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Educational Technology Integration Among Community College Instructors

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EDUCATIONAL TECHNOLOGY INTEGRATION AMONG
COMMUNITY COLLEGE INSTRUCTORS

by

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This dissertation, submitted by Oybek Turayev in partial fulfillment of the requirements for the Degree of Doctor of Philosophy from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done, and is hereby approved.

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April 23, 2018
Date

PERMISSION

Title	Educational Technology Integration Among Community College Instructors
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Oybek Turayev
April 17, 2018

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ABSTRACT

Over the last two decades, educational technology (ET) integration has become an increasingly important aspect of higher education, particularly with the growth of online, distance and hybrid courses and degree programs. Furthermore, accrediting agencies such as the Higher Learning Commission (HLC) are paying close attention to online and hybrid courses and degree programs, making effective use of ET even more important to colleges and universities. Even in traditional, on-campus classrooms, some instructors are not using ET effectively to augment teaching and learning.

The main purpose of this research study was to examine a holistic view of educational technology integration into teaching and learning among community college instructors. Additionally, the study aimed to identify some positive and negative factors of educational technology integration and the ways in which those factors affect technology integration among faculty. The study concentrated on identifying facilitative conditions that influence ET integration among instructors at five community colleges. Ely’s (1999) Conditions of Educational Technology Implementation (CETI) theory served as a theoretical framework for this research study. Ely's (1999) CETI framework is based on the comprehensive perspective of ET integration and implementation. Ely’s (1999) theoretical framework includes eight conditions of educational technology implementation (CETI): Availability of time, Existence of knowledge and skills, Leadership, Participation, Availability of resources, Commitment, Rewards, Dissatisfaction with the status quo.

The research study used and applied quantitative research methods of data collection. The data was collected from 307 instructors who were teaching at five Midwestern state community colleges at the time of survey completion. Data collection was accomplished through the use of

an electronic survey. There were two sections in the survey questionnaires. The first was a personal demographic questionnaire to collect demographic information from participants of the study. The second was the educational technology integration questionnaire, which included 60 questions and used six-point Likert-like scale items (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree and 6 = strongly agree) for data collection purposes. An open-ended question was also included at the end of the survey to collect additional comments about instructors' self-perceptions of educational technology integration and facilitative factors that influence them to integrate educational technology.

The research study specifically investigated the effects of these predictor variables (degree program, gender, academic rank, education level and facilitative conditions) by addressing the following research questions through null hypothesis:

1. Are there differences in instructors' beliefs about educational technology integration into teaching and learning based on discipline (degree program)? There was a statistically significant difference between English, Education, and Humanities disciplines and Engineering, Technology, and Energy disciplines. The ANOVA showed statistical significance with the following $F (9,297) = 1.93$, $p =.047$) values. Therefore, H-null:1 was rejected due to the differences in between disciplines.

2. Are there differences in the factors related to educational technology integration into teaching and learning between male and female instructors? There was no statistically significant difference in means and standard deviation scores between male and female instructors based, on the sample t-test analysis. The t-test examination revealed the following results: (t 305 =1.074; $p=.284 >0.05$). Therefore, H-null: 2 was retained due to no statistical differences between male and female instructors in terms of educational technology integration.

3. Are there differences in competencies in educational technology integration among instructors based on academic ranks (professor, associate professor, assistant professor, instructor, lecturer, and other)? Overall, there were small differences in mean scores between instructor ranks in terms of educational technology (ET) integration. However, the ANOVA test showed no statistically significant differences between faculty ranks. The one-way ANOVA was equal to F (5,301) = .793, p =.555). Therefore, H-null: 3 was retained, due to no statistical differences between instructors based on faculty ranks.

4. Are there differences in technology integration into teaching and learning based on the facilitative conditions (time, skills, leadership, participation, resources, commitment, rewards, and dissatisfaction with the status quo)? Based on ANOVA results, there were statistically significant differences between community colleges in terms of facilitative factors. The one-way ANOVA had a F value of (4,302) = 3.817, p =.005). Therefore, H-null: 4 was rejected due to statistical difference between community colleges in terms of facilitative conditions.

5. Are there differences in educational technology training needs of instructors based on educational level (trade/technical/vocational training, associate degree, bachelor’s degree, master’s degree, professional degree, or doctorate degree)? Based on the ANOVA result, there was a statistically significant difference between groups in terms of technology training needs. The ANOVA test had an F value of (2,304) = 5.929, p =.003). Therefore, H-null: 5 was rejected due to statistical differences between instructors based on the educational level.

CHAPTER I

INTRODUCTION

The rapid development in educational technology (ET) over the past decade has influenced changes in our educational system. The field of educational technology (i.e., successful integration of educational technologies into teaching and learning) continues to be an important aspect of curriculum and instructional design, offering tools to augment and enhance learning outcomes. Educational technologies have become increasingly important in higher education, as well as in other facets of life. Thus, higher education personnel, faculty, and staff are motivated to find effective and efficient ways of integrating educational technology into teaching and learning, subsequently providing students with higher quality educational experiences.

Understanding the impact of ET on higher education is essential, as academic institutions are striving to improve by utilizing innovative instructional models, effective educational curriculum, and various learning management systems. The success of ET within a college or university depends upon understanding and accepting the institution's current educational state and how the institution foresees goals, objectives, and challenges that relate to ET integration (Allen & Sites, 2012; Brown, 2008; Ely, 1999; Hall & Hord, 1987; Laurillard, 2013; Reiser & Dempsey, 2012; Rogers, 2003; Tomei, 2005).

Administrators, faculty, and staff across numerous academic institutions understand the importance of ET practices, as well as opportunities for professional development in ET integration. Unfortunately, acknowledging the importance of ET integration is not sufficient;

educators must be supported, motivated, and trained in educational technology within their disciplines. Leaders and administrators of academic institutions must support the ET integration process financially and conceptually (Allen & Sites, 2012; Ely, 1999; Fernandez & Cano, 2016; Karasavvidis & Kollias, 2014; Surry & Farquhar, 1997; Surry & Ensminger, 2002; Varden, 2002).

Educators across disciplines plan and implement their ET integration in different ways. While many faculty members are rapidly adding new ET to their pedagogical toolbox, others are more resistant to educational technology integration. Investigation of this multi-faceted process of ET integration requires an examination and understanding of conditional factors that motivate faculty to integrate educational technology, as well as the institutional factors that encourage and support such technology implementations. Various systemic processes must be completed in order to effectively integrate new ET into teaching and learning. Many faculty members become discouraged and frustrated by this process (Allen & Sites, 2012; Ely, 1999; Karasavvidis & Kollias, 2014; Rogers, 2003; Surry & Ensminger, 2002; Varden, 2002; Zhao & Frank, 2003).

During the early 1990's, educators were confronted with the task of effectively using personal computer technologies to enhance their teaching and learning practices. Now, two decades later, administrators, faculty, and staff are looking for effective and efficient methods for ET integration in order to improve learning outcomes. Additionally, the ET integration process is becoming more complex over time, because new developments in ET continue to change at an increasingly fast pace (Becker, 1998; Ely, 1999; Reiser & Dempsey, 2012; Rogers, 2003). Considering this sense of urgency, educational institutions have felt a push to ensure that faculty and staff members are prepared to effectively use ET in the classroom and produce the best student learning outcomes (Olson & Winger, 2013).

Nonetheless, academic institutions are still facing challenges in providing effective training programs for faculty to enhance their ET integration. In order to develop effective faculty training programs in ET integration, faculty competencies with various instructional tools must be understood; only then can any strategic plan for effective ET integration be proposed (Bates & Poole, 2003; Brinkerhoff, 2006; Ely, 1999; Reiser & Dempsey, 2012; Rogers, 1995; Surry & Ensminger, 2002; Williams, 2003).

Statement of the Problem

Over the last two decades, educational technology (ET) integration has become an increasingly important aspect of higher education, particularly with the growth of online, distance and hybrid courses and degree programs. Furthermore, accrediting agencies such as the Higher Learning Commission (HLC) are paying close attention to online and hybrid courses and degree programs, making effective use of ET even more important to colleges and universities. Even in traditional, on-campus classrooms, some instructors are not using ET effectively to augment teaching and learning. The literature indicates that numerous factors contribute to this lack of ET integration (Brown, 2008; Ely, 1999; Olson & Winger, 2013; Porter & Graham, 2016; Reiser & Dempsey, 2012; Rogers, 2003; Surry & Ensminger, 2002; Varden, 2002), including:

1. Instructors' technology skills
2. Instructors' teaching loads
3. Opportunities for professional development and teaching innovation
4. Educational level of instructors and students
5. Instructors' years of experience
6. Administrative and institutional support (e.g., instructional design resources and assistance, funding for instructional development)

There have been many research studies in higher education that convey similar ideas and factors as challenges in ET integration into teaching and learning (Abrahams, 2010; Abuhmaid, 2011; Al-Senaidi & Poirot, 2009; Bordbar, 2010; Brown, 2008; Demici, 2009; Drent & Meelissen, 2008; Elzarka, 2012; Georgina, 2007; Howard, 2013; Jones, 2004; Kay, et al., 2013; Kirkwood, 2015; Levin & Wadmany, 2008; Moeller & Reitzes, 2011; Olson & Winger, 2013; Parker, Bianchi & Cheah, 2008; Porter & Graham, 2016; Reiser & Dempsey, 2012; Rogers, 2003; Surry & Ensminger, 2002; Varden, 2002; Watson, 2006; Williams, 2003; Wozney, et al., 2006). The majority of these studies collectively show need for further analysis of ET integration among faculty. Particularly, Rogers (2003) identified personal skills and educational learning environments as the ET characteristics that influence the decision to integrate educational technology. Reiser and Dempsey (2012) indicated user characteristics, subject content characteristics, software, hardware considerations, and organization's technical capacity as factors influencing ET integration into teaching and learning. Surry and Ensminger (2002) claimed that technological, individual, organizational, and institutional factors should be considered when examining ET integration in higher education institutions.

Despite a large number of research studies on ET integration and adoption, there is less research specifically about ET integration among community college instructors. Most of the prior research on ET concentrated on early adopters and innovators of the technology adoption among four-year institutions and did not identify ET integration factors for faculty in community college environments. There are many differences between two-year and four-year institutions in terms of ET integration conditions and environment. These factors include: availability of time, existence of educational technology skills, leadership, participation, availability of resources, commitment, rewards, and job satisfaction. All of these factors are essential to the successful integration of educational technology into teaching and learning (Bates & Poole, 2003; Brown, 2008; Ely, 1999; Olson & Winger, 2013; Parker, Bianchi & Cheah, 2008; Pope, Hare & Howard, 2002; Porter & Graham, 2016; Reiser & Dempsey, 2012; Rogers, 1995; Surry & Ensminger, 2002; Varden, 2002).

Therefore, the first goal of this research study was to compare relevant information in the literature and gather measurable quantitative data that assessed the notion of need for further research in ET integration among community college instructors. As indicated previously, a majority of the prior research in ET demonstrated that there was a need for a fresh look into faculty perceptions through facilitative factors of ET integration. Many community college instructors were facing various difficulties as they embraced new ET into teaching and learning practices. Additionally, the integration of ET in community college environments was not only a concern to faculty, but also to administrators, staff, and students in terms of affordability, usability, and likeability of the ET. This statement by itself also supported the idea of further research related to the integration of educational technology, as well as the identification of the solutions for challenges of integration (Brown, 2008; Ely, 1999; Levin & Wadmany, 2008; Keengwe & Onchwari, 2008; Rozell & Gardner, 1999; Rogers, 2003; Ruhizan, et al., 2014; Surry & Ensminger, 2002; Teo, 2012).

Altogether, effective use of ET and curriculum design requires an understanding of the advantages, disadvantages, barriers, and limitations involved in ET integration. Therefore, the second goal of this research study was to gather a comprehensive understanding of community college instructors' views of ET integration, as well as the variables that impacted their choices to integrate or abandon ET in teaching and learning.

This research study extended the scope of previous research on educational technology

(ET) by examining community college instructors' educational technology integration through facilitative conditions of technology implementation. The examination clarified community college instructors' personal preferences related to ET use, as well as their reported challenges and successes of implementation into teaching and learning.

Theoretical Framework

The majority of the prior research on educational technology (ET) was focused on diffusion of innovations, the change process in the earlier stages of educational technology adoption, and implementation. Many higher educational institutions in the United States (US) have already transitioned through this stage of educational technology adoption. Subsequently, many institutions already have ET platforms and strongly rely on technology-based hardware, software, and learning management systems (LMS). Therefore, the study did not examine adopter categories or characteristics; rather, it concentrated on identifying facilitative conditions that influence ET integration among instructors at community colleges (Brown, 2008; Ely, 1999; Fullan, 1996; Holloway, 1996; Reiser & Dempsey, 2012; Rogers, 2003; Sherry et al., 2000; Surry & Ely, 2001; Surry & Ensminger, 2002).

Despite a large research publication pool on ET and institutionalization of the instructional tools across many campuses, a gap remains in the facilitation and implementation process of ET integration into teaching and learning in community colleges. There are several reasons why this gap still exists between educational technology and its integration. These reasons include but are not limited to: workload, time, incentives, and intrinsic motivation of faculty. These facilitative conditions are very critical within community college work environments, because workload, time, and job satisfaction conditions are key burnout factors among many community college instructors (Bates & Poole, 2003; Burkman, 1987; Ely, 1999;

Reiser & Dempsey, 2012; Rogers, 2003; Surry & Ely, 2001; Surry & Ensminger, 2002; Varden, 2002; Weiss et al., 1977).

Traditionally, many newly designed educational technology (ET) innovations are heavily tested in terms of hardware, software, design, and educational theory. Unfortunately, research related to faculty perceptions of ET effectiveness is lacking, as is testing of educational technology integration into teaching and learning. Therefore, investigating and understanding faculty experiences with ET integration is critical in terms of finding ways to bridge the existing gap between educational technology and its integration (Allen & Sites, 2012; Brown, 2008; Ely, 1999; Rogers, 2003; Surry & Ely, 2001; Surry & Ensminger, 2002; Varden, 2002).

Ely's (1999) Conditions of Educational Technology Implementation (CETI) Theory served as a theoretical framework for this research study. This is well known theory in the instructional design and educational technology integration process. Ely's (1999) CETI framework is based on the comprehensive perspective of ET integration and implementation. The theory focuses on implementation and facilitative conditions related to ET integration (Brown, 2008; Casler et al., 2003; Surry & Ensminger, 2002; Haryono, 1990; Bauder, 1993; Ellsworth, 1997; Varden, 2002; Yidana, 2007).

Ely's (1999) CETI theory consists of eight conditions that facilitate educational technology implementation:

1. Availability of Time

This factor of the theory refers to time for work and the ET integration process. Instructors' time is always limited, and they feel that there is not enough time to accomplish everything expected of them (e.g., teaching, research, and service). There are countless research studies on faculty time management, which show that faculty are required to use their time for teaching, assessment, course planning, research, and service. In addition, there are other activities in which instructors need to be involved, if they plan to integrate some type of ET into teaching and learning. This condition of Ely's (1999) theory is strongly linked to participation, commitment, leadership, and rewards for faculty (Backhouse, 2003; Brown, 2008; Haryono, 1990; Rogers, 1995; Surry & Ensminger, 2002; Varden, 2002; Yidana, 2007).

2. Dissatisfaction with the Status Quo

This factor of the theory refers to dissatisfaction with environment, or with some type of situation at work. Overall, dissatisfaction can be associated with many factors such as availability of time or resources, pay or incentives, quality of technology, and lack of ET knowledge. The absence of one or two of these conditions can negatively influence instructors' ET integration process, and gradually lead to some resistance for adoption, collaboration, and implementation (Brown, 2008; Christenson, 2000; Rogers, 1995; Surry & Ensminger, 2002; Tatnall, 2001; Varden, 2002; Yidana, 2007).

3. Knowledge and Skills

Educational technology knowledge is one of the very critical factors for the ET integration process. Often, ET literacy is a barrier for educational innovation and technology implementation. This factor is strongly linked to weak goals and objectives, poor instructional design, resources, rewards, leadership, and personal commitment (Allen & Sites, 2012; Brown, 2008; Dick & Carey, 1996; Ely, 1999; Ensmginer, 2001; Hall & Hord, 1987; Reiser & Dempsey, 2012; Rogers, 1995; Yidana, 2007).

When faculty have a lack of understanding related to what needs to be improved in teaching and learning, poor quality of course design and development are likely occur. The ET integration process requires broad knowledge in how to perform needs analyses, collaboration, communication, and self-study (Boone, 1992; Dick & Carey, 1996; Dooley, 1999; Ely, 1999; Reiser & Dempsey, 2012; Rogers, 2003; Sherry et al., 2000; Surry & Ensminger, 2002; Woldkowski, 1993; Yidana, 2007).

4. Availability of Resources

Availability of resources is a major factor in both educational technology (ET) integration and in training the workforce to obtain required technology skills. The resources include, but are not limited to: hardware, software, financial funding, educational technology support systems, and training. In order to address the lack of available resources, departments should work closely together to utilize all of the available funds, and create effective networking groups where resources can be shared. Departments might work as a team and purchase needed hardware and software, as well as plan required trainings together (Allen & Sites, 2012; Boone, 1992; Ely, 1999; Barone & Hanger, 2001; Berge et al., 2001; Burton &Danielson, 1999; Carman, 1999; Carter, 1998; Ellsworth, 1997; Ensminger, 2001; Head & Moore, 1999; Mereba, 2003; Rogers, 2003; Surry & Ensminger, 2002; Tatnall, 2001).

5. Rewards or Incentives

Rewards and incentives can serve as motivation for innovation, creativity, and ET integration in teaching and learning. This factor strongly links to leadership, participation, resources, time, and employee satisfaction at work. Leadership in any department plays a critical role in creating some type of incentive, whether it is intrinsic or extrinsic. Unfortunately, it is very challenging to measure the effect of incentives and rewards in educational technology integration among faculty (Boone, 1992; Dick & Carey, 1996; Ely, 1999; Harris, 1994; Galagan, 2003; Reiser & Dempsey, 2012; Rogers, 1995; Crosby et al., 2003; Surry & Ensminger, 2002; Varden, 2002; Yidana, 2007).

6. Participation

Participation of faculty in educational technology (ET) integration is a key component in teaching and learning. Ely (1999) defines this component as shared decision making of faculty in ET implementation and the integration process. Participation among administrators, faculty, and staff can be observed during administrative meetings and roundtable discussions. This condition is strongly linked to time, commitment, knowledge, skills, and incentives of the faculty. Participation is also linked to faculty roles and employment contracts, where some faculty are able to allocate time for certain ET integration and implementation initiatives (Allen & Sites, 2012; Ehrmann, 2001; Ely, 1999; Harris, 1994; Rogers, 2003; Surry & Ensminger, 2002; Varden, 2002; Yidana, 2007).

7. Commitment

The commitment of the faculty and the leadership of the educational institution are two of the strongest factors in effective ET integration and implementation. All participants in the ET integration initiative need to endorse and support the project for its successful completion into teaching and learning practices. Strategies for controlling lack of commitment among faculty include: choosing the right stakeholders, establishing clear communication, and clearly explaining objectives, needs, goals, and incentives of the educational technology integration initiative to all members. This factor is strongly linked to leadership, resources, time, rewards, and incentives (Dick & Carey, 1996; Ely, 1999; Ehrmann, 2001; Ensminger, 2001; Hall & Hord, 1987; Reiser & Dempsey, 2012; Rogers, 2003; Surry & Ensminger, 2002; Varden, 2002; Yidana, 2007).

8. Leadership

Of the eight conditions, leadership is the most important in educational technology integration and implementation. Ely (1999) defined leadership as a source of support and defines the term as both executive and project leadership. Ehrmann (2001) stated leaders have an ability to solve project related problems and effectively engage all participating members for completion of the project. The executive leader is often seen as a chair of the organization and of a board. Project leaders are those who support, oversee, and implement the ET integration projects. Both types of leaders are very important in ET integration initiatives. The leadership factor is strongly associated with faculty commitment, time, participation, resources, rewards, and incentives. The absence of one of Ely's (1999) eight conditions in ET integration and implementation can lead to unsuccessful ET integration results. This failure often occurs on college campuses where instructors lack motivation related to the absence of one or more of Ely's (1999) eight conditions (Boone, 1992; Brown, 2008; Ehrmann, 2001; Ely, 1999; Fullan, 2003; Tatnall, 2001; Reiser & Dempsey, 2012; Rogers, 1995, 2003; Surry & Ensminger, 2002).

Purpose of the Research

The purpose of this research study was to examine a holistic view of educational technology (ET) integration into teaching and learning among community college instructors. Additionally, the study aimed to identify both positive and negative factors related to ET integration and the ways in which those factors affect technology integration among faculty. The investigation was guided by Ely's (1999) theoretical framework that include eight conditions of educational technology implementation (CETI):

1. Availability of time
2. Existence of knowledge and skills
3. Leadership
4. Participation

5. Availability of resources
6. Commitment
7. Rewards
8. Dissatisfaction with the status quo

This study investigation required an understanding of community college instructors' beliefs, competencies, experiences, and training needs related to educational technology integration. Additionally, the study examined instructors' self-perceptions regarding the impact of educational technology (ET) on their teaching and learning. Findings from this research study will enhance our understanding of specific factors which encouraged or discouraged instructors from integrating ET into teaching and learning practices. Furthermore, the data from this research study provide useful information related to instructors' educational level, years of experience, teaching responsibilities, academic ranks and their educational technology integration skills.

Research Questions

At a time when educational technology integration is expanding, it is very important to better understand the ET integration factor, and facilitative conditions of ET integration among community college instructors (Allen & Sites, 2012; Brown, 2008; Ely, 1999; Reiser & Dempsey, 2012; Rogers, 2003; Surry & Ely, 2002; Surry & Ensminger, 2002; Yidana, 2007).

According to Ely (1999), education level, academic rank, gender, discipline, and facilitative conditions (time, skills, leadership, participation, resources, commitment, rewards, and dissatisfaction with the status quo) play a significant role in effective ET integration. Therefore, this research study specifically investigated the effects of these predictor variables (degree program, gender, academic rank, education level and facilitative conditions) by addressing the following research questions:

Research Questions

1. Are there differences in instructors' beliefs about educational technology integration into teaching and learning based on discipline (degree program)?
2. Are there differences in the factors related to educational technology integration into teaching and learning between male and female instructors?
3. Are there differences in competencies in educational technology integration among instructors based on academic ranks (professor, associate professor, assistant professor, instructor, lecturer, and other)?
4. Are there differences in technology integration into teaching and learning based on the facilitative conditions (time, skills, leadership, participation, resources, commitment, rewards, and dissatisfaction with the status quo)?
5. Are there differences in educational technology training needs of instructors based on educational level (trade/technical/vocational training, associate degree, bachelor's degree, master's degree, professional degree, or doctorate degree)?

Null Hypotheses

The Null Hypotheses are matched with each research question. The Null Hypotheses are listed here in preparation for statistical analysis in chapter four.

1. There is no difference in instructors' beliefs about educational technology integration into teaching and learning based on discipline (degree program).
2. There is no difference in the factors related to educational technology integration into teaching and learning between male and female instructors.
3. There is no difference in competencies in educational technology integration among

instructors based on academic ranks (professor, associate professor, assistant professor, instructor, lecturer, and other).

4. There is no difference in technology integration into teaching and learning among instructors based on the facilitative conditions (time, skills, leadership, participation, resources, commitment, rewards, and dissatisfaction with the status quo).
5. There is no difference in educational technology training needs of instructors based on educational level (trade/technical/vocational training, associate degree, bachelor's degree, master's degree, professional degree, or doctorate degree).

Significance of the Study

Findings from this study were focused on assisting community college administrators, instructors, and instructional designers to better understand and address problems associated with educational technology (ET) integration. If administrators and department supervisors are aware of ET integration factors that encourage or discourage instructors to integrate educational technology into teaching, individual community colleges and degree programs will benefit. Furthermore, results from this research study will inform community college stakeholders and higher education committees about instructors' needs regarding successful educational technology integration.

Study Delimitations

This research study was limited to community college instructors who were employed by Midwestern public community colleges at the time of the study. Study results have limited applications to faculty members in other educational institutions because of differences related to tenure, academic freedom, support, experience, geographic location, and institutional policies.

Terms and Definitions

Change Agent (CA)

A change agent is an individual who influences clients' innovation decisions in a direction deemed desirable by a change agency. In most cases a change agent seeks to secure the adoption of new ideas, but he or she may also attempt to slow the diffusion process and prevent the adoption of certain innovations (Rogers, 1995, p.312).

Collaboration

Collaboration is when individuals work together to accomplish goals.

Decision

Decision occurs when an individual (or other decision-making unit) engages in activities that lead to a choice to adopt or reject the innovation (Rogers, 1995, p.165).

Diffusion of Innovations (DI)

Diffusion of innovations is the process by which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication, in that the messages are concerned with new ideas (Rogers, 1995, p.6).

Educational Technology (ET)

Educational technology is a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of human learning (AECT, 1977, p.1).

Implementation

Implementation occurs when an individual (or other decision-making unit) puts an innovation into use (Rogers, 1995, p.165).

Instructional Technology (IT)

Instructional technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning (Seels & Richey, 1994, p.9).

Innovation

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behavior is concerned, whether or not an idea is "objectively" new as measured by the lapse of time since its first use or discovery (Rogers, 1995, p.12).

Innovativeness

Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than the other members of a system (Rogers, 1995, p.23).

Innovation-Decision Process (IDP)

The innovation-decision process is the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision (Rogers, 1995, p.20).

Knowledge Building (KB)

Knowledge occurs when an individual (or other decision-making unit) is exposed to the innovation's existence and gains some understanding of how it functions (Rogers, 1995, p.165).

Online Learning (OL)

Online learning is a learning environment where learners utilize educational technologies to access course curriculum outside of a traditional classroom.

Social System (OS)

A social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members or units of a social system may be individuals, informal groups, organizations, and/or subsystems (Rogers, 1995, p.24).

Technology

A technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome (Rogers, 1995, p.13).

Organization the Study

In order to be effective and efficient with research study the following steps were taken in the initial stages of the study:

1. Reviewed literature associated with educational technology (ET) integration in higher education.
2. Built theoretical framework for the research study by reviewing prior literature in ET.
3. Established solid plan and purpose for the research study investigation.
4. Established study significance and delimitations based on the purpose and need of the study.
5. Developed clear research questions based on the purpose and significance of the study.
6. Defined research study terminology based on the purpose and significance of the study.

CHAPTER II

LITERATURE REVIEW

Technology Integration in Higher Education

A thorough literature review of prior research studies in educational technology (ET) was conducted, providing a strong basis for the current study. This chapter includes a literature review of ET in higher education. First, a brief history of ET is provided, followed by common models of educational technology. Next, facilitative conditions and challenges of ET integration are presented. Finally, faculty competencies, as well as training requirements related to integration of ET, are addressed.

Historical Perspectives of Educational Technology

There are several historical events that shaped how ET evolved and developed over the years. In the 1940s, the movement of radio, sound recordings, and audio-visual materials greatly contributed to the development of educational technology. *Educational Technology*, also known as *Instructional Technology,* unfolded at the time of World War II. During that time, hundreds of training films and visual instructional materials were produced for training U.S. military personnel. The need for massive training of individuals has also influenced the movement of research in the area of education with strong emphasis on theories and models of communication science (Driscoll & Dick, 1999; Reiser & Dempsey, 2012).

In the 1950s, television gained popularity and became a new distance learning tool. Educational technology took a drastic turn in its development during this period. During the 1960s, ET became known as an actual discipline in the education field. Leaders in the field of ET during that time such as Finn (1960) and Lumsdaine (1964) indicated that Educational Technology should be an independent discipline of its own and studied various instructional technologies through broad applications of science. In 1963, many instructional technology practices and models emerged and laid the foundation for the development of the educational technology discipline in the U.S. (Ely, 1963; Reigeluth, 1983; Seels & Richey, 1994).

In 1963, the Association for Educational Communication and Technology (AECT) produced its first definition of ET as follows:

> Audiovisual communications are the branch of educational theory and practice concerned with the design and use of messages which control the learning process. It undertakes: (a) the study of the unique and relative strengths and weaknesses of both pictorial and nonrepresentational messages which may be employed in the learning process for any reason; and (b) the structuring and systematizing of messages by men and instruments in an educational environment. These undertakings include planning, production, selection, management, and utilization of both components and entire instructional systems. Its practical goal is the efficient utilization of every method and medium of communication which can contribute to the development of the learners' full potential (Ely, 1963, p. 18).

In the 1970s, the definition of the field of educational technology was redefined two different ways by the Association for Educational Communication and Technology (AECT) Commission. The first definition of ET by AECT as a field was as follows:

> Instructional technology means the media born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook, and blackboard. The pieces that make up instructional technology (include): television, films, overhead projectors, computers, and other items of hardware and software (AECT, 1970, p.12).

The second definition of educational technology (ET) characterized the field more as a unique systemic process of instructional design and included the following:

> Instructional technology is a systemic way of designing, carrying out, and evaluating the whole process of learning and teaching in terms of specific objectives, based on research on human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction (AECT, 1970, p.21).

In 1972, a newly formed committee of the AECT defined the term as *educational technology* rather than *instructional technology*: Educational technology is a field involved in the facilitation of human learning through the systematic identification, development, organization, and utilization of a full range of learning resources and through the management of these processes (Ely, 1973, p. 36).

Over the years, ET evolved, developed, and broadened its research perspective with other unique abilities such as designing, planning, implementing, and evaluating learning environments. In 1977, AECT understood the changing factors of ET and provided a new definition statement: Educational technology is a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of human learning (AECT, 1977, p.1).

During the 1990s, the field of educational technology drastically changed due to the development of personal computers, the internet, interactive videos, and CD ROMs. In the mid-1990s, ET experienced a change in theory rather than technology itself. Early development stages of ET were shaped and based on behavioral theories. Later in the 1990s, cognitive and constructivist theories emerged and transformed ET into a new level. Again in

1994, AECT redefined the field as instructional technology: Instructional technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning (Seels & Richey, 1994, p.9). This definition of ET was very broad and included several domains within its practices when utilizing them into teaching and learning environments.

In 2007, AECT redefined the field for the last time and provided the following definition: Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (AECT, 2007, p.1).

The latest educational technology (ET) definition has many key components and supports a broader perspective of integration of instructional technologies through ethical, practical, and systemic measures. The terms educational technology and instructional technology have been used interchangeably throughout the history of educational technology. Among educators and leaders of education, *Educational Technology* is viewed as a broader construct than *Instructional Technology*. Throughout this research study, the term educational technology was used to stay true to the latest definition of the field of Educational Technology (AECT, 2007, p.13).

Educational Technology Models

There are many educational researchers, such as Allen & Sites (2012), Ellsworth (1997), Ely, (1999), Hall and Hord (1987), Rogers (2003), Surry and Ensminger (2002), and Varden (2002), who have conducted research on educational technology (ET) integration and implementation. There are several models and theories regarding ET integration that have developed over the years. They include the Concerns-Based Adoption Model (CBAM) by Hall and Hord (1987), Successive Approximation Model (SAM) by Allen & Sites (2012), and

Diffusion of Innovations (DOI) theory by Rogers (1962, 1971, 1995, 2003).

The Concerns-Based Adoption Model (CBAM). The Concerns-Based Adoption Model (CBAM) is one of the well-known models for ET adoption and implementation. Concerns-Based Adoption Model (CBAM) can be applied anywhere in the work environment to assist administrators, faculty, and staff in how to manage the change process due to ET integration.

Unlike Ely's eight conditions for ET integration and implementation, the CBAM model provides a step-by-step plan for faculty who are considering an ET integration initiative. When the model is utilized for practice, early inquiries are more self-arranged: What am I expecting from this adoption or integration? How will it influence me and our organization? Afterwards, when these inquiries are settled, new questions will develop that are more process-focused: How do I plan the educational technology integration? How could I utilize these materials proficiently in my educational technology integration? At the end, when questions are answered, the instructor can concentrate on the actual integration process (Hall & Hord, 1987; Surry & Ely, 2001).

The CBAM consists of three measurement stages: *Stages of Concern, Levels of Use* and *Innovation Configuratio*ns. During the ET integration process, everyone has a feeling of concern about the integration process and the ways it will affect everyone within the organization.

