12-2014

Faculty Integration of Technology in Undergraduate Courses at Private Colleges and Universities

Evelyn G. Smith
East Tennessee State University

Faculty Integration of Technology in Undergraduate Courses at Private Colleges and Universities

---

A dissertation
presented to
the faculty of the Department of Educational Leadership and Policy Analysis
East Tennessee State University

In partial fulfillment
of the requirements for the degree
Doctor of Education in Educational Leadership

---

by
Evelyn G. Smith
December 2014

Dr. Bethany H. Flora, Chair
Dr. Andrew Czuchry
Dr. Donald W. Good
Dr. Pamela H. Scott

Keywords: Faculty Use of Technology, Instructional Technology, Integration of Technology, Teaching and Learning, Pedagogy, Teaching, Technology, Technology Adoption, Technology Integration, Technology Use

ABSTRACT

Faculty Integration of Technology in Undergraduate Courses at Private Colleges and Universities

by

Evelyn G. Smith

The purpose of this quantitative research study was to investigate the integration of technology in undergraduate courses by faculty at private colleges and universities. Integration of technology is using technology as an instructional tool to improve teaching and learning (Clayton-Pedersen & O'Neill, 2005; Wilson & Hayes, 2000; Woodbridge, 2004). Chickering and Gamson's (1987) 7 principles for good practice in undergraduate education provided the theoretical framework for this research. The researcher conducted a survey of full-time faculty at 21 private colleges and universities in Kentucky, North Carolina, Tennessee, Virginia, and West Virginia. The results of the study indicated that faculty use technology significantly to communicate high expectations to students and to support diverse talents and ways of learning. However, faculty reported that they do not use technology significantly for the other 5 principles: to support student-faculty contact, promote cooperation and reciprocity among students, promote active learning, provide prompt feedback, and promote time on task.

Analysis of the data indicated that female faculty use technology significantly more than male faculty for all 7 principles. Findings regarding age indicated that faculty who are 40-59 use technology significantly more than faculty under 40 to support prompt feedback, time on task, and diverse talents and ways of learning. No significant differences existed between other age groups regarding these 3 principles. No significant differences existed between any age groups

regarding use of technology to promote student-faculty contact, encourage reciprocity and cooperation, promote active learning, and communicate high expectations.

The results of this study extend the current knowledge about faculty use of technology to advance good practice in undergraduate education. Additionally, the results provide information about differences in use of technology by faculty based on gender and age. These findings may inform institutional policies and practices with regard to implementing a systemic approach to teaching with technology.

DEDICATION

I dedicate this study to my family, especially my mother (a nonagenarian), husband, son, daughter-in-law, and four grandchildren. Their love, patience, understanding, and support have been steadfast as I spent countless hours on my quest to earn a doctorate degree. I also dedicate the study to my colleagues whose encouragement and support have been extraordinary. I thank all of you from the bottom of my heart!

ACKNOWLEDGEMENTS

First, it is with many thanks and much appreciation that I acknowledge the support and assistance of my dissertation committee members: Dr. Bethany H. Flora (Chair), Dr. Andrew Czuchry, Dr. Donald W. Good, and Dr. Pamela H. Scott.

I acknowledge Dr. Jasmine Renner, chair of my dissertation committee when I started this process, and all of the Educational Leadership and Public Policy (ELPA) faculty who helped make my journey a great educational experience.

I acknowledge the Chief Academic Officers at the Appalachian College Association (ACA) institutions who gave approval for their faculty to participate in the survey and extend my thanks to ACA faculty who participated in the survey.

I acknowledge Dr. Donna Wood who graciously allowed me to modify her survey instrument and use it for this research study.

I also acknowledge my colleagues, Dr. Clayton Hess for his encouragement and staunch support, and Dr. Christy Cowan for her assistance and support with SPSS and data analysis.

TABLE OF CONTENTS

Page

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

CHAPTER 1

INTRODUCTION

Technological advances over the past 3 decades have affected the processes of teaching and learning (Gappa, Austin, & Trice, 2007; Humphreys, 2012; Zhou & Xu, 2007). However, ". . . occasions in which the academy has been *transformed* by technology are rare" (Hartman, 2008, p. 1). Hartman suggested that these occasions, when viewed in a historical perspective, represented a series of three epochs: the online public-access catalog epoch; the personal computer, Internet, and web epoch; and the enterprise systems (enterprise resource planning [ERP] and content management system [CMS]) epoch. Hartman contended that although developments were continuing, these three epochs no longer represent technological frontiers for most colleges and universities. Rather, attention in higher education is focused ". . . on technology applications for teaching, learning and research—or what can be viewed as the epochs of teaching and learning with technology, and cyberinfrastructure" (p. 1).

Since the early1980s new learning theories and student-centered pedagogical practices have emerged. Integration of technology into teaching has facilitated the new theories and practices. Integration of technology is using technology as an instructional tool to improve teaching and learning (Clayton-Pedersen & O'Neill, 2005; Wilson & Hayes, 2000; Woodbridge, 2004). This research study was an exploration of use of technology to advance good practice in undergraduate education. Technology use explored included electronic mail, text messaging, social networking, social messaging, discussion forums, chat rooms, blogs, online learning, blended learning strategies, learning management systems, lecture videos, podcasts, presentation technology, collaboration technology, and technologies that provide real-world learning and problem-solving opportunities and promote student engagement and research.

Institutions of higher education have made significant investments in technological infrastructure such as multimedia classrooms, wireless networks, and learning management systems. Although many faculty members have been early adopters of technology, the impact of technology on teaching and learning has not been systemic, widespread, or sustained (Hartman, 2008; Zayim, Yildirim, & Saka, 2006). "Even so, our faith in the potential of technology as a tool to transform teaching and learning remains steadfast" (Hartman, 2008, p. 1). McGill, Bagenal, Buttenfield, and Forsman (2000) stated that "The core business of higher education—teaching, scholarship and research—is grounded in academic units (departments, schools and colleges) and is provided by a single resource—the faculty" (p. 2). Umbach and Wawrzynski (2005) echoed McGill et al. in their declaration that ". . . faculty behavior and attitudes affect students profoundly, which suggests that faculty members may play the single-most important role in student learning" (p. 176).

McGill et al. (2000) also asserted that direct faculty involvement will determine an institution's success in integrating technology into teaching and learning. LeCompagnon (1995) and Stedman, Roberts, Harder, Myers, and Thoron (2011) suggested that the primary motivating factor for faculty use of technology is a desire to solve existing problems—for example, to improve teaching and learning strategies, to promote collaborative learning, to increase student motivation, to encourage critical thinking, and to facilitate access to information resources. Personal characteristics are also a factor in determining which faculty will make use of technology in their teaching (Gibson, Harris, & Colaric, 2008; LeCompagnon, 1995; Osika, Johnson, & Buteau, 2009; Parker, Bianchi, & Cheah, 2008; Stedman et al., 2011).

Student expectations with regard to integration of technology into teaching and learning are high because many students have a predilection to technology. These students expect their

learning experiences to be enhanced by technology (Brown, 2009; Chelliah & Clarke, 2011; Smith, Salaway, & Caruso, 2009; Tapscott, 2009; Waggener, 2012; Young, 2012). However, while many students have a predilection to technology, there is still a digital divide among students, not only with regard to access to technology that is improving, but also with regard to engagement with technology, capability of the technology, individual competence, and availability of support. This digital divide presents pedagogical challenges for faculty in ensuring access to technology for all students and the development of practical skills in the use of technology (Chelliah & Clarke, 2011; Gappa et al., 2007; Hawkins & Oblinger, 2006; Lane, 2009). Understanding how faculty members teaching undergraduate courses handle these challenges is important in addressing the digital divide.

Because faculty members are providing the core business of higher education (Gappa et al., 2007; McGill et al., 2000), faculty use of technology in teaching and learning must be understood and responded to in a positive manner in order to achieve success in effectively integrating technology into pedagogy. Guidry and BrckaLorenz (2010) reported that even though research has indicated a link between technology and positive educational outcomes, some researchers argue that the pedagogical changes that inevitably accompany integration of technology are responsible for the positive educational outcomes, not the technologies themselves. The U.S. Office of Technology Assessment (1995) reported, ". . . it is becoming increasingly clear that technology, in and of itself, does not directly change teaching or learning. Rather, the critical element is how technology is incorporated into instruction" (p. 57). McGill et al. (2000), Roberts (2005), and Tabata and Johnsrud (2008) asserted that institutional success in offering appropriate technology-enhanced learning experiences to students relies

predominantly on faculty involvement. The involvement of faculty echoed the recommendations for higher education institutions by Zayim et al. (2006):

> Higher education institutions today are confronted with instructional technology innovation, which is transforming the way in which faculty and students interact and the roles they take. If the goal of the higher education institution is the integration of technology for a transformative change, then rather than the acquisition of technology itself, there must be a clear focus on the faculty members who use technology. For large-scale technology integration to occur in teaching, it is essential to understand and address differentiating needs of faculty in faculty development and support systems. (p. 220)

Transformation in teaching and learning does not come from technology itself but rather the way technology is used to solve problems (Bitner, Ostrom, & Burkhard, 2012; Chelliah & Clarke, 2011; Georgina & Hosford, 2009; Koç, 2005; Thille, 2010). Therefore, it is important to know how faculty are using technology. Knowing who uses technology, how they use it, and why they use it is crucial in planning faculty professional development in order to make informed decisions about technology adoptions (Parker et al., 2008). Little information is available about whether faculty are intentional in the use of technology to enhance student learning (Wood, 2009). The rapid changes in technology make understanding why and how faculty adopt technology particularly important (Straub, 2009).

Institutions of higher education are experiencing dramatic changes as they attempt to educate a more diverse student body and increase research efforts while simultaneously being confronted with fiscal constraints and external demands for accountability (Clayton-Pedersen & O'Neill, 2005; Futhey, Luce, & Smith, 2010; Gappa et al., 2007; Oblinger, 2012b; Schaffhauser, D., 2011; Sheets & Crawford, 2012; Thille, 2010; Umbach & Wawrzynski, 2005). Integration of

technology into teaching and learning may provide advantages, but effective and efficient use of technology requires significant fiscal resources (Oblinger, 2012b; Zayim et al., 2006). Technological advances have created new roles for faculty members as they interact with students and assess student learning (Gappa et al., 2007; "Flipped classrooms," n.d.). Changes in faculty work, faculty appointments, and faculty demographics are occurring in higher education. The number of tenured and tenure-track faculty has decreased, while the number of faculty with renewable contracts or fixed-term appointments has increased (Clery, 2012; Gappa et al., 2007). A significant demographic change in faculty is the sizable increase in the number of women in faculty positions (Gappa et al., 2007; U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, Digest of Education Statistics, 2011, 2012). From 2005 to 2011 the number of females in faculty positions in all degree-granting institutions increased by 22.1%, while male faculty members increased only slightly with an overall growth of 6.3%. Reported data for fall 2011 indicated that private 4-year institutions had 254,005 full-time faculty comprised of 58% males and 42% females. Private nonprofit 4-year institutions reported 238,219 full-time faculty for 2011 with the same percentage of males (58%) and females (42%) (U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, Digest of Education Statistics, 2011). It is important to know the overall gender composition of faculty to determine whether the gender composition of participants in the current study is consistent with the overall gender composition.

Statement of the Problem

The use of instructional technologies in higher education classrooms is nearly ubiquitous. There is much documentation in the literature about the transformative powers of technology but less about how faculty members perceive the effects of technology on pedagogy (Parker et al.,

2008). Given the centrality of teaching and learning to the mission of colleges and universities, integration of technology remains an important goal and one of the most conspicuous pieces of unfinished business (Hartman, 2008). According to Hartman (2008), "Although there have been some signature successes, overall higher education has not convincingly demonstrated that technology has had a systemic, widespread, or sustained impact on the process of teaching or on student learning outcomes" (p. 1). Mendenhall (2012) asserted that the productivity of every industry except education has been changed by technology, "In fact, in education today technology is most often an add-on cost and not used to change or improve teaching and learning" (p. 117). The large investments educational institutions have made in infrastructure to support teaching and learning with technology provide a compelling impetus to explore the types of technology and levels of use being incorporated into pedagogy by faculty and whether that use supports good practice in undergraduate education. Furthermore, it is important to understand if differences exist among faculty due to demographic factors, as this information could be useful in identifying groups that may need more assistance and support to integrate technology successfully into their curricula (Wood, 2009). Previous research indicated that demographic factors such as gender, rank, and length of tenure influence orientation toward technology (Gibson et al, 2008; Osika et al., 2009; Parker et al., 2008; Zayim et al., 2006).

Another reason for examining technology use by faculty is that technology has the potential to help meet the demand for accountability and lower costs in postsecondary education (Oblinger, 2012b; Sheets & Crawford, 2012; Tamarkin & Rodrigo, 2011; Thille, 2010; U.S. Department of Education, Office of Educational Technology, 2012; Young, 2012). Institutions continue to invest heavily in current technologies with the expectation that faculty will use them to enhance their teaching and the learning experiences of students (Brill & Galloway, 2007).

Faculty must acquire new skills and abilities in addition to the traditional talents and competencies expected of professors. "Entrepreneurialism, quantifiable productivity, and efficiency are high on the list of expectations that faculty must meet" (Gappa et al., 2007, p. 9). Increased expectations have resulted in expanded faculty workloads and declines in faculty autonomy and control. These changes have come at a time when faculty members want more flexibility from educational institutions in order to meet the multiple and complex demands, both personal and professional, on faculty time (Gappa et al., 2007).

One way to explore the types and levels of technology use by faculty is to elicit faculty input. Surveys are one of the most common methods of data collection (Bluman, 2008; Fraenkel & Wallen, 2009; Pike 2007). According to Pike (2007) survey data are used in about 60% of published research in major higher education journals. The use of surveys is widespread in educational research because credible information from a large population can be collected at a relatively low cost, particularly if the survey is conducted in an online format (Lefever, Dal, & Matthíasdóttir, 2007). Surveys are often the only way to obtain a representative description of traits, beliefs, attitudes, and other characteristics of the population. Surveys also allow for generalizability across the population (Fraenkel & Wallen, 2009; Jankowicz, 2005; McMillan & Schumacher, 2010; Schwarz, 2007; Sue & Ritter, 2007; Witte & Witte, 2007). According to McMillan and Schumacher (2010) online surveys can be the most effective kind of survey with regard to response rate and number of participants.

The purpose of this quantitative study was to investigate integration of technology by faculty teaching at the undergraduate level at private colleges and universities. Integration of technology is using technology as an instructional tool to improve teaching and learning (Clayton-Pedersen & O'Neill, 2005; Wilson & Hayes, 2000; Woodbridge, 2004). The

theoretical framework for this research was Chickering and Gamson's (1987) seven principles for good practice in undergraduate education that support: (a) contact between students and faculty, (b) reciprocity and cooperation among students, (c) active learning, (d) prompt feedback, (e) time on task, (f) high expectations, and (g) diverse talents and ways of learning. The study explored faculty use of technology to advance the seven principles for good practice in undergraduate education. Technology use included electronic mail, text messaging, social networking, social messaging, discussion forums, chat rooms, blogs, online learning, blended learning strategies, learning management systems, lecture videos, podcasts, presentation technology, collaboration technology, and technologies that provide real-world learning and problem-solving opportunities and promote student engagement and research.

This study provides information about faculty integration of technology into teaching to support good practice in undergraduate education at private colleges and universities. Results include differences in use of technology by faculty based on demographic factors of gender and age. The results of this study may be useful in guiding instructional technology practices and designing and implementing a systemic approach to teaching and learning with technology. The information potentially will be useful to university chief academic officers, instructional technologists, and other academic staff who are involved in curriculum design and development and faculty training related to pedagogy and technology. In addition, the information is likely to be of interest to information systems personnel who provide technology training and support to faculty.

Research Questions

The purpose of this quantitative research study was to investigate the integration of technology in undergraduate courses by faculty at private colleges and universities. The research study addressed the following questions:

RQ1. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to enhance student-faculty contact?

RQ2. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to encourage reciprocity and cooperation among students?

RQ3. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote active learning?

RQ4. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to provide prompt feedback to students?

RQ5. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote time on task?

RQ6. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to communicate high expectations to students?

RQ7. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to support diverse talents and ways of learning?

RQ8. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on gender?

RQ9. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on gender?

RQ10. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on gender?

RQ11. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on gender?

RQ12. Are there significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on gender?

RQ13. Are there significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on gender?

RQ14. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on gender?

RQ15. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on age group?

RQ16. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on age group?

RQ17. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on age group?

RQ18. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on age group?

RQ19. Are there significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on age group?

RQ20. Are there significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on age group?

RQ21. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on age group?

