard Communication - We Should Visit
- Advanced PowerPoint

**Information and Research Tools Track**

Gathering, sharing, and evaluating information represents a skill-set all its own. We were fortunate to partner with faculty and staff from the university library to offer this content.

- Your Embedded Librarian, Personalized!
- Cite It - Fast and Right! Zotero to the Rescue
- Intellectual Property and Copyright
- Google Power Searching
- Information Literacy - Info, Info, Everywhere
- The Electronic Survey – Data Collection at a Click
- Writing Better Survey Questions
- Engaging Students with Treasures from Special Collections and Archives: Incorporating Primary Sources into Your Courses
- WorldCat Local: A Google-like View of our Local Catalog
- It's 2AM. Do You Know Where Your Resources Are? (LibGuides)

**Social Tools Track**

Social tools allow for ubiquitous, personalized access and sharing of interesting and informational content. This track explored networking, cloud sharing, blogging, and other social tools in education.

- Google + Hangouts - Let it All Hangout
- Cloud Saving and Sharing: This May Not Be Heaven, But Still I'm in the Cloud
- Social Networking: He Shared, She Shared
- Voice Thread: Let's Get Together and Talk about This
- Campus Pack I – Blogs, Wikis, and journals
- Campus Pack II - The Personal Learning Space
- Photo Basics - In 1,000 Words or Less
- Video Basics - Lights, Camera, Download!
- WordPress: Powerful Websites in Minutes
- Adobe Connect Pro - Meetings Without Boundaries
- Follow Me on Pinterest: Creative Uses of Pinterest in Teaching and Learning

## Appendix B

Approval for Use of Course Materials

By signing this form, I agree to allow the contents of my course _____ to be examined for inclusion of educational technologies, communications methods, and course/unit objectives. I understand that neither my name nor the specific course name will be shared in any way, and that any reporting that results from the examination will protect the identities of all students and other course participants as well. I understand that the evaluation of any course is *not* intended to assess its content inclusion, grading practices, or other aspects of course delivery.

## Appendix C

Semi-Structured Interview Questions

How long have you been teaching in higher education?

Describe the environments in which you teach (face-to-face, online, blended).

Recalling the *U Innovate* sessions you attended last fall, tell me about your perceptions of the QM rubric and its associated standards.

Describe the process you use to select educational technologies for your teaching.

Tell me about your approach to incorporating new ideas or technologies in your courses.

Did the information you received as part of the QM sessions influence your course construction? How?

Are there any technologies you tried to use, but couldn't incorporate?

Would you try them again? Why, or why not?

Please describe the impact, if any, QM knowledge had on your course construction.

## Appendix D

Informed Consent Document

The School of Library and Information Management at Emporia State University supports the practice of protection for human subjects participating in research and related activities. The following information is provided so that you can decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time, and that if you do withdraw from the study, you will not be subjected to reprimand or any other form of reproach. Likewise, if you choose not to participate, you will not be subjected to reprimand or any other form of reproach.

The purpose of this study is to explore changes in educational technology use, if any, as a result of attending the five Quality Matters (QM) sessions offered as a part of the U Innovate learning initiative. I understand that no foreseen risk or discomfort is associated with taking part in the study.

Your participation in this study will help expand upon the theoretical framework regarding the use of educational technologies and the decision processes involved in their selection. You are asked to participate in a semi-structured interview as a part of data collection, and based upon your answers, may be asked for additional clarification to your comments. Although all interviews will be recorded, your personal information will not be shared in any way. In most cases, data will be compiled in aggregate to protect your anonymity. Individual comments will be shared using representational codes as identifiers to maintain your anonymity.

Any questions you have regarding this form, the interview process, or the research in general may be directed to Sandra Valenti (svalenti@emporia.edu) or Gwen Alexander (galexan1@emporia.edu).

*"I have read the above statement and have been fully advised of the procedures to be used in this project. I have been given sufficient opportunity to ask any questions I had concerning the procedures and possible risks involved. I understand the potential risks involved and I assume them voluntarily. I likewise understand that I can withdraw from the study at any time without being subjected to reproach."*

_____ _____

Subject Date

I, Sandra Valenti, hereby submit this dissertation to Emporia State University as partial fulfillment of the requirements for a doctoral degree. I agree that the Library of the University may make it available for use in accordance with its regulations governing materials of this type. I further agree that quoting, photocopying, or other reproduction of this document is allowed for private study, scholarship (including teaching), and research purposes of a nonprofit nature. No copying which involves potential financial gain will be allowed without written permission of the author. I also agree to permit the Graduate School at Emporia State University to digitize and place this dissertation in the ESU institutional repository.

Signature of Author

Date

Understanding Factors for Innovation Adoption in Higher Education: A Case Study Approach

Title of Dissertation

Signature of Graduate School Staff

Date Received