The Stage of Concern. This is a method of collecting data about individuals' states of mind, responses to or emotions about the new ET process and implementation.

Levels of Use. Every individual instructor will utilize new developments or instructional innovations in different ways. There are instructors who contemplate often when it is time to utilize change and adopt a new ET. There are some individuals who initiate change and utilize the change process with its full potential.

Innovation Configurations. New developments are quite often adjusted based on the instructor's personal needs in order to fulfill the teaching and learning curriculum, and instructional design requirements (Hall & Hord, 1987).

The Successive Approximation Model (SAM). The Successive Approximation Model (SAM) by Allen & Sites (2012) is a relatively new model of educational technology (ET) integration and implementation. SAM is an alternate way to progress with ET integration through short cycles rather than taking a longer step-by-step procedural process. SAM questions the idea of doing ET integration through the systemic procedure such as ADDIE (Analysis, Design, Development, Implementation, and Evaluation), which is known as a very linear procedural model in ET (Allen & Sites, 2012; Reiser & Dempsey, 2012).

Dissimilar to Ely's eight facilitative conditions for ET integration and implementation, SAM's role is to provide an actual step-by-step process for how to remove various barriers one encounters as either a faculty member, an administrator, or an instructional designer when planning an ET integration. SAM can be very effective when designing and integrating new instructional development into teaching and learning such as assessment rubrics, online class designs, and utilizing multimedia tools. SAM is well known as an instructional design model for e-learning integration that can assist with construction of new ET innovations and execution of implementation through driven learning processes (Allen & Sites, 2012).

There are three process stages in SAM, which include the following:

Preparation. In this stage, SAM asks participating members of the educational technology integration (ETI) initiative to assemble all of the required data, and create a solid foundation for new ET integration. This stage is often the early planning of ET integration and depending on the situation, it is a relatively fast process if all of the change agents participate effectively and efficiently (Allen, 2012).

Iterative Design. This stage of SAM starts with shared conceptualized meeting with change agents who set up the ET integration initiative for a fruitful process. This stage is where all participating agents of the ET integration discuss and exchange ideas and project requirements. Through this stage, agents interact and move through an outline, model, and survey of the ET integration project (Allen, 2012).

Iterative Development. In this stage of SAM, change agents and participants will work through the improvement, execution, and assessment steps of the ET integration process. The review begins with the outline and confirmation of the project, and proceeds through all of the steps by studying and assessing each component of the project. If an error or required change is detected, participants need to correct the situation quickly and avoid any major changes to initial design plans, and the required budget for the ET integration process (Allen, 2012).

The Diffusion of Innovations (DOI) Theory. Rogers (1995) described the Diffusion of Innovations (DOI) theory of educational technology (ET) integration as a change and adoption phenomenon that is recognized as an innovation by adopters. DOI is a very well-known theory and has a broad framework that concentrates on three areas of change and technology innovation:

1. Characteristics of Adopters
2. Attributes of Change of Innovations
3. Decision in Change Process

Diffusion of Innovations has been utilized in many disciplines (e.g., education, sociology, economics, agriculture, and geography) for understanding and analyzing the change and diffusion process of innovations (Brown, 2008; Charlton, 1997; Ely, 1999; Surry, 1993;

Holloway, 1996; Fullan, 1996; Sherry et al, 2000; Yidana, 2007).

Facilitative Conditions in Educational Technology Integration

Massy and Zemsky (1995) recognized the following factors as key conditions for successful educational technology (ET) integration: individual faculty attributes, course content qualities, and innovative ideas. Furthermore, they thought supervisors at each department should play a leading role in effective ET integration into teaching and learning.

Hall and Khan (2003) listed several key factors (e.g., benefits, costs, skills, and commitment of the adaptors) that strongly affect ET integration and adoption. In addition, they also mentioned environmental, governmental, and micro-economic factors that control ET adoption effectiveness.

Pelgrum (2001) lists the following variables as decision factors when integrating ET into teaching and learning: faculty levels, administrative levels, and overall institutional technology system frameworks. In addition, ET integration and adoption is heavily dependent on institutional authority or leadership and faculty perceptions toward ET and innovation (Chen, 2008; Clausen, 2007; Ely, 1999; Zhao & Frank, 2003; Surry & Ensminger, 2002).

Rogers (2003) stated that two-way clear communication is important between educators and learners in order to make the ET integration effective and efficient. Educational technology advancements create instability in the thinking and practices of faculty adopters, and ET integration is viewed as risky due to changes and implementation of new instructional tools. New ET integration is not only challenging for instructors but also to learners. Therefore, clear communication between instructors and students establishes trust in their learning environment. When new technology integration or implementation succeeds, the process opens a safe zone where faculty can evaluate whether this new ET integration is worth their effort. This process also helps them find confidence in ET integration decisions (Rogers, 2003).

The quality and success of ET integration into teaching and learning can be strongly dependent on financial and intellectual assets. These two assets play a critical role in faculty motivation and ET integration. Other common components for success are availability of instructional technology tools, training workshops, and providing educators with more opportunities to coordinate with others (Buabeng 2012; Ely, 1999; Hall & Khan, 2003; Reiser & Dempsey, 2012; Rogers, 2003).

Attitudes and perceptions of administrators, faculty, and staff also play a critical role in ET integration. The absence of administrative support, motivation, lack of ET skills, and one-size-fits-all instructional curriculum also strongly hinder effective ET integration (Buabeng, 2012; Ely, 1999; Moeller & Reitzes, 2011; Rogers, 2003; Surry & Ensminger, 2002; Tomei, 2005).

Positive and Negative Factors of Educational Technology Integration

The advantages and disadvantages of educational technology (ET) integration into teaching and learning have also been researched by several scholars such as Allen (2012); Barone and Hanger (2001); Berge and Muinlenburg (2001); Carman (1999); Carter (1998); Ely (1999); Serwatka (2003); Ensminger and Surry (2002); and Rogers (2003). According to these research studies, there are many benefits of ET integration into teaching and learning, if the adoption and innovation is coming from individual instructor's perspectives rather than pushed by authorities of the educational institutions. Currently, one of the common ET integration practices among many faculty at community colleges is online-based, asynchronous courses, where instructors have the option of teaching from their offices or even from their homes. Schedule flexibility is another important advantage of online learning, as students and instructors can complete coursework around other obligations (e.g., work, family, friends) (Fortune et al., 2011; Salaway et al., 2007; Serwatka, 2003; Wang, 2003; Wheatley & Greer, 1995).

Educational technology (ET) also has the potential to reduce costs and increase revenues at institutions. Faculty can accommodate a larger number of students online, increasing tuition dollars and reducing the cost of hiring more instructors to teach campus courses. In the 21st century, ET integration into learning allows professionals to stay current in their fields without traveling long distances to attend classes on campus (Ely, 1999; Hatlevik et al., 2015; Hart, 2012; Liu et al., 2009; Malinovski et al., 2015).

Alongside cost-saving benefits, ET integration into learning also has great potential to meet the needs of each individual learner in ways that traditional learning environments cannot accommodate as effectively. New multimedia devices, programs, and simulations allow learners to practice skills that traditional classrooms cannot facilitate as effectively (Fortune et al., 2011; Hart, 2012; Hatlevik et al., 2015; Liu et al., 2009; Malinovski et al., 2015).

Nonetheless, there are also disadvantages of integrating ET into teaching and learning. In many online classes, students can face technical, quantitative, and scientific problems that may require assistance from their instructor. Because of the distance between students and instructors, unclear assignments and technical difficulties can create further problems for students. In multimedia-based learning environments, faculty are not as able to quickly modify lesson plans or provide immediate feedback. Over time, these problems can negatively affect students' as well as instructors' perceptions of ET integration (Baker, 1986; Hart, 2012; Jones, 2001; Ivankova & Stick, 2005; Rogers, 2003).

Other disadvantages in educational technology-based learning environments are stand-alone online programs, where ineffective learning may occur. This ineffective learning is related to the many activities that are typically expected of a student, regardless of the classes being in-person or online (i.e., asking questions and effectively contributing to class discussions during the online sessions). Other problems associated with this type of learning include learner isolation, frustration, anxiety, confusion, and reduced internal motivation (Laine, 2003; Piccoli, Ahmad & Ives, 2001; Serwatka, 2003).

Factors Affecting Educational Technology Training

Accuosti (2014) indicated that professional development of instructors in educational technology (ET) methodology is critical in effective educational technology integration initiatives. He listed several factors that need to be addressed for development of successful faculty development trainings. The first factor is creating an environment for knowledge sharing and mentoring faculty colleagues in ET initiatives. The second factor is to ask faculty to be active teachers and learners and gain new ET skills every semester. In addition, professional development trainings should guide faculty to provide effective ET integration. The third factor is the most critical: availability of ET resources for each faculty member.

Faculty Professional Development

According to many researchers (Albion, 2003; Demetriadis et al., 2002; Jung, 2005; Markaus-Kaite, 2007; Meyer & Desiderio, 2007; Russell et al., 2003), faculty development in educational technology (ET) should cover specific trainings in the areas of technology, pedagogy, methodology, evaluation, communication, and personal development. The technological trainings should cover specific technical trainings in learning management system (LMS) design, using various ET tools and relevant knowledge in technology hardware and software in terms of instructional design. Pedagogical training, on the other hand should help faculty with understanding curricular and instructional design processes. Technology by itself cannot teach and solve the classroom problems. Rather, it is instructors themselves who are able to utilize technology for that purpose. The third domain of training is methodological, where each faculty need to be trained well in ET in order to design and develop technology-based learning environments.

Another training that is very critical is faculty skills and knowledge of evaluation and assessment of the ET learning environment. This type of training should help faculty develop skills and knowledge in the evaluation of student knowledge and provide them with timely feedback through ET. The fourth domain of training is faculty communication for effective student, faculty, and staff communication through technology. The last training is in the area of personal development and attitudes toward technology-based learning. This type of training should assist faculty with development of self-efficacy and openness toward educational technology-based learning environments.

Faculty Competencies and Training Needs

According to Hart (2012) and Wang (2003), many prior research studies did not sufficiently address the elements of effective instructional design, when utilizing educational technology (ET) integration into teaching and learning. Today, ET integration into teaching via online and hybrid learning environments have significantly expanded in many higher education institutions and drastically increased the need for better understanding of technology and instructional design competencies of faculty among educational institutions.

Many researchers assume that current-generation instructors are technologically savvy and are able to design curriculum and integrate ET into teaching and learning, yet many instructors in community college settings still lack necessary skills to integrate educational technology effectively (Ensminger & Surry, 2002; Hart, 2012; Hampton, 2008).

Kopcha (2010) described both personal and institutional challenges of educational technology (ET) integration. These challenges must be effectively eliminated for successful ET integration into teaching and learning. The personal challenges that discourage instructors from integrating ET are: (1) instructor lack of competency and knowledge in ET integration, (2) fear of changes related to ET integration, and (3) inability to integrate ET due to course curriculum load with required standards and objectives. The institutional challenges that discourage instructors to integrate ET are: (1) lack of ET integration support from educational institution administration, (2) limited faculty training opportunities in ET integration, and (3) not enough instructional designers within the educational institution for onsite continuous support in ET (Ely, 1999; Ensminger & Surry, 2002; Hsu, 2010; Kopcha, 2010; Wachire & Keengwe, 2011).

The solutions for these aforementioned challenges are not extremely difficult to provide. The administration of educational institutions should spend their time wisely in order to find effective faculty support systems to solve their instructional designer support needs. The personal challenges of faculty should be eliminated by providing continuous onsite, non-judgmental support through curriculum-based ET integration practices (Ensminger & Surry, 2002; Hsu, 2010; Kopcha, 2010; Kurt, 2013; Plair, 2008).

The critical issues with instructor training are time, on-site training, ongoing guidance, and effective alignment of educational technology (ET) with course curricula. Often, faculty receive one or two days of ET training at the beginning of each semester, and they are left alone until the next ET training. Furthermore, there is no planned system of follow-up with the ET integration information. Many community colleges have only one or two instructional designers to support many instructors with their ET integration initiatives. All individual instructors have needs for continuous instructional designer support based on their discipline. Related to different levels of ET competencies among instructors, the training should be well planned and provide ongoing support. Educational technology integration is a continuous process and cannot be accomplished in a short day of ET training. Regardless of instructor competencies and skills of technology, faculty development training should meet the needs of each individual instructor involved in the ETI initiative (An & Reigeluth, 2011; Bumen, 2009; Elzarka, 2012; Hampton, 2008; Plair, 2008).

Summary

The reviewed literature and findings indicate that the direction of this research study was clear. First, educational technology (ET) evolved over the years and played an important role in many spheres of higher education. The changes and improvements in ET will continue and keep playing a vital role in education. Second, there are many factors involved in effective ET integration whether they are positive or negative. Personal and institutional factors will always be critical in faculty training and in the ET integration process. Third, faculty beliefs regarding ET and perceptions of technology effectiveness will also always play a significant role in effective ET integration. The literature review strongly suggests that understanding faculty beliefs and perceptions of technology effectiveness provides valuable information in assisting faculty with the ET integration process and also in creating effective educational technology-based learning environments (Allen et al., 2002; Ely, 1999; Ensminger & Surry, 2002; Fortune et al., 2011; Hart, 2012; Salaway et al., 2007; Schiller, 2003).

CHAPTER III

METHODOLOGY

This research study utilized quantitative (survey) research methods of data collection. Specific aspects of the research design are detailed in the following subsections. The motivation behind this quantitative study was to examine and identify self-perceptions of community college instructors regarding educational technology integration into teaching and learning practices.

Participants and Sampling

In this research study, survey responses were collected from 307 instructors who taught at five Midwestern state community colleges at the time of survey completion. Community colleges have a vital role in many spheres of life in their communities and serve many students from all walks of life with various educational backgrounds and learning experiences. The fundamental goal of these community colleges is to give open education access to those with a high school diploma to help them fulfill their foundational education needs and dreams.

Convenience sampling was used for data collection. Volunteer participants were selected by asking permission from the Academic Affairs office of each community college for a list of instructors who were teaching at the time of the study. Not every community college has an Institutional Review Board (IRB) office for the research review process and approval. Therefore, permission was requested from the Academic Affairs offices from each community college. After receiving official permission for conducting a study and collecting relevant data, the online-based survey was delivered to instructors through the statewide university system's email platform.

Procedure

Prior to conducting the research study, research approval was requested from the Institutional Review Board (IRB) at the University of North Dakota (Appendix A).

Data collection was accomplished through the use of an electronic survey. Prior to data collection, North Dakota University System (NDUS) Director of Academic Affairs, [redacted], sent an e-mail to all of the instructors of the five North Dakota state community colleges: Bismarck State College, Dakota College at Bottineau, Lake Region State College, North Dakota State College of Science, and Williston State College to notify them of the study. The e-mail to instructors indicated the NDUS office's support for the research study (Appendix B).

The initial e-mail from the researcher asking all of the community college faculty to participate in the study was sent soon after. The first email had a welcome message as well as information about the study. Furthermore, the e-mail message had a link at the bottom of the page to the survey. One week later, a follow up message was sent to all of the community college faculty. Subsequently, second, and third follow-up messages were sent, again sharing the link to the survey. Lastly, a final "Thank you" was emailed to all of the community college faculty for their participation in the research study (Appendix C).

Ethics and Confidentiality

An online ethics written information document was provided before starting the survey with prospective participants. A prepared online statement of consent was also provided to participants. The online consent explained the rights of the participants and was available for each participant prior to the start of the survey. Protection of confidentiality and anonymity of the participants was explained, and their right to withdraw from the study was described prior to survey completion (Appendix D).

Data Collection and Analysis

The data for this study were collected through a survey developed by the principal investigator. The survey for this study was written to gather information that might answer the research questions of this investigation (construct validity). It was subsequently reviewed by committee members (face validity). As previously mentioned, the survey was distributed during the Fall of 2017 by email to all active community college instructors at the Midwestern state community colleges.

Preliminary Analysis

Keeping in mind the end goal and to guarantee reliability of the detailed outcomes, the variables and constructs of the study were measured for internal consistency before the data analysis. The collected data were checked for errors, exceptions, and missing information; if any were detected, that specific datum was reevaluated; and if not, it was discarded from the analysis. In terms of descriptive statistics, mean scores and standard deviations were calculated. Overall data were examined for normal distribution, skewness, and kurtosis within the response distributions.

Reliability of the Survey Instrument

The reliability and internal consistency of the instrument was tested through analysis of early data from twenty volunteer instructors from one of the participating community colleges. The data from this group greatly assisted to evaluate reliability of the questionnaire content and internal consistency measures. After gathering data from the first 20 participants, *Cronbach's Alpha* and *Split-Half Reliability* analysis of *Guttmann Coefficient* were performed in order to test the survey instrument for any errors due to questionnaire construction.

In order to measure the reliability of the survey, the *Spearman-Brown* formula was used, since the survey items were based on the *Likert Scale* (ordinal data) format. According to Creswell (2014), Geoffrey et al. (2009), and Harris (2002), if the survey instrument has a Likert-

Scale format, then it is ideal to use the *Spearman-Brown* formula for reliability measures.

In order to assure the survey item consistency, Cronbach's alpha was computed for the purpose of reliability within the overall questionnaire.

Survey Data Analysis

During data analysis, descriptive and inferential analysis was used to assess the relationships between the various internal and external factors with faculty self-perceptions of educational technology integration in teaching and learning. A frequency table analysis was used to understand conditions that help or hinder educational technology integration among instructors.

There were three outcome (dependent) variables: (1) beliefs about educational technology integration into teaching and learning, (2) factors of educational technology integration, and (3) instructor competencies in education technology integration. Five predictor (independent) variables were used to address research questions 1-5. The predictor (independent) variables were: (1) discipline (degree program), (2) gender, (3) academic ranks, (4) facilitative conditions, and (5) educational level.

Collected data were analyzed for descriptive and inferential statistics. Descriptive statistics were used to analyze mean scores of community college instructors based on the three outcome variables noted above: (1) instructor beliefs about educational technology integration into teaching and learning, (2) factors of educational technology integration, and (3) instructor competencies in education technology integration. Inferential statistics were used for determining statistical differences by utilizing independent-sample *t* test and one-way analysis of variance (ANOVA). The significance level of .05 was used for all analyses.

The following research questions were answered by the statistical methods indicated:

1. Are there differences in instructors' beliefs about educational technology integration into teaching and learning based on discipline (degree program)? One-way ANOVA was used to address this question.
2. Are there differences in the factors related to educational technology integration into teaching and learning between male and female instructors? Independent samples t-test was used to address this question.
3. Are there differences in competencies in educational technology integration among instructors based on academic ranks (professor, associate professor, assistant professor, instructor, lecturer, and other)? One-way ANOVA was used to address this question.
4. Are there differences in technology integration into teaching and learning based on the facilitative conditions (time, skills, leadership, participation, resources, commitment, rewards, and dissatisfaction with the status quo)? One-way ANOVA was used to address this question.
5. Are there differences in educational technology training needs of instructors based on educational level (trade/technical/vocational training, associate degree, bachelor's degree, master's degree, professional degree, or doctorate degree)? One-way ANOVA was used to address this question.

Design of the Study

The study was designed to investigate the factors that influence instructors to integrate educational technology into teaching and learning environments. A descriptive research approach was used to examine instructors' perceptions of technology integration into teaching and learning. Six-point Likert-like scale items (1 = *strongly disagree, 2 = disagree,* 3 = *slightly disagree,* 4 = *slightly agree,* 5 = *agree, and 6 = strongly agree)* were developed and utilized by the principal investigator.

The personal demographic characteristic questionnaire was developed by the principal investigator to be able to characterize the demographic characteristics of responding instructors. Data were analyzed using IBM SPSS Statistics for Windows (Version 24.0. Armonk, NY). Furthermore, descriptive statistics, including means and standard deviations, were used to summarize the factors that influence faculty to integrate educational technology into teaching and learning environments.

Instrumentation

There were two sections in the survey questionnaires (Appendix E). The first was a personal demographic characteristic questionnaire to collect demographic information from participants of the study. The second was the educational technology integration questionnaire, which included 60 questions and used six-point Likert-like scale items (1 = *strongly disagree, 2 = disagree,* 3 = *slightly disagree,* 4 = *slightly agree,* 5 = *agree and 6 = strongly agree)* for data collection purposes. The participants were asked to indicate whether they agreed or disagreed with each statement. An open-ended question was also included at the end of the survey to collect additional comments about instructors' self-perceptions of educational technology integration and facilitative factors that influence them to integrate educational technology.

Data collection was accomplished using the Qualtrics survey platform. As previously indicated, the survey was developed as an online instrument by principal investigator at the Teaching and Learning program of the University of North Dakota.

CHAPTER IV

RESEARCH RESULTS

Descriptive and Inferential Statistics

Descriptive and inferential analysis were used to assess the relationships between the various internal and external factors with faculty self-perceptions of educational technology integration in teaching and learning. A frequency table analysis was used to understand conditions that help or hinder educational technology integration among instructors.

Frequencies for Demographic Categories

The frequencies were completed for the following demographic categories: gender, age, ethnicity, degree level, discipline area, years of teaching, rank, number of students enrolled, credit load, and employee contract.

Gender. There were more female participants (*f*=165, *PEC*=53.7) than male participants (*f*=142, *PEC*=46.3) in this study. Detailed information related to gender factors is provided in Table 1.

Table 1. Summary of the Frequencies for Gender

Gender		
Category	*f*	%
Male	142	46.3
Female	165	53.7
Total	307	100.0

Age. This research study had a unique age demographic. The largest group among participants were 117 (*PEC*=38) instructors between the ages of thirty-five and forty-five. The second largest group were 80 (*PEC*=26) instructors between the ages of forty-six and fifty-five. The third group consist of 59 (*PEC*=19.2) instructors who were between the ages of fifty-six and sixty-five years. Further information about comparison of the age category among instructors is provided in Table 2.

Table 2. Summary of the Frequencies for Age

Age		
Category	*f*	%
22-34 years old	44	14.3
35-45 years old	117	38.1
46-55 years old	80	26.1
56-65 years old	59	19.2
66-75 years old	5	1.6
76 years or older	2	.7
Total	307	100.0

Ethnicity. The ethnicity factor of the study demographics was not very diverse. The majority (*f*=297, *PEC*=96) of the survey participants indicated themselves as White or Caucasian. Frequencies for ethnicity are summarized in Table 3.

Table 3. Summary of the Frequencies for Ethnicity

Ethnicity		
Category	*f*	%
White	297	96.7
Hispanic or Latino	1	.3
Black or African American	2	.7
Asian	2	.7
Native Hawaiian/ Pacific Islander	1	.3
Other	4	1.3
Total	307	100.0

Degree. There were some differences between instructors in terms of earned degree levels. The most common highest earned degree level among (*f*=200, *PEC*=65) instructors were those with master's degree and the second most common were bachelor's (*f*=87, *PEC*=28.3) degree holders. In addition, slightly over six percent of the participating community college faculty held doctoral degrees at the time of the survey completion. Frequencies for instructor degree level are summarized in Table 4.

Table 4. Summary of the Frequencies for Degree Level

Degree		
Category	*f*	%
Bachelor's degree	87	28.3
Master's degree	200	65.1
Doctorate degree	20	6.5
Total	307	100.0

Location. Many faculty across all five community colleges participated in this study. They included Bismarck State College (*f*=102, *PEC*=32.2), Dakota College at Bottineau (*f*=49, *PEC*=16), Lake Region State College (*f* =55, *PEC*=18), North Dakota State College of Science (*f* =64, *PEC*=20.8), and Williston State College (*f* =37, *PEC*=12). Frequencies for five community colleges are summarized in Table 5.

Table 5. Summary of the Frequencies for Five Community Colleges

Teaching at College		
Category	*f*	%
Bismarck State College	102	33.2
Dakota College at Bottineau	49	16.0
Lake Region State College	55	17.9
North Dakota State College of Science	64	20.8
Williston State College	37	12.1
Total	307	100.0

Discipline. The demographic information of the faculty based on discipline was also very unique in terms of variance. There were more than twenty different areas of disciplines. Therefore, disciplines were grouped into ten categories based on the common subjects taught at five community colleges within North Dakota University System. The highest participating member groups were English Education and Humanities (*f* =56, *PEC*=18.2). The second highest group were faculty in Nursing, Health & Wellness (*f* =42, *PEC*=13.7). Business, Accounting, Economics, and Communication studies (*f* =40, *PEC*=13.2) came in third. The lowest group among all the disciplines were Criminal Justice, Law, and Psychology (*f* =7, *PEC*=2.3).

Frequencies for all disciplines are summarized in Table 6.

Table 6. Summary of the Frequencies for All Areas of Disciplines

Discipline		
Category	*f*	%
Agriculture & Environmental Science	27	8.8
English/Education/Humanities	56	18.2
Bus/Acct/Econ & Comm.	40	13.0
Nursing/Health & Wellness	42	13.7
Sociology/History/Music & Arts	25	8.1
Math & Physics	37	12.1
Chemistry & Biology	21	6.8
Engineering/Tech & Energy	31	10.1
Criminal/ Law & Psychology	7	2.3
IT & Computers	21	6.8
Total	307	100.0

Employment contract. The employment contracts of the faculty also provided useful information in terms of educational technology integration among instructors. The majority (f=245, *PEC*=80) of the instructors had a full-time employment contract at the time of the survey completion. Only a small number (f =47, *PEC* =15.3) of instructors had a part-time or short-time (f=15, *PEC* =5) employment contracts. Frequencies for employment are summarized in Table 7.

Table 7. Summary of the Frequencies for Employment

Employment Contract		
Category	*f*	%
Full-time	245	79.8
Part-time	47	15.3
Other/ Short Contracts	15	4.9
Total	307	100.0

Academic rank. Academic rank of the instructors also played an important role in educational technology integration and planning. The largest group (*f*=109, *PCT* =35.5) among community college faculty were in the "Instructor" rank. The second largest group were (*f*=104, *PCT* =34) faculty in "Associate Professor" rank. The third largest group were faculty in "Assistant Professor" rank. Frequencies for academic rank are summarized in Table 8.

Table 8. Summary of the Frequencies for Academic Rank

Academic Rank		
Category	*f*	%
Professor	9	2.9
Associate Professor	104	33.9
Assistant Professor	49	16.0
Instructor	109	35.5
Lecturer	26	8.5
Other: Adjunct	10	3.3
Total	307	100.0

Years of teaching experience. Years of teaching experience between instructors showed some differences. Over thirty-five percent (*f*=109) of the participants had anywhere between five to ten years of work experience. Almost eighty (*f*=79, *PCT* =25.7) instructors had between eleven to twenty years of teaching experience. Sixteen percent (*f*=49) of the instructors had twenty-one to thirty years of teaching experience. Years of teaching experiences of instructors are categorized in Table 9.

Table 9. Summary of the Frequencies for Teaching Experience

Years of Teaching Experience		
Category	*f*	%
1-4 years	42	13.7
5-10 years	109	35.5
11-20 years	79	25.7
21-30 years	49	16.0
31-40 years	23	7.5
40+ Years	5	1.6
Total	307	100.0

Number of students. The student enrollment was a strong indicator of how educational technology integration should be addressed related to the interests and needs of each student. Thirty percent of faculty (*f*=93, *PEC*=30.3) had a student enrollment anywhere between 51 to 75 students. The second largest group for class size (*f*=85, PEC=27.7) were faculty with 76 to 100 students. Frequencies for number of students are summarized in Table 10.

Table 10. Summary of the Frequencies for Number of Students

Number of Students		
Category	*f*	%
15-25 Students	40	13.0
26-50 Students	47	15.3
51-75 Students	93	30.3
76-100 Students	85	27.7
More than 101 Students	42	13.7
Total	307	100.0

Credit load. The credit loads of faculty among community colleges were measured as one of the key factors of educational technology integration. The workload of teaching credits also created some challenges for faculty professional development and educational technology integration opportunities. Slightly half (*f*=156, *PEC*=50.8) of the study participants indicated that they had anywhere between 12 to 18 credits of teaching loads per academic semester. Fifty-seven instructors (*PEC*=18.6) taught six to twelve credits of courses per semester. Sixteen percent of the instructors had more than twelve credits of teaching loads per academic semester. A summary of the faculty teaching loads per semester is provided in Table 11.

Table 11. Summary of the Frequencies for Faculty Credit Load

Credit Load		
Category	*f*	%
3-6 Credits	33	10.7
6-12 Credits	57	18.6
12-18 Credits	156	50.8
18-21 Credits	50	16.3
22+ Credits	11	3.6
Total	307	100.0

Descriptive Statistics

In terms of descriptive statistics, mean scores and standard deviations were calculated. Overall data were examined for normal distribution, skewness, and kurtosis within the distribution. The skewness and kurtosis results were measured anywhere between -2.0 and 2.0 scale formats. The summary of the means, standard deviation, skewness, and kurtosis for demographics questions provided the following results.

Gender. Gender had the following (M=1.54, SD=.506) scores, with non-normally distribution skewness of -.088 (SE=.139), and kurtosis of -1.80 (SE=.277).

Age. The age category had the following (M=2.58, SD=1.04) scores with non-normal distribution skewness of .381 (SE=.139), and kurtosis of -.313 (SE=.277).

Ethnicity. The ethnicity category had the following (M=1.17, SD=.982) results with non-normal distribution of skewness of 6.07 (SE=.139) and kurtosis of 36.69 (SE=.277).

Degree level of instructors. The degree levels of instructors had the following (M=3.82, SD=.786) scores, with non-normal distribution skewness of .612 (SE=.139), and kurtosis of 2.82 (SE=.277).

Employment contract. The employment contract of the faculty had the following (M=1.25, SD=.535) results, with non-normal distribution skewness of 2.06 (SE=.139), and kurtosis 3.31 (SE=.277).

Faculty discipline. Faculty discipline had following (M=4.70, SD=2.64) scores, with non-normal distribution skewness of .438 (SE=.139), and kurtosis of -.880 (SE=.277) in its distribution.

Faculty rank. The faculty rank had the following (M=3.22, SD=1.18) scores, with non-normal distribution skewness of .612 (SE+.139), and kurtosis of 2.82 (SE=.277).

Credit load. The credit load of the faculty showed the following (M=2.83, SD=.947) results, with non-normal distribution of skewness of -.173 (SE=.139), and kurtosis of .016 (SE=.277).

Class size. The number of students enrolled in the class also varied among faculty with the following (M=3.14, SD=1.21) scores, and non-normal distribution skewness of -.173 (SE=.139), and kurtosis of .016 (SE=.277). Detailed information about faculty demographic statistics is provided in Table 12.

Table 12. Summary of Means, Standard Deviation, Skewness, and Kurtosis of the Demographic Categories (N=307).

	N	*M*	*SD*	*Skewness*		*Kurtosis*	
Category				*Statistic*	*SE*	*Statistic*	*SE*
Gender	307	1.54	.506	-.088	.139	-1.80	.277
Age	307	2.58	1.04	.381		-.313	
Ethnicity	307	1.17	.982	6.07		36.69	
Degree	307	3.82	.786	.612		2.82	
Teach at College	307	2.63	1.43	.241		-1.33	
Discipline	307	4.70	2.64	.438		-.880	
Full or Part-time	307	1.25	.535	2.06		3.31	
Teach Experience	307	2.73	1.20	.545		-.268	
Academic Rank	307	3.22	1.18	.238		-.732	
Number of Students	307	3.14	1.21	-.242		-.813	
Credit Load	307	2.83	.947	-.173		.016	
N	307						

Descriptive Statistics for Survey Categories

For the purposes of descriptive statistics, only mean and standard deviation scores that showed some differences were reported here.

Instructor beliefs. There were ten items in the instructors' beliefs category of the questionnaire. The results from each question item indicated the following scores: item one (M=4.92, SD=.927), item two (M=3.17, SD=1.23), item three (M=4.40, SD=1.30), and item four (M=4.61, SD=1.23) respectively. Items five (M=5.13, SD=.773), six (M=5.09, SD=.715), and eight (M=5.07, SD=.791) had very similar mean and standard deviation scores. Items seven (M=4.77, SD=1.12), nine (M=4.79, SD=.986) and ten (M=4.93, SD=.884) also had somewhat similar scores. Summary of the means, standard deviation, skewness, and kurtosis for the instructors' beliefs about educational technology integration category is provided in Table 13.