Significance of the Study

The results of empirical research are often mixed or contradictory regarding the effectiveness of technology. Regardless, undergraduate students expect faculty to use technology and use it well (Crews, Miller, & Brown, 2009; Guidry & BrckaLorenz, 2010; Parker et al., 2008; Roberts, 2005). Technology is at the core of almost every aspect of our lives and technology can be leveraged for educational purposes to improve student learning (Bickel, Shewbridge, & Suess, 2012; Humphreys, 2012; Mendenhall, 2012; Oblinger, 2012b; Tate & Klein-Collins, 2012; U.S. Department of Education, Office of Educational Technology, 2010). The conceptual framework for the study was based on constructs of good practice in undergraduate education: (a) contact between students and faculty, (b) reciprocity and cooperation among students, (c) active learning, (d) prompt feedback, (e) time on task, (f) high expectations, and (g) diverse talents and ways of learning (Chickering & Gamson, 1987). Faculty members responded to survey statements about the types of technology they use to advance each good practice and their levels of use. Demographic data collected from faculty via the electronic survey provided data used to determine if there are significant differences in use of technology based on factors of gender and age group. Previous research indicated that factors such as gender and age influence orientation toward technology (Ahadiat, 2008; Gibson et al., 2008; Osika et al., 2009; Parker et al., 2008; Zayim et al., 2006).

A total of 421 full-time faculty at 21 private colleges and universities in the Appalachian region of Kentucky, North Carolina, Tennessee, Virginia, and West Virginia participated in this study. Because the theoretical constructs supporting this research were principles for good practice in undergraduate education, the survey included only faculty who teach undergraduate courses. Faculty participants responded to statements about the types of technology they use to

advance each good practice and their levels of use. Undergraduate faculty present a rich source of information because they are teaching millennial students. Many educational reforms are being driven by the characteristic profile of the millennial generation. Millennial students have been characterized as special, sheltered, confident, team-oriented, conventional, pressured, achieving, optimistic, intelligent, goal-oriented, ambitious, interested in learning, multitaskers, respectful of cultural differences, collaborative, desiring of flexibility, needy for feedback, and anticipatory of immediate response; they are often described as active learners who work best in small groups and prefer to learn through the use of technology (DiLullo, McGee, & Kriebel, 2011; Strange, as cited in Elam, Stratton, & Gibson, 2007). Students see themselves as customers of higher education and equal partners in the learning process (Puzziferro & Shelton, 2009). Because of their predilection to technology, millennial students expect technology to be integrated well into their educational experiences (Brown, 2009; Chelliah & Clarke, 2011; McCabe & Meuter, 2011; Roberts, 2005; Tapscott, 2009; Waggener, 2012; Young, 2012). However, millennial students care about the activities that the technology enables, not the technology itself (Oblinger & Oblinger, 2005; Wagner, 2005).

DiLullo et al. (2011) reported that in addition to the positive traits, millennial students are characterized as ". . . narcissistic with a feeling of entitlement, unmotivated, impatient, incurious, unprepared for independence, academically disengaged, and deficient in time management, media literacy, and critical thinking skills" (p. 215). Caution should be taken when globally defining any student cohort with a single set of character traits. The characteristic profile of millennial students can be challenged by research in several fields including cognition, learning style, neurology, and psychology. There is diversity in any generation and there is considerable diversity in background, personality, and learning style among millennial students; efforts should

be ". . . concentrated on providing education that focuses on the knowledge and competencies which students need to be successful in their chosen profession using teaching methods and techniques designed to accommodate all learning styles . . ." (DiLullo et al., p. 223).

Undergraduate faculty members are also teaching large numbers of nontraditional students who value quality, convenience, and cost (Puzziferro & Shelton, 2009). Nontraditional students want flexibility in course scheduling because they usually have competing work and family responsibilities. Use of technology has the potential to enable institutions to meet the demands of nontraditional students for flexible course scheduling in higher education (Stewart, Bachman, & Johnson, 2010). Nontraditional students expect faculty to have real-world experience and to be flexible and customer-service oriented (Puzziferro & Shelton, 2009). Faculty members must understand the characteristics of diverse learners such as millennial and nontraditional students and be prepared to address different learning needs in ways that are efficient (Gappa et al., 2007).

Assumptions

This researcher made the following assumptions:

1. Technology can be used as an effective tool to advance the seven principles of good practice in undergraduate education that support: (a) contact between students and faculty, (b) reciprocity and cooperation among students, (c) active learning, (d) prompt feedback, (e) time on task, (f) high expectations, and (g) diverse talents and ways of learning (Bickel et al., 2012; Bitner et al., 2012; Chelliah & Clarke, 2011; Chickering and Gamson,1987; Georgina & Hosford, 2009; Humphreys, 2012; Koç, 2005; Mendenhall, 2012; Oblinger, 2012b; Tate & Klein-Collins, 2012; Thille, 2010; U.S. Department of Education, Office of Educational Technology, 2010).

2. Only full-time faculty who teach undergraduate courses at participating colleges and universities responded to the survey. Faculty identified as teaching only graduate courses were not included in the survey distribution. Also, the first page of the electronic survey contained a note indicating that the survey was only for faculty teaching undergraduate courses.
3. Self-reported data are appropriate for this study. Surveys are used frequently in educational research and often are the only way to obtain a representative description of traits, beliefs, attitudes and other characteristics of the population. Surveys also allow for generalizability across the population (Fraenkel & Wallen, 2009; Jankowicz, 2005; McMillan & Schumacher, 2010; Pike (2007); Schwarz, 2007; Sue & Ritter, 2007).
4. SurveyMonkey, an online survey tool, provided a secure method for collecting survey results.
5. Data collected via SurveyMonkey were not altered in any way.
6. Survey responses were anonymous and confidential; no personal or institutional identifying information were reported in the results.

Limitations

This study was limited to full-time faculty who teach undergraduate courses at private 4-year colleges and universities. No attempt was made to collect or analyze data with regard to race or ethnicity because of the lack of significant diversity at the institutions surveyed; data from 2011 and 2012 indicate that diversity among the faculty at institutions where the survey was conducted ranged from 0% to 14 %, with only two greater than 10% and more than half at less than 5% (U.S. Department of Education, National Center for Education Statistics, Institute

of Education Sciences, Integrated Postsecondary Education Data System, "Look up an institution," n.d.). Thus, this study did not result in new information about any potential relationship between race and ethnicity and faculty use of technology to support the seven principles of good practice in undergraduate education. Therefore, the scope of this study was limited by not including race and ethnicity as demographic variables in the study.

The data used in this study were self-reported and therefore are subject to bias. Although some research findings indicate that self-reported data may not always be accurate (Leedy & Ormrod, 2013; Salajan, Schönwetter, & Cleghorn, 2010), self-reported data are used widely in educational research because self-reporting is often the only way to obtain information about traits, beliefs, attitudes, and other characteristics of faculty (Fraenkel & Wallen, 2009; McMillan & Schumacher, 2010; Schwarz, 2007; Sue & Ritter, 2007). Lance and Vandenberg (2009) indicated support for the use of self-reported data:

> . . . there is no strong evidence to lead us to conclude that self-report data are inherently flawed or that their use will always impede our ability to meaningfully interpret correlations or other parameter estimates obtained from the data. On the contrary, there are situations in which the use of self-report data appears to be appropriate and perhaps sometimes most appropriate. (p. 330)

All institutions included in this study are private 4-year institutions. Therefore, the results may not be generalizable to other types of institutions such as public colleges and universities, community colleges, and other 2-year institutions. While the results of this study may be generalizable to private institutions with characteristics similar to those institutions that participated in the study, the results may not be generalizable to private institutions with different characteristics such as size and regional differences.

Definitions of Terms

Definitions are provided for the following terms used in this study:

Blended learning: Blended learning is a combination of traditional face-to-face classroom instruction and online learning ("Blended Learning," n.d., para. 1).

Integration of technology: Integration of technology is using technology as an instructional tool to improve teaching and learning (Clayton-Pedersen & O'Neill, 2005; Wilson & Hayes, 2000; Woodbridge, 2004).

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

Full-time faculty: The IPEDS Glossary defines postsecondary teachers as: "An occupational category that consists of the following four functions: instruction only; instruction combined with research and/or public service; research; and public service" (U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, Integrated Postsecondary Education Data System, n.d.).

Instructional technology: Instructional technology is, "A complex, integrated process involving people, procedures, ideas, devices and organizations, for analyzing problems and devising, implementing, evaluating and managing solutions to those problems involved in all aspects of human learning" (Seels & Richey, as cited in Zayim et al., 2006, p. 213).

Objectivity: "Quantitative researchers attempt to operate under the assumption of objectivity. They assume that there is a reality to be observed and that rational observers who look at the same phenomenon will basically agree on its existence and its characteristics. They try to remain as neutral or value-free as they can, and they attempt to avoid human bias

whenever possible. In a sense, quantitative researchers attempt to study the phenomena that are of interest to them 'from a distance'" (Johnson & Christensen, 2012, p. 37).

Researcher bias: Research bias is, "Obtaining results consistent with what the researcher wants to find" (Johnson & Christensen, 2012, p. 264).

Teaching presence: Teaching presence is, ". . . the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educational worthwhile learning outcomes" (Anderson, Rourke, Garrison, & Archer, 2001, p. 3).

Technological literacy: Technological literacy is the capacity to "design, develop, control, use and assess technological systems and processes" (Warner, as cited in Georgina & Olson, 2008, p.1).

Overview of Study

Chapter 1 provided an introduction to the study, described the problem, and stated the research questions. Assumptions and limitations of the study were stated. A list of definitions provided clarification for terms that may not be common or that may have multiple interpretations.

Chapter 2 presents a review of the literature related to faculty integration of technology into teaching and learning. The literature review is focused on emerging technology in higher education, significance of pedagogical practice in higher education, influence of educational technology on the role of the faculty, and the influence of technology in undergraduate education. The influence of technology in undergraduate education is focused on traditional face-to-face, blended, and online classes; student expectations of faculty technical and pedagogical competence; and student experiences with technology.

Chapter 3 presents the research methodology. The research questions and null hypotheses are stated. The population and sample, instrumentation, data collection, data analysis and data presentation are described. A summary concludes Chapter 3.

Chapter 4 presents a summary of the demographics and discusses the results of the data analysis. The results of the data analysis are presented in a combination of narrative, frequency charts, and tables.

Chapter 5 contains a summary of the results of the research study and provides findings for each of the research questions. Conclusions drawn by the researcher and recommendations for potential future studies are stated.

CHAPTER 2

LITERATURE REVIEW

Introduction

The literature review established links between existing knowledge and the dissertation topic. Methodology from previous studies was incorporated into this study; for example, the decision to use Chickering and Gamson's (1987) seven principles for good practice in undergraduate education in forming the framework for the study was based on a dissertation by Wood (2009), who conducted a similar study with community college faculty. The literature review helped provide the context (history), refine the research problem, establish the conceptual framework, develop significance, identify methodological limitations, develop research hypotheses, and identify contradictory findings (McMillan & Schumacher, 2010).

This review was focused on scholarly literature in two areas: (1) the use of technology to advance the seven principles for good practice in undergraduate education, and (2) the differences in use of technology based on demographic factors. The seven principles for good practice in undergraduate education support (a) contact between students and faculty, (b) reciprocity and cooperation among students, (c) active learning, (d) prompt feedback, (e) time on task, (f) high expectations, and (g) diverse talents and ways of learning. The literature review included each principle. Literature regarding differences in use of technology based on demographic factors focused on gender and age.

Seven Principles for Good Practice in Undergraduate Education

In 1987 Chickering and Gamson published the seven principles for good practice in undergraduate education. Nine years later, Chickering and Ehrmann (1996) published an article

about implementing the seven principles using technology as levers. They suggested that in order to realize the full power of the new communication and information technologies, the technologies should be used in ways that are consistent with the seven principles. Chickering and Ehrmann described the technologies as tools with multiple capabilities.

The results of the 2008 National Survey of Student Engagement (NSSE) (Indiana University Center, 2008) included a list of college experiences that correlate to the most powerful learning outcomes. These high-impact practices include "first-year seminars and experiences; common intellectual experiences; learning communities; writing-intensive courses; collaborative assignments and projects; undergraduate research; diversity/global learning (study abroad); service learning, community-based learning; internships; and capstone courses and projects" (Bass, 2012, para. 10). According to Bass (2012, para. 10), "students' participation in one or more of these experiences had the greatest impact on success, retention, graduation, transfer, and other measures of learning." These high-impact practices closely resemble the seven principles for good practices published by Chickering and Gamson in 1987 (Bass, 2012). Kuh (2010) stated that the high-impact practices identified by NSSE induce student behaviors that enhance learning. These behaviors include devoting considerable time and effort to purposeful tasks, interacting with faculty and peers about substantive matters, experiencing diversity through contact with people who are different from the students, responding to more frequent feedback, reflecting and integrating learning, and discovering relevance of learning through real-world application (Kuh, 2010).

Students perform better and are more satisfied when institutions are committed to student academic success and engage students in educational experiences that lead to high levels of learning and development. Learning becomes more meaningful when students have

opportunities to apply their knowledge through experiences such as internships, community service, and capstone projects. In addition, students are more likely to succeed when institutions provide support to help them thrive socially and cope with nonacademic responsibilities such as work and family obligations (Indiana University Center, 2008; Kuh et al., 2005). Effective and efficient use of technology can facilitate academic and social success of students and assist students in meeting their nonacademic responsibilities by providing access to resources without the constraints of time and location. Faculty and staff can use email and text messages to follow up with students who miss class, experience academic difficulties, or have other problems. When faculty and staff take time to follow up with students, students feel more connected and part of the learning community and that they belong and are valued (Kuh et al., 2007). When faculty employ active and collaborative learning techniques and present academic challenges, students are more likely to engage in active and collaborative learning activities. The level of academic challenge has a positive relationship to improvements in general education knowledge and practical competencies (Umbach & Wawrzynski, 2005).

An example of an approach to teaching facilitated by technology is the flipped classroom model. This approach to teaching supports all seven principles of good practice in undergraduate education. Vaughan (2014) reported that use of the flipped classroom approach in higher education has resulted in increased student engagement, preparation, and achievement. Herreid and Schiller (2013) stated that the flipped classroom approach has become popular because of the availability of Internet resources. They described the flipped classroom as,

> A guiding principle of the flipped classroom is that work typically done as homework (e.g., problem solving, essay writing) is better undertaken in class with the guidance of

> the instructor. Listening to lecture or watching videos is better accomplished at home. Hence the term flipped or inverted classroom. (p. 62)

Fulton (as cited in Herreid & Schiller, 2013) reported the following advantages of the flipped classroom:

> . . . (1) students move at their own pace; (2) doing "homework" in class gives teachers better insight into student difficulties and learning styles; (3) teachers can more easily customize and update the curriculum and provide it to students 24/7; (4) classroom time can be used more effectively and creatively; (5) teachers using the method report seeing increased levels of student achievement, interest, and engagement; (6) learning theory supports the new approaches; and (7) the use of technology is flexible and appropriate for "21st century learning." (p. 62)

In a survey of 15,000+ members of the National Center for Case Study Teaching in Science Listserv conducted by Herreid and Schiller, 200 teachers reported that they use the flipped classroom approach and gave the following reasons:

> . . . (8) there is more time to spend with students on authentic research; (9) students get more time working with scientific equipment that is only available in the classroom; (1) students who miss class for debate/sports/etc. can watch the lectures while on the road; (11) the method "promotes thinking inside and outside the classroom"; (12) students are more actively involved in the learning process; and (13) they really like it. (p. 62)

Good Practice Encourages Student-Faculty Contact. Contact between students and faculty in class and outside the classroom is one of the most important factors in student motivation and engagement. Rapport with faculty motivates students, enhances their commitment to education, and encourages them to think about their own values and aspirations

(Chickering & Ehrmann, 1996). Technology increases student access to faculty and provides a safe environment for students to discuss personal concerns (Chickering & Ehrmann, 1996). Tools such as email, chat, and discussion boards provide students who are reluctant to engage in classroom discussion alternative ways to interact with faculty and other students. Contact between faculty and students is facilitated by the asynchronous nature of the tools (McCabe & Meuter, 2011). The social process of learning, providing space and opportunities for students and faculty to engage in social activities, is important (Dunlap & Lowenthal, 2009). Technology facilitates the social process through social networking and social messaging tools such as Facebook and Twitter, respectively. However, technology is not a substitute for faculty. Faculty members are vital to the learning process—they motivate students; and learning requires motivation (Legg & Wilson, 2009; Oblinger & Oblinger, 2005; Thille, 2010). Brown (2009) stated that, "the use of technology should not come at the expense of personal interaction both in and outside the classroom" (para. 2).

Learning does not happen in a vacuum in any learning environment; students interact with peers, faculty, campus administrators and staff, and community members. These interactions play a significant role in student learning when faculty members serve as mentors and use students' life experiences to foster deeper engagement in student learning (Brownell & Swaner, 2010). According to Umbach and Wawrzynski (2005), "The educational context created by faculty behaviors and attitudes has a dramatic effect on student learning and engagement," (p. 173). When faculty members emphasize effective educational practices, students become active participants in their learning and have a positive attitude about their educational experience (Umbach & Wawrzynski, 2005). Interaction with faculty members inside and outside the classroom gives students insight into the processes experts use to solve

problems. Faculty become role models and mentors for students and inspire students to become lifelong learners (Indiana University Center, 2008). Faculty who embrace technology and find ways to integrate technology into the educational process improve their connection with students (Yates, Adams, & Brunner, 2009).