Table 13. Summary of Means, Standard Deviation, Skewness, and Kurtosis of the Instructors' Beliefs about Educational Technology Integration (N=307).

Question Items	*N*	*M*	*SD*	*Skewness*		*Kurtosis*	
				Stats	*SE*	*Stats*	*SE*
1.I believe, using a computer with technology equipment and subject-based software in my instruction would make me a better instructor.	307	4.92	.927	-1.94	.139	5.71	.277
2. I believe, use of educational technology requires unnecessary curriculum reforms.	307	3.17	1.23	.108	.139	-.627	.277
3. I believe, decentralizing instructional support to the various academic departments would make them more relevant in educational technology integration.	307	4.40	1.30	-.834	.139	-.164	.277
4. I believe integration of educational technology into the curriculum is very discipline specific	307	4.61	1.23	-1.18	.139	.784	.277
5. I believe that all faculty members should know how to use instructional technology effectively.	307	5.13	.773	-1.68	.139	6.42	.277
6. I believe, instructional design department at my institution should have a plan for educational technology integration.	307	5.09	.715	-1.00	.139	3.72	.277
7. I believe educational technology integration initiatives should be my own choice	307	4.77	1.12	-1.30	.139	1.59	.277
8. I believe, Learning Management System (Blackboard, D2L, Canvas & Moodle) is an effective means of disseminating course material to students.	307	5.07	.791	-1.11	.139	2.93	.277
9.I believe educational technology tools would enable me to interact more with my students.	307	4.79	.968	-1.03	.139	1.25	.277
10.I believe educational technology maximizes the effectiveness of my teaching and learning.	307	4.93	.884	-1.56	.139	4.24	.277
N	307						

Positive and negative factors. There were eight items in the positive and negative category of the questionnaire. The results from each item indicated the following scores: item one (M=4.81, SD=.996), item two (M=3.02, SD=1.21), item three (M=4.66, SD=.958), and item four (M=2.45, SD=1.12) respectively. Items five (M=4.93, SD=.799), six (M=4.50, SD=1.13), seven (M=4.93, SD=.817), and eight (M=3.44, SD=1.45) had the following mean and standard deviation scores. Summary of the means, standard deviation, skewness, and kurtosis for positive and negative factors in educational technology integration category is provided in Table 14.

Table 14. Summary of Means, Standard Deviation, Skewness, and Kurtosis of the Positive and Negative Factors in Educational Technology Integration (N=307).

	N	*M*	*SD*	*Skewness*		*Kurtosis*	
Question Items				*Stats*	*SE*	*Stats*	*SE*
1.Educational technology integration increases my classroom participation.	307	4.81	.996	-1.38	.139	2.69	.277
2. I am not motivated to integrate any educational technology because it changes fast.	307	3.02	1.21	-.182		-1.04	
3. Educational technology integration made my classroom assessment effective.	307	4.66	.958	-1.19		1.66	
4. Every time when I try new educational technology, technology fails.	307	2.45	1.12	1.26		1.24	
5. Educational technology integration increases quality of my online classes.	307	4.93	.799	-1.15		2.54	
6. Educational technology integration effects my teaching evaluations.	307	4.50	1.13	-.975		.540	
7. Educational technology integration increased my technology skills.	307	4.93	.817	-1.27		3.29	
8.Educational technology integration is too much work for me.	307	3.44	1.45	-.145		-1.16	
N	307						

Facilitative conditions. The facilitative conditions section of the questionnaire had eight factors: time, knowledge, participation, leadership, resources, commitment, rewards, and dissatisfaction with the status quo. The descriptive statistics showed the following results for each facilitative factor. The time factor had (M=3.98, SD=1.21) scores with non-normal distribution skewness of -.784 (SE=.139), and kurtosis of -.059 (SE=.277). Faculty knowledge about educational technology had the following (M=3.43, SD=1.25) scores with non-normal distribution skewness of -.300 (SE=.139), and kurtosis of -.969 (SE=.277). The leadership factor among faculty had the following (M=3.24, SD=1.30) results with non-normal distribution skewness of-.010 (SE=.139), and kurtosis of-1.11 (SE=.277). The faculty perceptions of participation in educational technology (ET) integration initiatives had the following (M=3.16, SD=1.32) scores, with non-normal distribution skewness of-.058 (SE=.139), and kurtosis of-1.13 (SE=.277). The faculty opinion on resources for ET integration initiative had following (M=3.72, SD=1.28) scores, with non-normal distribution skewness of-.460 (SE=.139), and kurtosis of-.906 (SE=.277). The commitment of the faculty for ET initiatives had a lower (M=3.11, SD=1.36) scores. Compared to other questionnaire factors, the rewards and incentives of faculty for ET initiatives had the lowest (M=2.96, SD=1.32) scores. The faculty across five campuses had the following (M=3.38, SD=1.26) scores in terms of overall satisfaction with their educational technology environment. Summary of the means, standard deviation, skewness, and kurtosis for the facilitative factors of educational technology integration category is provided in Table 15.

Table 15. Summary of Means, Standard Deviation, Skewness, and Kurtosis of the Facilitative Conditions of the Educational Technology Integration (N=307).

Facilitative Conditions	*N*	*M*	*SD*	*Skewness*		*Kurtosis*	
				Stats	*SE*	*Stats*	*SE*
1. Time	307	3.98	1.21	-.784	.139	-.059	.277
2. Knowledge	307	3.43	1.25	-.300		-.969	
3. Leadership	307	3.24	1.30	-.010		-1.11	
4. Participation	307	3.16	1.32	.058		-1.13	
5. Resources	307	3.72	1.28	-.460		-.906	
6. Commitment	306	3.11	1.36	.044		-1.18	
7. Rewards	307	2.96	1.32	.556		-.844	
8. Dissatisfaction WSQ	307	3.38	1.26	-.202		-1.08	
N	307						

Faculty competencies in educational technology. There were eight items in the educational technology competencies category. Item one had the following (M=2.95, SD=1.33) scores, with non-normal distribution skewness of-.113 (SE=.139), and kurtosis of-1.03 (SE=.277). Item two had the following (M=4.43, SD=1.35) results with non-normal distribution skewness of-.1.08 (SE=.139), and kurtosis of-.365 (SE=.277). Item three had the highest (M=5.23, SD=.660) scores when compared to other categories within the questionnaire. Items four (M=4.83, SD=.800), and six (M=4.91, SD=1.04) had relatively similar scores. Items eight (M=2.97, SD=1.52), and one (M=2.95, SD=1.33) had also relatively similar mean and standard deviation scores respectively. Summary of the means, standard deviation, skewness, and kurtosis for instructor competencies in education technology integration category is provided in Table 16.

Table 16. Summary of Means, Standard Deviation, Skewness, and Kurtosis of the Instructor Competencies in Education Technology Integration (N=307).

Question Items	*N*	*M*	*SD*	*Skewness* Stats	*Skewness* SE	*Kurtosis* Stats	*Kurtosis* SE
1.I have not received any educational technology training for the past five years.	307	2.95	1.33	.113	.139	-1.03	.277
2. I have experience in creating digital and web content.	307	4.43	1.35	-1.08		.365	
3. I have following skills (Word processing, Spreadsheets, PowerPoint).	307	5.23	.660	-.775		1.84	
4. I know how to effectively utilize educational technology into my course.	307	4.83	.800	-.488		.170	
5. I am very familiar with search engines for the purpose of research.	307	5.08	.802	-1.33		3.40	
6. I am competent in 1 or 2 computer applications for instruction.	307	4.91	1.04	-1.35		1.82	
7. I am competent in 3 or 5 computer applications for instruction.	307	3.86	1.65	-.050		-1.59	
8. I am proficient in 6 or more applications and I am able to assist colleagues as needed.	307	2.97	1.52	.821		-.669	
N	307						

Faculty experiences of educational technology. The means, standard deviation, and overall distribution layout of the faculty experiences of educational technology had relatively lower scores compared to other categories of the questionnaire. There were eight items within the question group. Item one had the highest (M=4.66, SD=1.18) scores with non-normal distribution skewness of -1.63 (SE=.139), and kurtosis of 2.25 (SE=.277). Items three (M=2.49, SD=1.20), four (M=2.72, SD=1.28), and five (M=2.39, SD=1.15) had relatively similar and lower scores compared to other item categories. Items two (M=3.73, SD=1,4), seven (M=3.46, SD=1.60), and eight (M=3.26, SD=1.40) had relatively close mean and standard deviation scores. Summary of the means, standard deviation, skewness, and kurtosis for instructor experiences in education technology integration category is provided in Table 17.

Table 17. Summary of Means, Standard Deviation, Skewness, and Kurtosis of the Instructor Experiences in Education Technology Integration (N=307).

Question Items	*N*	*M*	*SD*	*Skewness*		*Kurtosis*	
				Stats	*Std. Error*	*Stats*	*Std. Error*
1. I have experience in utilizing Blackboard & Whiteboard tools such as document camera and overhead projector into teaching and learning.	307	4.66	1.18	-1.63	.139	2.25	.277
2. I have experience in utilizing Tablets, Simulations, and iClickers into teaching and learning.	307	3.73	1.41	-.369		-.903	
3. I have experience in utilizing Twitter, TodaysMeet, and Aka into teaching and learning.	307	2.49	1.20	.976		.312	
4. I have experience in utilizing Facebook and Snapchat into teaching and learning.	307	2.72	1.28	.613		-.567	
5. I have experience in utilizing Prezi and Slide Carnival into teaching and learning.	307	2.39	1.15	1.14		.830	
6. I have experience in utilizing Tegrity into teaching and learning.	307	4.05	1.42	-.680		-.703	
7. I have experience in utilizing Google Presentation into teaching and learning.	307	3.46	1.60	-.158		-1.51	
8. I have experience in utilizing Skype, Zoom and FaceTime.	307	3.26	1.40	.249		-1.12	
N	307						

Training needs of faculty in educational technology. There were eight items within this question category. The item one had (M=4.28, SD=1.21) scores, with non-normal distribution skewness of -.792 (SE=.139), and kurtosis of -.038 (SE=.277). Items two (M=4.64, SD=1.10), three (M=4.62, SD=1.10), four (M=.66, SD=1.06), and eight (M=4.63, SD=1.05) had almost identical scores. Items six (M=4.84, SD=1.01) and seven (M=4.79, SD=.912) had relatively higher mean and standard deviation scores compared to other items within the question category. Based on the mean and standard deviation scores, faculty across five campuses had a strong interest in educational technology integration training. Summary of the means, standard deviation, skewness, and kurtosis for educational technology training needs of the instructors' category is provided in Table 18.

Table 18. Summary of Means, Standard Deviation, Skewness, and Kurtosis of the Educational Technology Training Needs of Instructors (N=307).

Question Items	*N*	*M*	*SD*	*Skewness*		*Kurtosis*	
				Stats	*SE*	*Stats*	*SE*
1. I have an immediate need for more training with curriculum that integrates educational technology.	307	4.28	1.21	-.792	.139	-.038	.277
2. I need more regular educational technology seminars/workshops at my institution.	307	4.64	1.10	-1.21		1.28	
3. I would need more instructional designer's support in my educational technology integration process.	307	4.62	1.10	-1.22		1.20	
4. I would need free instructional design classes.	307	4.66	1.06	-1.24		1.58	
5. I need strong support from my direct supervisor in educational technology integration.	307	4.49	1.20	-1.12		.706	

Table 18 Cont.

Question Items	*N*	*M*	*SD*	*Skewness*		*Kurtosis*	
				Stats	*SE*	*Stats*	*SE*
6. I need more time to change the curriculum to incorporate educational technology.	307	4.84	1.01	-1.37	.139	2.13	.277
7. I need to collaborate with my colleagues on educational technology integration issues.	307	4.79	.912	-1.36		2.50	
8. I need better professional development plan in educational technology integration at my institution.	307	4.63	1.05	-1.07		.914	
N	307						

Availability of information for faculty in educational technology. There were eight items within this question category. Items two (M=5.14, SD=.869) and six (M=5.02, SD=.955) had the highest scores. Item four had the lowest (M=4.65, SD=1.31) scores with non-normal distribution skewness of -.999 (SE=.139), and kurtosis of .276 (SE=.277). Items one (M=4.77, SD=1.22), three (M=4.82, SD=1.15), five (M=4.88, SD=1.15), seven (M=4.73, SD=1.26), and eight (M=4.93, SD=1.13) had relatively similar means and standard deviation scores respectively. Summary of the means, standard deviation, skewness, and kurtosis for importance of educational technology information for instructors' category is provided in Table 19.

Table 19. Summary of Means, Standard Deviation, Skewness, and Kurtosis of the Educational Technology Information Importance to Instructors (N=307).

Question Items	*N*	*M*	*SD*	*Skewness*		*Kurtosis*	
				Stats	*SE*	*Stats*	*SE*
1.Informal network of friends and family is important in my educational technology integration.	307	4.77	1.22	-.946	.139	.055	.277
2. Professional colleagues on campus is important in my educational technology integration.	307	5.14	.869	-1.05		1.27	
3. Professional colleagues from other institutions is important in my educational technology integration.	307	4.82	1.15	-1.03		.599	
4. The role of VP/Dean is important in my educational technology integration.	307	4.65	1.31	-.999		.276	
5.The role of my direct supervisor is important in my educational technology integration.	307	4.88	1.15	-1.24		1.34	
6. The role of innovative students are important in my educational technology integration.	307	5.02	.955	-1.13		1.95	
7. Online technology newsgroups and websites are important in my educational technology integration.	307	4.73	1.26	-1.05		.466	
8.Open educational resources are important in my educational technology integration.	307	4.93	1.13	-1.40		2.05	
N	307						

Reliability and Internal Consistency of the Survey Items

The research study questionnaire had two components, a demographic questionnaire and an educational technology (ET) integration questionnaire. The ET integration questionnaire made it feasible to gather instructors' self-perceptions of ET use and integration. The self-perceptions questionnaire measurement was effective to understand how instructors across five community colleges feel about technology and integration. Instructors had different backgrounds and knowledge and satisfaction in educational technology and integration. For example, one faculty member was more motivated with her work, and her ET skills allowed her to be independent in her position. Another faculty member, who was equally motivated with his work, showed that his ET tools enabled him to satisfy his needs for creativity and advancement. Research has shown that there are individual as well as discipline-based differences in educational technology integration (Bernard et al., 2004; Guidry & BrckaLorenz, 2010; Neumann, 2001; Waggoner: 2006; White & Liccardi, 2006). Research has also shown that there are many faculty needs such as rewards and reinforcements for educational technology integration (Ely, 1999; Hall & Khan, 2003; Reiser & Dempsey, 2012; Rogers, 2003).

Reliability

After gathering data from the first 20 participants, *Cronbach's Alpha* and *Split-Half Reliability* analysis of *Guttmann Coefficient* were performed in order to test the survey instrument for any errors related to questionnaire construction. There were seven major components on the educational technology integration questionnaire:

1. Instructor Beliefs about Educational Technology Integration.
2. Positive and Negative Factors in Educational Technology Integration.
3. Facilitative Conditions of Educational Technology Integration.

4. Instructor Competencies in Educational Technology and Integration.
5. Instructor Experiences in Educational Technology.
6. Educational Technology Training Needs of Instructors.
7. Importance of Resources in Educational Technology Integration.

The *Instructor Beliefs about Educational Technology Integration* component had ten items with six-point Likert-like scale format (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, and 6 = strongly agree). The *Positive and Negative Factors in Educational Technology Integration*, *Facilitative Conditions of Educational Technology Integration, Instructor Competencies in Educational Technology, Instructor Experiences in Educational Technology*, *Educational Technology Training Needs of Instructors*, and *Importance of Resources in Educational Technology Integration* components had eight items with six-point Likert-like scale format (1= strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, and 6 = strongly agree) on the questionnaire.

Instructor beliefs. The instructor beliefs about the educational technology integration category had the following *Cronbach's Alpha* internal consistency results: Overall *Cronbach's Alpha* was .800, and the *Cronbach's Alpha* based on standardized ten items was .830 respectively. Question item two (M=2.70, SD=1.49) scores were significantly smaller compared to question items five (M=5.15, SD=1.04), six (M=5.00, SD=649), and eight (M=5.15, SD=.745). Another item with smaller mean and standard deviation scores was question item three (M=3.30, SD=1.52).

Summary of reliability and internal consistency for instructors' beliefs about educational technology integration category is provided in Table 20.

Table 20. Summary of Reliability and Internal Consistency for Instructors' Beliefs about Educational Technology Integration (N=20).

	Instructor Beliefs of ET Integration	*M*	*SD*	*N*
1	I believe using a computer with technology equipment and subject-based software in my instruction would make me a better instructor.	4.85	1.13	20
2	I believe use of educational technology requires unnecessary curriculum reforms.	2.70	1.49	20
3	I believe decentralizing instructional support to the various academic departments would make them more relevant in educational technology integration.	3.30	1.52	20
4	I believe integration of educational technology into the curriculum is very discipline specific.	4.15	1.30	20
5	I believe that all faculty members should know how to use instructional technology effectively.	5.15	1.04	20
6	I believe instructional design department at my institution should have a plan for educational technology integration.	5.00	.649	20
7	I believe educational technology integration initiatives should be my own choice.	4.75	1.20	20
8	I believe Learning Management System (Blackboard, D2L, Canvas & Moodle) is an effective means of disseminating course material to students.	5.15	.745	20
9	I believe educational technology tools would enable me to interact more with my students.	4.75	1.11	20
10	I believe educational technology maximizes the effectiveness of my teaching and learning.	4.90	.968	20

Summary of the *Cronbach's Alpha* internal consistency of the item total statistics, if the item was deleted from the instructors' beliefs about educational technology integration category of the questionnaire is provided in Table 21.

Table 21. Item Total Statistics of Cronbach's Alpha for Instructors' Beliefs about Educational Technology Integration (N=20).

Instructor Beliefs of EDTI	Mean (If Item Deleted)	Scale Variance (If Item Deleted)	Corrected (Item-Total Correlation)	Cronbach's Alpha (If Item Deleted)
Question 1	39.85	36.87	.668	.760
Question 2	42.00	36.73	.466	.787
Question 3	41.40	34.04	.619	.764
Question 4	40.55	44.15	.087	.831
Question 5	39.55	40.57	.432	.787
Question 6	39.70	42.01	.588	.781
Question 7	39.95	42.68	.205	.814
Question 8	39.55	41.41	.564	.780
Question 9	39.95	35.41	.805	.744
Question 10	39.80	38.37	.672	.764

Based on the Cronbach's Alpha analysis (Table 21), the scales of Cronbach's Alpha did not yield very high alpha values when items were removed from the scale. As it was mentioned previously, original overall Cronbach's Alpha was .800, and the Cronbach's Alpha based on standardized ten items was .830. There was no major difference between original scale and new scale when an item was deleted from the scale. Therefore, none of the items were removed from the instructors' beliefs category of the scale. It is important to note that an alpha value of .7 is an acceptable measurement scale for survey-based research studies (Harris, 2002).

Positive and negative factors. The positive and negative factors of the educational technology integration category had the following *Cronbach's Alpha* internal consistency results: Overall *Cronbach's Alpha* was .791, and the *Cronbach's Alpha* based on standardized eight items was .794 respectively. There were eight items in the positive and negative factors question. Items two (M=2.45, SD=1.53), four (M=2.75, SD=1.25), and eight (M=2.55, SD=1.31) were significantly smaller compared to question items one (M= 4.75, SD=1.20), three (M=4.65, SD=.988), five (M=5.10, SD=.852), and seven (M=5.20, SD=.768). Another item with smaller mean and standard deviation scores was item three (M=3.30, SD=1.52). Summary of reliability and internal consistency for positive and negative factors in educational technology integration category is provided in Table 22.

Table 22. Summary of Reliability and Internal Consistency for Positive and Negative Factors in Educational Technology Integration (N=20).

	Positive & Negative Factors of ET Integration	*M*	*SD*	*N*
1	Educational technology integration increases my classroom participation.	4.75	1.20	20
2	I am not motivated to integrate any educational technology because it changes fast.	2.45	1.53	20
3	Educational technology integration made my classroom assessment effective.	4.65	.988	20
4	Every time when I try new educational technology, technology fails.	2.75	1.25	20
5	Educational technology integration increases quality of my online classes.	5.10	.852	20
6	Educational technology integration effects my teaching evaluations.	4.40	1.27	20
7	Educational technology integration increased my technology skills.	5.20	.768	20
8	Educational technology integration is too much work for me.	2.55	1.31	20

Summary of the Cronbach's Alpha internal consistency of the item total statistics, if the item was deleted from the positive and negative factors in educational technology integration category of the questionnaire is provided in Table 23.

Table 23. Item Total Statistics for Positive and Negative Factors in Educational Technology Integration (N=20).

Positive & Negative Factors of ETI	Mean (If Item Deleted)	Scale Variance (If Item Deleted)	Corrected (Item-Total Correlation)	Cronbach's Alpha (If Item Deleted)
Question 1	27.10	29.35	.382	.786
Question 2	29.40	25.41	.519	.768
Question 3	27.20	28.80	.570	.759
Question 4	29.10	27.88	.482	.770
Question 5	26.75	30.82	.450	.776
Question 6	27.45	26.36	.599	.750
Question 7	26.65	32.45	.318	.791
Question 8	29.30	24.85	.703	.730

Based on the Cronbach's Alpha analysis (Table 23), the scales of Cronbach's Alpha did not yield very high alpha values when items were removed from the scale. As it was mentioned previously, overall Cronbach's Alpha was .791, and the Cronbach's Alpha based on standardized eight items was .794. Therefore, none of the items were removed from the positive and negative factors category of the scale. The value of alpha is strongly dependent on the number of items in the scale, if item is removed from the scale it would also have some negative effect on survey instrument quality.

Facilitative conditions of technology integration. The facilitative conditions of educational technology integration category had the following *Cronbach's Alpha* internal consistency results: Overall *Cronbach's Alpha* was .925, and the *Cronbach's Alpha* based on standardized eight items was .923 respectively. There were eight items in the facilitative conditions category. Items three (M=2.80, SD=1.24), four (M=2.60, SD=1.31), six (M=2.60, SD=1.42), and eight (M=2.85, SD=1.38) were very similar and had no significant differences. However, items one (M=3.40, SD=1.35), two (M=3.05, SD=1.35), five (M=3.25, SD=1.44), and seven (M=3.70, SD=1.21) were slightly greater in terms of mean and standard deviation scores. The item seven (M=3.70, SD=1.21) had a mean and standard deviation score greater than questions four (M=2.60, SD=1.31) and six (M=2.60, SD=1.42). Summary of reliability and internal consistency for facilitative conditions of educational technology integration category is provided in Table 24.

Table 24. Summary of Reliability and Internal Consistency for Facilitative Conditions of Technology Integration (N=20).

	Facilitative Conditions of EDTI	*M*	*SD*	*N*
1	I have insufficient time to integrate educational technology into my courses.	3.40	1.35	20
2	I do not have enough technology knowledge for educational technology integration.	3.05	1.35	20
3	I do not have a strong leadership support for educational technology on my campus.	2.80	1.24	20
4	I feel uncomfortable to participate in educational technology integration initiatives.	2.60	1.31	20
5	I have very limited resources for educational technology integration projects.	3.25	1.44	20
6	I am not interested in committing to any educational technology integration initiatives.	2.60	1.42	20
7	There are enough incentives on my campus for educational technology integration.	3.70	1.21	20
8	I am dissatisfied with my educational technology learning environment.	2.85	1.38	20

Summary of the Cronbach's Alpha internal consistency of the item total statistics, if an item was deleted from the facilitative conditions of the educational technology integration category of the questionnaire is provided in Table 25.

Table 25. Item Total Statistics for Facilitative Conditions of Technology Integration (N=20).

Facilitative Conditions	Mean (If Item Deleted)	Scale Variance (If Item Deleted)	Corrected (Item-Total Correlation)	Cronbach's Alpha (If Item Deleted)
Question 1	20.85	58.66	.737	.915
Question 2	21.20	57.11	.821	.909
Question 3	21.45	58.78	.813	.910
Question 4	21.65	56.45	.891	.903
Question 5	21.00	56.84	.772	.912
Question 6	21.65	56.34	.811	.909
Question 7	20.55	68.05	.311	.944
Question 8	21.40	56.88	.811	.909

As it was mentioned previously, overall Cronbach's Alpha for facilitative conditions category was .925, and the Cronbach's Alpha based on standardized eight items was .923. Based on the Cronbach's Alpha analysis (Table 25), the scales of Cronbach's Alpha yielded very high alpha values when items were removed from the scale. However, there was no major difference between original scale and new scale when an item was deleted from the scale. Therefore, none of the items were removed from the scale for the facilitative conditions category. It is important to note that an alpha value of .7 is an acceptable measurement scale for survey-based research studies (Harris, 2002).

Instructor competencies in educational technology. The instructor competencies in educational technology category had the following *Cronbach's Alpha* internal consistency results: Overall *Cronbach's Alpha* was .677, and the *Cronbach's Alpha* based on standardized eight items was .780 respectively. There were eight items for this category. The mean and standard deviation scores for items three (M=5.55, SD=.759), five (M=5.20, SD=.768) and six (M=5.20, SD=.894) were respectively greater compared to items two (M=4.55, SD=1.39), four (M=4.75, SD=.967), and seven (M=4.65, SD=1.22). The mean and standard deviation scores for items one (M=2.35, SD=1.63) and eight (M=3.75, SD=1.37) were relatively smaller than item three (M=5.55, SD=.759). Summary of reliability and internal consistency for instructor competencies in education technology category is provided in Table 26.

Table 26. Summary of Reliability and Internal Consistency for Instructor Competencies in Education Technology (N=20).

	Instructor Competencies of EDTI	*M*	*SD*	*N*
1	I have not received any educational technology training for the past five years.	2.35	1.63	20
2	I have experience in creating digital and web content.	4.55	1.39	20
3	I have following skills (Word processing, Spreadsheets, PowerPoint).	5.55	0.75	20
4	I know how to effectively utilize educational technology into my course.	4.75	0.96	20
5	I am very familiar with search engines for the purpose of research.	5.20	0.76	20
6	I am competent in 1 or 2 computer applications for instruction.	5.20	0.89	20
7	I am competent in 3 or 5 computer applications for instruction.	4.65	1.22	20
8	I am proficient in 6 or more applications and I am able to assist colleagues as needed.	3.75	1.37	20

Summary of the Cronbach's Alpha internal consistency of the item total statistics, if an item was deleted from the instructor competencies in educational technology category of the questionnaire is provided in Table 27.

Table 27. Item Total Statistics of Cronbach's Alpha for Instructor Competencies in Education Technology (N=20).

Instructor Competencies of EDTI	Mean (If Item Deleted)	Scale Variance (If Item Deleted)	Corrected (Item-Total Correlation)	Cronbach's Alpha (If Item Deleted)
Question 1	33.65	30.13	-.338	.848
Question 2	31.45	22.68	.159	.707
Question 3	30.45	23.41	.373	.653
Question 4	31.25	19.77	.701	.579
Question 5	30.80	21.11	.713	.598
Question 6	30.80	19.85	.763	.574
Question 7	31.35	16.66	.857	.509
Question 8	32.25	17.67	.623	.572

As it was mentioned previously, overall Cronbach's Alpha for instructor competencies in educational technology category was .677, and the Cronbach's Alpha based on standardized eight items was .780. Based on the Cronbach’s Alpha analysis (Table 27), Cronbach’s Alpha value would be .848 if item one was removed from the scale. However, other scales of Cronbach’s Alpha did not yield very high alpha values. The value of alpha is strongly dependent on the number of items in the scale, if item is removed from the scale it would also have some negative effect on survey instrument quality. Therefore, none of the items were removed from the scale in instructor competencies of educational technology category. It is important to note that an alpha value of .7 is an acceptable measurement scale for survey-based research studies (Harris, 2002).

The instructor experiences in educational technology. The instructor experiences in educational technology category had the following *Cronbach's Alpha* internal consistency results: Overall *Cronbach's Alpha* was .712, and the *Cronbach's Alpha* based on standardized eight items was .722 respectively. There were eight items within the educational technology experiences category. The mean and standard deviation scores for items three (M=2.45, SD=.999), four (M=2.80, SD=1.28), five (M=2.30, SD=1.30), and seven (M=2.95, SD=1.53), were significantly smaller compared to question items one (M=4.55, SD=1.31), two (M=3.35, SD=1.30), six (M=4.15, SD=1.38), and eight (M=3.85, SD=1.38). Summary of reliability and internal consistency for instructor experiences in educational technology category is provided in Table 28.

Table 28. Summary of Reliability and Internal Consistency for Instructor Experiences in Education Technology (N=20).

	Instructor Experiences in Education Technology	*M*	*SD*	*N*
1	I have experience in utilizing Blackboard & Whiteboard tools such as document camera and overhead projector into teaching and learning.	4.55	1.31	20
2	I have experience in utilizing Tablets, Simulations, and iClickers into teaching and learning.	3.35	1.30	20
3	I have experience in utilizing Twitter, TodaysMeet, and Aka into teaching and learning.	2.45	0.99	20
4	I have experience in utilizing Facebook and Snapchat into teaching and learning.	2.80	1.28	20
5	I have experience in utilizing Prezi and Slide Carnival into teaching and learning.	2.30	1.30	20
6	I have experience in utilizing Tegrity into teaching and learning.	4.15	1.38	20
7	I have experience in utilizing Google Presentation into teaching and learning.	2.95	1.53	20
8	I have experience in utilizing Skype, Zoom and Facetime.	3.85	1.38	20

Summary of the Cronbach's Alpha internal consistency of the item total statistics, if an item was deleted from the instructor experiences in education technology category of the questionnaire is provided in Table 29.

Table 29. Item Total Statistics of Cronbach's Alpha for Instructor Experiences in Education Technology (N=20).

	Mean (If Item Deleted)	Scale Variance (If Item Deleted)	Corrected (Item-Total Correlation)	Cronbach's Alpha (If Item Deleted)
Question 1	21.85	29.18	.434	.677
Question 2	23.05	27.62	.563	.648
Question 3	23.95	31.31	.428	.682
Question 4	23.60	28.77	.485	.666
Question 5	24.10	28.72	.478	.667
Question 6	22.25	29.67	.364	.692
Question 7	23.45	30.68	.238	.724
Question 8	22.55	30.57	.300	.706

As it was mentioned previously, overall Cronbach's Alpha for instructor experiences in educational technology category was .712, and the Cronbach's Alpha based on standardized eight items was .722 respectively. Based on the Cronbach's Alpha analysis (Table 29), the scales of Cronbach's Alpha did not yield very high alpha values when items were removed from the scale. Therefore, none of the items were removed from the scale in instructor experiences of educational technology category. It is important to note that an alpha value of .7 is an acceptable measurement scale for survey-based research studies (Harris, 2002).

The educational technology training needs of instructors. The educational technology training needs of instructors' category had the following *Cronbach's Alpha* internal consistency results: Overall *Cronbach's Alpha* was .929, and the *Cronbach's Alpha* based on standardized eight items was .949 respectively. There were eight items for this component of the question category. The means and standard deviations for items one (M=3.80, SD=1.19), three (M=3.85, SD=1.34), four (M=3.90, SD=1.29), and five (M=3.80, SD=1.39) were relatively close to each other. The scores for items two (M=4.05, SD=1.23) and eight (M=4.00, SD=1.33) were almost identical. Items six (M=4.30, SD=1.41) and seven (M=4.40, SD=1.31) had greater mean and standard deviation scores compared to other items. Summary of reliability and internal consistency for educational technology training needs of instructors' category is provided in Table 30.

Table 30. Summary of Reliability and Internal Consistency for Educational Technology Training Needs of Instructors' (N=20).

	Educational Technology Training Needs of Instructors	*M*	*SD*	*N*
1	I have an immediate need for more training with curriculum that integrates educational technology.	3.80	1.19	20
2	I need more regular educational technology seminars/workshops at my institution.	4.05	1.23	20
3	I would need more instructional designer's support in my educational technology integration process.	3.85	1.34	20
4	I would need free instructional design classes.	3.90	1.29	20
5	I need strong support from my direct supervisor in educational technology integration.	3.80	1.39	20
6	I need more time to change the curriculum to incorporate educational technology.	4.30	1.41	20

Table 30 Cont.