Faculty presence is an essential component in effective online courses. Students value clear course requirements, faculty responsiveness to students' needs, timeliness of information, and faculty feedback. Students value faculty communication and responsiveness more than synchronous and face-to-face communication. Being able to see or hear the faculty member is not very important to students. Faculty teaching online courses can make their presence known through ". . . developing learning materials and activities that promote high levels of cognitive engagement, providing students with in-depth feedback for growth and development, exchanging ideas in student discussions, and continually challenging students to deepen their thinking" (Sheridan & Kelly, 2010, p. 2). Technology can be used for sustained communication with students to facilitate student construction of meaning and make students feel as though they are in a real classroom environment (Dunlap & Lowenthal, 2009; Wood, 2009).

Good Practice Encourages Cooperation Among Students. Teamwork enhances learning. "Learning is collaborative and social, not competitive and isolated" (Chickering & Ehrmann, 1996, p. 4). Technology facilitates cooperation and reciprocity among students through tools such as online discussion boards, chat rooms, blogs, electronic mail, collaboration technology, and presentation technology. When students work together, they become more engaged in learning. Sharing ideas with other students and responding to the ideas of others expands students' thinking and understanding. Technology facilitates study groups, collaborative learning, group problem solving, and discussion of assignments without the constraints of time

and location (Chickering & Ehrmann, 1996). Brown and Adler (2008) reported that online resources such as blogs, wikis, social networking sites, and virtual communities allowed people with common interests to collaborate in innovative ways. Collaborating with others in solving problems or mastering difficult material prepares students not only for college but also for future careers (Indiana University Center, 2008; Kuh, Kinzie, Schuh, & Whitt, 2005).

Cooperation, collaboration, and social learning are important components of students' higher education experience. Learning outcomes and the quality of the learning experience are enhanced through collaboration, interaction, connection, and relevance (Gourley, 2010; Oblinger, 2012a; Puzziferro & Shelton, 2009). Many students are comfortable collaborating in person or electronically (Jonassen, 2004; Oblinger, 2012a; Oblinger & Oblinger, 2005). Learning management systems can facilitate communication, one-on-one or in groups and synchronously or asynchronously; they provide ways for students to work together and connect outside the classroom. Students can complete group projects without face-to-face meetings by using tools such as shared documents, discussion boards, virtual classrooms, and chat sessions. These same tools can connect all students for class discussion and promotion of community. Working together with other people is a skill needed in the workplace and students should understand the importance of cooperating and collaborating with other students (McCabe & Meuter, 2011). Research (Gourley, 2010; Oblinger, 2012a; Puzziferro & Shelton, 2009) indicates that collaboration leads to better academic performance than individual or competitive learning. Discussing information with others helps students synthesize and internalize information.

Collaboration can also help students understand other cultures (Tapscott, 2009). When students experience diversity they learn valuable information about themselves and other cultures. Technology enables students to communicate with other students with different beliefs,

political opinions, and personal values; and from different economic, social, and racial or ethnic backgrounds (Indiana University, 2008; Kuh et al., 2005). Understanding other cultures and having empathy for diverse people are desirable traits for students not only in academic programs and other educational activities but also in the workplace. Brownell and Swaner (2010) reported that diverse views led to a stronger learning environment, which is consistent with research results reported by Milem (2000).

> Students who interact with peers of different backgrounds or who take courses with diversified curricular content show greater growth in their critical thinking skills than those who do not do so. They also tend to be more engaged in learning and are more likely to stay enrolled in college, to report greater satisfaction with their college experience, and to seek graduate or professional degrees. Similarly, students educated in racially and ethnically heterogeneous institutions assess their academic, social, and interpersonal skills more highly than do students from homogeneous colleges and universities.
>
> In addition to these benefits, diversified environments give students opportunities to develop the skills and competencies they will need to function effectively as citizens of an increasingly diverse democracy. Those who interact with peers of different backgrounds while in college are more likely to engage in community service. They also demonstrate greater awareness and acceptance of people from other cultures and are more committed to improving race relations in our society. (para. 12)

Good Practice Encourages Active Learning. Chickering and Ehrmann (1996) suggested that learning is not a spectator sport. Students do not learn much from listening to lectures, memorizing material, and providing rote answers. According to Chickering and Ehrmann,

"They [Students] must talk about what they are learning, write reflectively about it, relate it to past experiences, and apply it to their daily lives. They must make what they learn part of themselves" (p. 3). Technology supports active learning through resources for learning by doing, time-delayed exchange, and real-time conversation (Chickering & Ehrmann, 1996).

Active learning is ". . . learning that is dynamic and relevant to one's life, and authentic (geared toward real, practical issues and problems)" (Puzziferro & Shelton, 2009, p. 6). Active learning also implies that students have control over what and how they learn as opposed to traditional didactic learning where students receive content via lecture, written material, or other mechanisms. In collaborative or interactive learning, students construct knowledge through interaction with one another and with faculty or other sources of knowledge. Technology can support traditional didactic, active, and interactive learning experiences (Means, Toyama, Murphy, Bakia, & Jones, 2010). Learning management systems provide a platform that engages students and allows them to take charge of their learning experiences. Student engagement and active learning occur through self-assessments and feedback, discussions, and chats. Active engagement with other students occurs through information sharing, for example, through web links (McCabe & Meuter, 2011).

Effective use of technology supports the development of critical thinking, adaptability, and collaboration, essential skills for achieving success in the rapidly changing information age (Koç, 2005). Participation in small study groups is a strong determinant of students' success in higher education. Students who study in groups are more engaged in their studies, are better prepared for class, and have better learning outcomes than students who work on their own. Study groups are effective because students can ask questions to get clarification of material, improve their understanding of the material by listening to answers to questions from other

students, and enhance their own learning by assuming the role of teacher to help other group members learn (Brown & Adler, 2008). Technology facilitates student engagement through hands-on assignments that allow students to explore beyond what is available in the classroom by using remote instruments such as telescopes and data sets. "Engaging students in problem-solving, in virtual communities, and in active learning is an effective learning strategy—and it is more affordable and scalable than in the past" (Oblinger, 2010, p. 4).

Many students prefer learning by doing. They learn well through discovery either by themselves or with other students. When students learn through discovery, they retain the information better and are more likely to be able to use the information in creative and meaningful ways (Oblinger & Oblinger, 2005; Tapscott, 2009). The one-size-fits-all model of learning is no longer appropriate. Faculty can no longer simply lecture to students; they must adopt interactive, collaborative, and active-learning teaching strategies (Perkins & Casdorph, 2011; Tapscott, 2009; Thille, 2010). Students should be encouraged to use discovery and critical thinking processes rather than memorizing information (Tapscott, 2009). Static knowledge will not be sufficient for future workers—they must be able to discover what they need to know (Clayton-Penderson & O'Neill, 2005; Gourley, 2010). New knowledge and skills are needed on a continuous basis (Brown & Adler, 2008).

Effective active and collaborative learning practices include

> (1) asking questions in class and/or contributing to class discussions; (2) making class presentations; (3) working with other students on class projects inside or outside of class; (4) tutoring other students; (5) participating in a community-based project as part of a course; (6) discussing ideas from readings or classes with other students, family members, or others outside of class. (Kuh et al., 2005, p. 48)

Technology can facilitate class discussion in and out of the classroom. Faculty can stimulate discussion in class by using PowerPoint slides to provide thought-provoking words or visuals. Discussion boards provide an excellent way to continue class discussions and for discussions to occur outside of class. PowerPoint slides and media clips enable students to make interesting and engaging presentations in class. Learning management systems and other collaborative tools facilitate cooperation with other students on class projects and community-based projects. Students are able tutor other students or be tutored through chat tools and email.

Good Practice Gives Prompt Feedback. Chickering and Ehrmann (1996) suggested that students need to know what they know and do not know in order for them to focus their learning. Therefore, students need frequent feedback on their performance. Technology can be used to provide feedback in many ways, such as the use of email for person-to-person feedback, the use of simulations with inherent feedback, and the use of video to critique one's own work. Reviewers can respond to written materials using editing and tracking functions in word processing software. Prompt and meaningful feedback on student assignments and questions is essential in order to allow students to reflect on and develop strategies to improve their performance. Many students, particularly millennials, place high value on quick responses (Oblinger & Oblinger, 2005). By grading student work in a timely manner and providing prompt and quality feedback to students, faculty members can determine the need for differentiated instruction and initiate actions to improve student learning. Faculty can let students know their standing in the class at all times by evaluating assignments, providing feedback, grading work, and posting scores to an online gradebook within a learning management system. Faculty can use discussion-based tools such as email, chat, and discussion boards to provide virtual office

hours where students may ask questions and get instant feedback from faculty (McCabe & Meuter, 2011).

Faculty and mentors can evaluate student progress and provide appropriate feedback through portfolios. "Educators from a variety of institutions and from many disciplines are using these particular tools [electronic portfolios] to deepen learning and facilitate knowledge and skill transfer and to foster students' abilities to make connections between their learning experiences in an assortment of classroom, workplace, and community settings" (Humphreys, 2012, p. 27). These portfolios provide a history of student work that can be used to demonstrate gains in knowledge and competence (Chickering & Ehrmann, 1996). Students create and own their portfolios and the contents; they control access to their portfolios. Through ownership and control of their portfolios, students have more responsibility for learning, which can result in improved quality of student learning. Students may create multiple electronic portfolios for different audiences. For example, a student may create a portfolio to track personal ideas and interests, to show prospective employers, or to document progress made toward completion of a research project or class project (Chen & Light, 2010). Appropriate feedback has a positive effect on student learning and success. Feedback enhances learning by providing students with guidance as to whether or not they are on track and enables them to make changes in their studies when necessary. Feedback on student comprehension and information processing can be provided through classroom assessment techniques. Classroom assessments also provide information on teaching effectiveness (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2007). Regardless of the feedback approach, it must be prompt and sufficiently detailed to enable students to determine whether they need to change the way they are approaching their academic work.

Good Practice Emphasizes Time on Task. Chickering and Ehrmann (1996) argued that new technologies could dramatically improve time on task for students by making study time more efficient and reducing commuting time. Time efficiency increases when students can communicate with faculty and other students through technology rather than face-to-face. Electronic resources allow students to make better use of their time by reducing the need to travel to the library or other facilities to access resources (Chickering & Ehrmann, 1996).

Online learning can stimulate student engagement in learning; provide a variety of experiences outside the classroom; teach students how to do independent research; help students become technologically literate and proficient, as well as master subject-specific knowledge and skills; and teach students values and ethics (Brooks, 2009). Online learning is no longer just for those who face barriers of time or space. Online learning provides many benefits for faculty and students, which include the ability to reach resources, experts, lecturers, and interactive experiences from every part of the world; and the opportunity for students to work at their own pace and to access resources beyond what they have in the traditional classroom (Flores, 2010).

Stewart et al. (2010) suggested that online students may have an advantage over traditional students because online students spend more time on task than traditional students. The use of technology often increases time on task and might be one explanation for the link between use of technology and positive educational outcomes (Guidry & BrckaLorenz, 2010). The findings from a recent meta-analysis commissioned by the United States Department of Education to examine the relationship between learning outcomes and online and blended courses indicated that both online and blended courses appear to require more time on task than traditional courses and have a significant positive impact on learning outcomes. NSSE data supported these findings (Guidry & BrckaLorenz, 2010).

Faculty can create a more effective learning environment by providing realistic timeframes for assignments. They can use goals and learning modules to inform students of course expectations (McCabe & Meuter, 2011). Learning management system tools such as the calendar function can help students manage their time effectively and complete assignments on time. Course content can be modularized to allow release of content when faculty are ready for students to focus on particular content. The announcement tool provides an efficient and effective way to remind students of pending due dates and deadlines. By effectively managing their time in college, students learn a critical skill that will be essential in the workplace.

Good Practice Communicates High Expectations. Chickering and Ehrmann (1996) stated that expectations are important for all students and expectations for students to perform well will become a self-fulfilling prophecy. They asserted that technology allows faculty to communicate high expectations explicitly and efficiently. Faculty promote high levels of student achievement by setting high expectations for student performance. Challenging intellectual and creative work is crucial to student learning (Indiana University Center, 2008). Faculty set high expectations when they provide students with challenging and achievable goals. Learning management systems make it easy for faculty to define course expectations, provide examples of exemplar work, and specify requirements for assignments (McCabe & Meuter, 2011). Technology enables faculty to more clearly articulate criteria for evaluating student work (Chickering & Ehrmann, 1996). For example, a grading rubric can be stored in a learning management system or on a web page for students to access. A grading rubric provides students with performance expectations for an assignment and the set of criteria that faculty will use to grade the work. Using a rubric also facilitates grading consistency.

Good Practice Respects Diverse Talents and Ways of Learning. Chickering and Ehrmann (1996) asserted that there are many ways to learn and that different students have different learning styles. Technology can be used to support different methods of learning through audio visuals, printed materials, hands-on activities, demonstrations, step-by-step instructions, and simulations. Faculty can provide structured assignments for students who need direction and more open-ended assignments for students who are more motivated and self-directed. Technology allows students to learn by methods that are most effective for them (Chickering & Ehrmann, 1996).

Technology has become an integral part of teaching and learning and is used to meet the needs of students with varied learning styles. When technology is integrated effectively into the teaching and learning process, the faculty member becomes a facilitator of learning rather than simply a provider of information. Technology broadens the learning environment beyond the regular classroom and allows learning to occur by a variety of methods and without the constraints of time and location (Adcock, 2008; Tate & Klein-Collins, 2012). Online courses can be used to reach students with diverse learning styles (Brooks, 2009). Many students have a predilection to technology and are comfortable communicating electronically with their peers and with faculty. One-on-one interactions between students and their peers and students and faculty may be more prevalent in online courses than in face-to-face courses (Brooks, 2009).

Some students are not comfortable in the traditional face-to-face classroom with lectures and discussions. These students seldom answer questions or become engaged in discussions taking place in the traditional face-to-face classroom. Faculty can provide students who have difficulty participating in a traditional face-to-face classroom a more comfortable environment for engaging with faculty and other students by using tools such as e-mail, discussion boards,

and chat. Other students are bored in the traditional classroom. For these students, the current model of pedagogy is becoming obsolete; they prefer a collaborative learning environment rather than learning where the faculty member is a broadcaster and the students are simply receivers. In a collaborative environment students have discussions and learn from each other (Tapscott & Williams, 2010).

Influence of Demographic Factors on Faculty Use of Technology

Previous research indicated that demographic factors such as gender, rank, and length of tenure influence orientation toward technology (Gibson et al, 2008; Osika et al., 2009; Parker et al., 2008; Zayim et al., 2006) and that there is a significant positive correlation between technology literacy and integrating technology into pedagogy (Georgina & Hosford, 2009). In a national study conducted to determine which technologies are being used by accounting faculty, Ahadiat (2008) reported that the most popular applications of information technology by accounting faculty were email, the Internet, word processing software, electronic spreadsheets, presentation software, and data analysis software. Ahadiat examined differences in the use of technology among faculty based on demographic factors of discipline, rank, teaching experience, age, and gender. Analysis of teaching experience and age revealed significant differences in use of technology by faculty between 25 and 44 years of age with 5 or fewer years of experience and faculty 45 years and older with 6 or more years of teaching experience. The less experienced and younger faculty members were more likely to use technology than the older and more experienced faculty. No significant difference in use of technology was found with regard to gender (Ahadiat, 2008). Lane and Lyle (2011) researched how user traits impact the adoption of educational technologies and found that age and gender were less important than expertise in minimizing barriers and providing support.

Zhou and Xu (2007) found that there were no significant differences in five of seven statements based on gender in responses to perceived impacts of computers on teaching and learning. Male and female responses were fairly consistent when asked if use of technology allows faculty to spend more time with individual students, to spend less time lecturing to the entire class, and to have time for research. Male and female responses were consistent to some degree when asked if use of technology allows students to communicate better with the instructor and classmates and to manage their learning activities better. However, responses were significantly different to the questions of whether technology enables students to learn material more easily or thoroughly and whether technology allows faculty to present more complex material to students. Males were more likely than females to believe computers would have a positive effect on faculty teaching and student learning (Zhou & Xu, 2007).

In a study conducted by Wood (2009) at a community college, no significant differences were found between male faculty and female faculty with regard to use of technology to improve student-faculty contact, encourage cooperation among students, promote active learning, provide prompt feedback, increase time on task, communicate high expectations to students, and address diverse talents and ways of learning. Although Wood found no overall significant differences between male and female faculty, results of the study indicated that males were not quite as likely as females to use technology in all categories except prompt feedback, where there was very little difference.

Chapter Summary

Unquestionably, technology has changed the landscape of education (Puzzifero, 2009). Technology has changed the role that faculty and students have in teaching and learning ("Flipped classrooms," n.d.; Gappa et al., 2007; Zayim et al., 2006). Research has shown that

students learn better when they are engaged in their educational experiences (Bass, 2012, para. 10; Chickering & Ehrmann, 1996; Doherty, Blake, & Cooper, 2009; Indiana University Center, 2008; Kuh, 2010; Liu, Kalk, Kinney, & Orr, 2012; Oblinger, 2010, p. 4). Faculty-student and student-student interactions also have positive effects on learning outcomes (Anderson et al., 2001, p. 3; Chickering & Ehrmann, 1996; Dunlap & Lowenthal, 2009; Legg & Wilson, 2009; Puzziferro & Shelton, 2009; Shea, Li, & Pickett, 2006; Umbach & Wawrzynski, 2005; Yates et al., 2009). Many students have a predilection to technology and expect their learning experiences to be enhanced by technology (Brown, 2009; Chelliah & Clarke, 2011; Smith et al., 2009; Tapscott, 2009; Waggener, 2012; Young, 2012). Faculty must determine how to engage students and maximize technologies to affect learning outcomes positively (Gourley, 2010; Legg & Wilson, 2009; Oblinger, 2012a; Puzziferro & Shelton, 2009; Sheridan & Kelly, 2010; Umbach & Wawrzynski, 2005; Vaughan, 2014). These are not easy challenges as institutions evaluate educational costs required to make teaching and learning more effective with increased enrollments and student diversity (Oblinger, 2012b; Sheets & Crawford, 2012; Tamarkin & Rodrigo, 2011; Thille, 2010; U.S. Department of Education, Office of Educational Technology, 2012; Young, 2012).