7	I need to collaborate with my colleagues on educational technology integration issues.	4.40	1.31	20
8	I need better professional development plan in educational technology integration at my institution.	4.00	1.33	20

Summary of the Cronbach's Alpha internal consistency of the item total statistics, if the item was deleted from the educational technology training needs of instructors' category of the questionnaire is provided in Table 31.

Table 31. Item Total Statistics of Cronbach's Alpha for Educational Technology Training Needs of Instructors (N=20).

	Mean (If Item Deleted)	Scale Variance (If Item Deleted)	Corrected (Item-Total Correlation)	Cronbach's Alpha (If Item Deleted)
Question 1	28.30	64.32	.846	.940
Question 2	28.05	64.57	.801	.942
Question 3	28.25	60.72	.925	.934
Question 4	28.20	64.90	.739	.946
Question 5	28.30	60.95	.873	.938
Question 6	27.80	61.74	.818	.941
Question 7	27.70	64.64	.739	.946
Question 8	28.10	63.98	.757	.945

Based on the Cronbach's Alpha analysis (Table 31), the scales of Cronbach's Alpha yielded very high alpha values when each item was removed from the scale. As it was mentioned previously, overall Cronbach's Alpha for instructor needs in educational technology category was .929, and the Cronbach's Alpha based on standardized eight items was .949. There was no major difference between original scale and new scale when an item was deleted from the scale. Therefore, none of the items were removed from the scale of instructors' needs of educational technology category. It is important to note that an alpha value of .7 is an acceptable measurement scale for survey-based research studies (Harris, 2002).

Summary of the Internal Consistency

The value of alpha is strongly dependent on the number of items in the scale, if any item is removed from the scale it would also have some negative effect on overall survey instrument quality. It is important to note that an alpha value of .7 is very reasonable scale to accept in the survey-based research studies. It should also be noted that, while a high value for Cronbach's alpha indicates good internal consistency of the items in the scale, but it does not mean that the scale is unidimensional. It should also be noted that, the number of the population in the reliability and internal consistence analysis group of this study was only 20 instructors. Therefore, some of the Cronbach's Alpha scores were higher than .7 scale.

Split-Half Reliability of Guttmann Coefficient

In order to create reliable internal consistency within the questionnaire, *Split-Half Reliability of Guttmann Coefficient* was performed by splitting questionnaire items into two major parts. The goal was to be certain whether the two halves of the same questionnaire would yield similar scores and error variances. For reliability measure of the survey, the *Spearman-Brown* formula was used, since the survey items were based on the six-point Likert-like scale format. According to Creswell (2014), Geoffrey et al. (2009), and Harris (2002), if the survey instrument has a Likert-like scale format, then it is ideal to use the *Spearman-Brown* formula. After completing *Split-Half Reliability analysis of Guttmann Coefficient*, *Cronbach's Alpha* was computed for the purpose of reliability within the overall questionnaire. The overall alpha for the

Split-Half Reliability Analysis, based on seven major parts of the questionnaire, was .802. There were seven males (35%) and thirteen females (65%) in the test for the *Split-Half Reliability* consistency measure. Summary of the overall Split-Half Reliability test is provided in Table 32.

Table 32. Summary of Split-Half Reliability Analysis

		Reliability Statistics	
Cronbach's Alpha	Part 1	Value	.640
		N of Items	7[a]
	Part 2	Value	.612
		N of Items	7[b]
		Total N of Items	14
Correlation Between Forms			.844
Spearman-Brown		Equal Length	.915
Coefficient		Unequal Length	.915
Guttman Split-Half Coefficient			.902

a. The 1st Half items are: Q_I_1st half, Q_II_1st half, Q_III_1st half, Q_IV_1st half, Q_V_1st half, Q_VI_1st half, Q_VII_1st half
b. The 2nd Half items are: Q_I_2nd half, Q_II_2nd half, Q_III_2nd half, Q_IV_2nd half, Q_V_2nd half, Q_VI_2nd_half, Q_VII_2nd half

Summary of means and standard deviations scores of the Split-Half Reliability Analysis is provided in Table 33.

Table 33. Summary of Mean & Standard Deviation in Split-Half Reliability Analysis

Scale Statistics				
	M	*Variance*	*SD*	*N of Items*
Part 1	119.91	172.61	13.13	7[a]
Part 2	114.08	273.27	16.53	7[b]
Both Parts	234.00	812.46	28.50	14

a. The 1st Half items are: Q_I_1st half, Q_II_1st half, Q_III_1st half, Q_IV_1st half, Q_V_1st half, Q_VI_1st half, Q_VII_1st half
b. The 2nd Half items are: *Q_I_2nd half, Q_II_2nd half, Q_III_2nd half, Q_IV_2nd half, Q_V_2nd half, Q_VI_2nd_half, Q_VII_2nd half*

Summary of the Reliability

Data was gathered from the first 20 participants and *Cronbach's Alpha* and *Split-Half Reliability of Guttmann Coefficient* analysis were performed. The results showed statistical assurance of the reliability of the overall survey instrument. All of the seven major components in educational technology integration questionnaire were consistent with each other and provided high alpha scores in terms of reliability of the survey instrument. The Guttmann Split-Half Coefficient value was equal to .902, and this is considered a strong instrumental reliability. The Cronbach's Alpha for the first half of the instrument was equal to .640 and for the second half was .612 respectively. The mean and standard deviation scores for the *Split-Half Reliability Analysis* were similar: the first half of the questionnaire (M=119.98, SD=13.13) and the second half (M=114.08, SD=16.53).

Results of the Research Questions

The study was designed to investigate the factors that influence instructors to integrate educational technology into teaching and learning environments. A descriptive research approach was used to examine instructors' perceptions of ET integration into teaching and learning. A six-point Likert-like scale format (1 = *strongly disagree, 2 = disagree,* 3 = *slightly disagree,* 4 = *slightly agree,* 5 = *agree, and 6 = strongly agree)* was developed and utilized by the principal investigator.

Data were analyzed using IBM SPSS Statistics for Windows (Version 24.0. Armonk, NY). Furthermore, descriptive statistics, including means and standard deviations, were used to summarize the factors that influence instructors to integrate educational technology into teaching and learning environments.

The inferential statistics were performed to determine statistical differences by utilizing independent sample *t* test and analyses of variance (ANOVA). The significance level of .05 was used for all analyses.

Research Question One

Are there differences in instructors' beliefs about educational technology integration into teaching and learning based on discipline (degree program)? One-way ANOVA was used to address this question.

Null Hypothesis One

There is no difference in instructors' beliefs about educational technology integration into teaching and learning based on discipline (degree program).

In order to understand instructors' beliefs of educational technology integration based on their teaching disciplines, multiple comparison tests of the disciplines in terms of means, standard deviation, and significance levels were performed. Summary of the mean and standard deviation scores of the ANOVA is provided in Table 34.

Table 34. Summary of One-Way ANOVA for Instructors' Beliefs about Educational Technology Integration Based on Disciplines (N=307).

Disciplines	*N*	*M*	*SD*	*SE*
Agriculture & Environment Science	27	34.62	4.91	.946
English/Education/Humanities	56	32.64	5.50	.735
Bus/Acct/Econ & Comm.	40	34.15	4.69	.742
Nursing/Health & Wellness	42	32.95	5.24	.808
Sociology/History/Music & Arts	25	32.64	5.17	1.03
Math & Physics	37	32.59	5.39	.887
Chemistry & Biology	21	33.47	4.30	.940

Table 34 Cont.

Disciplines	*N*	*M*	*SD*	*SE*
Engineering/Tech & Energy	31	36.35	3.76	.676
Criminal/ Law & Psychology	7	34.85	3.53	1.33
IT & Computers	21	32.61	5.40	1.18
Total	307	33.53	5.06	.289

95% Confidence Interval for Mean

A one-way analysis of variance (ANOVA) was performed to understand the role of discipline on instructors' educational technology integration beliefs. Instructors were divided into ten discipline groups: 1) Agriculture and Environmental Science; 2) English, Education, and Humanities; 3) Business, Accounting, Economics, and Communication; 4) Nursing, Health, and Wellness; 5) Sociology, History, Music, and Arts; 6) Mathematics and Physics; 7) Chemistry and Biology; 8) Engineering, Technology, and Energy; 9) Criminal Justice, Law, and Psychology; and 10) Information Technology and Computer Science.

The descriptive statistics comparison (Table 34) indicated that the mean score for the English, Education, and Humanities disciplines ($M = 32.64$, $SD = 5.50$) was significantly different from Agriculture and Environmental Science disciplines ($M = 34.62$, $SD = 4.91$) and Engineering, Technology, and Energy disciplines ($M = 36.35$, $SD = 3.76$). There was a small difference in mean scores between Business, Accounting, Economics, Communication, Chemistry, Biology, Nursing, Health, and Wellness disciplines.

There was statistically significant difference between disciplines; some of the differences in mean scores were smaller, but statistical significance existed between discipline groups as indicated by ANOVA (Table 35). The ANOVA test was significant, $F(9,297) = 1.93$, $p = .047$).

Therefore, H-null:1 was rejected due to statistically significant differences between disciplines. The effect size between discipline groups was calculated and eta squared was equal to .05. According to Cohen (1988), the effect sizes can be measured by the following scale: .01 = small effect, .06 = medium effect and .14 = large effect. Therefore, the effect size for between groups had a small effect. Summary of the ANOVA is provided in Table 35.

Table 35. Summary of One-Way ANOVA for Instructors' Beliefs about Educational Technology Integration Based on Disciplines.

Source	*df*	*SS*	*MS*	*F*	*p.*
Between Groups	9	435.47	48.38	1.93	.047
Within Groups	297	7426.98	25.00		
Total	306	7862.45			

Based on the test for homogeneity of variance (Table 36), the instructors' beliefs variable showed an F value of 2.325 in Levene's test with the Sig. (*p*) value of .015. The result indicated that the Sig. value of (.015<.05) is less than the alpha value of .05, therefore the null hypothesis was rejected due to the significant difference between all ten discipline groups among instructors. Summary of the test of homogeneity of variances is shown in Table 36.

Table 36. Summary of Test of Homogeneity of Variances in One-Way ANOVA for Instructors' Beliefs about Educational Technology Integration Based on Disciplines.

Test of Homogeneity of Variances			
Levene Statistic	*df1*	*df2*	*p.*
2.325	9	297	.015

Agriculture and Environmental Science Disciplines

First, Agriculture and Environmental Science (AES) was compared to English, Education, and Humanities (EEH), and the following (M=1.98, SE=1.17, and Sig=.797) scores were observed respectively. When, AES was compared to Math and Physics (M&P) disciplines, the following (M=2.03, SE=1.26, and Sig=.844) scores were identified respectively. In both comparison cases with (Sig values= .797 and .844> 0.05) scores, it was observed that there were no statistically significant differences between those disciplines. Furthermore, when AES was compared to Chemistry and Biology (CHB) disciplines, the following (M=1.15, SE=1.45, and Sig=.999) scores were received, which again did not show any statistically significant difference in results. Detailed output of a Tukey HSD test for Agriculture & Environmental Science fields when compared to other disciplines is shown in Table 37.

Table 37. Summary of Tukey HSD Comparison in One-Way ANOVA for Instructors' Beliefs about Educational Technology Integration Based on Agriculture & Environmental Science.

Based on Discipline	Disciplines	*MD(I-J)*	*SE*	*p.*
Agriculture & Environmental Science	English/Education/Humanities	1.98	1.17	.797
	Bus/Acct/Econ & Comm.	.479	1.24	1.00
	Nursing/Health & Wellness	1.67	1.23	.938
	Sociology/History/Music & Arts	1.98	1.38	.916
	Math & Physics	2.03	1.26	.844
	Chemistry & Biology	1.15	1.45	.999
	Engineering/Technology & Energy	1.72	1.31	.951
	Criminal/ Law & Psychology	.227	2.12	1.00
	IT & Computers	2.01	1.45	.932

**. The mean difference is significant at the 0.05 level.*

English Education and Humanities Disciplines

When English, Education, and Humanities (EEH) discipline was compared to other fields, there were some small differences and as well as significant differences were observed. When EEH compared to Business, Accounting, Economics, and Communication (BAEC) disciplines, the following scores were observed (M=1.50, SE=1.03, and Sig=.908) respectively. When EEH was compared to Nursing, Health, and Wellness disciplines, the following (M=.309, SE=1.02, and Sig=1.00) scores emerged. Both comparison scenarios above did not show any statistically significant difference in scores. However, when EEH was compered to Engineering, Technology, and Energy disciplines, the following (M=371, SE=1.11, and Sig=.034) significant score differences were identified respectively. The significance level (.034>0.05) was smaller than the alpha score and showed statistically significant difference between disciplines. Therefore, H-null: 1 was rejected due to differences between disciplines. Detailed output of a Tukey HSD test for English, Education, and Humanities fields when compared to other disciplines is provided in Table 38.

Table 38. Summary of Tukey HSD Comparison in One-Way ANOVA for Instructors' Beliefs about Educational Technology Integration Based on English & Education Discipline.

Based on Discipline	Disciplines	*MD(I-J)*	*SE*	*p.*
English/Education & Humanities	Agriculture & Environmental Science	1.98	1.17	.797
	Bus/Acct/Econ & Comm.	1.50	1.03	.908
	Nursing/Health & Wellness	.309	1.02	1.00
	Sociology/History/Music & Arts	.002	1.20	1.00
	Math & Physics	.048	1.05	1.00

Table 38 Cont.

Based on Discipline	Disciplines	*MD(I-J)*	*SE*	*p.*
	Chemistry & Biology	.833	1.27	1.00
	Engineering/Tech & Energy	3.71*	1.11	.034
	Criminal/ Law & Psychology	2.21	2.00	.984
	IT & Computers	.023	1.27	1.00

*. *The mean difference is significant at the 0.05 level.*

Business, Accounting, Economics and Communication Disciplines

When Business, Accounting, Economics, and Communication (BAEC) disciplines were compared to Sociology, History, Music, and Art (SHMA) fields, the following (M=1.52, SE=1.27, and Sig=.974) scores were gained. When BAEC disciplines were compared to Math and Physics (M&P) fields, the following (M=1.55, SE=1.14, and Sig=.937) results were received. Whereas, the comparison between Math and Physics (M&P) disciplines to IT and Computer Science (ITCS) fields provided the following (M=1.53, SE=1.34, and Sig=9.81) outcomes respectively. As results were observed, there were no statistically significant differences found between BAEC and other disciplines.

Nursing, Health and Wellness Disciplines

When Nursing, Health, and Wellness (NHW) disciplines were compared to Agriculture and Environmental Science (AES) fields, the following scores were observed (M=1.16, SE=1.23, and Sig=.938) respectively. Whereas, the comparison with Math and Physics (M&P) fields had the following (M=0.35, SE=1.12 and Sig 1.00) scores. Furthermore, when NHW disciplines were compared to Engineering, Technology, and Energy (ETE) disciplines, they all generated the following (M=3.40, SE=1.18 and Sig=0.11) scores. There were similarities between mean difference, standard error, and significance scores of Agriculture and Environmental Science (AES) disciplines (M=1.16, SE=1.23, and Sig=.938) to Business, Accounting, Economics, and Communication (BAEC) disciplines (M=1.19, SE=1.10 and Sig=986). Overall, when NHW disciplines were compared to other disciplines, there were no statistically significant differences.

Sociology, History, Music and Art Disciplines

When Sociology, History, Music, and Art (SHMA) disciplines were compared to other fields, the following mean, standard deviation, and significance scores were observed. Firstly, when SHMA were compared to Agriculture and Environmental Science (AES) disciplines, they had the following (M=2.03, SE=1.26, and Sig=.844) scores respectively. Secondly, when SHMA were compared to Business, Accounting, Economics, and Communication (BAEC) fields, they had the following (M=2.03, SE=1.26, and Sig=.844) results. Thirdly, when SHMA were compared to Engineering, Technology, and Energy (ETE) fields, they generated the following (M=3.76, SE=1.21, and Sig=.067) outcomes. Overall, in all three comparison cases, the significance levels were greater than the alpha level, and no significant difference was found.

Mathematics and Physics Disciplines

When Math and Physics (M&P) fields were compared to Agriculture and Environmental Science (AES) disciplines, the following scores were observed (M=2.03, SE=1.26, and Sig=.844) respectively. Whereas, the comparison with Business, Accounting, Economics and Communication (BAEC) fields had the following (M=1.55, SE=1.14 and Sig .937) outcomes. Furthermore, when M&P disciplines were compared to Engineering, Technology, and Energy (ETE) disciplines, they generated the following (M=3.76, SE=1.21 and Sig=0.67) scores respectively. There were similarities between mean difference, standard error, and significance scores of Nursing, Health, and Wellness (M=.357, SE=1.12, and sig=1.00); Sociology, History, Music, and Art (M=.054, SE=1.29, and sig=1.00); and Chemistry & Biology (M=.881, SE=1.36, and sig=1.00) disciplines. Overall, when M&P disciplines were compared to other disciplines, there were no statistically significant differences found.

Chemistry and Biology Disciplines

When Chemistry & Biology (Ch&B) fields were compared to Nursing, Health, and Wellness disciplines, the following (M=.523, SE=1.33, and Sig=1.0) scores were recorded. Whereas, the comparison with Math & Physics (M&P) fields had the following (M=.881, SE=1.36 and Sig 1.0) scores respectively. Furthermore, when Ch & B disciplines were compared to Information Technology & Computers (IT&C) disciplines, they had the following (M=.857, SE=1.54 and Sig=1.0) results. There were similarities between mean difference, standard error, and significance scores of English, Education, and Humanities (M=.833, SE=1.27, and Sig=1.00) and Sociology, History, Music, and Art (M=.836, SE=1.48, and Sig=1.00) disciplines. Overall, when Ch&B disciplines were compared to other disciplines, no statistically significant differences were observed.

Engineering, Technology and Energy Disciplines

When Engineering, Technology, and Energy (ETE) disciplines were compared to Agriculture and Environmental Science, the following (M=1.72, SE=1.31, Sig=.951) scores were observed. Whereas, the comparison with Business, Accounting, Economics, and Communication (BAEC) fields had the following (M=2.20, SE=1.19 and Sig .707) outcomes. Furthermore, when ETE disciplines were compared to Information Technology & Computers (IT&C) disciplines, they had the following (M=3.73, SE=1.41 and Sig=.202) scores, and no statistical difference was observed.

However, when ETE were compered to English, Education, and Humanities (EEH) disciplines, the following (M=3.71, SE=1.11, and Sig=.034) outcome emerged between disciplines. The significance level (.034<.050) was smaller than the alpha value and showed a statistically significant difference between Engineering, Technology, and Energy (ETE) and English, Education, and Humanities (EEH) disciplines respectively. Therefore, H-null: 1 was rejected due to statistical difference between disciplines in educational technology integration.

There were some close similarities between mean difference, standard error, and significance scores of Nursing, Health, and Wellness (M=3.40, SE=1.18, and Sig=.118) and Sociology, History, Music, and Art (M=3.71, SE=1.34, and Sig=.154) disciplines. Detailed output of a Tukey HSD test for Engineering Technology and Energy disciplines when compared to other fields is shown in Table 39.

Table 39. Summary of Tukey HSD Comparison in One-Way ANOVA for Instructors' Beliefs About Educational Technology Integration Based on Engineering & Technology Disciplines.

Based on Discipline	Discipline	*MD(I-J)*	*SE*	*p.*
Engineering/Tech & Energy	Agriculture & Environmental Science	1.72	1.31	.951
	English/Educ/Humanities	3.71*	1.11	.034
	Bus/Acct/Econ & Comm.	2.20	1.19	.707
	Nursing/Health & Wellness	3.40	1.18	.118
	Sociology/History/Music & Arts	3.71	1.34	.154
	Math & Science	3.76	1.21	.067
	Chemistry & Biology	2.87	1.41	.574
	Criminal/ Law & Psychology	1.49	2.09	.999
	IT & Computers	3.73	1.41	.202

*. *The mean difference is significant at the 0.05 level.*

Criminal Justice, Law and Psychology Disciplines

When Criminal Justice, Law, and Psychology (CJLP) related fields were compared to other fields, statistically significant differences between disciplines were not observed. Comparison of Agriculture and Environmental Science gave the following (M=.227, SE=2.12, Sig=1.0) scores respectively. Whereas, the comparison with English, Education, and Humanities (BAEC) fields gave the following (M=2.21, SE=2.00, Sig .984) outcomes.

Furthermore, when CJLP disciplines were compared to Business, Accounting, Economics, and Communication fields, the results provided the following (M=.707, SE=2.04, Sig=1.00) scores respectively. In addition, it was observed that there were very close similarities in scores when CJLP fields were compared to Nursing, Health, and Wellness (M=1.90, SE=2.04 and Sig=.995); Sociology, History, and Music (M=2.21, SE=2.13, Sig=.990); and Math and Physics (M=2.26, SE=2.06, Sig=.985) disciplines. There were some close similarities in significance scores, but no statistically significant differences between disciplines were identified.

Information Technology and Computers

When IT and Computers related fields were compared to other fields, statistically significant differences between disciplines were not observed. Comparison of Agriculture and Environmental Science gave the following (M=2.07, SE=1.45, Sig=.932) scores respectively. Whereas, the comparison with Business, Accounting, Economics and Communication (BSEC) fields, gave the following (M=1.53, SE=1.34, Sig .981) outcomes. Detailed output of a Tukey HSD test for IT and Computer Science disciplines when compared to other fields is shown in Table 40.

Table 40. Summary of Tukey HSD Comparison in One-Way ANOVA for Instructors' Beliefs About Educational Technology Integration Based on IT & Computer Science Disciplines.

Discipline	Discipline	*MD(I-J)*	*SE*	*p.*
IT & Computers	Agriculture & Environmental Science	2.01	1.45	.932
	English/Education/Humanities	.023	1.27	1.00
	Bus/Acct/Econ & Comm.	1.53	1.34	.981
	Nursing/Health & Wellness	.333	1.33	1.00
	Sociology/History/Music & Arts	.020	1.48	1.00
	Math & Physics	.024	1.36	1.00
	Chemistry & Biology	.857	1.54	1.00
	Engineering/Tech & Energy	3.73	1.41	.202
	Criminal/ Law & Psychology	2.23	2.18	.991

*. *The mean difference is significant at the 0.05 level.*

Test of Homogeneous Subsets for One-Way ANOVA

The test of homogeneous subsets for One-Way ANOVA on instructors' beliefs about educational technology integration into teaching and learning based on discipline was also run. The ANOVA test results indicated that, in terms of overall discipline homogeneity, there were no statistically significant differences between fields. The overall significance level (.256>0.05) was greater than the alpha and showed no statistically significant difference between disciplines respectively. Summary of the homogeneous subsets of the variance based on the all discipline groups is provided in Table 41.

Table 41. Summary of One-Way ANOVA for Instructors' Beliefs about Educational Technology Integration Based on Disciplines (N=307).

		Subset for alpha = 0.05
Disciplines	*n*	*1*
Math & Physics	37	32.59
IT & Computers	21	32.61
Sociology/History/Music & Arts	25	32.64
English/Educ/Humanities	56	32.64
Nursing/Health & Wellness	42	32.95
Chemistry & Biology	21	33.47
Bus/Acct/Econ & Comm.	40	34.15
Agriculture & Environmental Science	27	34.62
Criminal/ Law & Psychology	7	34.85
Engineering/Tech & Energy	31	36.35
Sig.		.256

a. Uses Harmonic Mean Sample Size = 22.671.
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Research Question Two

Are there differences in the factors related to educational technology integration into teaching and learning between male and female instructors? Independent sample t-tests were used to address this question.

Null Hypothesis Two

There is no difference in the factors related to educational technology integration into teaching and learning between male and female instructors.

The goal of question two was to investigate whether any statistically significant differences existed between male and female instructors in terms of educational technology integration. The group statistics test (Table 42) between male and female instructors revealed the following mean and standard deviation results: male instructors had following (M=33.03, SD=4.57), and female instructors had following (M=32.47, SD=4.48) scores respectively. There was no statistically significant difference in means and standard deviation scores between male and female instructors. Summary of the mean and standard deviation scores for male and female instructors is provided in Table 42.

Table 42. The Group Statistics Test of Male and Female Instructors in Educational Technology Integration (N=307).

Group Statistics				
Gender	*n*	*M*	*SD*	*SEM*
Male	142	33.03	4.57	.384
Female	165	32.47	4.48	.348

In addition to overall group statistics of gender, educational technology integration based on the positive and negative factors were also analyzed. There were eight items within the positive and negative factors category of the questionnaire. There were no statistically significant difference between mean and standard deviation scores. However, item two scores for male (M=3.27, SD=1.13), and female instructors (M=2.81, SD=1.23) showed some differences. Among other question items, the item four had a significantly lower mean and standard deviation scores for male (M=2.47, SD=1.17) and female (M=2.43, SD=1.08) instructors. The item eight also had lower mean and standard deviation scores for male (M=3.70, SD=1.45) and female (M=3.23, SD=1.40) instructors. Summary of the mean and standard deviation scores for each question item based on gender category is provided in Table 43.

Table 43. Summary of the Mean and Standard Deviation Scores for Positive & Negative Factors of Educational Technology Integration.

Positive & Negative Factors of ETI	Gender	*n*	*M*	*SD*	*SEM*
1.Educational technology integration increases my classroom participation.	Male	142	4.79	1.01	.085
	Female	164	4.82	0.98	.077
2. I am not motivated to integrate any educational technology because it changes fast.	Male	142	3.27	1.13	.095
	Female	164	2.81	1.23	.097
3. Educational technology integration made my classroom assessment effective.	Male	142	4.56	0.97	.082
	Female	164	4.74	0.93	.073
4. Every time when I try new educational technology, technology fails.	Male	142	2.47	1.17	.098
	Female	164	2.43	1.08	.085
5. Educational technology integration increases quality of my online classes.	Male	142	4.87	0.81	.068
	Female	164	4.99	0.79	.062
6. Educational technology integration effects my teaching evaluations.	Male	142	4.49	1.11	.094
	Female	164	4.51	1.15	.090
7. Educational technology integration increased my technology skills.	Male	142	4.87	0.81	.068
	Female	164	4.98	0.81	.064
8. Educational technology integration is too much work for me	Male	142	3.70	1.45	.122
	Female	164	3.23	1.40	.110

Independent Samples Test Analysis

According to the independent samples test (Table 44), statistically significant differences between male and female instructors based on the positive and negative factors of educational technology integration were not observed. The t-test examination revealed the following results: ($t_{305} = 1.074$; $p = .284 > 0.05$). Therefore, H-null:2 was retained due to no statistical difference between male and female instructors in educational technology integration. Summary of the independent samples test scores for male and female instructors is shown in Table 44.

Table 44. Summary of the Independent Samples Test

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	*Sig.*	*t*	*df*	*Sig. (2-tailed)*	*Mean Difference*	*SE Difference*	*95% Confidence Interval of the Difference*	
									Lower	*Upper*
Positive & Negative Factors of EDTI	Equal variances assumed	.502	.479	1.074	305	.284	.5564	.5180	-.4630	1.575
	Equal variances not assumed			1.072	296.298	.284	.5564	.5188	-.4647	1.577

Research Question Three

Are there differences in competencies in educational technology integration among instructors based on academic ranks (professor, associate professor, assistant professor, instructor, lecturer, and other)? One-way ANOVA was used to address this question.

Null Hypothesis Three

There is no difference in competencies in educational technology integration among instructors based on academic ranks (professor, associate professor, assistant professor, instructor, lecturer, and other).

The one-way analysis of variance (ANOVA) was performed to understand the role of academic ranks on instructor competencies in educational technology. The ranks of the instructors consisted of five groups: 1) Professor, 2) Associate Professor, 3) Assistant Professor, 4) Instructor, 5) Lecturer, and 6) Adjunct.

The descriptive statistics comparison test indicated that the mean score for Lecturer rank (M = 32.96, SD = 3.75) was significantly different from Professor (M = 35.22, SD = 6.55) and Associate Professor (M = 34.41, SD = 5.81) ranks. The Assistant Professor (M = 35.06, SD = 5.20), Instructor (M = 33.92, SD = 4.59), and Adjunct Instructor (M = 35.10, SD = 4.97) ranks also had some similarities and slight differences in terms of mean scores. Overall, there were differences in mean scores between instructor ranks in terms of educational technology competencies. Summary of the ANOVA descriptive analysis is provided in Table 45.

Table 45. Summary of Descriptive Analysis of One-Way ANOVA for Instructor Competencies in Educational Technology Integration Based on Academic Ranks (N=307).

	Instructor Competencies			
Ranks	*n*	*M*	*SD*	*SE*
Associate Professor	104	34.41	5.81	.569
Assistant Professor	49	35.06	5.20	.744
Instructor	109	33.92	4.59	.440
Lecturer	26	32.96	3.75	.736
Other: Adjunct	10	35.10	4.97	1.57
Total	307	34.26	5.14	.293

A one-way analysis of variance (ANOVA) shows no statistically significant differences between ranks in educational technology competencies. The ANOVA was equal to F (5,301) = .793, p =.555). Therefore, H-null: 3 is retained due to no statistical difference between instructor competencies based on the ranks. The effect size between instructor ranks was equal to eta squared of .04. According to Cohen (1988), the effect sizes can be measured by the following scale: .01 = small effect, .06 = medium effect and .14 = large effect. Therefore, the effect size for between groups was small. Summary of the ANOVA test is shown in Table 46.

Table 46. Summary of One-Way ANOVA for Instructor Competencies in Educational Technology Integration Based on Academic Ranks (N=307).

Source	*df*	*SS*	*MS*	*F*	*p.*
Between Groups	5	105.23	21.046	.793	.555
Within Groups	301	7984.86	26.528		
Total	306	8090.09			

Since, one-way analysis of variance (ANOVA) test showed no statistical significance between instructor ranks in educational technology competencies, Tukey HSD test was not performed. Instead, the Homogeneous Subsets in Tukey HSD Tests was utilized to see the differences in means for academic ranks. Summary of homogeneous subsets in Tukey HSD test based on the academic ranks is shown in Table 47.

Table 47. Summary of Homogeneous Subsets in Tukey HSD Tests of One-Way ANOVA for Instructor Competencies in Educational Technology Integration Based on Academic Ranks (N=307).

		Instructor Competencies
		Subset for alpha = 0.05
Academic Ranks	*n*	1
Lecturer	26	32.96
Instructor	109	33.92
Associate Professor	104	34.41
Assistant Professor	49	35.06
Other: Adjunct	10	35.10
Professor	9	35.22
Sig.		.718

a. Uses Harmonic Mean Sample Size = 20.778.
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Research Question Four

Are there differences in educational technology integration among community college instructors based on the facilitative conditions (time, skills, leadership, participation, resources, commitment, rewards, and dissatisfaction with the status quo)? One-way ANOVA was used to address this question.

Null Hypothesis Four

There is no difference in educational technology integration among community college instructors based on the facilitative conditions (time, skills, leadership, participation, resources, commitment, rewards, and dissatisfaction with the status quo). Summary of the ANOVA descriptive analysis is provided in Table 48.

Table 48. Summary of Descriptive Analysis of One-Way ANOVA for Educational Technology Integration among Community College Instructors Based on Facilitative Conditions (N=307).

College Campuses	Descriptives			
	n	*M*	*SD*	*SE*
Bismarck State College	102	31.09	5.44	.539
Dakota College of Bottineau	49	30.51	5.64	.806
Lake Region State College	55	28.85	5.04	.680
North Dakota State College of Science	64	32.45	4.38	.547
Williston State College	37	30.35	4.93	.811
Total	307	30.79	5.23	.298

A one-way analysis of variance (ANOVA) was performed to understand the role of facilitative conditions on instructor educational technology integration among five community colleges. The facilitative conditions were divided into eight factors: 1) Time, 2) Skills, 3)

Leadership, 4) Participation, 5) Resources, 6) Commitment, 7) Rewards, and 8) Dissatisfaction with the status quo.

The descriptive statistics comparison test of ANOVA (Table 42) indicated that the mean score for LRSC (M = 28.85, SD = 5.04) was significantly different from NDSCS (M = 32.45, SD = 4.38) and BSC (M = 31.09, SD = 5.44). There was a very small difference in mean scores between DCB (M = 30.51, SD = 5.64), and WSC (M = 30.35, SD = 4.93).