Knowledge about how students learn combined with information technology has the potential to be the transformative force to reduce higher education costs and improve learning outcomes (Connors & Tally, 2015; Hartman, 2008; Parker et al., 2008). "Educational technology becomes a transformative innovation when it instantiates learning science into reusable and easily accessible technology-enabled courses, which simultaneously collect the data that learning scientists need in order to better understand the underlying mechanisms of human learning" (Thille, 2010, p. 74). The technological transformation of education and society is

evidenced by the number of students, faculty, and members of the workforce at all levels who use technology in their learning, work, and daily lives. Because faculty members are central to the teaching and learning process, it is imperative to understand the extent they are using technology and the differences in technology use based on demographic factors. Faculty must be given the support they need to provide a learning environment that is active and engaging and that maximizes student learning (Tamarkin et al., 2010).

CHAPTER 3

METHODOLOGY

The purpose of this quantitative study was to investigate faculty integration of technology in undergraduate courses. Integration of technology is using technology as an instructional tool to improve teaching and learning (Clayton-Pedersen & O'Neill, 2005; Wilson & Hayes, 2000; Woodbridge, 2004). Technology was defined as electronic mail, text messaging, social networking, social messaging, discussion forums, chat rooms, blogs, online learning, blended learning strategies, learning management systems, lecture videos, podcasts, presentation technology, collaboration technology, and technologies that provide real-world learning and problem-solving opportunities and promote student engagement and research. The theoretical framework for this research was Chickering and Gamson's (1987) seven principles for good practice in undergraduate education that support: (a) contact between students and faculty, (b) reciprocity and cooperation among students, (c) active learning, (d) prompt feedback, (e) time on task, (f) high expectations, and (g) diverse talents and ways of learning.

The researcher used a quantitative study because the purpose of the research was to determine the extent to which full-time faculty at private colleges and universities use technology to advance good practice in undergraduate education and to evaluate the differences in use of technology among the participants based on gender and age. Quantitative research is used to address research problems resulting in a description of trends or an explanation of the relationship among variables (Creswell, 2008; Fraenkel & Wallen, 2009; Jankowicz, 2005; Johnson & Christensen, 2012; McMillan & Schumacher, 2010). "Quantitative researchers hope to find common patterns in thought and behavior and to generalize broadly" (Johnson & Christensen, 2012, p. 53). In quantitative research data usually are reduced to means, medians,

correlations, and other summarizing statistics. "It is not necessary to look at individual performances; rather, the *average*s of those performances are of greater interest" (Leedy & Ormrod, 2013, p. 97).

The use of surveys is widespread in educational research because credible information from a large population can be collected at a relatively low cost, particularly if the survey is conducted in an online format (Lefever et al., 2007). Therefore, the researcher used a nonexperimental survey research design to examine faculty integration of technology in undergraduate courses at 21 private colleges and universities. Also, generalization was desirable and use of surveys allows for generalizability across the population if the data collected are representative of the larger group (Bartlett, Bartlett, & Reio, 2008; Fraenkel & Wallen, 2009; Jankowicz, 2005; Johnson & Christensen, 2012; Leedy & Ormrod, 2013; McMillan & Schumacher, 2010; Schwarz, 2007; Sue & Ritter, 2007; Wood, 2009). The researcher maintained objectivity in collecting and analyzing data throughout the study. By using an electronic survey to collect data, the researcher avoided personal interaction with the survey participants and minimized the risk of researcher bias. As a nonexperimental research design, the study examined relationships between different data without any manipulation of data or random assignment to groups (Johnson & Christensen, 2012).

The researcher has the responsibility to ensure the study was conducted ethically (Creswell, 2008; Frankel & Wallen, 2009; McMillan & Schumacher, 2010). This research project used a survey containing closed statements where participants chose from predefined options. The researcher minimized the risk of harm by getting approval from each institution's chief academic officer or institutional review board (IRB), obtaining informed consent from participants, protecting the anonymity and confidentiality of participants and institutions,

avoiding deceptive practices in the research design, and providing participants the right to withdraw from the research project at any time (Fraenkel & Wallen, 2009). After receiving permission to survey an institution's faculty, the researcher sent an email to faculty members at the institution inviting them to participate in the survey and informing them that by completing and submitting the survey they would be affirming their informed consent to participate in the survey. Chief academic officers received a copy of the email. The researcher explained that the participants were taking part in research that would require them to respond to survey statements about their use of technology to advance Chickering and Gamson's (1987) seven principles for good practice in undergraduate education and to provide demographic data. In the email the researcher also explained that participation was voluntary and that declining to participate in the survey would have no impact on the faculty member. The researcher assured chief academic officers and faculty at participating institutions that data would be rendered anonymous for analysis and reporting. The researcher also assured chief academic officers and faculty that only aggregate data would be reported in the dissertation in order to avoid the possibility of exposing the identity of a particular institution or faculty member based on responses for a particular question or set of questions. The researcher collected no data until the East Tennessee State University IRB approved the research project. Only faculty at institutions that gave approval for the survey received the invitation to participate in the survey.

Research Questions and Corresponding Null Hypotheses

Twenty-one research questions guided this research study. The research questions and corresponding null hypotheses were as follows:

RQ1. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to enhance student-faculty contact?

$H_0$1. Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to enhance student-faculty contact.

RQ2. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to encourage reciprocity and cooperation among students?

$H_0$2. Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to encourage reciprocity and cooperation among students.

RQ3. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote active learning?

$H_0$3. Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to promote active learning.

RQ4. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to provide prompt feedback to students?

$H_0$4. Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to provide prompt feedback to students.

RQ5. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote time on task?

$H_0$5. Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to promote time on task.

RQ6. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to communicate high expectations to students?

$H_0$6. Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to communicate high expectations to students.

RQ7. Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to support diverse talents and ways of learning?

$H_0$7. Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to support diverse talents and ways of learning.

RQ8. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on gender?

$H_0$8. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on gender.

RQ9. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on gender?

$H_0$9. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on gender.

RQ10. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on gender?

$H_0$10. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on gender.

RQ11. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on gender?

$H_0$11. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on gender.

RQ12. Are there significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on gender?

$H_0$12. There are no significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on gender.

RQ13. Are there significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on gender?

$H_0$13. There are no significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on gender.

RQ14. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on gender?

$H_0$14. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on gender.

RQ15. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on age group?

$H_0$15. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on age group.

RQ16. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on age group?

$H_0$16. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on age group.

RQ17. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on age group?

$H_0$17. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on age group.

RQ18. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on age group?

$H_0$18. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on age group.

RQ19. Are there significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on age group?

$H_0$19. There are no significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on age group.

RQ20. Are there significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on age group?

$H_0$20. There are no significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on age group.

RQ21. Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on age group?

$H_0$21. There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on age group.

Population and Sample

The population for this study was full-time faculty who teach undergraduate courses at selected private colleges and universities in the Appalachian region of Kentucky, North Carolina, Tennessee, Virginia, and West Virginia. The researcher selected the institutions because they are members of the Appalachian College Association (ACA), a non-profit consortium of 35 private 4-year liberal arts and professional studies institutions. The ACA provides programs and resources to promote cooperation and collaboration among member institutions to serve the people of Appalachia through higher education and related services (Appalachian College Association, 2014). The researcher chose faculty at ACA institutions to participate in this study because training on technology for use in teaching and learning has been a significant benefit provided to faculty by ACA.

Twenty-one (60%) of the 35 institutions accepted the invitation to participate in the survey. Based on data reported by the institutions in fall 2011 and fall 2012, the number of full-time faculty at the 21 participating institutions totaled 1,800 (U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, Integrated Postsecondary Education Data System "Look up an institution," n.d.). Using faculty names and email addresses from the institutions' web sites, the researcher distributed the survey to 1,924 faculty. Many full-time faculty at the participating institutions teach both graduate and undergraduate courses and in some cases it was not clear whether a faculty member taught only undergraduate courses. After distribution of the survey, some faculty emailed the researcher indicating they teach only graduate courses and therefore did not respond to the survey. Further investigation of the participating institutions' web sites by the researcher revealed other faculty who taught only graduate courses. The survey population totaled 1,864 after removal of 60 faculty who were identified as teaching only graduate courses. Based on 1,864 faculty, 331 participants were needed to achieve a 95% confidence level with a 5% margin of error (Israel, 2013; Johnson & Christensen, 2012). However, a larger response would lead to smaller sampling errors (Johnson & Christensen, 2012). Thus, 22.6% (421) of the 1,864 faculty who participated in the survey constituted an acceptable sample of the survey population.

Instrumentation

The survey (see Appendix F) consisted of 16 statements with 51 response items and took approximately 10 minutes to complete. The survey collected (a) the name of the learning management system used, (b) information about faculty use of technology to advance the seven principles of good practice in undergraduate education, and (c) the following faculty demographic information: gender, age group, number of years of higher education teaching

experience, educational level (highest degree earned), rank, tenure status, discipline category, and institution. Identification of the learning management systems used by participants provided information used to gauge similarities of learning environments. The reason for collecting the name of the participant's institution was solely to provide the researcher with information to determine if an institution had a low response rate and follow-up emails might be required to encourage participation.

The survey instrument was an amended version of a survey developed for a similar study in Alabama by Wood (2009). With permission from the developer, the researcher modified the instrument to make it viable for this study. The modifications consisted of revising some survey statements to include technology used to advance good practice in undergraduate education and deleting survey statements relating to topics not addressed in this research project. The researcher conducted a pilot test of the instrument with selected community college faculty who would not be participating in the actual survey. An instructional technologist, director of online learning, and a graduate education faculty member who previously taught undergraduate courses reviewed the survey instrument. The researcher incorporated feedback from the pilot testing in the survey instrument. The survey response items did not include *not applicable* as an attempt to encourage participants to respond to all of the survey items.

To have validity a survey instrument must measure what it is intended to measure (Leedy & Ormrod, 2013). Although the instrument had been used in a similar study, and the researcher took care to ensure that the amended survey questions were not leading or ambiguous, the pilot test helped validate the survey instrument. Pilot testing can be helpful in identifying inconsistencies or unexpected interpretations of the survey question. Because the survey participants included male and female faculty members, males and females were included in the

pilot test. The researcher requested that pilot test participants provide feedback with regard to question ambiguity and relevance to the study and incorporated pertinent feedback into the survey instrument. Conducting a pilot test and asking participants for feedback is one step in determining whether the survey will measure what it is intended to measure (Leedy & Ormrod, 2013). "The external validity of a research study is the extent to which its results apply to situations beyond the study itself—in other words, the extent to which the conclusions drawn can be *generalized* to other contexts" (Leedy & Ormrod, 2013, p. 103). To establish external validity of the study, the researcher used a real-life setting for the pilot test; faculty teaching undergraduate courses at an institution of higher education, an instructional technologist, a director of online learning, and a graduate faculty member who previously taught undergraduate courses participated in the survey. Each item on the survey measured a single construct or concept in order to enhance internal consistency. Consistent administration of the survey to all participants electronically via SurveyMonkey enhanced reliability of the survey. Standardization in use of the survey instrument is important to enhancing reliability (Leedy & Ormrod, 2013). The researcher used Cronbach's alpha coefficient to assess the reliability of the survey instrument.

Data Collection

In spring 2014 the researcher collected data using an electronic survey administered through SurveyMonkey, a widely used online survey website (Leedy & Ormrod, 2013). The researcher compiled a list of faculty names and email addresses from each participating institution's web site. Upon receiving approval from each institution's chief academic officer and IRB, when necessary, the researcher sent an email to faculty members explaining that the institution's chief academic officer or IRB had approved distribution of the survey and inviting

them to participate in the survey. The email contained a brief description of the study, information about the survey instrument, and a link to the survey on SurveyMonkey.com. The email explained that faculty members could decline to respond to one or more statements and that they could exit the survey at any time without completing and submitting the survey. The email also specified that faculty could decline to participate in the study without any consequence and provided contact information for the chair of the East Tennessee State University IRB and the researcher's dissertation chair for any questions faculty might have about their rights as research subjects.

The researcher asked faculty to complete the survey within 2 weeks of the date of distribution. Officials at ACA institutions provided approvals for participation at varying times; therefore, faculty at participating institutions responded to the survey at different times. Initial distribution of the survey included faculty at 19 institutions and resulted in 302 responses. The researcher sent a follow-up email to faculty 2 weeks after the initial distributions, thanking those who had participated and encouraging those who had not completed the survey to do so. Approval from and distribution of the survey to two additional institutions and follow-up emails to the initial distribution list garnered an additional 119 responses. Survey responses totaled 421, which was 91 more than the 330 needed to achieve a 95% confidence level with a 5% margin of error (Israel, 2013; Johnson & Christensen, 2012). The response rate was 22.6%.

The researcher exported survey data from SurveyMonkey to Excel spreadsheets and SPSS files. The researcher assigned random numerical codes to identifying data, the name of the participant's institution. Tools used to conduct the data analysis were IBM SPSS Statistics 22.0 and Microsoft Excel. The researcher used a password-protected private computer to store data for analysis and used flash drives for backup copies. A locked file cabinet secured the backup

flash drives. With permission from the ETSU IRB and the researcher's dissertation chair and methodologist, the researcher recruited a colleague to assist with setting up and conducting tests in SPSS. Before sharing data with the colleague, the researcher rendered the data anonymous.

Data Analysis

Although the survey collected demographic information on gender, age group, number of years of higher education teaching experience, educational level (highest degree earned), rank, tenure status, and discipline category, this study focused on gender and age only. The researcher used descriptive and inferential statistics to analyze the data. The computer program, IBM SPSS Statistics 22.0, was used for the statistical computation. Assignment of numerical codes to survey item responses facilitated statistical analysis. Response options consisted of *very often*, *often*, *sometimes*, and *never*, which corresponded to 4, 3, 2, and 1, respectively. Items with higher numerical codes indicated greater frequency of integrating technology to advance the seven principles of good practice in undergraduate education. Chickering and Gamson's (1987) seven principles for good practice in undergraduate education were the dependent variables for research questions 1 through 21. The independent variable for research questions 1 through 7 was the test value of 2.5. The independent variables for research questions 8 through 14 and 15 through 21 were gender (*male* and *female*) and age group (*under 40, 40-49, 50-59,* and *60 or over),* respectively. The survey collected age group data for *under 30, 30-39, 40-49, 50-59,* and *60 or over*. Because of the small number of faculty (5) reporting age group as *under 30*, the *under 30* and *30-39* age groups were combined in an *under 40* age group for data analysis. To analyze the data the researcher computed descriptive statistics (means, standard deviations, and effect sizes) and coefficient of reliability (Cronbach's alpha) and conducted inferential statistics

(one-sample *t* tests, independent-samples *t* tests, ANOVA tests, and Tukey post hoc tests). All data were analyzed at the .05 level of significance.

Data presentation includes a combination of text, figures, and tables. Results of the one-sample *t* tests for research questions 1 through 7 are presented as descriptive statistics (means, standard deviations, and effect sizes) and inferential statistics (*t* values, *p* values, and confidence intervals). Results of the independent *t* tests for questions 8 through 14 are presented as descriptive statistics (means, standard deviations, and effect sizes), inferential statistics (*t* value, *p* value, and confidence intervals), and figures (frequency charts showing distribution of responses). Results of the one way analysis of variance (ANOVA) and Tukey post hoc tests for research questions 15 through 21 are presented as descriptive statistics (means, standard deviations, and effect sizes), inferential statistics (*F* values, *p* values, and confidence intervals), figures (frequency charts showing distribution of responses), and tables (means, standard deviations, and pairwise differences).

Chapter Summary

Chapter 3 presented the methodology used to formulate responses to the research questions about the extent to which technology is being integrated into undergraduate courses at private colleges and universities to advance good practice in undergraduate education and what differences exist in use of technology by faculty based on demographic factors of gender and age group. The rationale for the quantitative study was presented and the research questions and corresponding null hypotheses were stated. The population, instrumentation, data collection procedures, data analysis process, and data presentation were described.

CHAPTER 4

RESULTS OF THE STUDY

This research study was an exploration of faculty integration of technology in undergraduate courses to advance good practice in undergraduate education. Full-time faculty teaching at the undergraduate level at 21 private colleges and universities participated in the study by completing an electronic survey administered through SurveyMonkey. The survey consisted of six statements for each of Chickering and Gamson's (1987) seven principles for good practice in undergraduate education (42 response items) that support: (a) contact between students and faculty, (b) reciprocity and cooperation among students, (c) active learning, (d) prompt feedback, (e) time on task, (f) high expectations, and (g) diverse talents and ways of learning. Participants used a Likert scale to indicate the types of technology used and the extent to which technology is used to support each principle. The response options of *very often*, *often*, *sometimes*, or *never* corresponded to 4, 3, 2, and 1, respectively. Seven additional survey statements related to demographic data collected to evaluate whether significant differences existed in use of technology based on demographic factors. This study addressed two demographic factors, gender and age.

Demographics

A total of 421 faculty participated in the survey; however, some participants did not report all demographic data or respond to all survey items. A total of 417 of the 421 faculty reported gender with slightly more females (225, 53.96%) responding than males (192, 46.04%). The gender composition for participants in this study, 54% females and 46% males, differs from gender composition reported for private 4-year institutions in fall 2011, 42% females and 58% males (U.S. Department of Education, National Center for Education Statistics, Institute of

Education Sciences, Digest of Education Statistics, 2011). With regard to age, the 415 respondents reported their age groups as 50-59 (27.71%), 40-49 (26.27%), 60 or over (24.58%), 30-39 (20.24%) and under 30 (1.2%). Because of the small number of faculty (5) reporting age group as under 30, the under 30 and 30-39 age groups were combined in an under 40 age group for data analysis. Unreported demographic data and the number of faculty not reporting were as follows: gender (4), and age group (6). All participants responded to all of the survey items related to student-faculty contact. Some participants skipped all of the survey items relating to the other principles of good practice in undergraduate education. Because there were only a few skipped items, the researcher chose not to remove the entire response from the dataset; rather, a response with unreported data was treated as missing data for that particular item, thereby reducing the number for that item.

Findings

The researcher used aggregate data for analysis and reporting. The survey contained six statements for each of the seven principles of good practice in undergraduate education. The aggregate data resulted in seven variables, one variable for each of the seven principles containing all responses for the respective set of six survey statements. Thus, a maximum of 2,526 responses were possible (421 participants × 6 statements) for each of the seven principles. However, some participants did not respond to some of the survey statements and did not report gender and/or age; therefore, the number of responses by item varied.

Before aggregating the data the researcher used SPSS to compute Cronbach's alpha to measure the internal consistency among the survey items for each principle of good practice in undergraduate education. Cronbach's alpha ranges between 0 and 1. The larger the value of alpha, the more the scale is coherent and therefore reliable. The threshold frequently used for

alpha is ≥ 0.70 (Duhachek, Coughlan, & Iacobucci, 2005). Six of the seven sets of survey statements met the threshold for Cronbach's alpha: reciprocity and cooperation among students (α = .711), active learning (α = .775), prompt feedback (α = .761), time on task (α = .799), high expectations (α = .749), and diverse talents and ways of learning (α = .825). The set of survey statements that did not meet the threshold for Cronbach's alpha was student-faculty contact (α = .516). A review of the values for *Cronbach's Alpha if Item Deleted* provided by SPSS indicated that alpha would not reach the threshold by deleting any single item. The researcher removed the two items with the lowest *Corrected Item-Total Correlation* (blogs and email, respectively) and alpha did not increase. Therefore, the researcher retained both items in the analysis.

All items for the sets of survey statements for the principles of prompt feedback, time on task, and diverse talents and ways of learning correlated with the total scale to a good degree (lower r = .40). The sets of survey statements for the principles of reciprocity and cooperation among students and high expectations also correlated with the total scale to a good degree (lower r = .30). The remaining set of survey statements for the principle of active learning correlated with the total scale to a good degree (lower r = .51) with the exception of one item with a lower r = .246. Because the alpha for this set of survey items met the threshold of ≥ 0.70, and the lower r value was not significantly below .30 for the one item that did not correlate with the total scale to a good degree, the researcher decided not to remove the item. Thus, no items were removed from the survey.

Using SurveyMonkey, Excel, and SPSS, the researcher computed descriptive statistics (means, standard deviations, and effect sizes) and coefficient of reliability (Cronbach's alpha) and conducted inferential statistics (one-sample t tests, independent-samples t tests, ANOVA tests, and Tukey post hoc tests) to evaluate the survey data. A comparison of the aggregate mean

scores to a test value of 2.5 using one-sample *t* tests indicated whether technology was used to a significant extent (research questions 1 through 7). The test value of 2.5 represented the midpoint, or neutral point, on the test variable (four possible response values, ranging from 4 to 1, corresponding to *very often*, *often*, *sometimes*, and *never*, respectively). Items with higher numerical codes indicated more frequent integration of technology to advance the seven principles of good practice in undergraduate education. Mean scores greater than 2.5 with statistical significance indicated faculty use of technology to a significant extent and implied more frequent integration of technology. Mean scores greater than 2.5 without statistical significance, mean scores less than 2.5 with statistical significance (that is, significance not counter to the null hypothesis), and mean scores of 2.5 or less without statistical significance indicated faculty are not using technology to a significant extent to advance good practice in undergraduate education. Results of the one-sample *t* tests for research questions 1 through 7 are presented as descriptive statistics (means and standard deviations) and inferential statistics (*t* value, *p* value, and confidence intervals). Frequency charts show the response distributions for research questions 1 through 7.

Research questions 8 through 14 were focused on differences in technology use based on gender and were evaluated using independent-samples *t* tests. Results of the independent-samples *t* tests are presented as descriptive statistics (means, standard deviations, and effect sizes), inferential statistics (*t* value, *p* value, and confidence intervals), and figures (frequency charts showing distribution of responses by gender). Research questions 15 through 21 were focused on differences in technology use based on age group and were evaluated using oneway ANOVA tests. Results of the ANOVA and Tukey post hoc tests for research are presented as descriptive statistics (means, standard deviations, and effect sizes), inferential statistics (*F* value,

p value, and confidence intervals), figures (frequency charts showing distribution of responses by age groups), and tables (population, means, standard deviations, and pairwise differences by age groups).

To quantify the size of the differences between groups the researcher computed Cohen's *d* to report effect sizes for one-sample *t* tests and independent-samples *t* tests and η^2 to report effect sizes for oneway ANOVA tests. Cohen's guidelines state that effect size is small, medium, and large if *d* is in the vicinity of 0.2, 0.5, and 0.8, respectively (Witte & Witte, 2007). Values of 0.01, 0.06, and 0.14 are interpreted as small, medium, and large effect sizes, respectively for η^2 (Green & Salkind, 2008). All tests used an alpha of .05. A *p* value of .000 computed by SPSS was reported as $p < .001$.

Research Question 1 – Student-Faculty Contact

Research question 1 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to enhance student-faculty contact?" Six survey statements provided the data to analyze research question 1. A one-sample *t* test was conducted to compare the aggregate mean score for the six items ($M = 1.93$, $SD = 1.183$) pertaining to student-faculty contact to the test value of 2.5. The test was significant, $t(2,501) = 24.263$, $p < .001$; however, because the mean was below the test value, the significance was not counter to the null hypothesis. Therefore, the null hypothesis was retained. The 95% confidence interval for the difference in means was -.62 to -.53. The mean score for faculty use of technology to enhance student-faculty contact was significantly below the test value of 2.5. The effect size was medium, $d = .49$. The results indicated that faculty do not use technology to a significant extent to enhance student-faculty contact. Figure 1 shows the distribution of responses to the survey statements.

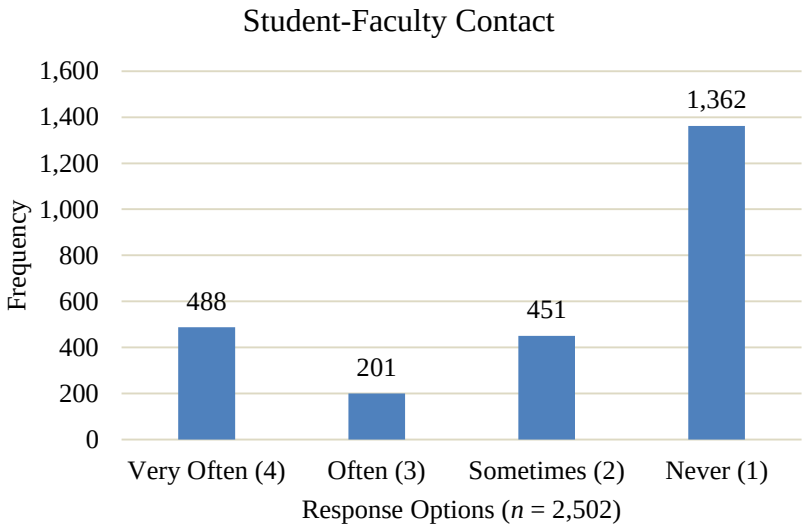

Figure 1. Frequency of Responses - Student-Faculty Contact

Research Question 2 – Reciprocity and Cooperation

Research question 2 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to encourage reciprocity and cooperation among students?" Six survey statements provided the data to analyze research question 2. A one-sample *t* test was conducted to compare the aggregate mean score for the six items ($M = 1.89$, SD = 1.138) pertaining to reciprocity and cooperation among students to the test value of 2.5. The test was significant, $t(2,500) = 26.683$, $p < .001$; however, because the mean was below the test value, the significance was not counter to the null hypothesis. Therefore, the null hypothesis was retained. The 95% confidence interval for the difference in means was -.65 to -.56. The mean score for faculty use of technology to encourage reciprocity and cooperation among students was significantly below the test value of 2.5. The effect size was medium, $d = .53$. The results indicated that faculty do not use technology to a significant extent to encourage reciprocity and cooperation among students. Figure 2 shows the distribution of responses to the survey statements.

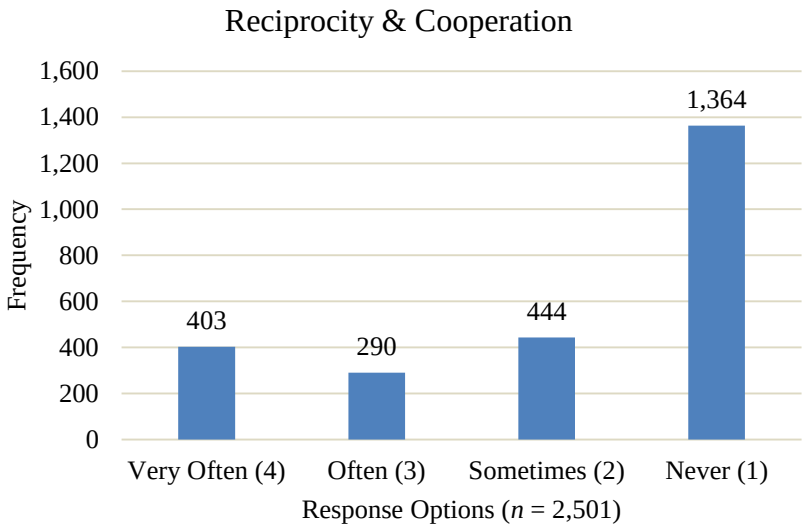

Figure 2. Frequency of Responses - Reciprocity & Cooperation

Research Question 3 – Active Learning

Research question 3 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote active learning?" Six survey statements provided the data to analyze research question 3. A one-sample *t* test was conducted to compare the aggregate mean score for the six items (M = 2.51, SD = 1.177) for the six items pertaining to active learning to the test value of 2.5. The test was not significant, $t(2,497) = .442$, $p = .659$. Therefore, the null hypothesis was retained. The 95% confidence interval for the difference in means was -.04 to .06. The effect size was small, $d = .01$. The results indicated that faculty do not use technology to a significant extent to promote active learning. Figure 3 shows the distribution of responses to the survey statements.

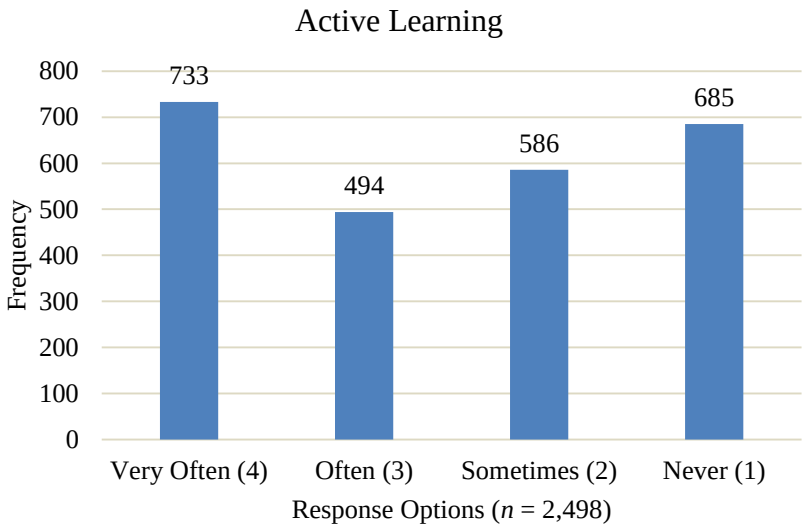

Figure 3. Frequency of Responses - Active Learning

Research Question 4 – Prompt Feedback

Research question 4 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to provide prompt feedback to students?" Six survey statements provided the data to analyze research question 4. A one-sample *t* test was conducted to compare the aggregate mean score for the six items ($M = 2.54$, $SD = 1.255$) pertaining to prompt feedback to the test value of 2.5. The test was not significant, $t(2,490) = 1.461$, $p = .144$. Therefore, the null hypothesis was retained. The 95% confidence interval for the difference in means was -.01 to .09. The effect size was small, $d = .03$. The results indicated that faculty do not use technology to a significant extent to provide prompt feedback to students. Figure 4 shows the distribution of responses to the survey statements.

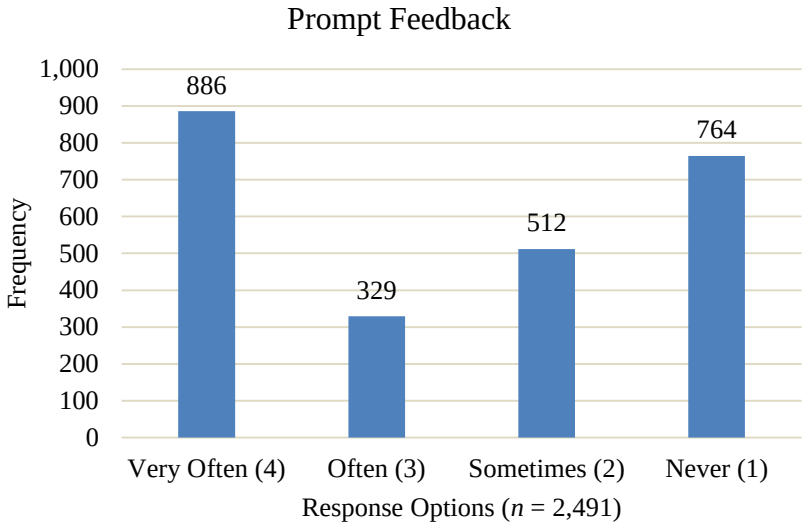

Figure 4. Frequency of Responses - Prompt Feedback

Research Question 5 – Time on Task

Research question 5 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote time on task?" Six survey statements provided the data to analyze research question 5. A one-sample *t* test was conducted to compare the aggregate mean score for the six items (M = 2.40, SD = 1.20) pertaining to time on task to the test value of 2.5. The test was significant, $t(2{,}473) = 4.152$, $p < .001$; however, because the mean was below the test value, the significance was not counter to the null hypothesis. Therefore, the null hypothesis was retained. The 95% confidence interval for the difference in means was -.15 to -.05. Faculty use of technology to promote time on task was significantly below the test value of 2.5. The effect size was small, d = .08. The results indicated that faculty do not use technology to a significant extent to promote time on task. Figure 5 shows the distribution of responses to the survey statements.

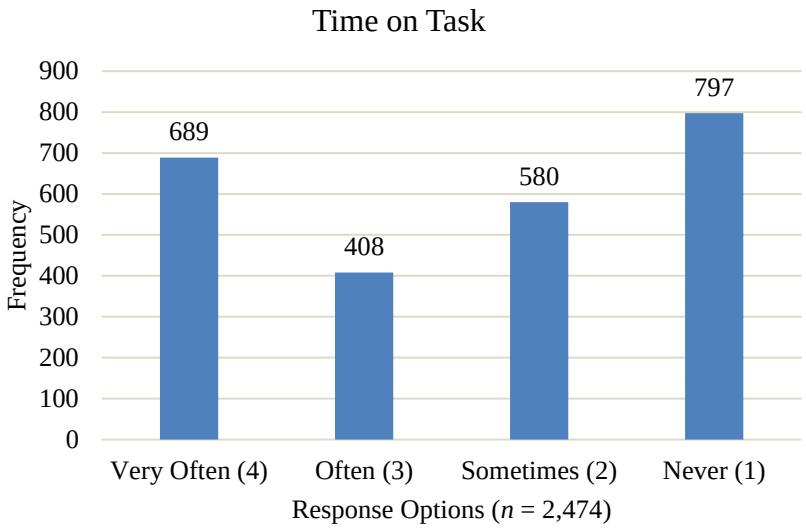

Figure 5. Frequency of Responses - Time on Task

Research Question 6 – High Expectations

Research question 6 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to communicate high expectations to students?" Six survey statements provided the data to analyze research question 5. A one-sample *t* test was conducted to compare the aggregate mean score for the six items ($M = 2.78$, $SD = 1.206$) pertaining to high expectations to the test value of 2.5. The test was significant, $t(2,475) = 11.602$, $p < .001$. Therefore, the null hypothesis was rejected. The 95% confidence interval for the difference in means was .23 to .33. The effect size was small, $d = .23$. The results indicated that faculty use technology to a significant extent to communicate high expectations to students. Figure 6 shows the distribution of responses to the survey statements.