Based on the one-way analysis of variance (ANOVA) there was a statistically significant difference between community colleges in terms of facilitative factors. The one-way ANOVA had a F value of (4,302) = 3.814, p =.005). Therefore, H-null: 4 is rejected due to statistical differences between community college faculty in terms of facilitative conditions.

The effect size between discipline groups was equal to .04. According to Cohen (1988), the effect sizes can be measured by the following scale: .01 = small effect, .06 = medium effect and .14 = large effect. Therefore, the effect size for the between groups was small. Summary of the ANOVA test is provided in Table 49.

Table 49. Summary of One-Way ANOVA for Educational Technology Integration among Community College Instructors Based on the Facilitative Conditions (307).

Sources	*df*	*SS*	*MS*	*F*	*p.*
Between Groups	4	403.67	100.92	3.817	.005
Within Groups	302	7984.39	26.43		
Total	306	8388.07			

Summary of the Tukey HSD test comparison for facilitative conditions among five community college faculty is provided in Table 50.

Table 50. Summary of Tukey HSD Tests in One-Way ANOVA for Educational Technology Integration among Community College Instructors Based on the Facilitative Conditions

Colleges	Colleges	*MD(I-J)*	*SE*	*p.*
Bismarck State College (BSC)	DCB	.587	.893	.965
	LRSC	2.24	.860	.071
	NDSCS	-1.35	.819	.465
	WSC	.746	.986	.943
Dakota College of Bottineau (DCB)	BSC	-.587	.893	.965
	LRSC	1.65	1.01	.474
	NDSCS	-1.94	.976	.273
	WSC	.158	1.11	1.00
Lake Region State College (LRSC)	BSC	-2.24	.860	.071
	DCB	-1.65	1.01	.474
	NDSCS	-3.59*	.945	.002
	WSC	-1.49	1.09	.648
North Dakota State College of Science (NDSCS)	BSC	1.35	.819	.465
	DCB	1.94	.976	.273
	LRSC	3.60*	.945	.002
	WSC	2.10	1.06	.279
Williston State College (WSC)	BSC	-.746	.986	.943
	DCB	-.158	1.11	1.00
	LRSC	1.49	1.09	.648
	NDSCS	-2.10	1.06	.279

**. The mean difference is significant at the 0.05 level.*

Summary of the homogeneous subsets in Tukey HSD test based on facilitative conditions is shown in Table 51.

Table 51. Summary of Homogeneous Subsets in Tukey HSD Test of One-Way ANOVA for Educational Technology Integration among Instructors Based on the Facilitative Conditions.

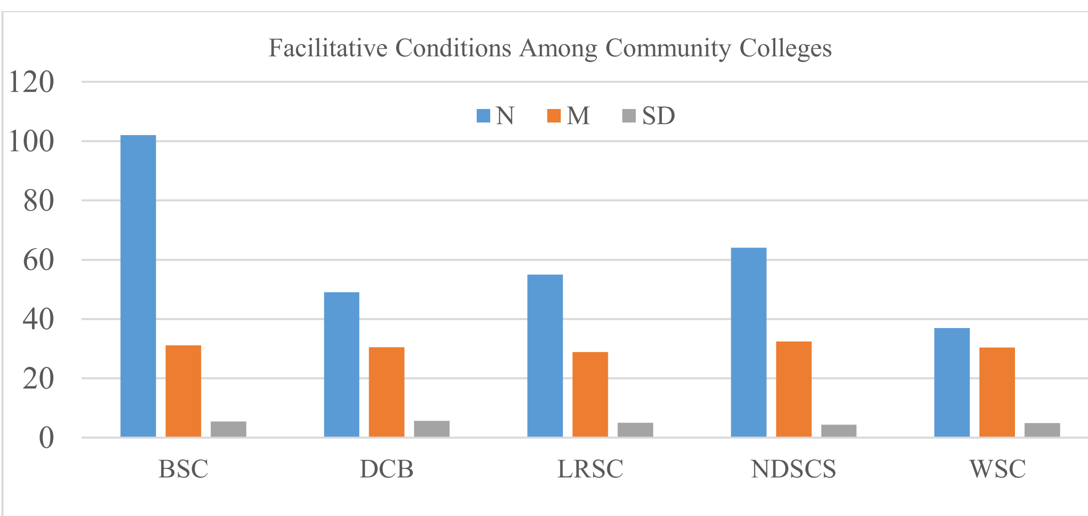
		Facilitative Conditions	
		Subset for alpha = 0.05	
Colleges	*n*	1	2
Lake Region State College	55	28.85	
Williston State College	37	30.35	30.35
Dakota College of Bottineau	49	30.51	30.51
Bismarck State College	102	31.09	31.09
North Dakota State College of Science	64		32.45
Sig.		.152	.205

a. Uses Harmonic Mean Sample Size = 54.917.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Detailed illustration of the educational technology integration among community college instructors based on the facilitative conditions is shown in Figure 1.

Figure 1. Educational Technology Integration among Instructors Based on the Facilitative Conditions.



Research Question Five

Are there differences in educational technology training needs of instructors based on educational level (trade/technical/vocational training, associate degree, bachelor's degree, master's degree, professional degree, and doctorate degree)? One-way ANOVA was used to address this question.

Null Hypothesis Five

There is no difference in educational technology training needs of instructors based on educational level (trade/technical/vocational training, associate degree, bachelor's degree, master's degree, professional degree, or doctorate degree).

A one-way analysis of variance (ANOVA) was performed to understand the training needs of instructors in educational technology based on their educational level. The educational level of the instructors was divided into six levels: 1) Trade Training, 2) Associate Degree, 3) Bachelor's Degree, 4) Master's Degree, 5) Professional Degree, and 6) Doctoral Degree.

The descriptive statistics comparisons test of ANOVA (Table 46) indicated that the mean score for Doctorate Degree ($M = 31.90$, $SD = 6.62$) was significantly different from Bachelor's Degree ($M = 37.65$, $SD = 6.60$) and Master's Degree ($M = 37.14$, $SD = 7.01$). There was a very small difference in mean scores between Bachelor's Degree ($M = 37.65$, $SD = 6.60$) and Master's Degree ($M = 37.14$, $SD = 7.01$). Summary of the ANOVA descriptive analysis is provided in Table 52.

Table 52. Summary of Descriptive Analysis of One-Way ANOVA for Educational Technology Training Needs of Instructors Based on Educational Level (N=307).

	Instructor Training Needs			
Education Level	*n*	*M*	*SD*	*SE*
Bachelor's degree	87	37.65	6.60	.708
Master's degree	200	37.14	7.01	.495
Doctorate degree	20	31.90	6.62	1.48
Total	307	36.94	6.98	.398

Based on the one-way analysis of variance (ANOVA) there was a statistically significant difference between groups in terms of educational technology training needs. As stated previously, some of the difference in mean scores were smaller, but some of them were statistically significant. The one-way ANOVA (Table 53) test had a F value of (2,304) = 5.929, p =.003). Therefore, H-null: 5 was rejected due to statistical differences between instructors in terms of their educational level. The effect size between discipline groups was equal to 0.04. Therefore, based on the effect size result it can be concluded that effect size between groups was small. Summary of the ANOVA test is provided in Table 53.

Table 53. Summary of One-Way ANOVA for Educational Technology Training Needs of Instructors Based on Educational Level.

Source	*df*	*SS*	*MS*	*F*	*p.*
Between Groups	2	560.52	280.26	5.929	.003
Within Groups	304	14369.53	47.26		
Total	306	14930.05			

Summary of the Tukey HSD test for the educational technology training needs of the instructors based on educational level is provided in Table 54.

Table 54. Summary of Tukey HSD Comparison in One-Way ANOVA for Educational Technology Training Needs of Instructors Based on Educational Level.

Educational Level	Degrees	*MD(I-J)*	*SE*	*p.*
Bachelor's degree	Master's degree	.515	.882	.829
	Doctorate degree	5.75*	1.70	.002
Master's degree	Bachelor's degree	-.515	.882	.829
	Doctorate degree	5.24*	1.61	.004
Doctorate degree	Bachelor's degree	-5.75*	1.70	.002
	Master's degree	-5.24*	1.61	.004

**. The mean difference is significant at the 0.05 level.*

Summary of the homogeneous subsets in Tukey HSD test for instructor education level is shown in Table 55.

Table 55. Summary of Homogeneous Subsets in Tukey HSD Tests of One-Way ANOVA for Educational Technology Training Needs of Instructors Based on Educational Level.

		Instructor Training Needs	
		Subset for alpha = 0.05	
Degree	*n*	1	2
Doctorate degree	20	31.90	
Master's degree	200		37.14
Bachelor's degree	87		37.65
Sig.		1.00	.933

a. Uses Harmonic Mean Sample Size = 45.117.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Open-Ended Question Results

At the end of the survey participants had opportunity to answer an open-ended question. Out of 307 participants 272 faculty completed the open-ended question. There were large number of comments from 272 instructors regarding their educational technology perceptions and integration into teaching and learning environments. Therefore, the selected list of responses of the instructors with comments were provided (Appendix F).

Due to the quantitative nature of the study, the qualitative related data results were quantified and analyzed by SPSS for frequencies, percentile, means and standard deviation scores. After evaluating the qualitative data, several unique results about community college instructors' educational technology use and integration emerged. Summary of the mean and standard deviation scores of the open-ended question statistics is provide in Table 56.

Table 56. Open Ended Question Statistics:

Statistics	
N	272
Mean	4.82
Std. Deviation	2.91

Summary of frequencies and percentile scores for the open-ended question is shown in Table 51.

Table 57. Open-Ended Question Summary of Frequencies and Percentiles

	Open-Ended Question Summary	*f*	%
1	Educational technology integration is challenging. I am not motivated for any ETI initiatives. I have too many credits to teach, and I have no time for any curriculum changes.	41	15.1
2	I use many different type of educational technologies in my classes: LMS, Flipped Classroom Environment, Video Recordings, Open Education Resources, Various Educational Technology Softwares.	50	18.4
3	Students are not ready for educational technology-based learning environment.	4	1.5
4	Educational technology integration should be my choice. Canned curriculum for ETI and push to use technology are contributing for higher costs for students.	12	4.4
5	I need more training in ETI. I have a great need for discipline based ETI.	81	29.8
6	I am a strong advocate for ETI. I am very comfortable with various ETI processes.	17	6.3
7	I am motivated with educational technology, and if I do not know much about ETI, I always ask from my colleagues.	7	2.6
8	Budget for Educational Technology should be increased for effective ETI.	14	5.1
9	Need more support from administration and department supervisors.	16	5.9
10	We need more pay and rewards for effective ETI.	30	11.0
	Total	272	100%

Note: ETI abbreviation stands for Educational Technology Integration

Due to the quantitative nature of the study, some of the open-ended question results were briefly discussed in Chapter V.

Table of Summary of the Survey Statistics

Summary of the survey statistics based on each question category is provided in Table 58. The results of the survey statistics were briefly discussed in Chapter V.

Table 58. Summary of Survey Statistics.

Instructors' Beliefs About Educational Technology Integration (N=307).

Items: I believe . . .		Strongly disagree	Dis-agree	Slightly disagree	Slightly agree	Agree	Strongly agree	Total
1. using a computer with technology equipment and subject-based software in my instruction would make me a better instructor.	*f*	6	4	9	34	191	63	307
	%	2.0	1.3	2.9	11.1	62.2	20.5	100%
2. use of educational technology requires unnecessary curriculum reforms.	*f*	23	92	43	121	16	12	307
	%	7.5	30.0	14.0	39.4	5.2	3.9	100%
3. decentralizing instructional support to the various academic departments would make them more relevant in educational technology integration.	*f*	7	32	32	49	133	54	307
	%	2.3	10.4	10.4	16.0	43.3	17.6	100%
4. integration of educational technology into the curriculum is very discipline specific.	*f*	6	27	17	42	154	61	307
	%	2.0	8.8	5.5	13.7	50.2	19.9	100%
5. that all faculty members should know how to use instructional technology effectively.	*f*	2	3	2	30	179	91	307
	%	0.7	1.0	0.7	9.8	58.3	29.6	100%
6. instructional design department at my institution should have a plan for educational technology integration.	*f*	1	1	2	43	177	83	307
	%	0.3	0.3	0.7	14.0	57.7	27.0	100%
7. educational technology integration initiatives should be my own choice.	*f*	5	14	22	38	156	72	307
	%	1.6	4.6	7.2	12.4	50.8	23.5	100%
8. Learning Management System (Blackboard, D2L, Canvas & Moodle) is an effective means of disseminating course material to students.	*f*	1	2	7	43	166	88	307
	%	0.3	0.7	2.3	14.0	54.1	28.7	100%
9. I believe educational technology tools would enable me to interact more with my students.	*f*	1	9	21	55	157	64	307
	%	0.3	2.9	6.8	17.9	51.1	20.8	100%
10. I believe educational technology maximizes the effectiveness of my teaching and learning.	*f*	3	5	10	42	181	66	307
	%	1	1.6	3.3	13.7	59	21.5	100%

Table 58 Cont.

Positive and Negative Factors in Educational Technology Integration Category (307).

Items		Strongly disagree	Dis-agree	Slightly disagree	Slightly agree	Agree	Strongly agree	Total
1. Educational technology integration increases my classroom participation.	*f*	4	9	13	54	163	64	307
	%	1.3	2.9	4.2	17.6	53.1	20.8	100%
2. I am not motivated to integrate any educational technology because it changes fast.	*f*	39	81	44	123	18	2	307
	%	12.7	26.4	14.3	40.1	5.9	0.7	100%
3. Educational technology integration made my classroom assessment effective.	*f*	1	15	16	63	173	39	307
	%	0.3	4.9	5.2	20.5	56.4	12.7	100%
4. Every time when I try new educational technology, technology fails.	*f*	38	176	41	28	18	6	307
	%	12.4	57.3	13.4	9.1	5.9	2.0	100%
5. Educational technology integration increases quality of my online classes.	*f*	0	6	9	46	185	61	307
	%	0	2.0	2.9	15.0	60.3	19.9	100%
6.Educational technology integration effects my teaching evaluations	*f*	4	20	31	58	150	44	307
	%	1.3	6.5	10.1	18.9	48	14.3	100%
7.Educational technology integration increased my technology skills	*f*	1	5	9	47	183	62	307
	%	0.3	1.6	2.9	15.3	59.6	20.2	100%
8.Educational technology integration is too much work for me	*f*	31	73	37	76	76	14	307
	%	10.1	23.8	12.1	24.8	24.8	4.6	100%

Table 58 Cont.

Instructor Competencies in Education Technology Integration Category (307).

Items		Strongly disagree	Dis-agree	Slightly disagree	Slightly agree	Agree	Strongly agree	Total
1. I have not received any educational technology training for the past five years.	*f*	50	81	55	81	36	4	307
	%	16.3	26.4	17.9	26.4	11.7	1.3	100%
2. I have experience in creating digital and web content.	*f*	15	27	19	49	143	54	307
	%	4.9	8.8	6.2	16	46.6	17.6	100%
3. I have following skills (Word processing, Spreadsheets, PowerPoint).	*f*	0	1	3	24	174	105	307
	%	0	0.3	1.0	7.8	56.7	34.2	100%
4. I know how to effectively utilize educational technology into my course.	*f*	0	1	17	72	161	56	307
	%	0	0.4	5.5	23.5	52.4	18.2	100%
5. I am very familiar with search engines for the purpose of research.	*f*	0	7	3	36	173	88	307
	%	0	2.3	1.0	11.7	56.5	28.7	100%
6. I am competent in 1 or 2 computer applications for instruction.	*f*	0	21	4	43	153	86	307
	%	0	6.8	1.3	14.0	49.9	28	100%
7. I am competent in 3 or 5 computer applications for instruction.	*f*	6	106	22	31	75	67	307
	%	2.0	34.5	7.2	10.1	24.4	21.8	100%
8. I am proficient in 6 or more applications and I am able to assist colleagues as needed.	*f*	24	156	30	30	35	32	307
	%	7.8	50.8	9.8	9.8	11.4	10.4	100%

Table 58 Cont.

Instructor Experiences in Education Technology Integration Category (307).

Items		Strongly disagree	Dis-agree	Slightly disagree	Slightly agree	Agree	Strongly agree	Total
1. I have experience in utilizing Blackboard & Whiteboard tools such as document camera and overhead projector into teaching and learning.	*f*	10	22	7	31	190	47	307
	%	3.3	7.2	2.3	10.1	61.9	15.3	100%
2. I have experience in utilizing Tablets, Simulations, and iClickers into teaching and learning.	*f*	22	58	31	88	85	23	307
	%	7.2	18.9	10.1	28.7	27.7	7.5	100%
3. I have experience in utilizing Twitter, TodaysMeet, and Aka into teaching and learning.	*f*	50	154	36	42	19	6	307
	%	16.3	50.2	11.7	13.7	6.2	2.0	100%
4. I have experience in utilizing Facebook and Snapchat into teaching and learning.	*f*	43	132	39	59	28	6	307
	%	14	43	12.7	19.2	9.1	2.0	100%
5. I have experience in utilizing Prezi and Slide Carnival into teaching and learning.	*f*	52	168	29	37	16	5	307
	%	16.9	54.7	9.4	12.1	5.2	1.6	100%
6. I have experience in utilizing Tegrity into teaching and learning.	*f*	16	54	16	64	126	31	307
	%	5.2	17.6	5.2	20.8	41	10.1	100%
7. I have experience in utilizing Google Presentation into teaching and learning.	*f*	39	84	22	34	114	14	307
	%	12.7	27.4	7.2	11.1	37.1	4.6	100%
8. I have experience in utilizing Skype, Zoom and FaceTime.	*f*	19	113	31	74	53	17	307
	%	6.2	36.8	10.1	24.1	17.3	5.5	100%

Table 58 Cont.

Educational Technology Training Needs of Instructors Category (307).

Items		Strongly disagree	Dis-agree	Slightly disagree	Slightly agree	Agree	Strongly agree	Total
1. I have an immediate need for more training with curriculum that integrates educational technology.	*f*	6	30	34	71	133	33	307
	%	2.0	9.8	11.1	23.1	43.3	10.7	100%
2. I need more regular educational technology seminars/workshops at my institution.	*f*	4	19	20	50	163	51	307
	%	1.3	6.2	6.5	16.3	53.1	16.6	100%
3. I would need more instructional designer's support in my educational technology integration process.	*f*	3	23	16	52	166	47	307
	%	1.0	7.5	5.2	16.9	54.1	15.3	100%
4. I would need free instructional design classes.	*f*	3	19	13	60	162	50	307
	%	1.0	6.2	4.2	19.5	52.8	16.3	100%
5. I need strong support from my direct supervisor in educational technology integration.	*f*	7	26	21	53	157	43	307
	%	2.3	8.5	6.8	17.3	51.1	14.0	100%
6. I need more time to change the curriculum to incorporate educational technology.	*f*	2	14	14	40	167	70	307
	%	0.7	4.6	4.6	13.0	54.4	22.8	100%
7. I need to collaborate with my colleagues on educational technology integration issues.	*f*	1	11	15	45	187	48	307
	%	0.3	3.6	4.9	14.7	60.9	15.6	100%
8.I need better professional development plan in educational technology integration at my institution.	*f*	2	15	30	47	166	47	307
	%	0.7	4.9	9.8	15.3	54.1	15.3	100%

Table 58 Cont.

Importance of Educational Technology Information Category (307).

Items		Strongly disagree	Dis-agree	Slightly disagree	Slightly agree	Agree	Strongly agree	Total
1. Informal network of friends and family is important in my educational technology integration.	*f*	1	23	27	43	114	99	307
	%	0.3	7.5	8.8	14	37.1	32.2	100%
2. Professional colleagues on campus is important in my educational technology integration.	*f*	0	4	10	43	132	118	307
	%	0	1.3	3.3	14	43	38.4	100%
3. Professional colleagues from other institutions is important in my educational technology integration.	*f*	2	17	21	52	117	98	307
	%	0.7	5.5	6.8	16.9	38.1	31.9	100%
4. The role of VP/Dean is important in my educational technology integration.	*f*	8	21	28	47	111	92	307
	%	2.6	6.8	9.1	15.3	36.2	30	100%
5. The role of my direct supervisor is important in my educational technology integration.	*f*	4	15	15	49	121	103	307
	%	1.3	4.9	4.9	16	39.4	33.6	100%
6. The role of innovative students are important in my educational technology integration.	*f*	2	5	8	62	122	108	307
	%	0.7	1.6	2.6	20.2	39.7	35.2	100%
7. Online technology newsgroups and websites are important in my educational technology integration.	*f*	6	18	29	42	116	96	307
	%	2	5.9	9.4	13.7	37.8	31.3	100%
8. Open educational resources are important in my educational technology integration	*f*	6	9	17	42	126	107	307
	%	2	2.9	5.5	13.7	41	34.9	100%

Summary statistics for the eight facilitative factors of educational technology integration among instructors is provided in Table 59.

Table 59. Summary for Facilitative Factors of Educational Technology Integration

Items		Strongly disagree	Dis-agree	Slightly disagree	Slightly agree	Agree	Strongly agree	Total
1. I have insufficient time to integrate educational technology into my courses.	*f*	12	41	20	117	103	14	307
	%	3.9	13.4	6.5	38.1	33.6	4.6	100%
2. I do not have enough technology knowledge for educational technology integration.	*f*	22	63	57	93	70	2	307
	%	7.2	20.5	18.6	30.3	22.8	0.7	100%
3. I do not have a strong leadership support for educational technology on my campus.	*f*	24	91	43	91	53	5	307
	%	7.8	29.6	14	29.6	17.3	1.6	100%
4. I feel uncomfortable to participate in educational technology integration initiatives.	*f*	30	91	50	77	55	4	307
	%	9.8	29.6	16.3	25.1	17.9	1.3	100%
5. I have very limited resources for educational technology integration projects.	*f*	13	63	33	93	97	8	307
	%	4.2	20.5	10.7	30.3	31.6	2.6	100%
6. I am not interested in committing to any educational technology integration initiatives.	*f*	39	87	44	78	54	5	307
	%	12.7	28.3	14.3	25.4	17.6	1.6	100%
7. There are enough incentives on my campus for educational technology integration initiatives.	*f*	23	133	48	46	49	8	307
	%	7.5	43.3	15.6	15.6	16	2.6	100%
8. I am dissatisfied with my educational technology learning environment.	*f*	20	75	52	91	67	2	307
	%	6.5	24.4	16.9	29.6	21.8	0.7	100%

CHAPTER V

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

The main purpose of this research study was to examine a holistic view of educational technology integration (ET) into teaching and learning among community college instructors. Additionally, the study aimed to identify some positive and negative factors of educational technology integration and the ways in which those factors affect technology integration among faculty. Chapter I of the study included an introduction, statement of the research problem, research theoretical framework, research questions and study limitations. Chapter II of the study contained a literature review on educational technology, ET models, and facilitative factors that affecting ET integration. Furthermore, Chapter II included information about faculty ET knowledge and training needs for effective ET integration. Chapter III of the study included the research methodology, procedures, ethical data collection, and process of data analysis. Chapter IV included results of the data analysis through descriptive and inferential statistics. Chapter IV started with reporting descriptive demographic data of the study participants and followed by reporting inferential study results based on the five research questions. Chapter V of the study includes an overall summary of the study, discussion of the research questions, conclusions and recommendations for practice.

Overview of the Methodology

The research study utilized quantitative survey research methods for data collection. The data was collected from 307 instructors who were teaching at five Midwestern state community colleges at the time of survey completion.

Data collection was accomplished through the use of an electronic survey. Prior to data collection, North Dakota University System (NDUS) Director of Academic Affairs, [redacted], sent an e-mail to all of the instructors of the five North Dakota state community colleges: Bismarck State College, Dakota College at Bottineau, Lake Region State College, North Dakota State College of Science, and Williston State College to notify them of the study.

There were two sections in the survey questionnaire. The first was a personal characteristic questionnaire to collect demographic information from participants of the study. The second was the educational technology (ET) integration questionnaire, which included 60 questions and used a six-point Likert-like scale format (1 = *strongly disagree, 2 = disagree,* 3 = *slightly disagree,* 4 = *slightly agree,* 5 = *agree and 6 = strongly agree)* for data collection purposes. The participants were asked to indicate whether they agreed or disagreed with each statement. An open-ended question was also included at the end of the survey to collect additional comments about instructors' self-perceptions of ET integration and facilitative factors that influence them to integrate educational technology.

During data analysis, descriptive and inferential analyses were used to assess the relationships between the various internal and external factors that affect ET integration in teaching and learning. A frequency table analyses was used to understand conditions that help or hinder ET integration among instructors.

There were three outcome (dependent) variables: (1) beliefs about ET integration into teaching and learning, (2) factors of ET integration, and (3) instructor competencies in ET integration. Five predictor (independent) variables were used to address research questions 1-5. The predictor (independent) variables were: (1) discipline (degree program), (2) gender, (3) academic ranks, (4) facilitative conditions, and (5) educational level.

Inferential statistics were used for determining statistical differences by utilizing independent-sample *t* tests and one-way analysis of variance (ANOVA). The significance level of .05 was used for all analyses.

The following research questions were answered by the statistical methods indicated:

1. Are there differences in instructors' beliefs about educational technology integration into teaching and learning based on discipline (degree program)? One-way ANOVA was used to address this question.
2. Are there differences in the factors related to educational technology integration into teaching and learning between male and female instructors? Independent samples t-test was used to address this question.
3. Are there differences in competencies in educational technology integration among instructors based on academic ranks (professor, associate professor, assistant professor, instructor, lecturer, and other)? One-way ANOVA was used to address this question.
4. Are there differences in technology integration into teaching and learning, based on the facilitative conditions (time, skills, leadership, participation, resources, commitment, rewards, and dissatisfaction with the status quo)? One-way ANOVA was used to address this question.
5. Are there differences in the educational technology training needs of instructors based on educational level (trade/technical/vocational training, associate degree, bachelor's degree, master's degree, professional degree, or doctorate degree)? One-way ANOVA was used to address this question.

Discussion of Research Question One

Are there differences in instructors' beliefs about educational technology integration into teaching and learning based on discipline (degree program)? One-way ANOVA was used to address this question.

A one-way analysis of variance (ANOVA) was performed to understand the role of discipline on instructor technology integration beliefs. Instructors were divided into ten discipline groups: 1) Agriculture and Environmental Science; 2) English, Education, and Humanities; 3) Business, Accounting, Economics, and Communication; 4) Nursing, Health, and Wellness; 5) Sociology, History, Music, and Arts; 6) Mathematics and Physics; 7) Chemistry and Biology; 8) Engineering, Technology, and Energy; 9) Criminal Justice, Law, and Psychology; and 10) Information Technology and Computer Science.

The descriptive statistics comparisons (Table 34) indicated that the mean scores for the English, Education, and Humanities disciplines ($M = 32.64$, $SD = 5.50$) was significantly different from Agriculture and Environmental Science disciplines ($M = 34.62$, $SD = 4.91$) and Engineering, Technology, and Energy disciplines ($M = 36.35$, $SD = 3.76$). There were also small differences in mean scores between Business, Accounting, Economics, Communication, Chemistry, Biology, Nursing, Health, and Wellness disciplines, but they were not statistically significant.

There was a statistically significant difference between English, Education, and Humanities disciplines and Engineering, Technology, and Energy disciplines. The ANOVA (Table 35) results showed statistical significance with the following $F (9,297) = 1.93$, $p =.047$) values. Therefore, H-null:1 was rejected due to the differences in between disciplines.

Several research studies (Bernard et al., 2004; Guidry & BrckaLorenz, 2010; Neumann, 2001; Waggoner: 2006; White & Liccardi, 2006) have linked disciplines to educational technology integration.

According to Guidry and BrckaLorenz (2010), faculty in the education disciplines tend to integrate more educational technology into teaching and learning. Based on the same study, 667 faculty out of 731 had indicated that they use more educational technology (ET) during their teaching and learning practices. The following disciplines were evaluated during their study: Arts and Humanities, Biological Science, Business, Education, Engineering, Physical Sciences and Social Sciences their study. Among all of these disciplines, education fields had the highest (17.9%) use of ET compared to other fields. The groups of faculty who do not integrate much education technology were Engineering (5.9%), Social Science (36%) and Biological Science (39%) disciplines. The high or low level of ET integration can be understood, related to importance and specific values of these disciplines. Another reason for difference may be due to faculty abilities, resources and individual motivation.

According to Waggoner (2006), faculty in educational disciplines seem to integrate more ET related to the fact that education faculty have more expertise and research-based knowledge in instructional design and technology. Furthermore, he concluded that ET integration is influenced by faculty assumptions of student learning, faculty perceptions of ET, environmental context and faculty ET knowledge.

According to White and Liccardi (2006), disciplines should be studied well prior to ET integration due to costs involved in designing, planning and initiating ET integration. They had utilized Biglan’s (1973) classification of disciplines in their study, when analyzing needs for instructional design for disciplines. They categorized subjects into the following groups:

1. Hard-Applied (Agriculture and Natural Sciences, Psychiatry, Medicine, Pharmacy, Dentistry, Civil Engineering, Telecommunication Engineering, Mechanical Engineering, Chemical Engineering, Electrical Engineering, Computer Science).
2. Hard-Pure (Biology, Biochemistry, Genetics, Physiology, Mathematics, Physics, Chemistry, Geology, Astronomy, Oceanography).
3. Soft-Pure (Psychology, Sociology, Anthropology, Political Science, Humanities Linguistics, Literature, Communications, Creative Writing, Economics, Philosophy, Archaeology, History, Geography).
4. Soft-Applied (Recreation, Arts, Education, Nursing, Conservation, Counseling, Human Resource Management, Finance, Accounting, Banking, Marketing, Journalism, Library, Archival Science, Law, Architecture, Interior Design, Crafts, Arts, Dance, Music).

White and Liccardi (2006) provided the following instructional design suggestions for each discipline category:

1. Hard-Applied subjects are ideally suited for online tests, recorded lectures and self-paced learning environments in their educational technology design.
2. Hard-Pure subjects are ideally suited for visual student learning design, where a step by step process of solving or explaining scientific problems is generally required in these subjects.
3. Soft-Pure subjects are ideally suited for self-paced lessons, recorded lectures, online assessments and simulation-based learning environments in their educational technology design.
4. Soft-Applied subjects are ideally suited for online lectures, online discussions, online simulations and role-playing games in their educational technology design.

Many of these aforementioned studies (Bernard et al., 2004; Guidry & BrckaLorenz 2010; Neumann, 2001; Waggoner: 2006; White & Liccardi, 2006) have similarities to findings in this study. Based on the statistical results, English, Education, and Humanities disciplines (M = 45.60, SD = 7.16) were significantly different from Agriculture and Environmental Science disciplines (M = 48.74, SD = 5.31) and Engineering, Technology, and Energy disciplines (M = 49.61, SD = 6.13). These differences might be understood related to hard and soft subject characteristics of the fields or to other facilitative characteristics (e.g., time and knowledge). Overall, there are many critical factors in educational technology (ET) integration. The subject characteristics alone cannot provide enough information for effective ET integration. There is no easy solution for effective ET integration. The important point here is to understand characteristics of each discipline and have a solid plan for effective ET integration without ignoring unique subject-based differences of how students learn and understand these subjects. Another important statement that should be made here is that we need more experienced instructional designers who can understand both educational technology design and discipline based educational technology integration.

Discussion of Research Question Two

Are there differences in the factors related to educational technology (ET) integration into teaching and learning between male and female instructors? Independent samples t-test was used to address this question.

The goal of the question was to investigate whether any statistically significant differences exist between male and female instructors in terms of ET integration. The independent t-test between male and female instructors reveled the following mean and standard deviation results: male instructors had (M=33.03, SD=4.57) and female instructors had

(M=32.47, SD=4.48) scores respectively. There was no statistically significant difference in means and standard deviation scores between male and female instructors based, on the sample t-test analysis (Table 46). The t-test examination revealed the following results: (t 305 =1.074; p=.284 >0.05). Therefore, H-null: 2 was retained due to no statistical differences between male and female instructors in terms of educational technology integration.