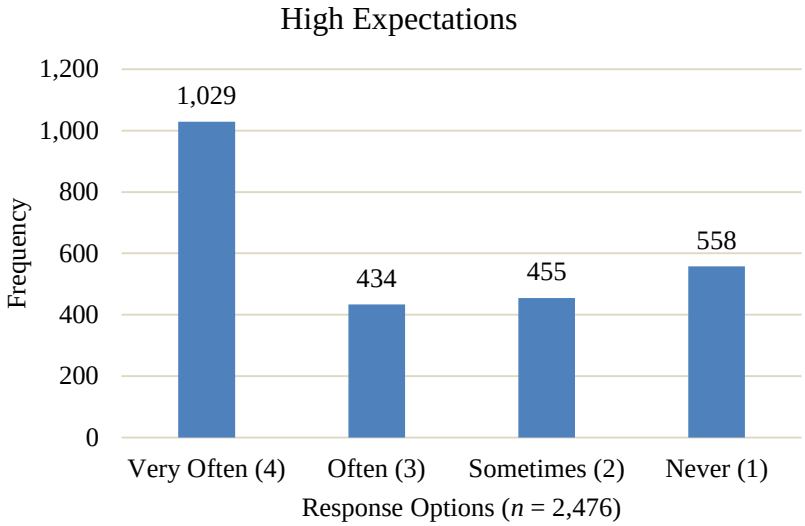

Figure 6. Frequency of Responses - High Expectations

Research Question 7 – Diverse Talents

Research question 7 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to support diverse talents and ways of learning?" Six survey statements provided the data to analyze research question 5. A one-sample *t* test was conducted to compare the aggregate mean score for the six items ($M = 2.79$, $SD = 1.097$) for the six items pertaining to diverse talents and ways of learning to the test value of 2.5. The test was significant, $t(2,456) = 13.212$, $p < .001$. Therefore, the null hypothesis was rejected. The 95% confidence interval for the difference in means was .25 to .34. The effect size was small, $d = .27$. The results indicated that faculty use technology to a significant extent to support diverse talents and ways of learning. Figure 7 shows the distribution of responses to the survey statements.

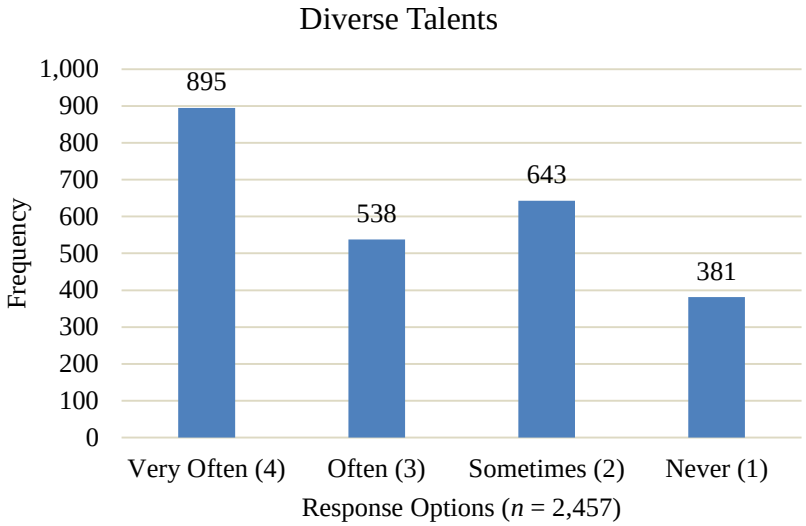

Figure 7. Frequency of Responses - Diverse Talents

Research Question 8 – Student-Faculty Contact–Gender

Research question 8 asked, "Are there any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on gender?" An independent-samples *t* test was conducted to evaluate whether a statistically significant difference existed between the aggregate mean scores for males and females for the six survey statements pertaining to using technology to enhance student-faculty contact. The test was significant, $t(2{,}476) = 2.244$, $p = .025$. Therefore, the null hypothesis was rejected. The results indicated that females ($M = 1.97$, $SD = 1.200$) use technology significantly more than males ($M = 1.87$, $SD = 1.161$) to enhance student-faculty contact. The 95% confidence interval for the difference in means was -.200 to -.013. The effect size was small, $d = .09$. Figure 8 shows the distribution of responses for males and females.

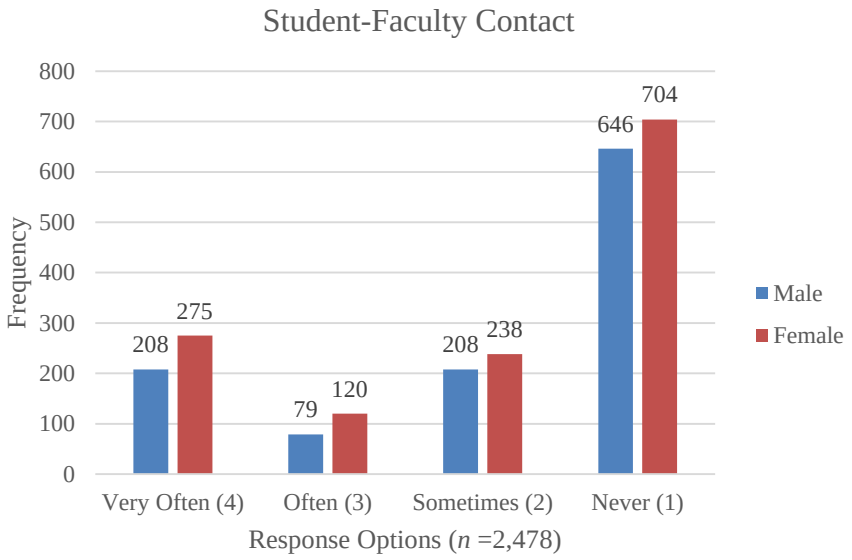

Figure 8. Responses by Gender – Student-Faculty Contact

Research Question 9 – Reciprocity and Cooperation–Gender

Research question 9 asked, "Are there any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on gender?" An independent-samples *t* test was conducted to evaluate whether a statistically significant difference existed between the aggregate mean scores for males and females for the six survey statements pertaining to using technology encourage reciprocity and cooperation among students. The test was significant, $t(2,475) = 2.132$, $p = .033$. Therefore, the null hypothesis was rejected. The results indicated that females (M = 1.93, SD = 1.145) use technology significantly more than males (M = 1.84, SD = 1.130) to encourage reciprocity and cooperation among students. The 95% confidence interval for the difference in means was -.188 to -.008. The effect size was small, $d = .05$. Figure 9 shows the distribution of responses for males and females.

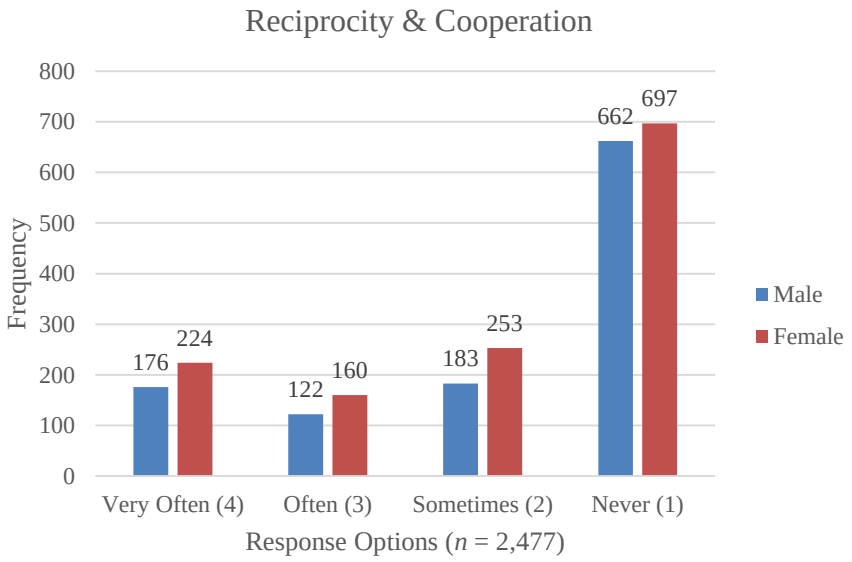

Figure 9. Responses by Gender – Reciprocity & Cooperation

Research Question 10 – Active Learning–Gender

Research question 10 asked, "Are there any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on gender?" An independent-samples *t* test was conducted to evaluate whether a statistically significant difference existed between the aggregate mean scores for males and females for the six survey statements pertaining to using technology to promote active learning. The test was significant, $t(2,478) = 5.097$, $p < .001$. Therefore, the null hypothesis was rejected. The results indicated that females (M = 2.62, SD = 1.176) use technology significantly more than males (M = 2.38, SD = 1.166) to promote active learning. The 95% confidence interval for the difference in means was -.333 to -.148. The effect size was small, $d = .20$. Figure 10 shows the distribution of responses for males and females.

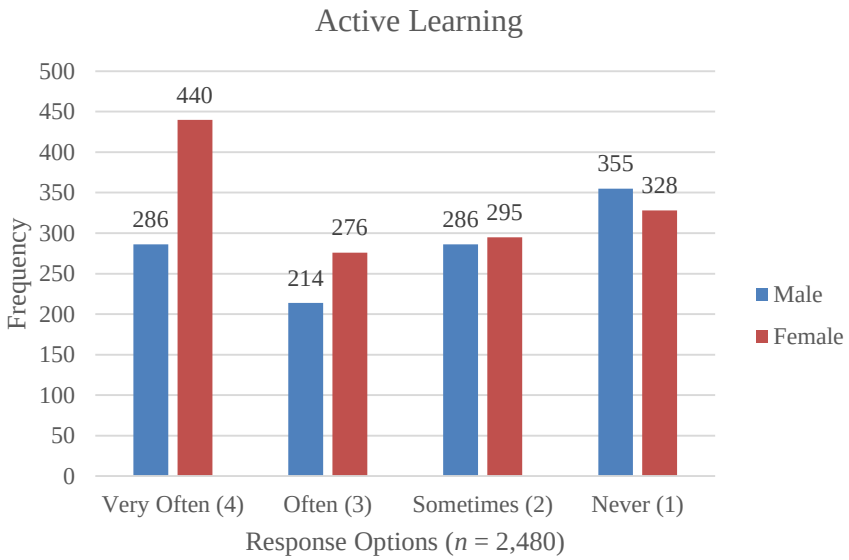

Figure 10. Responses by Gender – Active Learning

Research Question 11 – Prompt Feedback–Gender

Research question 11 asked, "Are there any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on gender?" An independent-samples *t* test was conducted to evaluate whether a statistically significant difference existed between the aggregate mean scores for males and females for the six survey statements pertaining to using technology to provide prompt feedback to students. The test was significant, $t(2,471) = 4.644$, $p < .001$. Therefore, the null hypothesis was rejected. The results indicated that females (M = 2.64, SD = 1.251) use technology significantly more than males (M = 2.41, SD = 1.248) to provide prompt feedback. The 95% confidence interval for the difference in means was -.333 to -.135. The effect size was small, $d = .19$. Figure 11 shows the distribution of responses for males and females.

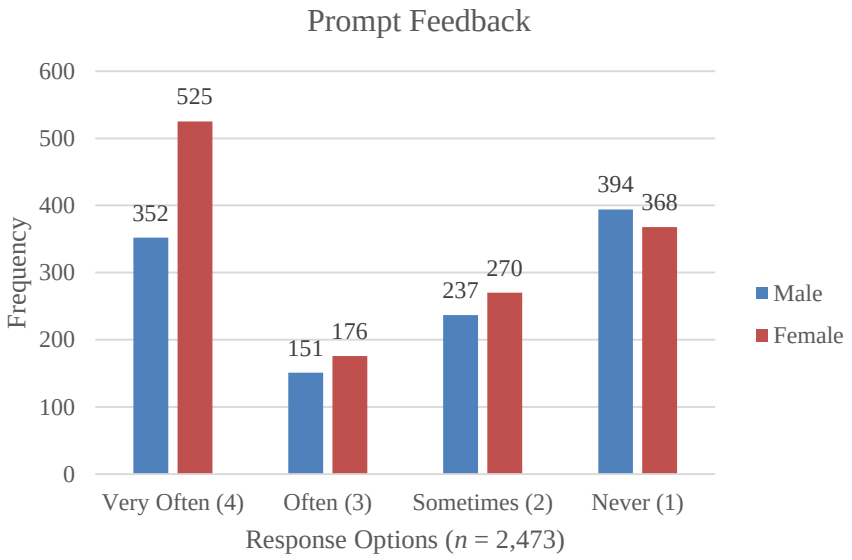

Figure 11. Responses by Gender – Prompt Feedback

Research Question 12 – Time on Task–Gender

Research question 12 asked, "Are there any significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on gender?" An independent-samples *t* test was conducted to evaluate whether a statistically significant difference existed between the aggregate mean scores for males and females for the six survey statements pertaining to using technology to promote time on task. The test was significant, $t(2{,}408.564) = 4.472$, $p < .001$. Therefore, the null hypothesis was rejected. The results indicated that females (M = 2.50, SD = 1.203) use technology significantly more than males (M = 2.28, SD = 1.187) to promote time on task. The 95% confidence interval for the difference in means was -.310 to -.121. The effect size was small, $d = .18$. Figure 12 shows the distribution of responses for males and females.

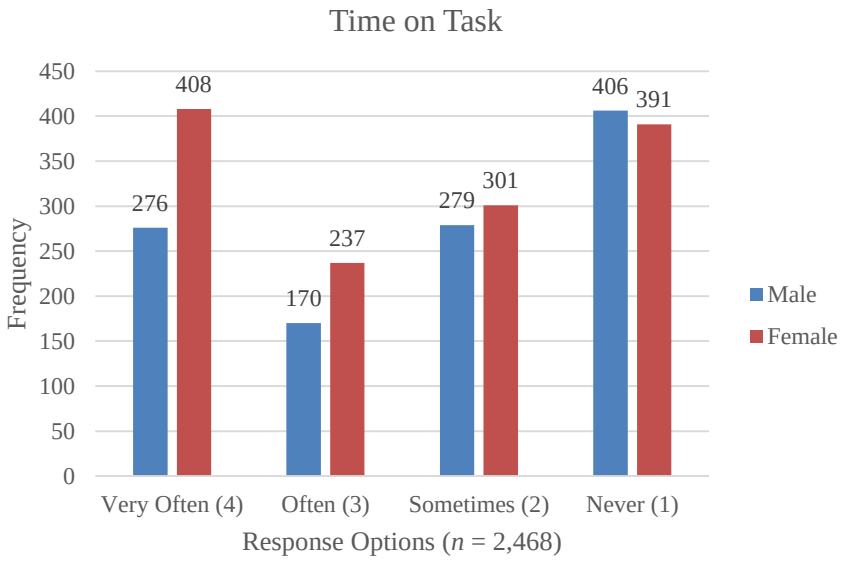

Figure 12. Responses by Gender – Time on Task

Research Question 13 – High Expectations–Gender

Research question 13 asked, "Are there any significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on gender?" An independent-samples *t* test was conducted to evaluate whether a statistically significant difference existed between the aggregate mean scores for males and females for the six survey statements pertaining to using technology to communicate high expectations to students. The test was significant, $t(2{,}377.186) = 4.013$, $p < .001$. Therefore, the null hypothesis was rejected. The results indicated that females (M = 2.87, SD = 1.187) use technology significantly more than males (M = 2.67, SD = 1.221) to communicate high expectations to students. The 95% confidence interval for the difference in means was -.291 to -.100. The effect size was small, $d = .16$. Figure 13 shows the distribution of responses for males and females.

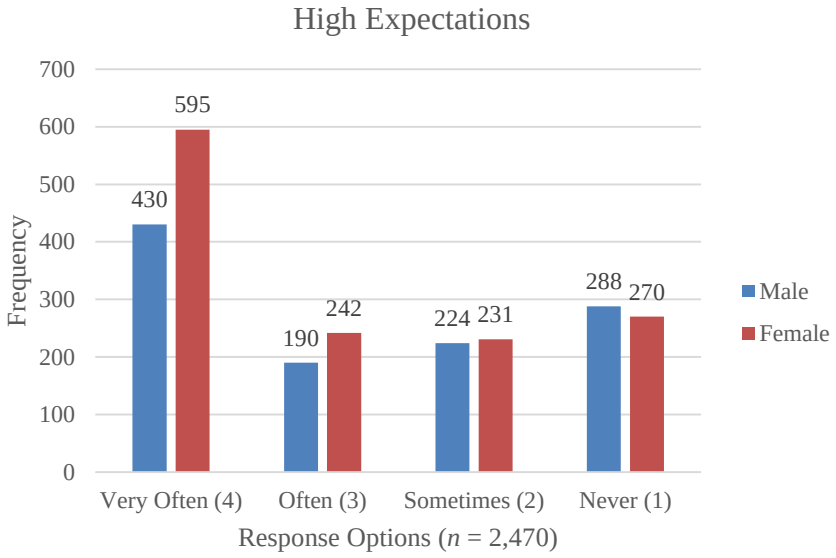

Figure 13. Responses by Gender – High Expectations

Research Question 14 – Diverse Talents–Gender

Research question 14 asked, "Are there any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on gender?" An independent-samples *t* test was conducted to evaluate whether a statistically significant difference existed between the aggregate mean scores for males and females for the six survey statements pertaining to using technology to support diverse talents and way of learning. The test was significant, $t(2,326.114) = 6.119$, $p < .001$. Therefore, the null hypothesis was rejected. The results indicated that females (M = 2.92, SD = 1.055) use technology significantly more than males (M = 2.64, SD = 1.128) to support diverse talents and ways of learning. The 95% confidence interval for the difference in means was -.358 to -.185. The effect size was small, $d = .25$. Figure 14 shows the distribution of responses for males and females.

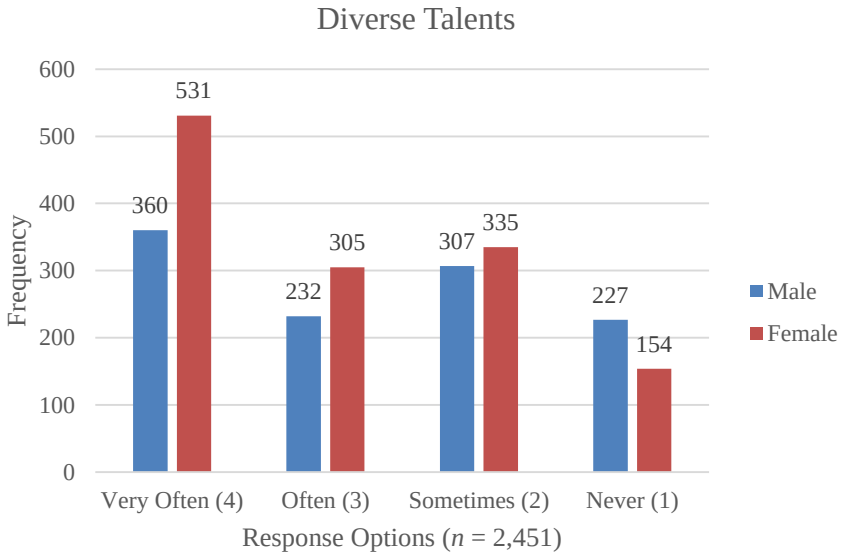

Figure 14. Responses by Gender – Diverse Talents

Research Question 15 - Student-Faculty Contact–Age Group

Research question 15 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on age group?" Data from the six survey statements pertaining to student-faculty contact were aggregated for analysis. An ANOVA was conducted to evaluate the relationship between age and use of technology to enhance student-faculty contact. The factor variable, age group, included four levels: under 40, 40-49, 50-59, and 60 or over. The ANOVA was not significant, $F(3, 2{,}463) = 1.549$, $p = .200$. Therefore, the null hypothesis was retained. The strength of the relationship between age groups and use of technology to enhance student-faculty contact as assessed by eta η^2 was small (.002). The results indicated that use of technology to enhance student-faculty contact was not affected significantly by age. Table 1 reports the means, standard deviations, and 95% confidence intervals for the four age groups. Figure 15 shows the frequency of responses by age group.

Table 1

Pairwise Differences – Student-Faculty Contact

				95% Confidence Intervals		
Age Group	*N*	*M*	*SD*	Under 40	40-49	50-59
Under 40	534	1.88	1.147			
40-49	651	2.00	1.211	-.06 to .29		
50-59	684	1.87	1.176	-.18 to .17	-.29 to .04	
60 or over	598	1.94	1.187	-.12 to .24	-.23 to .11	-.10 to .24

Note: There are no significant mean differences at the 0.05 level.

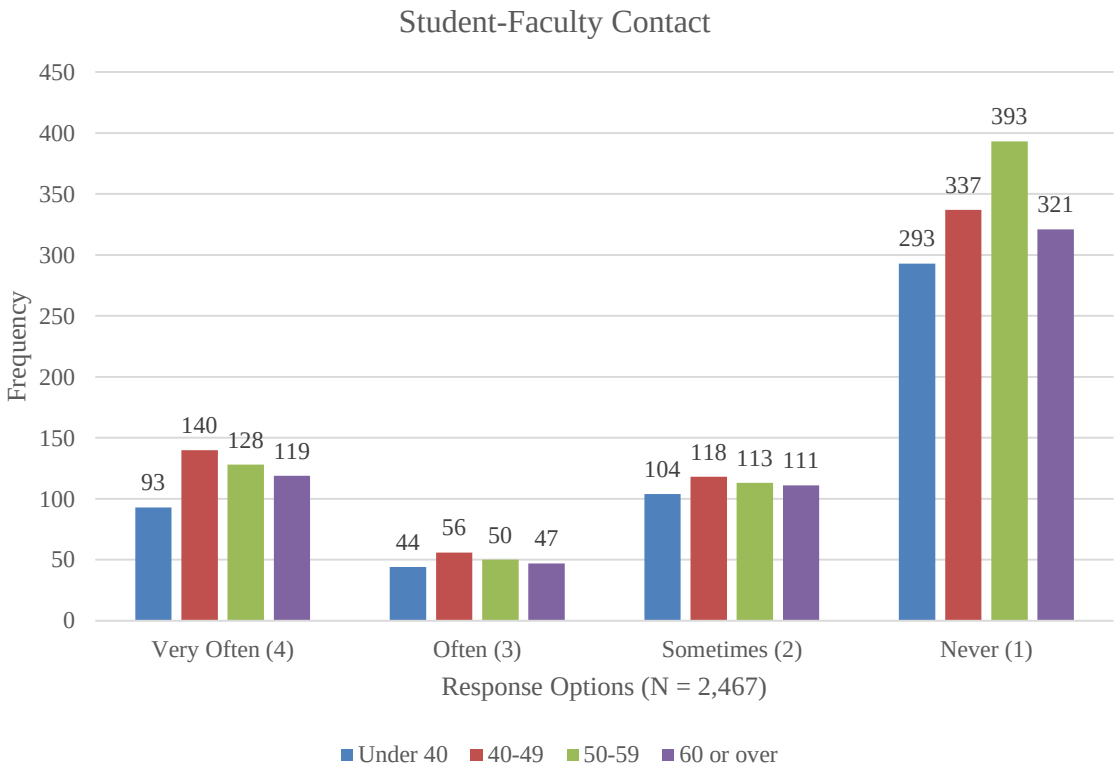

Figure 15. Frequency of Responses by Age Group - Student-Faculty Contact

Research Question 16 – Reciprocity and Cooperation–Age Group

Research question 16 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on age group?" Data from the six survey statements pertaining to reciprocity and cooperation were aggregated for analysis. An

ANOVA was conducted to evaluate the relationship between age and use of technology to encourage reciprocity and cooperation among students. The factor variable, age group, included four levels: under 40, 40-49, 50-59, and 60 or over. The ANOVA was not significant, $F(3, 2{,}461) = .942$, $p = .419$. Therefore, the null hypothesis was retained. The strength of the relationship between age groups and use of technology to encourage reciprocity and cooperation among students as assessed by η^2 was small (.001). The results indicated that use of technology to encourage reciprocity and cooperation among students was not affected significantly by age. Table 2 reports the means, standard deviations, and 95% confidence intervals for the four age groups. Figure 16 shows the distribution of responses for age groups.

Table 2

Pairwise Differences – Reciprocity & Cooperation

				95% Confidence Intervals		
Age Group	*N*	*M*	*SD*	Under 40	40-49	50-59
Under 40	533	1.83	1.109			
40-49	648	1.88	1.101	-.12 to .23		
50-59	679	1.93	1.150	-.06 to .28	-.11 to .21	
60 or over	605	1.91	1.188	-.09 to .26	-.14 to .19	-.19 to .14

Note: There are no significant mean differences at the 0.05 level.

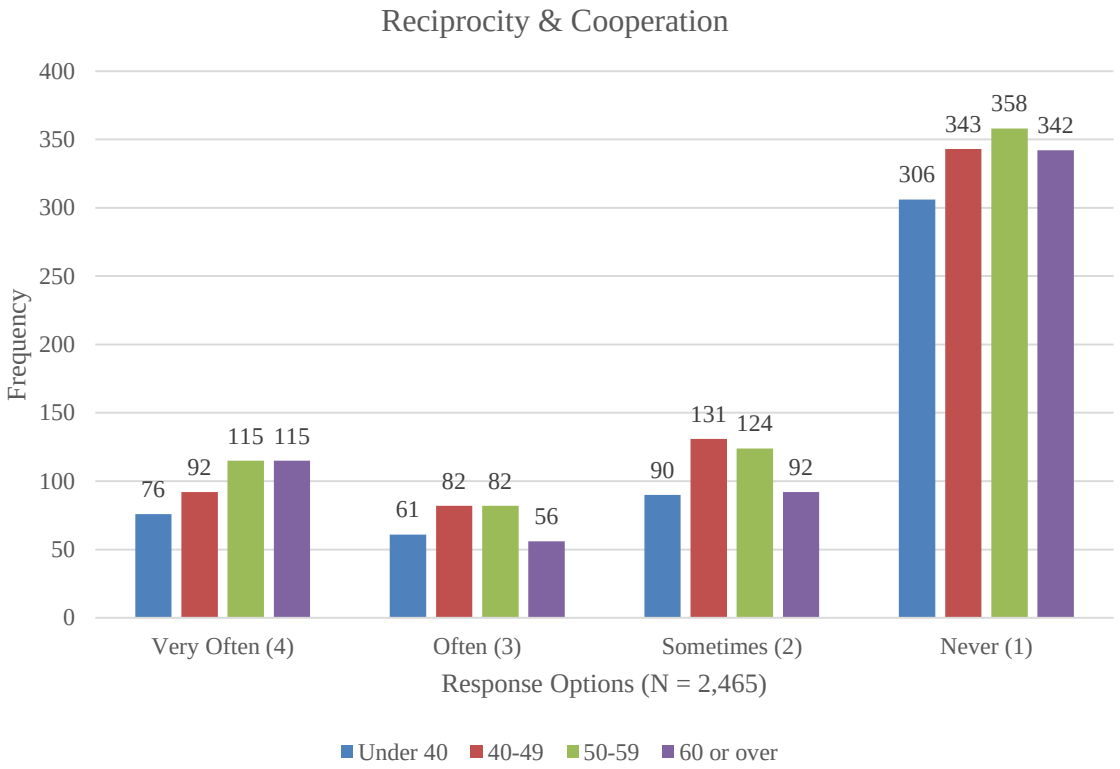

Figure 16. Frequency of Responses by Age Group - Reciprocity & Cooperation

Research Question 17 – Active Learning–Age Group

Research question 17 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on age group?" Data from the six survey statements pertaining to active learning were aggregated for analysis. An ANOVA was conducted to evaluate the relationship between age and use of technology to promote active learning. The factor variable, age group, included four levels: under 40, 40-49, 50-59, and 60 or over. The ANOVA was not significant, $F(3, 2{,}464) = .613$, $p = .606$. Therefore, the null hypothesis was retained. The strength of the relationship between age groups and use of technology to promote active learning as assessed by η^2 was small (.001). The results indicated that use of technology to promote active learning was not affected significantly by age. Table 3 reports the means, standard

deviations, and 95% confidence intervals for the four age groups. Figure 17 shows distribution of responses for age groups.

Table 3

Pairwise Differences – Active Learning

				95% Confidence Intervals		
Age Group	*N*	*M*	*SD*	Under 40	40-49	50-59
Under 40	533	2.55	1.168			
40-49	653	2.47	1.182	-.25 to .10		
50-59	677	2.53	1.180	-.19 to .16	-.11 to .22	
60 or over	605	2.48	1.176	-.25 to .11	-.16 to .18	-.22 to .12

Note: There are no significant mean differences at the 0.05 level.

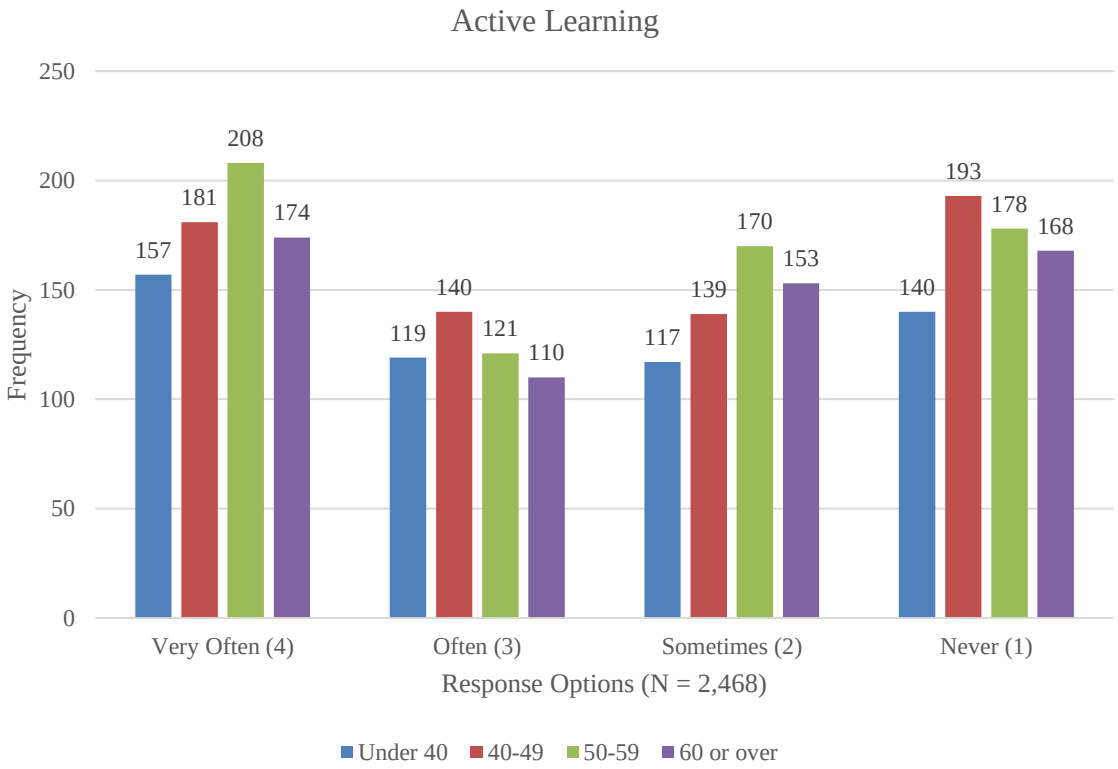

Figure 17. Frequency of Responses by Age Group - Active Learning

Research Question 18 – Prompt Feedback–Age Group

Research question 18 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on age group?" Data from the six survey statements pertaining to prompt feedback were aggregated for analysis. An ANOVA was conducted to evaluate the relationship between age and use of technology to provide prompt feedback to students. The factor variable, age group, included four levels: under 40, 40-49, 50-59, and 60 or over. The ANOVA was significant, $F(3, 2{,}457) = 3.617$, $p = .013$. Therefore, the null hypothesis was rejected. The strength of the relationship between age groups and use of technology to promote prompt feedback as assessed by η^2 was small (.004).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted using Tukey's HSD to evaluate pairwise difference among the mean scores of the four age groups. There was a significant difference in the mean scores between age groups 40-49 and under 40 ($p = .015$) and between age groups 50-59 and under 40 ($p = .047$). However, there was not a significant difference between the mean scores for age groups 40-49 and 50-59 ($p = .967$), age groups 40-49 and 60 or over ($p = .326$), age groups 50-59 and 60 or over ($p = .587$), or age groups 60 or over and under 40 ($p = .543$). The results indicated that faculty who are 40-59 use technology to promote prompt feedback significantly more than faculty under 40. The results also indicated no significant difference in use of technology to promote prompt feedback by faculty who are 40 or over, and by faculty who are 60 or over and under 40. Table 4 reports the means, standard deviations, and 95% confidence intervals for the pairwise differences for the four age groups. Figure 18 shows the distribution of responses for age groups.

Table 4

Pairwise Differences – Prompt Feedback

				95% Confidence Intervals		
Age Group	*N*	*M*	*SD*	Under 40	40-49	50-59
Under 40	533	2.40	1.219			
40-49	647	2.62	1.247	.03 to .41*		
50-59	682	2.59	1.281	.00 to .37*	-.21 to .14	
60 or over	599	2.50	1.259	-.09 to .29	-.30 to .06	-.27 to .09

*The mean difference is significant at the 0.05 level.