The outcomes of the study have some similarities to Elzarka's (2012) study of *Technology use in Higher Education*. She indicated that there was no statistically significant difference between male and female faculty in educational technology (ET) integration into teaching and learning. However, there were some mean and standard deviation score differences between male (M=1.65, SD=.709) and female (M=2.05, SD=.715) faculty in terms of solving existing ET barriers in ET integration process (Elzarka, 2012).

Similar results were also found in Hampton's (2008) study, when comparing male (M=3.85, SD=.55) and female (M=3.92, SD=.49) faculty in terms of perceived status of technology support. Hampton (2008) had also indicated that there was no any statistically significant difference between male and female faculty in terms of ET integration.

Arlien (2016) found the following small differences when comparing male (M=4.4, SD=.94) and female (M=5.0, SD=1.21) community college instructors in terms of digital use in online classes. According to Arlien (2016), there was no statistical difference between male and female faculty in ET integration; however, female faculty tend to utilize technology more often compared to their male counterparts in their course design, assignments and in student assessments.

According to Spotts et al. (1997), the following factors: technology skills, time, ET integration training and student learning outcomes are important for female faculty, when they make their decisions for the educational technology (ET) integration. Furthermore, external factors such as pay, promotion, rewards and recognition make female faculty more eager for ET integration. In addition, male faculty were also strongly motivated for pay and tenure in the ET integration process.

In many of these studies (Arlien, 2016; Hampton, 2008; Elzarka, 2012; Spotts et al., 1997), male faculty had reported themselves as moderately skilled in terms of ET integration knowledge and experiences. They indicated that they are comfortable working with their colleagues and finding solutions for ET initiatives.

When examining the differences between male and female faculty perceptions in terms of ET integration, there is no clear answer that indicates male or female faculty are better in ET adoption and integration. There are always internal and external factors that play a critical role in effective ET integration.

Discussion of Research Question Three

Are there differences in competencies in educational technology (ET) integration among instructors based on academic ranks (professor, associate professor, assistant professor, instructor, lecturer, and other)? One-way ANOVA was used to address this question.

A one-way analysis of variance (ANOVA) was performed to understand the role of academic ranks on instructor competencies in ET. The ranks of the instructors consisted of five groups: 1. Professor, 2. Associate Professor, 3. Assistant Professor, 4. Instructor, 5. Lecturer, and 6. Adjunct.

The descriptive statistics comparison test (Table 45) indicated that the mean score for the rank of Lecturer (M = 32.96, SD = 3.75) was significantly different from Professor (M = 35.22, SD = 6.55) and Associate Professor (M = 34.41, SD = 5.81) ranks. The Assistant Professor (M =

35.06, SD = 5.20), Instructor (M = 33.92, SD = 4.59) and Adjunct Instructor (M = 35.10, SD = 4.97) ranks also had some similarities and slight differences in terms of mean scores. Overall, there were small differences in mean scores between instructor ranks in terms of educational technology (ET) integration. However, the ANOVA (Table 46) test showed no statistically significant differences between faculty ranks. The one-way ANOVA was equal to F (5,301) = .793, p =.555). Therefore, H-null: 3 was retained, due to no statistical differences between instructors based on faculty ranks.

Study results by Elzarka (2012) supported the same conclusion. She had found no statistically significant difference between academic ranks of the faculty in terms of ET integration and application. However, she indicated that tenured faculty (associate professors) tend to integrate more ET compared to non-tenured faculty (assistant professor, instructors and lectures) during the semester.

Georgina (2007), had also indicated that there were no statistically significant differences between faculty in terms of faculty ranks. However, there were small differences in mean and standard deviation scores among faculty. Forty-two percent of the respondents were faculty in the professor and associate professor ranks. They all indicated that they were moderately proficient in using many of the ET tools in their teaching and learning practices.

Arlien (2016) found that 75.6% of the online faculty (associate and assistant professors) in the tenure track positions were developing more digital content for teaching and learning compared to 24.6 %, non-tenured, adjunct and instructor faculty. Furthermore, faculty who were in the professor and associate professor ranks had higher intrinsic motivation for digital content development compare to non-tenured, adjunct and instructor faculty.

Hampton (2008) examined the following faculty ranks in her study: professor, associate professor, assistant professor and instructor, and indicated that there were no statistically significant differences between faculty ranks in terms of perceived barriers in educational technology (ET) integration.

Stone (2005) also indicated that there was no statistically significant difference between faculty ranks. However, faculty who were in the professor ranks likely develop and integrate less educational technology compared to other faculty who were in the assistant and associate professor ranks. Furthermore, faculty who were going through the tenure process seem to develop and integrate more ET compared to faculty who were already tenured.

Understanding ET integration through faculty ranks is challenging because there are many factors that play a role in ET usage and integration. In all of these studies (Arlien, 2016; Hampton, 2008; Elzarka, 2012; Spotts et al., 1997), there were no statistically significant differences among faculty in ET integration based on the faculty ranks. However, other factors such as faculty experiences, perceptions of technology use, hard or soft discipline characteristics and facilitative conditions might be influencing the faculty regarding ET integration initiatives.

Discussion of Research Question Four

Are there differences in educational technology integration among community college instructors based on the facilitative conditions (time, skills, leadership, participation, resources, commitment, rewards, and dissatisfaction with the status quo)? One-way ANOVA was used to address this question.

A one-way analysis of variance (ANOVA) was performed to understand the role of facilitative conditions on instructor educational technology (ET) integration among five community colleges. The facilitative conditions were divided into eight factors: 1) Time, 2) Skills, 3) Leadership, 4) Participation, 5) Resources, 6) Commitment, 7) Rewards, and 8)

Dissatisfaction with the status quo.

The descriptive statistics comparison results (Table 48) indicated that the mean score for LRSC (M = 28.85, SD = 5.04) was significantly different from NDSCS (M = 32.45, SD = 4.38) and BSC (M = 31.09, SD = 5.44). There were very small differences in mean scores between DCB (M = 30.51, SD = 5.64) and WSC (M = 30.35, SD = 4.93).

Based on ANOVA (Table 49), there were statistically significant differences between community colleges in terms of facilitative factors. The one-way ANOVA had a F value of $(4,302) = 3.817$, $p = .005$). Therefore, H-null: 4 was rejected due to statistical difference between community colleges in terms of facilitative conditions.

Facilitative Conditions

The role of facilitative conditions within community college environments has been critical in effective educational technology (ET) integration. On the Educational Technology Integration Questionnaire, there were eight items with a six-point Likert-like scale format (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, and 6 = strongly agree). The eight conditions of educational technology were: Availability of Time, Existence of Knowledge, Leadership, Participation, Availability of Resources, Commitment, Rewards and Dissatisfaction (Table 59).

Based on the study outcomes, the following results emerged when faculty perceptions of ET integration were analyzed based on the facilitative conditions.

Availability of time. The first item of the facilitative question had the following statement: "*I have insufficient time to integrate educational technology into my courses*". Among faculty, fourteen (4.6%) of them strongly agreed, and 103 (33.6%) more also agreed with the foregoing statement. Furthermore, 117 (38.1%) faculty slightly agreed, and twenty (6.5%) more of them also slightly disagreed with the same statement. Among faculty, only twelve (3.9%) of them strongly disagreed, and forty-one (13.4%) more also disagreed with the statement. Furthermore, based on the Open-Ended Question Summary (Table 57), fifteen percent of the faculty indicated that they do not have enough time for educational technology integration due to their teaching loads.

Knowledge and skills. The second item of the facilitative question had the following statement: "*I do not have enough technology knowledge for educational technology integration*". Out of 307 faculty across five community colleges, seventy (22.8%) faculty agreed and two (0.7%) more strongly agreed with the statement. Ninety-three (30.3%) faculty, slightly agreed, and other fifty-seven (18.6%) slightly disagreed with the statement. Among faculty, only twenty-two (7.2%) of them strongly disagreed and sixty-three (20.5%) more also disagreed with the same statement. Furthermore, based on the Open-Ended Question Summary (Table 57), almost thirty percent (29.8%) of the faculty indicated that they need more trainings in discipline based educational technology integration.

Leadership. The third item in the facilitative question had the following statement: "*I do not have a strong leadership support for educational technology on my campus*". Among faculty, five (1.6%) of them strongly agreed, and fifty-three (17.3%) more agreed with the forgoing statement. In addition, ninety-one (29.6%) faculty, slightly agreed, and forty-three (14%) more slightly disagreed with the same statement. Amongst faculty, only twenty-four (7.8%) strongly disagreed and ninety-one (29.6%) disagreed with the item statement. Furthermore, based on the Open-Ended Question Summary (Table 57), eleven percent of the faculty indicated that they need more support from their college administration and department supervisors in their ET integration initiatives.

Participation. The fourth item within the facilitate question category had the following statement: "*I feel uncomfortable to participate in educational technology integration initiatives*". Only four (1.3%) faculty strongly agreed, and fifty-five (17.9%) more agreed with the statement. Furthermore, seventy-seven (25.1%) faculty slightly agreed, and fifty (16.3%) more slightly disagreed with the statement. Only, thirty (9.8%) faculty strongly disagreed, and ninety-one (29.6%) more disagreed with the question statement. In addition, based on the Open-Ended Question Summary (Table 57), over six percent of the faculty indicated that they are motivated, very comfortable with various ET integration processes, and strong advocates for ET integration initiatives in their own campuses.

Resources. The fifth item within the facilitate question category had the following statement: "*I have very limited resources for educational technology integration projects*". Amongst participants, only eight (2.6%) of them strongly agreed, and ninety-seven (31%) more agreed with the statement. Ninety-three (30.3%) faculty slightly agreed, and thirty-three (10.7%) more slightly disagreed with same statement. In addition, only thirteen faculty (4.2%) strongly disagreed, and sixty-three (20.5%) more disagreed with the question statement. Furthermore, based on the Open-Ended Question Summary (Table 57), five percent of the faculty indicated that the budget for ET should be increased for effective ET integration.

Commitment. The sixth item within the facilitate question category had the following statement: "*I am not interested in committing to any educational technology integration initiatives*". Among faculty, only five (1.6%) faculty strongly agreed, and fifty-four (17.6%) more just agreed with the statement. Seventy-eight (25.4%) faculty slightly agreed, and forty-four (14.3%) more slightly disagreed with statement. In addition, eighty-seven faculty (28.3%) disagreed, and thirty-nine (12.7%) more strongly disagreed with given statement.

Rewards and incentives. The seventh item within the facilitate question category had the following statement: "*There are enough incentives on my campus for educational technology integration initiatives*". Within faculty, only eight (2.6%) of them strongly agreed, and forty-nine (16%) more just agreed with item statement. Forty-six (15%) faculty slightly agreed, and forty-eight (15%) more slightly disagreed with the statement. In addition, 133 (43.3%) faculty disagreed and twenty-three (7.5%) more strongly disagreed with the given statement. Furthermore, based on the Open-Ended Question Summary (Table 57), eleven percent of the faculty indicated that they need more pay, rewards, promotion for effective educational technology integration.

Dissatisfaction. The eighth item within the facilitate question category had the following statement: "*I am dissatisfied with my educational technology learning environment*".

Among faculty, sixty-seven (21.8%) of them agreed, and only two (0.7%) of them strongly agreed with the item statement. Ninety-one (29.6%) faculty slightly agreed, and fifty-two (16.9%) more slightly disagreed with the statement. In addition, seventy-five faculty (24.4%) disagreed, and only twenty (6.5%) strongly disagreed with the given statement. Furthermore, based on the Open-Ended Question Summary (Table 57), fifteen percent of the faculty indicated that they are not motivated for any educational technology integration initiatives related to ET integration challenges.

After careful review of the results, one of the most critical factors emerged from the study findings was lack of time for educational technology integration in discipline based educational technology curricula. In addition, there was also lack of technical and pedagogical training opportunities for faculty in ET integration.

Based on the Open-Ended Question Summary (Table 57) results, 5.9 % of the faculty indicated that they were concerned about appropriated ET budgets being drained and were used for other projects other than ET. Therefore, there were less funds available for ET initiatives, as well as for faculty training opportunities. Furthermore, based on the facilitative conditions items (Table 59), 156 (50.8%) faculty indicated that they need more incentives and rewards for their educational technology integration efforts. In addition, almost five percent of the faculty indicated that curricula and ET guidelines in their campuses were poorly defined and had not been updated for some time.

All five community colleges claim that they have the most current technology for any educational technology related developments, but unfortunately seventy-two (23.5%) of faculty (Table 59) within the survey indicated that they lack technical, pedagogical and instructional design skills and knowledge for ET integration projects. Furthermore, North Dakota community college systems' tenure and reward structures do not strongly encourage faculty for ET integration initiatives. Eleven percent of the faculty (Table 57) indicated that they need promotion and pay increases for ET integration initiatives.

Most of the study findings support prior research results, that faculty across five campuses want rewards, pay raises, promotion and resources for ET initiatives. In addition, many (29.8%) of the faculty indicated (Table 57) that they want to be involved in ET related decisions, if their campus plans to initiate any changes to their learning management systems (LMS).

This study's findings strongly support the results of the following research studies:

According to Ensminger and Surry (2008) the disconnect between faculty and technical personal was the lack of ability of support technicians' skills in following up with faculty in terms of educational technology initiatives. Furthermore, Ensminger and Surry (2008) identified that faculty become resistant to change, and ET integration initiatives, when they lack skills and incentives for the projects. In addition, the rewards and incentive structures were identified as critical factors for effective ET integration.

The study findings of Hinson and Lapraire (2005) in Louisiana Community College Faculty study, also have some similarities such as: lack of faculty experiences in technical and instructional design skills, due to poor support and services in the area of instructional design and curriculum development.

Quick & Davies (1999) have also identified several factors, such as lack of technology and instructional design expertise among support staff, which hinder effective ET integration success among faculty.

Harman et al. (2007) indicated that faculty need to be part of the ET integration decision process during the ET initiatives. Furthermore, faculty among community colleges were encouraged to be active and get involve in ET, faculty workloads and compensation discussions.

Discussion of Research Question Five

Are there differences in educational technology training needs of instructors based on educational level (trade/technical/vocational training, associate degree, bachelor’s degree, master’s degree, professional degree, and doctorate degree)? One-way ANOVA was used to address this question.

A one-way analysis of variance (ANOVA) was performed to understand the training needs of instructors in educational technology based on their educational level. The educational level of the instructors was divided into six levels: 1) Trade Training, 2) Associate Degree, 3) Bachelor’s Degree, 4) Master’s Degree, 5) Professional Degree, and 6) Doctoral Degree.

The descriptive statistics (Table 52) indicated that the mean score for Doctorate Degree (M = 31.90, SD = 6.62) was significantly different from Bachelor's Degree (M = 37.65, SD = 6.60) and Master's Degree (M = 37.14, SD = 7.01). There was a very small difference in mean scores between Bachelor's Degree (M = 37.65, SD = 6.60) and Master's Degree (M = 37.14, SD = 7.01).

Based on the one-way analysis of variance (ANOVA), there was a statistically significant difference between groups in terms of technology training needs. As stated previously, some of the differences in mean scores were smaller, but some of them were statistically significant. The ANOVA test had an F value of (2,304) = 5.929, p =.003) which was smaller than the alpha value in this study. Therefore, H-null: 5 was rejected due to statistical differences between instructors based on the educational level.

The education level of faculty plays a critical role in effective educational technology (ET) integration initiatives. According to following studies (Albion, 2003; Demetriadis et al., 2002; Jung, 2005; Markaus-Kaite, 2007; Meyer & Desiderio, 2007; Russell et al., 2003) faculty with higher degrees often have more subject matter expertise and skills that prepare them for ET integration initiatives. Furthermore, faculty with higher degrees can earn relatively more per hour compared to their peers with bachelor's degrees. As was mentioned previously, pay and incentives are the highest motivation factors for ET integration initiatives.

In many studies (Hampton, 2008; Elzarka, 2012; Spotts et al., 1997), faculty degree levels have also influenced faculty professional development opportunities in terms of fund allocations based on the discipline expertise. As it was mentioned previously, the higher the degree, the higher the subject matter expertise of the faculty. Faculty with advanced degrees seem to secure more funds for professional development opportunities.

Furthermore, faculty with advanced degrees seem to do well in self-training in the area of ET integration. Many faculty with advanced degrees do not need specific guidance, because they are more self-directed in their learning and are able to analyze and identify their ET integration needs. In addition, they can work well with peers and are able to design, plan and execute ET integration projects. Their expertise in their subject matter areas strongly assists them in ET integration initiatives, because they can evaluate what areas need to be improved and what educational technology should be integrated.

Faculty with higher degrees are also more involved in their educational advancements, and they tend to be more intrinsically motivated toward educational innovation and self-development. They are often committed, cooperative, and able to lead ET integration initiatives. Furthermore, in community college environments, faculty with advanced degrees have different employment contacts, and are most likely in the tenure track positions. Employment contacts have also great influence on faculty trainings and self-development in ET integration.

Finally, availability of time among faculty based, on employment contacts and degree levels, is also a critical factor. Faculty with advanced degrees might teach up to 12 credits and have other duties, but faculty with bachelor’s degrees have yearly contacts that require them to teach at least 15 credits per semester. As a result, they lack time for any ET development opportunities and personal advancement. Faculty with high teaching loads have less time for participation and commitment to ET integration training opportunities. These factors could lead to faculty stress, dissatisfaction, and resistance for any type of educational technology integration initiatives.

Conclusion

The research study questionnaire had two components, a demographic questionnaire and an educational technology integration questionnaire. The educational technology (ET) integration questionnaire made it feasible to gather instructors' self-perceptions of educational technology use and integration. The individualized self-perceptions of faculty were effective for understanding how instructors across many community colleges feel about ET and integration. Instructors have different backgrounds, knowledge and satisfaction with ET integration. For example, one faculty member was more motivated with her work, and her ET skills allowed her to be independent and productive in her position. Another faculty member, who was equally motivated with his work, showed that his educational technology tools enabled him to satisfy his needs for creativity and advancement in teaching and learning.

Research has shown that there are individual as well as discipline-based differences in educational technology integration (Bernard et al., 2004; Guidry & BrckaLorenz, 2010; Neumann, 2001; Waggoner, 2006; White & Liccardi, 2006). Research has also shown that there are many faculty needs such as rewards and reinforcements for educational technology integration (Ensminger & Surry, 2002; Hart, 2012; Hampton, 2008). One of the reasons for slow educational technology (ET) integration among community college faculty was misunderstanding the role of ET in teaching and learning. Furthermore, community college administrators might benefit more from updated information about faculty members' ET skills and experiences. Therefore, ET integration has been a challenging process not only for faculty, but also for college administrators in term of developing effective ET based learning environments. Curriculum and academic development divisions of the community colleges should clearly define the role and the necessity of ET integration in teaching and learning.

All five community colleges claim that they have adequate technology for ET integration into teaching and learning environments. However, the lack of knowledge and practical experiences of some faculty in ET skills create more challenges and hinders the effective ET integration into student learning environments.

The administrations at community colleges want their faculty to integrate ET and also be self-directed learners of new educational technology tools and innovations. However, there is a lack of pay and rewards for new ET integration initiatives. The budgets for ET have been tight across many community colleges. College administrators are struggling to maintain adequate funds for ET related projects. The funding challenges for ET integration have negatively affected resources for online course developments across five community colleges (North Dakota University System, 2017).

Faculty need funds, incentives and time for ET integration projects. Furthermore, due to budgetary challenges, some of the open positions have not been filled, and instead, some faculty and staff were asked to take on more responsibilities and projects. The aforementioned factors and barrier should be carefully investigated, and faculty needs for ET integration should be timely addressed. Community colleges instructors do not want to be behind in ET integration. They need to move forward and find better, innovative ways of solving ET integration challenges and issues. Community colleges should maintain adequate budgets for ET development and create better learning environments for faculty, staff and as well as to their students.

Recommendations for Practice

In order to effectively solve the educational technology integration challenges the following four steps need to be taken:

1. Community college administration should create an educational technology integration review board and evaluate successes and failures of each degree program in ET integration initiatives.
2. Instructional Design and Technology Departments (IDTD) should work closely with faculty members in each division and create ET integration plan based on the needs and abilities of each faculty member.
3. Every educational division should have ET integration plan and a budget for faculty professional development opportunities.
4. Based on the careful review and evaluations of each faculty member's ET needs, skills and abilities, Instructional Design and Technology specialists should develop a discipline-based ET integration training for each faculty member with the assistance of subject matter experts in each division.

Furthermore, faculty development trainings in educational technology (ET) should cover specific trainings in the areas of technology, pedagogy, methodology, assessment, communication, and personal development. The technological training should cover specific topics in learning management systems (LMS), using various ET tools and relevant knowledge in technology hardware, and software in terms of instructional design. The pedagogical trainings should help faculty with understanding curricular and instructional design processes. Technology by itself cannot teach and solve classroom problems; it is up to instructors to integrate technology into teaching and learning. The trainings in educational methodology will help faculty with design and development of technology-based learning environments.

Another training that is very critical is faculty skills and knowledge of evaluation and assessment of the ET learning environment. These types of professional development trainings will help faculty to evaluate students' knowledge and effectively provide them with timely feedback through educational technology.

Recommendations for Future Research

1. Research should investigate community college faculty members' technical training needs in educational technology integration.
2. Research should address the role of community college faculty employment contracts in educational technology integration.
3. Research should address community college administrators' knowledge and perceptions of educational technology integration.

Reflections

The results of the study are significant and timely for informing decision makers to support faculty in delivering the highest potential for student learning and preparation of future work force. Furthermore, the results of this study have some possible implications for other community colleges and academic institutions.

APPENDICES

APPENDIX A

Institutional Review Board Approval Letter

UND UNIVERSITY OF NORTH DAKOTA

DIVISION OF RESEARCH & ECONOMIC DEVELOPMENT

UND.edu

Institutional Review Board
Twamley Hall, Room 106
264 Centennial Dr Stop 7134
Grand Forks, ND 58202-7134
Phone: 701.777.4279
Fax: 701.777.6708
Email: UND.irb@research.UND.edu

October 4, 2017

Principal Investigator(s):	Oybek Turayev
Project Title:	Educational Technology Integration Among Community College Instructors
IRB Project Number:	IRB-201710-060
Project Review Level:	Exempt 2
Date of IRB Approval:	10/04/2017
Expiration Date of This Approval:	10/03/2020

The application form and all included documentation for the above-referenced project have been reviewed and approved via the procedures of the University of North Dakota Institutional Review Board.

If you need to make changes to your research, you must submit a Protocol Change Request Form to the IRB for approval. No changes to approved research may take place without prior IRB approval.

This project has been approved for 3 years, as permitted by UND IRB policies for exempt research. You have approval for this project through the above-listed expiration date. When this research is completed, please submit a Termination Form to the IRB.

The forms to assist you in filing your project termination, adverse event/unanticipated problem, protocol change, etc. may be accessed on the IRB website: http://und.edu/research/resources/human-subjects/

Sincerely,

[redacted]

IRB Coordinator

MLB/sb

Cc: Myrna Olson, Ph.D.

The University of North Dakota is an equal opportunity / affirmative action institution.

APPENDIX B

Initial Recruitment Email Copy

Dear NDUS Community College Faculty,

I am writing to community college faculty within the North Dakota University System on behalf of Oybek Turayev. Oybek is a community college faculty member at Lake Region State College and is a Ph.D. candidate in Teaching & Learning with an emphasis in Higher Education from the University of North Dakota.

At present, Oybek is engaged in a research project titled "*Educational Technology Integration Among Community College Instructors*". He states that this project has the potential to provide insight into some of the challenges of educational technology integration into teaching and learning among instructors. Furthermore, findings from this research study will enhance the understanding of specific factors that encourage or discourage instructors from integrating educational technology into teaching and learning practices. Oybek seeks your assistance by completing the attached survey. Your participation is voluntary and additional details to respondents are provided in his survey.

It is anticipated that the enclosed survey will take approximately 10-15 minutes to complete. Oybek confirmed that he has IRB approval from the five public community colleges in the state and the University of North Dakota.

Survey Link: (Link was removed)

Thank you for your assistance!

[redacted]

North Dakota University System
Director of Academic Affairs

Phone: 701-328-4143
Cell: 701-340-5054
lisa.a.johnson@ndus.edu
www.ndus.edu

APPENDIX C

Follow up Email Copies

First Follow up Email Copy

SURVEY OF EDUCATIONAL TECHNOLOGY INTEGRATION AMONG COMMUNITY COLLEGE INSTRUCTORS

Dear BSC Faculty,

First of all, I would like to thank those of you who have already completed the online survey in EDUCATIONAL TECHNOLOGY INTEGRATION AMONG COMMUNITY COLLEGE INSTRUCTORS. I really appreciate your time and contribution you have made toward this important research study. If you have not responded to the survey yet, please click on the link at the bottom of the page and take a few moments to complete the survey. It only takes anywhere between 10-12 minutes to complete the survey. Your responses are very important to us and will help us to provide valuable information about educational technology integration among community college instructors in North Dakota. We hope, this project will open new doors to investigate and improve educational technology training needs of the community college instructors in North Dakota.

Thank you so much,

Oybek Turayev Ph.D. Candidate, Principal Investigator
Email: oybek.turayev@ndus.edu
Phone: 701-665-1693

Myrna Olson Ed.D., Study Advisor
myrna.olson@email.und.edu
Phone: 701-777-3188

SURVEY LINK>> (Link was Removed)

Second Follow up Email Copy

Dear Community College Instructors,

First of all, I would like to thank those of you who have already completed the online survey in *EDUCATIONAL TECHNOLOGY INTEGRATION AMONG COMMUNITY COLLEGE INSTRUCTORS.* I really appreciate your time and contribution you have made toward this important research study. If you have not responded to the survey yet, please click on the link at the bottom of the page and take a few moments to complete the survey. It only takes anywhere between 10-15 minutes to complete the survey.

Thank you so much,

Oybek Turayev Ph.D. Candidate, Principal Investigator
Email: oybek.turayev@ndus.edu
Phone: 701-665-1693

Myrna Olson Ed.D., Study Advisor
myrna.olson@email.und.edu
Phone: 701-777-3188

SURVEY LINK>> (Link was Removed)

Third Follow up Email Copy

Dear Community College Instructors,

First of all, I would like to thank those of you who have already completed the online survey in *EDUCATIONAL TECHNOLOGY INTEGRATION AMONG COMMUNITY COLLEGE INSTRUCTORS.* I really appreciate your time and contribution you have made toward this important research study. If you have not responded to the survey yet, please click on the link at the bottom of the page and take a few moments to complete the survey. It only takes anywhere between 10-15 minutes to complete the survey.

Thank you so much,

Oybek Turayev Ph.D. Candidate, Principal Investigator
Email: oybek.turayev@ndus.edu
Phone: 701-665-1693

Myrna Olson Ed.D., Study Advisor
myrna.olson@email.und.edu
Phone: 701-777-3188

SURVEY LINK>> (Link was Removed)

Thank you Letter Copy

SURVEY OF EDUCATIONAL TECHNOLOGY INTEGRATION HAS BEEN CLOSED: THANK YOU!

SURVEY OF EDUCATIONAL TECHNOLOGY INTEGRATION HAS BEEN CLOSED

Dear Faculty,

On behalf of the Teaching and Learning Program within College of Human Development and Education at University of North Dakota (UND), we would like to express a special thank you for your generous donation of your time and commitment to this research study.

We have received more than 300 faculty responses across five campuses. Many community college instructors took time from their busy schedules to complete the questionnaire. The Qualtrics link for the survey has been deactivated.

Thank you so much again for your time and commitment.

Kindest regards,

Oybek Turayev Ph.D. Candidate, Principal Investigator
Email: oybek.turayev@ndus.edu
Phone: 701-665-1693

Myrna Olson Ed.D., Study Advisor
myrna.olson@email.und.edu
Phone: 701-777-3188

APPENDIX D

Welcome Email & Informed Consent Copy

SURVEY OF EDUCATIONAL TECHNOLOGY INTEGRATION AMONG COMMUNITY COLLEGE INSTRUCTORS

Dear Community College Instructors,

The Teaching and Learning Program within College of Human Development and Education at University of North Dakota (UND), invites you to participate in an important research project by completing a survey. We hope you have received an initial email about our study from [redacted] **NDUS Director of Academic Affairs**. This project has the potential to provide insight into some of the challenges of educational technology integration into teaching and learning among community college instructors. Furthermore, findings from this research study will enhance the understanding of specific factors that encourage or discourage instructors from integrating educational technology into teaching and learning practices. We would really appreciate your time and support if you would complete the survey.
Please click on the link at the bottom of the page and take a few moments to complete the survey. Here are the details of the study below:

Project Title:
EDUCATIONAL TECHNOLOGY INTEGRATION AMONG COMMUNITY COLLEGE INSTRUCTORS.

Investigators:
Oybek Turayev Ph.D. Candidate, Principal Investigator, responsible for contact with participants. Myrna Olson Ed.D., Study advisor.

Purpose:
The purpose of this research study is to examine factors which impact educational technology integration into teaching and learning among community college instructors. These factors include instructor competencies and training needs, as well as instructor beliefs regarding technology integration.

Procedure:
The online survey will be used to gather data from community college instructors. You will be asked to answer 59 educational technology integration questions in addition to 11 general demographic questions.

Duration of survey:
It takes anywhere between 10-15 minutes to complete the survey.

Risks of Participation:
There are no known risks associated with this project.

Benefits:
Your responses are very important to us and will help us to provide valuable information about educational technology integration among community college instructors in North Dakota. In addition, this project will open new doors to investigate and improve educational technology training needs of the community college instructors in North Dakota.

Confidentiality:
Participants' name or school will not appear on the questionnaire. The investigators will keep all the survey results in a secure location until data analysis complete. The data will be kept in a locked file cabinet drawer. No individual data will be reported, only summarized information will be made available to the public.

Compensation:
There is no compensation for participation

Rights to Ask Questions:
The principal investigator of this study is Oybek Turayev. If you have questions, concerns, or complaints about the research please contact the principle investigator; Oybek Turayev at 701-665-1693, or Study Advisor; Myrna Olson at 701-777-3188 only during the day.

If you have questions regarding your rights as a research subject, you may also contact The University of North Dakota Institutional Review Board at (701) 777-4279. You may also call this number with problems, complaints, or concerns about the research. Please call this number if you cannot reach research staff, or you wish to talk with someone who is an informed individual who is independent of the research team.

Voluntary Participation:
Participation in this study is voluntarily and there is no penalty associated with not responding the survey. In addition, you may skip any question that you feel uncomfortable answering.

Completion of the survey implies that you have read the information in this form and consent to participate in the research.

We would really appreciate your time and support if you would complete the survey. The link for the survey is below.

Thank you so much,

Oybek Turayev Ph.D. Candidate, Principal Investigator
Email: oybek.turayev@ndus.edu
Phone: 701-665-1693

Myrna Olson Ed.D., Study Advisor
myrna.olson@email.und.edu
Phone: 701-777-3188

SURVEY LINK>> (Link was Removed)

APPENDIX E

Educational Technology Survey Copy

Educational Technology Integration Survey Copy

Demographic Information

1. What is your gender?
   - Male Female
2. What is your age?
   - 22-34 years old
   - 35-45 years old
   - 46-55 years old
   - 56-65 years old
   - 66-75 years old
   - 76 years or older
3. Please specify your ethnicity.
   - White
   - Middle Eastern
   - Hispanic or Latino
   - Black or African American
   - Native American or American Indian
   - Asian / Pacific Islander
   - Other____________
4. What is the highest degree or level of school you have completed?
   - Trade/technical/vocational training
   - Associate degree
   - Bachelor's degree
   - Master's degree
   - Professional degree
   - Doctorate degree
5. I teach primary at (please, select the applicable to you):
   - Bismarck State College
   - Dakota College of Bottineau
   - Lake Region State College
   - North Dakota State College of Science
   - Williston State College
6. I teach in the Program/Department of (Please type) ______________

7. I am a (please, select the applicable to you):
   - Full-time Faculty Member
   - Part-time Faculty Member
   - Other (specify)___________
8. How many years of teaching experience do you have?
   - 1-4 years
   - 5-10 years
   - 11-20 years
   - 21-30 years
   - 31-40 years
   - Other (specify)___________
9. What is your academic rank?
   - Professor
   - Associate Professor
   - Assistant Professor
   - Instructor
   - Lecturer
   - Other (specify)___________
10. What is the average number of undergraduate students that you teach in a regular semester?
    - 15-25 students
    - 26-50 students
    - 51-75 students
    - 76-100 students
    - Other (specify)___________
11. On average, how many course credits do you teach per semester?
    - 3-6 credits
    - 6-12 credits
    - 12-18 credits
    - 18-21 credits
    - 22 or more credits

Q12. Instructor Beliefs about Educational Technology Integration

Instructor Beliefs about Educational Technology Integration
Please, select the option that best reflects how you feel about each of the following statements. Rating Scale: Strongly Disagree (SD = 1), Disagree (D = 2), Slightly Disagree (SLD = 3), Slightly Agree (SLA = 4), Agree (A=5), Strongly Agree (SA = 6)

Statement	SD	D	SLD	SLA	A	SA
1. I believe, using a computer with technology equipment and subject-based software in my instruction would make me a better instructor.	1	2	3	4	5	6
2. I believe, use of educational technology requires unnecessary curriculum reforms.	1	2	3	4	5	6
3. I believe, decentralizing instructional support to the various academic departments would make them more relevant in educational technology integration.	1	2	3	4	5	6
4. I believe integration of educational technology into the curriculum is very discipline specific	1	2	3	4	5	6
5. I believe that all faculty members should know how to use instructional technology effectively.	1	2	3	4	5	6
6. I believe, instructional design department at my institution should have a plan for educational technology integration.	1	2	3	4	5	6
7. I believe educational technology integration initiatives should be my own choice	1	2	3	4	5	6
8. I believe, Learning Management System (Blackboard, D2L, Canvas & Moodle) is an effective means of disseminating course material to students.	1	2	3	4	5	6
9. I believe educational technology tools would enable me to interact more with my students.	1	2	3	4	5	6
10. I believe educational technology maximizes the effectiveness of my teaching and learning.	1	2	3	4	5	6

Q13. Role of Positive and Negative Factors in Educational Technology Integration

Positive and Negative Factors in Educational Technology Integration
Please, select the option that best reflects how you feel about each of the following statements. Rating Scale: Strongly Disagree (SD = 1), Disagree (D = 2), Slightly Disagree (SLD = 3), Slightly Agree (SLA = 4), Agree (A=5), Strongly Agree (SA = 6)

Statement	SD	D	SLD	SLA	A	SA
1. Educational technology integration increases my classroom participation.	1	2	3	4	5	6
2. I am not motivated to integrate any educational technology because it changes fast	1	2	3	4	5	6
3. Educational technology integration made my classroom assessment effective	1	2	3	4	5	6
4. Every time when I try new educational technology, technology fails.	1	2	3	4	5	6
5. Educational technology integration increases quality of my online classes.	1	2	3	4	5	6
6. Educational technology integration effects my teaching evaluations.	1	2	3	4	5	6
7. Educational technology integration increased my technology skills.	1	2	3	4	5	6
8. Educational technology integration is too much work for me.	1	2	3	4	5	6

Q14. Facilitative Conditions of Technology Integration into Teaching & Learning.
Please, select the option that best reflects how you feel about each of the statements.
Rating Scale: Strongly Disagree (SD = 1), Disagree (D = 2), Slightly Disagree (SLD = 3), Slightly Agree (SLA = 4), Agree (A=5), Strongly Agree (SA = 6)

Statement	SD	D	SLD	SLA	A	SA
1. I have insufficient time to integrate educational technology into my courses.	1	2	3	4	5	6
2. I do not have enough technology knowledge for educational technology integration.	1	2	3	4	5	6
3. I do not have a strong leadership support for educational technology on my campus.	1	2	3	4	5	6
4. I feel uncomfortable to participate in educational technology integration initiatives.	1	2	3	4	5	6
5. I have very limited resources for educational technology integration projects.	1	2	3	4	5	6
6. I am not interested in committing to any educational technology integration initiatives.	1	2	3	4	5	6
7. There are enough incentives on my campus for educational technology integration initiatives.	1	2	3	4	5	6
8. I am dissatisfied with my educational technology learning environment.	1	2	3	4	5	6

Q15. Instructor Competencies in Education Technology Integration

Instructor Technology Use in Teaching and Learning
Please, select the option that best reflects how you feel about each of the statements.
Rating Scale: Strongly Disagree (SD = 1), Disagree (D = 2), Slightly Disagree (SLD = 3), Slightly Agree (SLA = 4), Agree (A=5), Strongly Agree (SA = 6)

Statement	SD	D	SLD	SLA	A	SA
1. I have not received any educational technology training for the past five years.	1	2	3	4	5	6
2. I have experience in creating digital and web content	1	2	3	4	5	6
3. I have following skills (Word processing, Spreadsheets, PowerPoint)	1	2	3	4	5	6
4. I know how to effectively utilize educational technology into my course.	1	2	3	4	5	6
5. I am very familiar with search engines for the purpose of research	1	2	3	4	5	6
6. I am competent in 1 or 2 computer applications for instruction.	1	2	3	4	5	6
7. I am competent in 3 or 5 computer applications for instruction.	1	2	3	4	5	6
8. I am proficient in 6 or more applications and I am able to assist colleagues as needed.	1	2	3	4	5	6

Q16. Instructor Experiences in Education Technology Integration
Please, select the option that best reflects how you feel about each of the statements.
Rating Scale: Strongly Disagree (SD = 1), Disagree (D = 2), Slightly Disagree (SLD = 3), Slightly Agree (SLA = 4), Agree (A=5), Strongly Agree (SA = 6)

Statement	SD	D	SLD	SLA	A	SA
1. I have experience in utilizing Blackboard & Whiteboard tools such as document camera and overhead projector into teaching and learning	1	2	3	4	5	6
2. I have experience in utilizing Tablets, Simulations, and iClickers into teaching and learning	1	2	3	4	5	6
3. I have experience in utilizing Twitter, TodaysMeet, and Aka into teaching and learning	1	2	3	4	5	6
4. I have experience in utilizing Facebook and Snapchat into teaching and learning	1	2	3	4	5	6
5. I have experience in utilizing Prezi and Slide Carnival into teaching and learning	1	2	3	4	5	6
6. I have experience in utilizing Tegrity into teaching and learning	1	2	3	4	5	6
7. I have experience in utilizing Google Presentation into teaching and learning	1	2	3	4	5	6
8. I have experience in utilizing Skype, Zoom and Facetime	1	2	3	4	5	6

Q17. What are the Educational Technology Training Needs of Instructors?
A. How do you feel about each of the following statements? Please, select the option that best reflects.
Rating Scale: Strongly Disagree (SD = 1), Disagree (D = 2), Slightly Disagree (SLD = 3), Slightly Agree (SLA = 4), Agree (A=5), Strongly Agree (SA = 6)

Statement	SD	D	SLD	SLA	A	SA
1. I have an immediate need for more training with curriculum that integrates educational technology.	1	2	3	4	5	6
2. I need more regular educational technology seminars/workshops at my institution.	1	2	3	4	5	6
3. I would need more instructional designer's support in my educational technology integration process.	1	2	3	4	5	6
4. I would need free instructional design classes.	1	2	3	4	5	6
5. I need strong support from my direct supervisor in educational technology integration.	1	2	3	4	5	6
6. I need more time to change the curriculum to incorporate educational technology.	1	2	3	4	5	6
7. I need to collaborate with my colleagues on educational technology integration issues.	1	2	3	4	5	6
8. I need better professional development plan in educational technology integration at my institution.	1	2	3	4	5	6

Q18. How important are the following sources of information to you for keeping abreast of changes/innovations in educational technology integration into teaching and learning? Please, select the option that best reflects.
Rating Scale: Strongly Disagree (SD = 1), Disagree (D = 2), Slightly Disagree (SLD = 3), Slightly Agree (SLA = 4), Agree (A=5), Strongly Agree (SA = 6)

Statement	SD	D	SLD	SLA	A	SA
1. Informal network of friends and family is important in my educational technology integration	1	2	3	4	5	6
2. Professional colleagues on campus is important in my educational technology integration	1	2	3	4	5	6
3. Professional colleagues from other institutions is important in my educational technology integration	1	2	3	4	5	6
4. The role of VP/Dean is important in my educational technology integration	1	2	3	4	5	6
5. The role of my direct supervisor is important in my educational technology integration	1	2	3	4	5	6
6. The role of innovative students are important in my educational technology integration	1	2	3	4	5	6
7. Online technology newsgroups and websites are important in my educational technology integration.	1	2	3	4	5	6
8. Open educational resources are important in my educational technology integration	1	2	3	4	5	6

Q19. Open ended question.
In this section of the survey please, write a few sentences about your own personal experiences in Educational Technology Integration______________

APPENDIX F

Selective Open Ended Question Results

Selective Samples of the Open-Ended Faculty Questionnaire based on their educational technology integration experiences into teaching and learning.

Selective Open Ended Question Results

Participant 1

Every time when I start new educational technology initiative it fails, and I get demotivated to move forward.

Participant 2

Educational technology changes too fast and gets challenging to plan educational technology integration projects.

Participant 3

Our campus could have used more training time for Blackboard, closer to actual deployment dates. For those who taught over the summer, the spring sessions were beneficial. For those of us who taught over the fall, not as timely. Yes, we could have spent off-contract time over the summer learning and preparing on our own more, however, it would be a good idea to earmark funds for training during times of critical application deployment. All of the fall in-service time could have been dedicated to Blackboard training and that would have been very beneficial. Having a summer training session for faculty paid for by the institution would have been great too.

Participant 4

For the past 10 years, I've taught entirely online. Sometimes the process is smooth and sometimes it's "baptism by fire," but my integration of educational technology is constantly evolving. Currently I am navigating the switch from eCollege (with which I was entirely familiar) to Blackboard (which is new for me). The transition has been bumpy.

Participant 5

I mostly use Power-Points through my Composition and film classes. I can show examples of poor writing on the overhead projector and point out where the writing could improve; furthermore, I can color-code the writing in order to show students different parts of a sentence, errors in a sentence, or how to improve that sentence.

Participant 6

Using technology in my classroom has risen significantly in the past two years. I began teaching at WSC with no Power-Point presentations and no want or need for computers in the classroom. Now, I have all my students submit their major essays via an LMS to save on paper/printing costs for students and to receive student submissions with timestamps (for grading and late paper policy disputes).

Participant 7

Getting more familiar with Blackboard. Using it for online quizzes for the first time in my teaching career. Setup was difficult at first, but much better now.

Participant 8

I have been doing a "flipped classroom" for the past 3 terms where I have recorded all of my lectures on Power-Point and have made them available through You-Tube. I have had to modify things as I go. The biggest benefit that I see is that I am present in the classroom 100% of the time instead of having to lecture. This allows me to work one-on-one with the students on homework and labs. Some students do not need a lot of extra help, but some do. Evaluations have showed that students prefer this method more so than the traditional classroom.

Participant 9

I flip my classrooms, so I am familiar with many aspects of technology in education. Sometimes there is student resistance to a different mode of instruction, so instead of support for integrating technology, support for helping students get on board would be more practical.

Participant 10

I use technology in almost every class. I don't think many of our students are ready for technology even though they are digital natives.

Participant 11

I think the more human education can be, the better for the students and faculty. I am suspicious of canned curriculum or assessment material. Also, I am aware that for many students, technology can be an impediment to learning. I feel some responsibility to use technology in my classes to help students learn technology, but I don't think technology automatically and unfailingly improves learning. Furthermore, I think our (that is, higher ed's) rush to use technology has contributed to higher costs for students.

Participant 12

I have experience in the Sim Lab and find it instrumental in educating nursing students. I also like to integrate technology as an opportunity for learning to groups of students. This assists to target all learning styles in the class.

Participant 13

I do not currently use much in the ways of educational technology integration due to way that I have set up the course, but I believe it would be feasible, and supported by administration, should I choose to do so. However, it should remain each instructor's choice to use it or not, whether it matches with their teaching style or not, instead of mandated for all.

Participant 14

I use clickers and use Slack for posting whiteboard and interacting with students. Use simulations for visualization and also do some coding in my classes.

Participant 15

I teach in the Nursing Program where we use technology daily and without good technology, our program would not be as successful as it is today. Currant students understand technology and I believe it is important to include it in our classes to help keep the students engaged.

Participant 16

I like it - just need more time and training. Also, would be good to see how others are utilizing educational technology in their classrooms. What works and what doesn't work, so we can focus on what works. All of this takes time and money.

Participant 17

Need more educational training session before new educational programs are implemented

Participant 18

As an online adjunct, it is difficult to participate in trainings. Since I work a job elsewhere, it is also difficult to implement technologies that are provided or attend professional development sessions to train on them. It is also challenging to not only teach online but also be the designer of the instructional online classroom. Other colleges I teach at do not require teachers to be online designers.

Participant 19

I believe that technology is a very important part of education as long as it fills a void that was there. I do not believe it necessary to use just to say you used technology. I have used technology in my classes (LMS system, etc.), but for the most part is being just to introduce my students to what they may see for their continuing education in industry and make them more comfortable with it.

Participant 20

Educational Technology Integration has been an integral part of my journey in education since the early 1990's. It evolved from teaching in early interactive TV classrooms to integration of fully online courses. The key is that if the technology saves me time, it's worth it. If it adds any element of additional time without compensation, it often times will not be adopted. So, there is a continual evaluation of "Is the adoption of this technology worth the investment." I have passed on some but taken advantage of others after addressing this question in my own mind. Technology for technologies sake is not good.

Participant 21

Began integrating computerized writing programs in mid-1980s; experienced in word processing, data bases, spreadsheets, LMS (Moodle & Blackboard), Facebook incorporated in courses. Technology is key to succeeding as both student & teacher in 21st Century.

Participant 22

eCollege LMS was quite a change from the traditional classroom setting when I first converted; however, comparing it to integrating Blackboard this fall, it was easier. eCollege is much more user friendly and the technical support more effective and available. There are too many clicks to get from Point A to Point B in Bb as opposed to eCollege. The gradebook is a huge difference in Bb that I struggle with on a daily basis.

Participant 23

I look to guidance from experienced colleagues when I need it in order to properly integrate technology. At least until I am comfortable and confident.

Participant 24

I have had very little education in this area other than the technology used in online classes. Just started using Blackboard during Summer 2017 session and found some integration easy while the majority of it is frustrating.

Participant 25

My students thoroughly enjoy when we actively use QR codes, Poll Everywhere or Kahoot!

Participant 26

I have been teaching online classes since 2001 and now teach three of my classes online. Half of the credits I teach are online each semester. Learning management systems that I have used are Web CT, Web CT 4.0, Moodle, and now Blackboard. In my on-campus classes, I presently integrate Blackboard into the class, semi-hybrid.

Participant 27

I have been an early adopter and user of technology in the class room throughout my teaching career, both in my previous position in a public high school, and as an instructor at NDSCS. I have generally been satisfied with the support my institution has provided in training for use of our old LMS system, as well as the transition to Blackboard.

Participant 28

Educational technology can be a challenge especially if you travel to different sites to teach. You should always have a plan b in your pocket that does not involve technology.

Participant 29

I have enjoyed using technology as the main source of information in my courses. The open, free educational textbooks work very well and the software, such as ALEKS are great.

Participant 30

I have gotten ideas and suggestions from other instructors in what they have used and have tried to implement some of them myself. I have no training and have had to figure things out on my own or by asking other professors.

Participant 31

Time and training is needed to fully utilize educational technology. Training is provided on some platforms such as Blackboard and Moodle, but further training on using various technologies would be most helpful.

Participant 32

Some courses are more suited to educational technology integration than others. In the courses that I teach, I use Blackboard for my LMS and SAM (Skills Assessment Manager) as a supplement to my instruction.

Participant 33

I wish we had more Educational Technology trainings at our campus. Blackboard has been a lot of work. Integrating educational technology can be a tricky subject when approaching a subject like music, which is very much performance-based.

Participant 34

I integrate a lot of technology programs into my classes, most are industry specific and feel I have available professional growth to keep up on those. I feel the opportunities to expand on college specific technology is lacking. I feel as instructors we should have more access to Microsoft suite training and a lot more training on the tools in Microsoft 365.

Participant 35

I am not sure what I would use for technology integration for BADM courses. Therefore I "drag my feet" when it comes to setting up my class on Blackboard.

Participant 36

I have used LMS platforms and technology extensively for the past fifteen years. I feel it makes me a better instructor and more organized. I also work smarter, not harder because of technology. It is important that my students submit most coursework via the LMS. I teach all of my courses both face-to-face on campus and in totally online formats. Each has its merits.

Participant 37

I would love to do more with Technology integration however time seems to keep me from achieving my desired goals.

Participant 38

I am comfortable utilizing various technology supports and if find I have the support and perseverance to learn new technologies.

Participant 39

Not enough support on campus for the Blackboard integration. Not enough support to help us use all the bells and whistles in designing courses. Some online environments aren't user friendly. MANY students state they do not like doing things online when they are in an on-campus class. I regularly poll them on this.

Participant 40

While there have been quite a few workshops on educational technology, etc. I find them difficult to follow along and need more one on one training. Our educational technology staff is terrific and very willing to help. It's a matter of finding opportunities to receive that individualized help.

Participant 41

Before budget cuts (before fall 2016), we had a committee that provided training, support and funds for educational technology integration. That was wiped to zero. With an increase of teaching load, I am finding it hard to implement new things. I currently use a classroom set of iPads to engage and interact with students in class. The students like a combination of technology and paper/pencil activities in class.

Participant 42

In my home campus we have a great instructional design person who is very knowledgeable and willing to find things out for us. Administration is very proactive in encouraging educational technology integration. Only downside is finding money to pay for research and training in new technologies.

Participant 43

The implementation of educational technology integration is only as good as the support behind it. Faculty need time for curriculum development and education, which requires the financial and supervisory support of campus administration.

Participant 44

The start of the process of integrating new technologies is labor intensive, but the payoff is in the time saved when this becomes a standard part of your instruction.

Participant 45

I try to integrate educational technology as much as possible in my classes. It is very challenging to integrate technology if you teach math & science. Students are not very motivated to learn math and adding more technology makes it more difficult for them. I would really like to have several educational technology trainings in an academic year in order to improve my knowledge.

Participant 46

It is difficult to integrate educational technology into Automotive technology program. It is time consuming to build a curriculum.

Participant 47

I am an early adopter. I don't wait for technology to come to me - I go out and find what I need and adapt it. If forced to use a system that doesn't work for me, I'll find something that works better and neglect the forced system in favor of my preferred method.

Participant 48

I teach art; therefore, it is very difficult to integrate technology into my classes. We have great educational technology support in our college. I would like to learn more educational technology that relates to Art. I would like to learn about digital drawing or sculpture software in order to integrate into my classes.

Participant 49

I like to use educational technology in my classes, but majority of my students are not very motivated to use technology.

Participant 50

I teach online and on-campus courses. All of my on-campus courses are hybrid, and include face-to-face classes, video conferencing and online forums such as Moodle.

Participant 51

I really like to integrate new educational technologies into my classes. We have limited support from our administration in this process. We need to be better compensated for our time for Educational Technology Integration. I need more useful resources for tech integration.

Participant 52

I have some basic knowledge in educational technology integration, but I need more curriculum-based training that can match my biology classes. Institutions should support more educational technology training for faculty.

Participant 53

I do not know much about educational technology to integrate into my classes. I need to be motivated and supported in curriculum design and development.

Participant 54

I have tried educational technology integration into my classes. It requires a good planning and design for effectiveness. I wish our administration also had some knowledge in ED Technology design process.

Participant 55

I teach auto technology and it is very challenging for me to integrate educational technology. I try to record some lectures, but I lack video editing skills for my lessons. Instructional design department could help with this process, but I have no time to try new technology when I am busy with hands on classes. I think, I am getting old as well for any educational technology initiatives. I will let younger faculty to deal with it.

Participant 56

I am a good learner and always work on myself in educational technology. I am not very good at some of the technology/education tool given in the survey, but I am a fast learner. I need my instructional designer’s help if I plan to integrate any new educational technology. I utilize my institutional LMS and build online classes and assignments. I would like to have more educational technology training sessions on my campus.

Appendix G

Summary of Facilitative Conditions

Facilitative Conditions in Educational Technology Integration

Facilitative Conditions Items Statistics

1. I have insufficient time to integrate educational technology into my courses.

Facilitative Conditions 1	Frequency	Percent
Strongly Disagree	12	3.9
Disagree	41	13.4
Slightly Disagree	20	6.5
Slightly Agree	117	38.1
Agree	103	33.6
Strongly Agree	14	4.6
Total	307	100.0

2. I do not have enough technology knowledge for educational technology integration.

Facilitative Conditions 2	Frequency	Percent
Strongly Disagree	22	7.2
Disagree	63	20.5
Slightly Disagree	57	18.6
Slightly Agree	93	30.3
Agree	70	22.8
Strongly Agree	2	.7
Total	307	100.0

3. I do not have a strong leadership support for educational technology on my campus.

Facilitative Conditions 3	Frequency	Percent
Strongly Disagree	24	7.8
Disagree	91	29.6
Slightly Disagree	43	14.0
Slightly Agree	91	29.6
Agree	53	17.3
Strongly Agree	5	1.6
Total	307	100.0

4. I feel uncomfortable to participate in educational technology integration initiatives.

Facilitative Conditions 4	Frequency	Percent
Strongly Disagree	30	9.8
Disagree	91	29.6
Slightly Disagree	50	16.3
Slightly Agree	77	25.1

Agree	55	17.9
Strongly Agree	4	1.3
Total	307	100.0

5. I have very limited resources for educational technology integration projects.

Facilitative Conditions 5	Frequency	Percent
Strongly Disagree	13	4.2
Disagree	63	20.5
Slightly Disagree	33	10.7
Slightly Agree	93	30.3
Agree	97	31.6
Strongly Agree	8	2.6
Total	307	100.0

6. I am not interested in committing to any educational technology integration initiatives.

Facilitative Conditions 6	Frequency	Percent
Strongly Disagree	39	12.7
Disagree	87	28.3
Slightly Disagree	44	14.3
Slightly Agree	78	25.4
Agree	54	17.6
Strongly Agree	5	1.6
Total	307	100

7. There are enough incentives on my campus for educational technology integration initiatives.

Facilitative Conditions 7	Frequency	Percent
Strongly Disagree	23	7.5
Disagree	133	43.3
Slightly Disagree	48	15.6
Slightly Agree	46	15.0
Agree	49	16.0
Strongly Agree	8	2.6
Total	307	100.0

8. I am dissatisfied with my educational technology learning environment.

Facilitative Conditions 8	Frequency	Percent
Strongly Disagree	20	6.5
Disagree	75	24.4
Slightly Disagree	52	16.9
Slightly Agree	91	29.6
Agree	67	21.8
Strongly Agree	2	.7
Total	307	100.0

Appendix H

Descriptive Statistics for Survey Questions

Instructor Beliefs about Educational Technology Integration Category

Descriptive Statistics								
	N	M	SD	Variance	Skewness		Kurtosis	
				Statistic	Statistic	Std. Error	Statis tic	Std. Error
1.I believe, using a computer with technology equipment and subject-based software in my instruction would make me a better instructor.	307	4.92	.927	.859	-1.94	.139	5.71	.277
2. I believe, use of educational technology requires unnecessary curriculum reforms.	307	3.17	1.23	1.53	.108	.139	-.627	.277
3. I believe, decentralizing instructional support to the various academic departments would make them more relevant in educational technology integration.	307	4.40	1.30	1.70	-.834	.139	-.164	.277
4. I believe integration of educational technology into the curriculum is very discipline specific	307	4.61	1.23	1.51	-1.18	.139	.784	.277
5. I believe that all faculty members should know how to use instructional technology effectively.	307	5.13	.773	.597	-1.68	.139	6.42	.277
6. I believe, instructional design department at my institution should have a plan for educational technology integration.	307	5.09	.715	.511	-1.00	.139	3.72	.277
7. I believe educational technology integration initiatives should be my own choice	307	4.77	1.12	1.26	-1.30	.139	1.59	.277
8. I believe, Learning Management System (Blackboard, D2L, Canvas & Moodle) is an effective means of disseminating course material to students.	307	5.07	.791	.626	-1.11	.139	2.93	.277
9.I believe educational technology tools would enable me to interact more with my students.	307	4.79	.968	.937	-1.03	.139	1.25	.277
10.I believe educational technology maximizes the effectiveness of my teaching and learning.	307	4.93	.884	.782	-1.56	.139	4.24	.277
N	307							

Positive and Negative Factors in Educational Technology Integration Category

Descriptive Statistics								
	N	M	SD	Variance	Skewness		Kurtosis	
				Statistic	Statistic	Std. Error	Statistic	Std. Error
1.Educational technology integration increases my classroom participation	307	4.81	.996	.992	-1.383	.139	2.695	.277
2. I am not motivated to integrate any educational technology because it changes fast.	307	3.02	1.213	1.470	-.182	.139	-1.049	.277
3. Educational technology integration made my classroom assessment effective	307	4.66	.958	.919	-1.197	.139	1.668	.277
4. Every time when I try new educational technology, technology fails.	307	2.45	1.126	1.268	1.269	.139	1.249	.277
5. Educational technology integration increases quality of my online classes.	307	4.93	.799	.639	-1.151	.139	2.540	.277
6. Educational technology integration effects my teaching evaluations	307	4.50	1.136	1.290	-.975	.139	.540	.277
7. Educational technology integration increased my technology skills	307	4.93	.817	.668	-1.277	.139	3.295	.277
8.Educational technology integration is too much work for me	307	3.44	1.450	2.103	-.145	.139	-1.167	.277
N	307							

Instructor Competencies in Education Technology Integration Category

Descriptive Statistics								
	N	M	SD	Variance	Skewness		Kurtosis	
Instructor Competencies Category				Statistic	Statistic	Std. Error	Statistic	Std. Error
1.I have not received any educational technology training for the past five years.	307	2.95	1.33	1.769	.113	.139	-1.03	.277
2. I have experience in creating digital and web content.	307	4.43	1.35	1.841	-1.083	.139	.365	.277
3. I have following skills (Word processing, Spreadsheets, PowerPoint).	307	5.23	.660	.435	-.775	.139	1.84	.277
4. I know how to effectively utilize educational technology into my course.	307	4.83	.800	.640	-.488	.139	.170	.277
5. I am very familiar with search engines for the purpose of research.	307	5.08	.802	.644	-1.33	.139	3.40	.277
6. I am competent in 1 or 2 computer applications for instruction.	307	4.91	1.04	1.083	-1.35	.139	1.82	.277
7. I am competent in 3 or 5 computer applications for instruction.	307	3.86	1.65	2.735	-.050	.139	-1.59	.277
8. I am proficient in 6 or more applications and I am able to assist colleagues as needed.	307	2.97	1.52	2.320	.821	.139	-.669	.277
N	307							

Facilitative Factors of Educational Technology Integration Category

Descriptive Statistics								
	N	M	SD	Variance	Skewness		Kurtosis	
Facilitative Conditions Category				Statistic	Statistic	Std. Error	Statistic	Std. Error
1. I have insufficient time to integrate educational technology into my courses.	307	3.98	1.21	1.47	-.784	.139	-.059	.277
2. I do not have enough technology knowledge for educational technology integration.	307	3.43	1.25	1.58	-.300	.139	-.969	.277
3. I do not have a strong leadership support for educational technology on my campus.	307	3.24	1.30	1.69	-.010	.139	-1.11	.277
4. I feel uncomfortable to participate in educational technology integration initiatives.	307	3.16	1.32	1.75	.058	.139	-1.13	.277
5. I have very limited resources for educational technology integration projects.	307	3.72	1.28	1.65	-.460	.139	-.906	.277
6. I am not interested in committing to any educational technology integration initiatives.	306	3.11	1.36	1.86	.044	.139	-1.18	.278
7. There are enough incentives on my campus for educational technology integration initiatives.	307	2.96	1.32	1.76	.556	.139	-.844	.277
8. I am dissatisfied with my educational technology learning environment.	307	3.38	1.26	1.59	-.202	.139	-1.088	.277
N	307							

Instructor Experiences in Education Technology Integration Category

Descriptive Statistics								
	N	M	SD	Variance	Skewness		Kurtosis	
Instructor Experiences Category				Statistic	Statistic	Std. Error	Statistic	Std. Error
1. I have experience in utilizing Blackboard & Whiteboard tools such as document camera and overhead projector into teaching and learning	307	4.66	1.18	1.40	-1.63	.139	2.25	.277
2. I have experience in utilizing Tablets, Simulations, and iClickers into teaching and learning	307	3.73	1.41	2.01	-.369	.139	-.903	.277
3. I have experience in utilizing Twitter, TodaysMeet, and Aka into teaching and learning	307	2.49	1.20	1.46	.976	.139	.312	.277
4. I have experience in utilizing Facebook and Snapchat into teaching and learning.	307	2.72	1.28	1.65	.613	.139	-.567	.277
5. I have experience in utilizing Prezi and Slide Carnival into teaching and learning.	307	2.39	1.15	1.33	1.14	.139	.830	.277
6. I have experience in utilizing Tegrity into teaching and learning.	307	4.05	1.42	2.04	-.680	.139	-.703	.277
7. I have experience in utilizing Google Presentation into teaching and learning.	307	3.46	1.60	2.58	-.158	.139	-1.51	.277
8. I have experience in utilizing Skype, Zoom and FaceTime.	307	3.26	1.40	1.98	.249	.139	-1.12	.277
N	307							

Educational Technology Training Needs of Instructors Category

Descriptive Statistics								
	N	M	SD	Variance	Skewness		Kurtosis	
Instructor Training Needs Category				Statistic	Statistic	Std. Error	Statistic	Std. Error
1. I have an immediate need for more training with curriculum that integrates educational technology.	307	4.28	1.21	1.46	-.792	.139	-.038	.277
2. I need more regular educational technology seminars/workshops at my institution.	307	4.64	1.10	1.22	-1.21	.139	1.285	.277
3. I would need more instructional designer's support in my educational technology integration process.	307	4.62	1.10	1.21	-1.22	.139	1.20	.277
4. I would need free instructional design classes.	307	4.66	1.06	1.12	-1.24	.139	1.58	.277
5. I need strong support from my direct supervisor in educational technology integration.	307	4.49	1.20	1.45	-1.12	.139	.706	.277
6. I need more time to change the curriculum to incorporate educational technology.	307	4.84	1.01	1.03	-1.37	.139	2.13	.277
7. I need to collaborate with my colleagues on educational technology integration issues.	307	4.79	.912	.832	-1.36	.139	2.50	.277
8. I need better professional development plan in educational technology integration at my institution.	307	4.63	1.05	1.10	-1.07	.139	.914	.277
N	307							

Importance of Educational Information Category

Descriptive Statistics								
	N	M	SD	Variance	Skewness		Kurtosis	
Importance of ET Information Category				Statistic	Statistic	Std. Error	Statistic	Std. Error
1.Informal network of friends and family is important in my educational technology integration.	307	4.77	1.22	1.49	-.946	.139	.055	.277
2. Professional colleagues on campus is important in my educational technology integration.	307	5.14	.869	.755	-1.05	.139	1.27	.277
3. Professional colleagues from other institutions is important in my educational technology integration	307	4.82	1.15	1.33	-1.03	.139	.599	.277
4. The role of VP/Dean is important in my educational technology integration.	307	4.65	1.31	1.73	-.999	.139	.276	.277
5.The role of my direct supervisor is important in my educational technology integration.	307	4.88	1.15	1.32	-1.24	.139	1.34	.277
6. The role of innovative students are important in my educational technology integration.	307	5.02	.955	.911	-1.13	.139	1.95	.277
7. Online technology newsgroups and websites are important in my educational technology integration.	307	4.73	1.26	1.60	-1.05	.139	.466	.277
8.Open educational resources are important in my educational technology integration.	307	4.93	1.13	1.28	-1.40	.139	2.05	.277
N	307							

References

Abrahams, D. A. (2010). Technology adoption in higher education: a framework for identifying and prioritizing issues and barriers to adoption of instructional technology. *Journal of Applied Research in Higher Education, 2* (2), 34–49.

Abuhmaid, A. (2011). ICT training courses for teacher professional development in Jordan. *Turkish Online Journal of Educational Technology*, *10* (4),195-210. Retrieved from http://www.tojet.net/articles/10420.pdf

Accuosti J. (2014). Factors affecting education technology success. *American Society for Engineering Education*. Retrieved from http://www.asee.org/documents/zones/zone1/2014

Alazam, A.O., Bakar, A., Hamzah, R., & Asmiran, S. (2013). Teachers' ICT skills and ICT integration in the classroom: the case of vocational and technical teachers in Malaysia. *Creative Education*, *3*(8), 70–76.

Albion P. (2003) Graduating teachers' dispositions for integrating information and communications technologies into their teaching. *Society for Information Technology and Teacher Education International 1* (1), 1592– 1599.

Alessi, S. M., & Trollip, S. R. (2001). Multimedia for learning: Methods and development (3rd ed.). Boston: Allyn & Bacon.

Al-Senaidi, S., Lin, L., & Poirot, J. (2009). Barriers to adopting technology for teaching and learning in Oman. *Computers & Education, 53*(3), 575–590.

Allen, M. (2012). Leaving ADDIE for SAM: An agile model for developing the best learning experiences. Alexandria, VA: ASTD Press.

Allen, M., & Sites, R. (2012). Leaving ADDIE for SAM: *An agile model for developing the best* *learning experiences*. Alexandria, VA: American Society for Training and Development.

Allen, M., Bourhis, J., Burrell, N., & Mabry, E. (2002). Comparing student satisfaction with distance education to traditional classrooms in higher education: A meta-analysis. *American Journal of Distance Education*, *16* (2), 83-97.

An, Y. J., & Reigeluth, C. (2011). Creating technology-enhanced, learner-centered classrooms: K–12 teachers' beliefs, perceptions, barriers, and support needs. *Journal of Digital Learning in Teacher Education*, *28*(2), 54–62.

Appelman, R. (2000). An iterative development model: A genesis from pedagogical needs. *International Journal of Engineering Education and Lifelong Learning*, *10* (1–4), 136–141.

Arabasz, P., & Baker, M. B. (2003). Evolving campus support models for e-learning courses. *Educause Center for Applied Research Bulletin*, *1*(9).9.

Arenas, E. (2015). Affordances of learning technologies in higher education multicultural environments. *Electronic Journal of E-Learning*, *13*(4), 217–227.

Arlien, K.M. (2016). *Community college faculty members' perceptions of creating digital content to enhance online instructor social presence* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Association for Educational Communications and Technology (1970). To improve learning: An evaluation of instructional technology. Washington, DC: U.S. Government Printing Office. Retrieved from http://www.itma.vt.edu/courses/itintro/whatis2.htm

Association for Educational Communications and Technology (1972). The field of educational technology: a statement of definition. *Audio-visual Instruction, 17*(8), 36-43. Retrieved May 21, 2017 from http://www.aect.org/About/Ethics.asp

Association for Educational Communications and Technology (1977). Educational technology: Definition and glossary of terms. Washington, DC: Association for Educational Communications and Technology. Retrieved May 21, 2017 from http://www.aect.org/About/Ethics.asp

Association for Educational Communications and Technology (2007). AECT: Code of professional ethics. Retrieved May 21, 2017 from http://www.aect.org/About/Ethics.asp

Backhouse, B. (2003). Information and communication technology integration: Beyond the early adopters. *Tech Trends, 47*(3), 5-8.

Baker, K. (1986). Dilemmas at a distance. *Assessment & Evaluation in Higher Education, 11*(3) 219-230.

Banathy, B. H., & Jenlink, P. M. (2004). *Systems inquiry and its application in education*. Handbook of research for educational communications and technology (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Barone, C.A., & Hagner, P.R. (2001). *Assessing conditions for campus transformation. Technology-enhanced teaching and learning: Leading and supporting the transformation on your campus.* Educause Leadership Strategies. San Francisco, CA: Jossey-Bass Publishing.

Bates, A. W., & Poole, G. (2003) *Effective Teaching with Technology in Higher Education: Foundations for Success*. San Francisco, CA: Jossey-Bass Publishing.

Bauder, D. (1993). *Computer integration in K-12 schools: Conditions related to adoption and implementation*. (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Becker, H. & Ravitz, J. (1998). The equity threat of promising innovations: Pioneering internetconnected schools. *Journal of Educational Computing Research*, *18*, (4).

Berge, Z.L., Muilenburg, L.Y., and Van Hanegan, J. (2002). Barriers to distance education and training: Survey results. *Quarterly Review of Distance Education*, *3*(4), 409-418.

Bernard, R., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., & Huang, B. (2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research*, *74*, 379–439.

Biglan, A. (1973). The characteristics of subject matter in different academic areas. *Journal of Applied Psychology*, *57* (3), 195-203.

Boone, E. J. (1992). *Developing programs in adult education*. Prospect Hills, Ill.: Waveland Press, Inc.

Bordbar, F. (2010). English teachers' attitudes toward computer-assisted language learning. *International Journal of Language Studies*, *4* (3), 27-54.

Brinkerhoff, J. (2006). Effects of a long-duration, professional development academy on technology skills, computer self-efficacy and technology integration beliefs and practices. *Journal of Research on Technology* in Education, *39* (1), 22-43.

Brown, J. A. (2008). *Perceptions of the Relative Importance of Conditions that Facilitate Implementation* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Bumen, N. T. (2009). Possible effects of professional development on Turkish teachers' self-efficacy and classroom practice. *Professional Development in Education, 35*(2), 261–278.

Burkman, E. (1987). Factors affecting utilization. *Instructional technology: Foundations.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Burton, J. & Danielson, J. (1999). *A systems approach to adopting new technologies in education*. Paper presented at the National Convention of the Association of Educational Communications and Technology (AECT), Houston, TX. Retrieved from http://files.eric.ed.gov/fulltext/ED436128.pdf

Carman, W.H. (1999). *An application of the Delphi method of forecasting to the future of technology infrastructure in West Virginia high schools.* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Carter, C. (1998). *An assessment of the status of the diffusion and adoption of computer-based technology in appalachian college association colleges and universities.* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Casler, E.C., Meier, E., Miller, S., Newman, D.L., Pack, G., Payne-Bourcy, L., & Wan, T.Y. (2003). Technology Use as a Catalyst for Change: A Leadership Framework for Transforming Urban Teacher Preparation. *International Electronic Journal for Leadership in Learning. 7* (12). Retrieved from http://www.ucalgary.ca/~iejll/.

Chen, C. H. (2008). Why do teachers not practice what they believe regarding technology integration? *The Journal of Educational Research*, *102* (1), 65-75.

Christensen, C.M. (2000). *The innovator's dilemma*. New York: Harper Collings.

Clausen, J. M. (2007). Beginning teachers' technology use: First-year teacher development and the institutional context's affect on new teachers' instructional technology use with students. *Journal of Research on Technology in Education*, *39* (3), 245–261.

Cradler, J. (2003). Technology's impact on teaching and learning. *Learning and Leading with Technology, 30* (7), 54-57.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods* *approaches*. Thousand Oaks, CA, US: Sage Publications, Inc.

Creswell, J. W. (2015) *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (5th ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Crosby, B., MacArthur, D & Wang, M. (2003). A descriptive study of community college teachers' attitudes toward online learning. *TechTrends*, *47* (5), 28-31.

Demetriadis S., Barbas A., Molohides A., Palaigeorgiou G., Psillos D., Vlahavas I., Tsoukalas I. & Pombortsis A. (2002). Cultures in negotiation: teacher's acceptance and resistance attitudes considering the infusion of technology into schools. *Computers & Education, 41*, 19–37

Demirci, A. (2009). How do Teachers Approach New Technologies: Geography Teachers' Attitudes towards Geographic Information Systems (GIS). *European Journal of Educational Studies*, *1*(1), 43-53.

Dewey, J. (1900). Psychology and social practice. *The Psychological Review*, *1* (7), 105–124.

Dick, W., Carey, L., & Carey, J. O. (2009). *The systematic design of instruction* (7th ed.). Columbus, OH: Allyn & Bacon.

Dick, W. & Carey, L. (1996). *The systematic design of instruction* (4th ed.). New York: Harper Collins.

Dooley, K.E. (1999). Towards a holistic model for the diffusion of educational technologies: An integrative review of educational innovations studies. Retrieved on April 10, 2017 from http://ifets.ieee.org/periodical/vol_4_99/kim-dooley.html.

Dooley, L.M., Martinez, A., Metcalf, T., (1999). A study of the adoption of computer technology by teachers, *Educational Technology and Society, 2*, (4), 35-45.

Drent, M., & Meelissen, M. (2008). Which factors obstruct or stimulate teacher educators to use

ICT innovatively? *Computers & Education, 51* (1), 187-199.

Driscoll, M. (1998). *Web-based training: using technology to design adult learning experiences.* San Francisco, CA: Jossey-Bass/Pfeiffer.

Driscoll, M.P. (2002). *Psychological foundations of instructional design*. Upper Saddle River, NJ: Pearson Education, Inc.

Earle, R.S. (2002). The integration of instructional technology into public education: Promises and challenges. *ET Magazine*, *42* (1), 5-13.

Ehrmann, S.C. (2001). *Technology and educational revolution: Ending the cycle of failure*. Retrieved from https://eric.ed.gov/?id=EJ619996

Ellsworth, J.B. (1997).Technology and change for the information age. *Vision: The Technology Source*. Retrieved from http://technologysource.org/article/technology_and_change_for_the_information_age/

Ely, D. (1963). The changing role of the audiovisual process in education: A definition and a glossary of related terms. *AV Communications Review, 11* (1).

Ely, D.P. (1973). Defining the field of educational technology. *Audio-visual Instruction, 8* (3), 52-53.

Ely, D. (1990). The diffusion and implementation of educational technology in developing nations: Cross-cultural comparisons of Indonesia, Chile and Peru. (ERIC Document Reproduction Service No. ED331-469).

Ely, D.P. (1990). Conditions that facilitate the implementation of educational technology innovations. *Journal of Research on Computing in Education, 23*, (2), 298-315.

Ely, D.P. (1999). Conditions that facilitate the implementation of educations technology innovations. *Education Technology, 39* (6), 23-27.

Elzarka, S. (2012). *Technology Use in Higher Education Instruction* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Ensminger, D.C. (2001). *Using Ely's conditions during the instructional design process to increase success of implementation.* Retrieved from http://files.eric.ed.gov/fulltext/ED474554.pdf

Ensminger, D. C., & Surry, D. W. (2002). *Faculty Perceptions of Factors That Facilitate the Implementation of Online Programs.* Retrieved from http://files.eric.ed.gov/fulltext/ED464622.pdf

Ensminger, D.C., Surry, D.W., Porter, B.E., & Wright, D. (2004). Factors contributing to the successful implementation of technology innovations. *Educational technology and society, 7,* (3), 61-72.

Farquhar, J.D., & Surry, D.W. (1994). Adoption analysis: An additional tool for instructional developers. *Education and Training Technology International, 31*(1), 19-25.

Fernandez, F. M., & Cano, E. (2016). The influence of the internet for pedagogical innovation: using twitter to promote online collaborative learning. *International Journal of Educational Technology in Higher Education, 13* (22), 1-15.

Finn, J. D. (1960). Automation and education: A new theory for instructional technology. *Audiovisual Communications Review, 8*(1), 526.

Forrest, L. A. (1993). Factors affecting the diffusion of information technology innovation in the school library media center: A qualitative study. (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Fortune, M.F., Spielman, M, & Pangelinan, T. D. (2011). Student perceptions of Face-to-Face Learning and Social Media in Hospitality, Recreation and Tourism. MERLOT *Journal of*

Online Learning and Teaching, 7 (1), 1-16.

Fullan, M. (1996). Implementation of innovations. *International encyclopedia of educational technology*. Oxford: Elsevier Science.

Fullan, M. (2003). *Change forces with a vengeance.* Toronto: Taylor & Francis.

Gagne, R. M. (1985). *The conditions of learning and theory of instruction*. New York: Holt, Rinehart and Winston.

Galagan, P. (2003). *The future of the profession formerly known as training*. Retrieved from https://www.researchgate.net/publication

Geoffrey, M.E., Gay, L.R., & Airasian, P. (2009) *Educational Research: Competencies for Analysis and Applications.* (9th ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Georgina, D.A. (2007). *Integration of Technology in Higher Education Pedagogy* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Guidry, K., & BrckaLorenz, A. (2010). *A comparison of student and faculty academic technology use across disciplines*. Retrieved from http://cpr.indiana.edu/uploads

Hall, G., & Hord, S. (1987). *Change in schools: Facilitating the process*. Albany, NY: State University of New York Press.

Hall, B. H., & Khan, B. (2003). *Adoption of new technology*. *National Bureau of Economic Research*. Retrieved from http://www.nber.org/papers/w9730

Hampton, N.C. (2008) *Faculty Perceptions About Instructional Technology in Eight Community Colleges in the Tennessee Board of Regents Higher Education System.* (Ph.D. thesis) Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Harman, J., Dziuban, C., & Moskal, P. (2007). Strategic initiatives in the online environment: Opportunities and challenges. *On the Horizon*, *15* (3), 157-168.

Harris, J. (1994). A model for integration of telecomputing in precollege curricula. *Technology and Teacher Education Annual*, *1*(1), 637-642.

Harris, M. B. (2002) *Basic Statistics for Behavioral Sciences* (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Hart, C. (2012). Factors associated with student persistence in an online program of study: A review of the literature. *Journal of Interactive Online Learning, 11* (1), 19-42.

Haryono, A. (1990). *Lecturer's perceptions of the Conditions that Facilitate the Adoption and Implementation of an Instructional Innovation introduced through a Training Program in Higher Education in Indonesia.* (Ph.D. thesis) Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Hatlevik, O. E., Guðmundsdóttir, G. B., & Loi, M. (2015). Examining factors predicting students' digital competence. *Journal of Information Technology Education: Research, 14,* 123-137.

Head, T. & Moore, J. (1999). Breaking the mold: Virginia Tech's instructional development initiative. In Branch, R.M. & Fitzgerald, M.A. (Eds) *Educational Media and Technology Yearbook*, *24*, 17-21. Englewood, CO: Libraries Unlimited, Inc.

Hinson, J.M., and LaPrairie, K.N. (2005). Learning to Teach Online: Promoting Success through Professional Development. Community College Journal of Research & Practice *29* (6): 483-493.

Holloway, R.E. (1996). Diffusion and adoption of educational technology: A critique of research. In D.H. Jonassen. (Ed.). *Handbook of research for educational communications and* *technology* (pp. 1107-1133). New York, NY: Simon & Schuster Macmillan.

Howard, S. K. (2013). Risk-aversion: understanding teachers' resistance to technology integration. *Technology, Pedagogy and Education*, *22*(3), 357–372.

Huang, H. M., & Liaw, S. S. (2005). Exploring users' attitudes and intentions toward the Web as a survey tool. *Computers in Human Behavior*, *21* (5), 729-743.

Ivankova, N. V., & Stick, S. L. (2005). Collegiality and community-building as a means for sustaining student persistence in the computer-mediated asynchronous learning environment. *Online Journal of Distance Learning Administration, 8*(3), 1-16.

Jones, A. (2004). A Review of the Research Literature on Barriers to the Uptake of ICT by Teachers. *British Educational Communications and Technology Agency*. Retrieved April 20, 2017 from http://www.becta.org.uk

Jones, C.A. (2001) Teach Support: Preparing teachers to use technology. *Principal Leadership*, *1*(9), 35-39.

Jung I. (2005) ICT-pedagogy integration in teacher training: applications cases worldwide. *Journal of Educational Technology & Society 8*, 94–101.

Karasavvidis, I., & Kollias V., (2014). Technology Integration in the Most Favorable Conditions: Findings from a Professional Development Training Program. In: Karagiannidis, C., Politis P., & Karasavvidis I., (Ed.). Research on e-Learning and ICT in Education Technological, Pedagogical and Instructional Perspectives. New York: Springer.

Kay, R. (2006). Addressing gender differences in computer ability, attitudes and use: The laptop effect. *Journal of Educational Computing Research*, *34* (2), 187-211.

Kay, J., Reimann, P., Diebold, E., & Kummerfeld, B. (2013). MOOCs: So many learners, so much potential. *Technology*, *52* (1), 49–67.

Keengwe, J., & Onchwari, G. (2008). Computer technology integration and student learning: Barriers and promise, *Journal of Science Education and Technology*, *17*, 560-565.

Kirkwood, A. (2015). Teaching and learning with technology in higher education: blended and distance education needs joined-up thinking rather than technological determinism. Open Learning: *The Journal of Open, Distance and e-Learning, 29* (3), 1–16.

Knowles, M.S. (1990). *The adult learner: a neglected species* (4th ed.). Houston: Gulf Publishing Co.

Knezek, G. & Christensen, R. (2002). Impact of New Information Technologies on Teachers and Students. *Education and Information Technologies*, *7* (4) 369–376.

Kopcha, T. J. (2010). A systems-based approach to technology integration using mentoring and communities of practice. *Educational Technology Research and Development*, *58*(2), 175–190.

Laine, L. (2003). Is e-learning effective for IT training? *TD Educational Technology Journal, 57*(6), 55-60.

Laurillard, D. (2002). *Rethinking university teaching – A conversational framework for the effective use of learning technologies.* London: Routledge Falmer.

Laurillard, D. (2013). *Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology*. New York: Routledge, Taylor & Francis Group.

Laxford, K.W. (2009). *Implementation of Technology Integration in Higher Education: Case Study of the University of Dar-es-Salaam in Tanzania* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Lawless, K., & Pellegrino, J. (2007). Professional development in integrating technology into teaching and learning: Knowns, unknowns and ways to pursue better questions and answers. *Review of Educational Research*, 77 (4), 575-614.

Levin, T., & Wadmany, R. (2008). Teachers' views on factors affecting effective integration of information technology in classroom: Developmental scenery. *Journal of Technology and Teacher Education*, *16* (2), 233-236

Liaw, S., Huang, H., & Chen, G. (2007). Surveying instructor and learner attitudes toward eLearning. *Computers & Education*, *49* (4), 1066-1080

Lim, C. P., & Chai, C. S. (2008). Teachers' pedagogical beliefs and their planning and conduct of computer-mediated classroom lessons. *British Journal of Educational Technology, 39* (5), 807–828.

Lin, J. M., Wang, P., & Lin, I. (2012). Pedagogy technology: A two-dimensional model for teachers' ICT integration. *British Journal of Educational Technology, 43*(1), 97–108.

Liu, S. Y., Gomez, J., & Yen, C. (2009). Community college online course retention and final grade: Predictability of social presence. *Journal of Interactive Online Learning, 8*(2), 165-182.

Lumsdaine, A.A. (1964). Educational technology, programmed learning, and instructional science. In E.R. Hilgard (Ed.), *Theories of learning and instruction: The sixty-third yearbook of the National Society for the Study of Education*. Chicago: University of Chicago Press.

Malinovski, T., Vasileva-Stojanovska, T., Jovevski, D., Vasileva, M., & Trajkovik, V. (2015). Adult students' perceptions in distance education learning environments based on a video conferencing platform analysis. *Journal of Information Technology Education 14*, 1-19

Markauskaite, L. (2006). Gender issues in preservice teachers' training: ICT literacy and online learning. *Australasian Journal of Educational Technology*, *22* (1), 1-20.

Martins, C., Steil, A., & Todesco, J. (2004). Factors influencing the adoption of the Internet as a teaching tool at foreign language schools. *Computers & Education*, *42* (4), 220-237.

Massy, W. F., & Zemsky, R. (1995). *Using information technology to enhance academic productivity*. Washington, DC: Inter University Communications Council, Inc.

Massey, W.E. (2001). Uncertainties in the changing academic profession. In S.R. Graubard (Ed.), *The American academic profession* (pp. 67-94). New Brunswick, NJ: Transaction Publishers.

Meyers R. & Desiderio M. (2007) Technology empowered transitions: curriculum, teachers' practices, and Change. *The Rural Educator 29*, 37–41.

McKenzie, J. (1999). *How teachers learn technology best*. Bellingham, WA: FNO Press.

Mends-Brew, E. (2012). Enhancement of ICT in polytechnics for accelerated development. Natural and Applied Science, *3*(3), 99–107.

Mereba, T. (2003). Managing transformation: Aligning technology initiatives with institutional priorities. *TechTrends 47* (3), 42-44.

Merriam, S.B., & Caffarella, R.S. (1991). *Learning in adulthood*. San Francisco: Jossey-Bass.

Merriam-Webster's dictionary (12^{th} ed.). (2016). Springfield, MA: Merriam-Webster.

Mitzner, T. L., Boron, J. B., Fausset, C. B., Adams, A. E., Charness, N., Czaja, S. J., & Sharit, J. (2010). Older adults talk technology: technology usage and attitudes. *Computers in Human Behavior, 26* (6), 1710–1721.

Moeller, B., & Reitzes, T. (2011). *Integrating technology with student-centered learning*. A report to the Nellie Mae education foundation. Retrieved from https://www.nmefoundation.org/research/personalization/integrating-technology-with-student-centered-learn

Mueller, J., Wood, E., Willoughby, T., Ross, C., & Specht, J. (2008). Identifying discriminating variables between teachers who fully integrate computers and teachers with limited. integration. *Computers & Education, 51* (4), 1523-1537.

Neumann, R. (2001). Disciplinary differences and university teaching. *Studies in higher education, 26* (2), 135-146.

North Dakota University System. (2017). *2017 annual budget guidelines.* Retrieved from https://www.ndus.edu/uploads/resources/7990/fy18-annual-budget-guidelines-final.pdf

Olson, M., & Winger, A. (2013). Students and faculty speak out: When technology in the college classroom is productive or distractive. *Journal of Scholastic Inquiry: Education, 1*(1), 88-111. Granite Falls, MN: Center for Scholastic Inquiry, LLC.

Pajo, K., & Wallance, C. (2001). Barriers to the uptake of web-based technology by university teachers. *Journal of Distance Education 16* (1), 70-84.

Parker, R. E., Bianchi, A., & Cheah, T. Y. (2008). Perceptions of instructional technology: Factors on influence and anticipated consequences. *Educational Technology & Society*, *11* (2), 274-293.

Pelgrum, W. J. (2001). Obstacles to the integration of ICT in education: results from a worldwide educational assessment. *Computers & Education*, *37*(2), 163–178.

Piccoli, G., Ahmad, R. & Ives, B. (2001). Web-based virtual learning environments: A research framework and a preliminary assessment of effectiveness in basic IT skills training. *MIS Quarterly, 25* (4), 401-425.

Plair, S. (2008). Revamping professional development for technology integration and fluency. *The Clearing House*, *82* (2), 70-74.

Plomp, T., Anderson, R. E., Law, N., & Quale, A. (Eds.). (2009). *Cross-national information* *and communication technology: policies and practices in education*. Charlotte, N.C.: Information Age Publishing.

Pope, M., Hare, D., & Howard, E. (2002). Technology integration: Closing the gap between what preservice teachers are taught to do and what they can do. *Journal of Technology and Teacher Education, 10* (2), 101-203.

Porter, W. W., & Graham, C. R. (2016). Institutional Drivers and Barriers to Faculty Adoption of Blended Learning in Higher Education. *British Journal of Educational Technology*, *47* (4), 748-762.

Quick, D., & Davies, T. (1999). Community college faculty development: bringing technology into instruction. *Community College Journal of Research and Practice*, *23* (7), 641-653.

Reigeluth, C. M. (1983). Instructional design theories and models: An overview of their current status. Hillsdale, NJ: Lawrence Erlbaum Associates.

Reigeluth, C. M. (1999). *Instructional-design theories and models: A new paradigm of instructional theory.* NJ: Lawrence Erlbaum Associates.

Reiser, R., & Dempsey, J. (2002) *Trends and issues in instructional design and technology.* Upper Saddle River, NJ: Merrill Prentice Hall.

Reiser, R., & Dempsey, J. (2012) *Trends and issues in instructional design and technology*. Upper Saddle River, NJ: Merrill Prentice Hall.

Rogers, E.M. (1995). *Diffusion of innovations* (4th ed.). New York: Free Press.

Rogers, E.M. (2002). The nature of technology transfer. *Science Communication, 23* (3), 323-341.

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

Rogers, E.M. (2004). A prospective and retrospective look at the diffusion model. *Journal of*

Health Communication, 9, 13-19

Rozell, E.J., & Gardner, W.L. (1999). Computer-related success and failure: a longitudinal field study of the factors influencing computer-related performance. *Computers in Human Behavior, 15* (1), 1-10.

Ruhizan, M., Norazah, M., Mohd, B. R., Faizal, A., & Jamil, A. (2014). Vocational education readiness in Malaysia on the use of e-portfolios. *Journal of Technical Education and Training, 6* (2), 157–171.

Russell M., Bebell D., O'Dwyer L. & O'Connor K. (2003) Examining teacher technology use. Implications for preservice and in-service teacher preparation. *Journal of Teacher Education 54*, 297–310.

Salaway, G., & Caruso, J. B. (2007). *The ECAR study of undergraduate students and information technology 2007.* Retrieved from https://net.educause.edu/ir/library/pdf/ers0808/rs/ers0808w.pdf

Samarawickrema, G. & Stacey, E. (2007). Web-based learning and teaching: A case study in higher education *Distance Education*, *28* (3), 313-333.

Schiler, J. (2003). Working with ICT: Perceptions of Australian principals, *Journal of Educational Administration*, *41* (3), 171-185.

Seels, B. B., & Richey, R. C. (1994). *Instructional technology: The definition and domains of the field*. Washington, DC: Association for Educational Communications and Technology.

Serwatka, J. (2003). Assessment in on-line CIS courses. *Journal of Computer Information Systems, 43* (3), 16-20.

Sherry, L., Billig, S., Tavalin, F., & Gibson, D. (2000). New insights on technology adoption in schools. *T.H.E. Journal*, *27*, 43-46.

Silber, K. (1970). What field are we in, anyhow? *Audiovisual Instruction, 15* (5), 21–24.

Silber, K. (1972). The learning system. *Audiovisual Instruction, 17* (7), 10–27.

Spotts, T., Bowman, M., & Mertz, C. (1997). Gender and use of instructional technologies: A study of university faculty. *Higher Education, 34*, 421- 436.

Stone, P.N. (2005) *Technology adoption into teaching and learning by mainstream university faculty*: a mixed methodology study revealing the how, when, why, and why not. (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Surry, D. W. (1993). *The role of perceptions in the development and adoption of three computer-based learning modules.* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Surry, D.W., Brennan, J.D. (1998). *Diffusion of instructional innovations: Five important, unexplained questions.* Retrieved from https://files.eric.ed.gov/fulltext/ED422892.pdf

Surry, D. W. & Ensminger, D. C. (2002). Development of implementation profile instrument. *British Journal of Educational Technology*. *35*(34), 503-504.

Surry, D.W. & Farquhar, J.D. (1997). Diffusion theory and instructional technology. *Journal of Instructional Science and Technology (2)*1.

Surry, D.W., & Gustafson, K.L. (1994). *The role of perceptions in the adoption of computer-based learning*. (ERIC Document Reproduction Service No. ED 374788).

Surry, D.W., Robinson, M.A. & Marcinkiewicz (2001). *A model for integrating instructional technology into colleges of education*. Retrieved from https://pdfs.semanticscholar.org/45b4/d69043cdc60dcb850391653b31b5cedbc80b.pdf

Surry, D. W. & Land, S.M. (2000). Strategies for motivating higher education faculty to use technology. *Innovations in Education and Training International*. *37*, (2),149-153.

Swanson, J. A. & Walker, E., (2015). Academic versus non-academic emerging adult college student technology use. *Technology Knowledge and Learning*, *20* (2), 147-158.

Swanson, J. A. (2016). *The impact of technology integration upon collegiate pedagogy from the lens of multiple disciplines.* 13th International Conference on Cognition and Exploratory Learning in the Digital Age, Mannheim, Germany. Retrieved from https://eric.ed.gov/?id=ED571432

Tatnall, A. (2001). *Adoption of Information Technology by Small Business - Two Different Approaches to Modelling Innovation*. Managing Information Technology in a Global Economy, Toronto, Canada, Idea Group Publishing.

Telmesani, M. (2010). *Faculty Perceptions of Online Education* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education, 57*(4), 2432–2440.

Teo, T. (2012). Examining the intention to use technology among pre-service teachers: an integration of the technology acceptance model and theory of planned behavior. *Interactive Learning Environments, 20* (1), 3–18.

Tomei, L. A. (2005). *Taxonomy for the technology domain*. USA: Information Science Publishing.

Tondeur, J., Valcke, M., & van Braak, J. (2008). A multidimensional approach to determinants of computer use in primary education: Teacher and school characteristics. J*ournal of Computer Assisted Learning*, *24* (6), 494–506.

Tong, K.P., and Triniada, S.G. (2005). Conditions and constraints of sustainable innovative pedagogical practices using technology. *Journal of International Electronic for leadership in learning, 9* (3), 1-27.

U. S. Department of Education (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Washington, DC: U. S. Department of Education. Retrieved from https://tech.ed.gov/

Varden, C. H. (2002). *Application of Ely's conditions in implementation of a wireless laptop program*. Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Volman M. & Van Eck, E. (2001). Gender equity and information technology in education: The second decade. Review of Educational Research, *71* (4), 613-634.

Wachira, P., & Keengwe, J. (2011). Technology integration barriers: Urban school mathematics teachers' perspectives. *Journal of Science Education and Technology, 20* (1), 17–25.

Waggoner, M. D. (1994, 2006). Disciplinary differences and the integration of technology into teaching. *Technology, Pedagogy and Education*, *3*(2), 175-186.

Wang, Y. (2003). Assessment of learner satisfaction with asynchronous electronic learning systems. *Information & Management, 41*(1), 75-86.

Watson, G. (2006). Technology Professional development: Long-term effects on teacher self-efficacy. Journal *of Technology and Teacher Education*, *14* (1), 151 166.

Wheatley, B. & Greer, E. (1995). Interactive television: a new delivery system for a traditional reading course. *Journal of Technology and Teacher Education 3* (4), 343-350.

White, S., & Liccardi, I. (2006). Harnessing insight into disciplinary differences to refine

E-learning design. *Proceedings from 36th ASEE/IEEE Frontiers in Education Conference. San Diego, CA: ASEE/IEEE.* Retrieved from https://pdfs.semanticscholar.org/4adb/acab0325e6c011d8cbf9541934f06f2df0f6.pdf

Wepner, S., Tao, L., & Ziomek, N. (2006). Broadening our view about technology integration: Three literacy educators' perspectives. *Reading Horizons*, *46* (3), 215-237.

Weiss, D. J., Dawis, R. V., England, G. W., & Lofquist, L. H.. (1977). *Manual for the Minnesota satisfaction questionnaire.* Minneapolis: University of Minnesota.

Williams, M. D. (2003). Technology integration in education. In Tan, S.C. & Wong, F.L. (Eds.), *Teaching and Learning with Technology*, pp. 17-31: An Asia-Pacific Perspective. Singapore: Prentice Hall.

Wlodkowski, R. J. (1993). *Enhancing adult motivation to learn*. San Francisco: Jossey-Bass, Inc Publishing.

Wozney, L., Venkatesh, V., & Abrami, P.C. (2006). Implementing computer technologies: Teachers' perceptions and practices. *Journal of Technology and teacher education*, *14* (1), 173-207.

Yidana, I. (2007). *Faculty Perceptions of Technology Integration in the Teacher Education Curriculum*: *A Survey of Two Ghanaian Universities* (Ph.D. thesis). Retrieved from https://ezproxy.library.und.edu/login?cfltitle=Dissertations+%26+Theses+-+All

Yildirim, S. (2007). Current Utilization of ICT in Turkish Basic Education Schools: A Review of Teacher's ICT Use and Barriers to Integration. *International Journal of Instructional Media*, *34* (2), 171-86.

Yilmaz, N.P. (2011). Evaluation of the Technology Integration Process in the Turkish Education System. *Contemporary Educational Technology*, *2* (1), 37-54.

Yukselturk, E., & Bulut, S. (2009). Gender differences in self-regulated online learning environment. *Journal of Educational Technology & Society*, *2* (3), 12- 22.

Zhao, Y., & Frank, K. A. (2003). Factors affecting technology uses in schools: an ecological perspective. *American Educational Research Journal, 40* (4), 807–840.