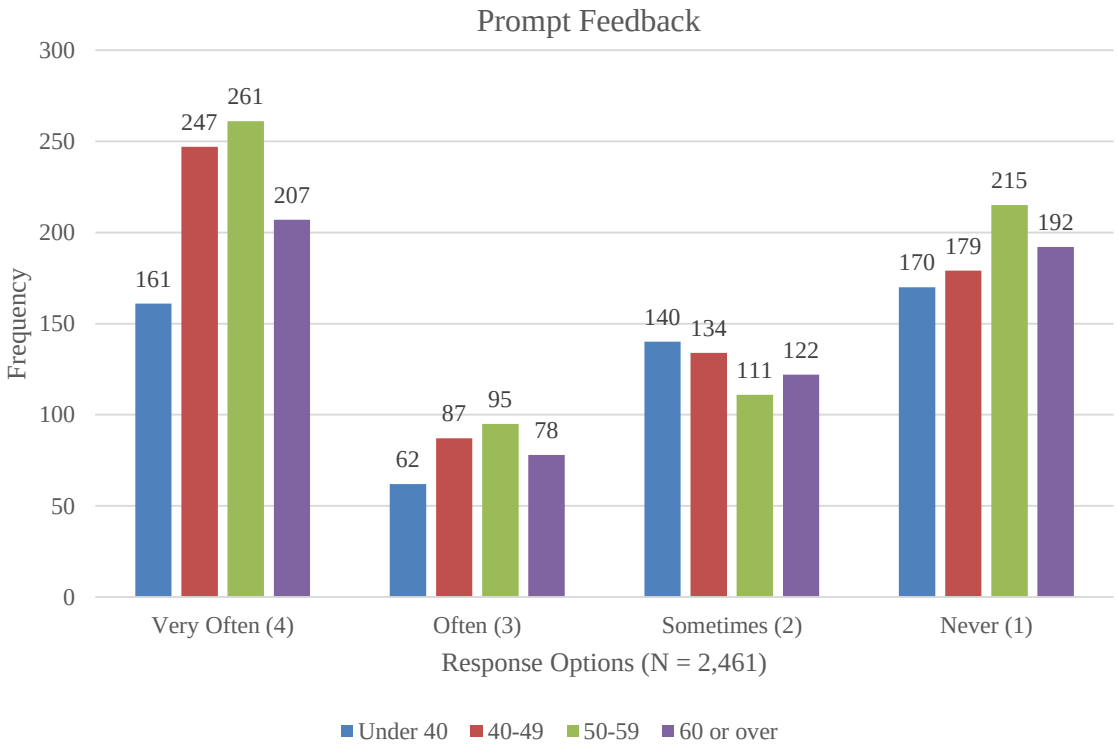

Figure 18. Frequency of Responses by Age Group - Prompt Feedback

Research Question 19 – Time on Task–Age Group

Research question 19 asked, "Are there significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on age group?" Data from the six survey statements pertaining to time on task were aggregated for analysis. An ANOVA was conducted to evaluate the

relationship between age group and use of technology to promote time on task. The factor variable, age group, included four levels: under 40, 40-49, 50-59, and 60 or over. The ANOVA was significant, $F(3, 2{,}447) = 4.498$, $p = .004$. Therefore, the null hypothesis was rejected. The strength of the relationship between age groups and use of technology to promote time on task as assessed by η^2 was small (.005).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted using Tukey's HSD to evaluate pairwise difference among the means of the four age groups. There was a significant difference in the means between age groups 40-49 and under 40 ($p = .018$) and between age groups 50-59 and under 40 ($p = .009$). However, there was not a significant difference between age groups 40-49 and 60 or over ($p = .256$), age groups 50-59 and 40-49 ($p = .997$), age groups 50-59 and 60 or over ($p = .168$), or age groups 60 or over and under 40 ($p = .676$). The results indicated that faculty who are 40-59 use technology to promote time on task significantly more than faculty who are under 40. The results also indicated no significant difference in use of technology to promote time on task by faculty who are 40 or over, and by faculty who are 60 or over and under 40. Table 5 reports the means, standard deviations, and 95% confidence intervals for the pairwise differences for the four age groups. Figure 19 shows the distribution of responses for age groups.

Table 5

Pairwise Differences – Time on Task

				95% Confidence Intervals		
Age Group	*N*	*M*	*SD*	Under 40	40-49	50-59
Under 40	531	2.27	1.213			
40-49	646	2.47	1.208	.02 to .39*		
50-59	678	2.48	1.209	.04 to .40*	-.16 to .18	
60 or over	596	2.35	1.157	-.10 to .26	-.30 to .05	-.31 to .03

*The mean difference is significant at the 0.05 level.

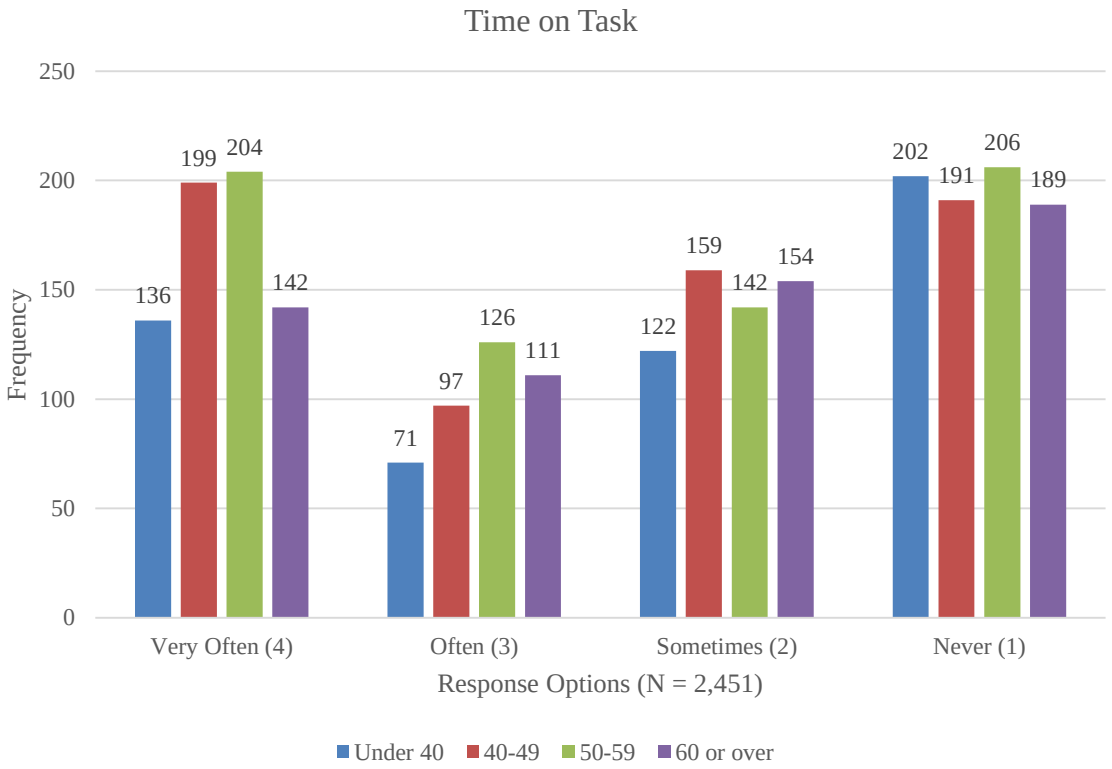

Figure 19. Frequency of Responses by Age Group - Time on Task

Research Question 20 – High Expectations–Age Group

Research question 20 asked, "Are there significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on age group?" Data from the six survey statements pertaining to high expectations were aggregated for analysis. An ANOVA was conducted to evaluate the relationship between age group and use of technology to communicate high expectations to students. The factor variable, age group, included four levels: under 40, 40-49, 50-59, and 60 or over. The ANOVA was not significant, $F(3, 2{,}449) = 1.928$, $p = .123$. Therefore, the null hypothesis was retained. The strength of the relationship between age groups and use of technology to communicate high expectations to students as assessed by η^2 was small (.002). The results indicated that use of technology to communicate high expectations to

students was not affected significantly by age group. Table 6 reports the means, standard deviations, and 95% confidence intervals for the four age groups. Figure 20 shows distribution of responses for age groups.

Table 6

Pairwise Differences – High Expectations

				95% Confidence Intervals		
Age Group	*N*	*M*	*SD*	Under 40	40-49	50-59
Under 40	533	2.74	1.206			
40-49	646	2.87	1.217	-.06 to .31		
50-59	676	2.78	1.210	-.14 to .22	-.26 to .08	
60 or over	598	2.71	1.181	-.21 to .16	-.33 to -.02	-.24 to .11

Note: There are no significant mean differences at the 0.05 level.

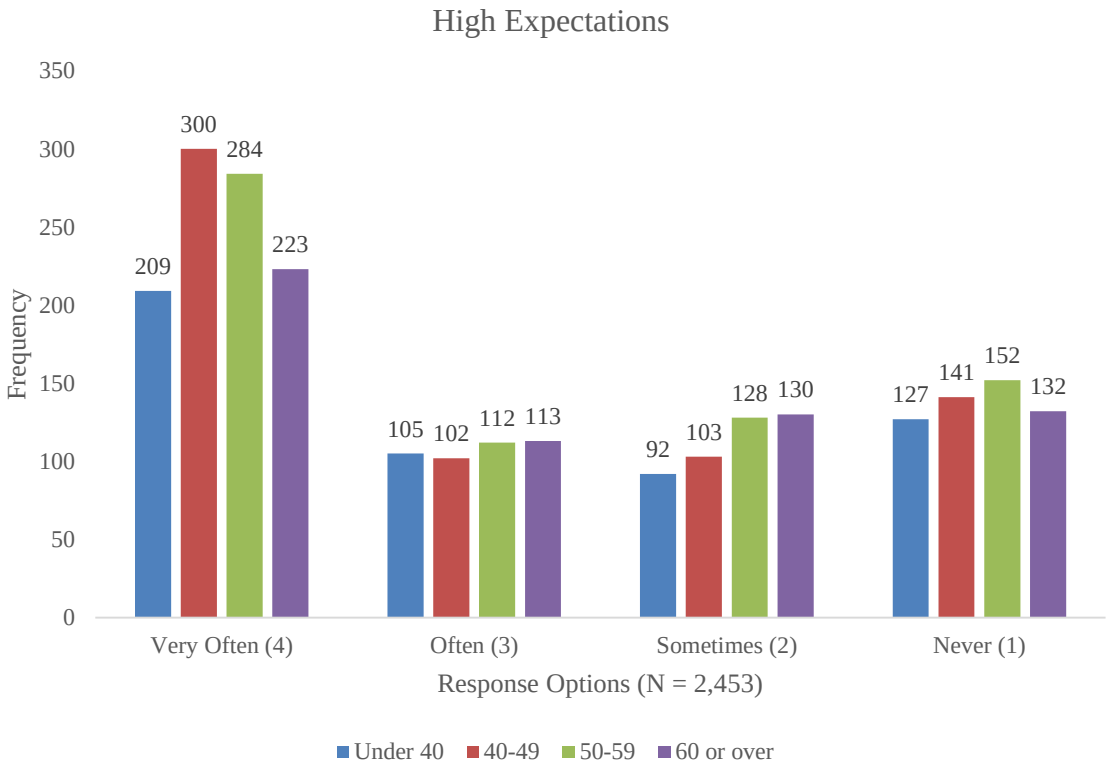

Figure 20. Frequency of Responses by Age Group - High Expectations

Research Question 21 – Diverse Talents–Age Group

Research question 21 asked, "Are there significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning?" Data from the six survey statements pertaining to diverse talents and ways of learning were aggregated for analysis. An ANOVA was conducted to evaluate the relationship between age group and use of technology to support diverse talents and ways of learning. The factor variable, age group, included four levels: under 40, 40-49, 50-59, and 60 or over. The ANOVA was significant, $F(3, 2{,}435) = 4.433$, $p = .004$. Therefore, the null hypothesis was rejected. The strength of the relationship between age groups and use of technology to support diverse talents and ways of learning as assessed by η^2 was small (.005).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted using Tukey's HSD to evaluate pairwise difference among the means of the four age groups. There was a significant difference in the mean scores between age groups 40-49 and under 40 ($p = .020$) and between age groups 50-59 and under 40 ($p = .009$). However, there was not a significant difference between age groups 40-49 and 60 or over ($p = .269$), age groups 50-59 and 40-49 ($p = .996$), age groups 50-59 and 60 or over ($p = .171$), or age groups 60 or over and under 40 ($p = .678$). The results indicated that faculty who are 40-59 use technology to promote prompt feedback to students significantly more than faculty under 40. The results also indicated no significant difference in use of technology to support diverse talents and ways of learning by faculty who are 40 or over and by faculty who are 60 or over and under 40. Table 7 reports the means, standard deviations, and 95% confidence intervals for the pairwise differences for the four age groups. Figure 21 shows the distribution of responses for age groups.

Table 7

Pairwise Differences – Diverse Talents

				95% Confidence Intervals		
Age Group	*N*	*M*	*SD*	Under 40	40-49	50-59
Under 40	525	2.66	1.113			
40-49	644	2.85	1.081	.03 to .35*		
50-59	678	2.86	1.103	.04 to .36*	-.14 to .17	
60 or over	592	2.74	1.084	-.10 to .24	-.27 to .05	-.28 to .03

*The mean difference is significant at the 0.05 level.

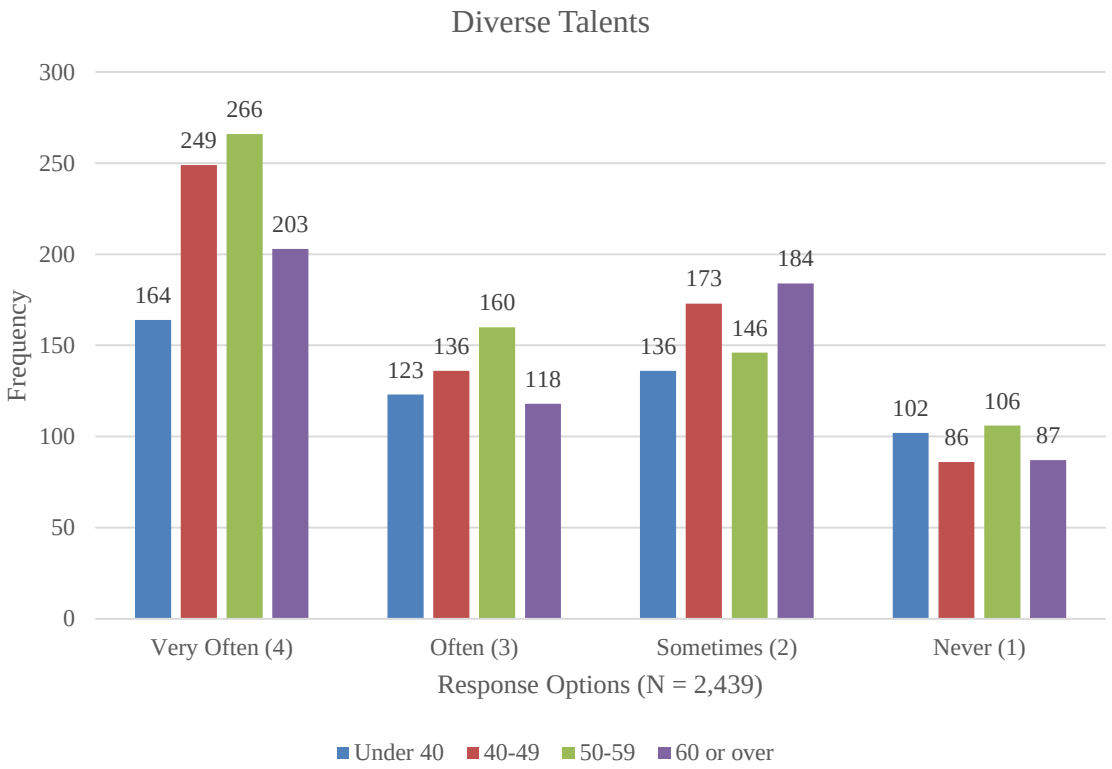

Figure 21. Frequency of Responses by Age Group - Diverse Talents

Chapter Summary

Chapter 4 presented the statistical results of the research study. A summary of demographics provided information about the total number of survey participants and the number of participants based on gender and age group. A brief discussion of missing data presented the rationale for not removing survey responses with unreported random data. A

discussion about the results of Cronbach's alpha testing presented the rationale for not removing any of the survey items from the data analysis. A brief description of testing procedures provided information about how the data were analyzed. Results from analysis of data for each research question were reported. Tables and figures provided supporting information.

CHAPTER 5

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATOINS

Chapter 5 contains four sections. The first section provides a summary of the quantitative research study conducted to investigate faculty integration of technology into teaching and learning at the undergraduate level at private colleges and universities. The second section provides a discussion of the findings and presents the conclusions. The third section presents recommendations for further study. The fourth section is a summary of the chapter.

Summary of Research Study

The purpose of this quantitative study was to investigate faculty integration of technology into teaching and learning at the undergraduate level to support the principles of good practice in undergraduate education to improve teaching and learning. The study was an exploration of the extent to which technology is being integrated into undergraduate courses at private colleges and universities to advance good practice in undergraduate education. The study also was an exploration of differences in use of technology by faculty based on demographic factors of gender and age. For this study, integration of technology was defined as using technology as an instructional tool to improve teaching and learning. The theoretical constructs of this research were Chickering and Gamson's (1987) seven principles for good practice in undergraduate education that support: (a) contact between students and faculty, (b) reciprocity and cooperation among students, (c) active learning, (d) prompt feedback, (e) time on task, (f) high expectations, and (g) diverse talents and ways of learning. The researcher conducted an electronic survey to obtain data from faculty at member institutions of the Appalachian College Association (ACA), a consortium of 35 private colleges and universities. All ACA member institutions were invited to

participate and 21 institutions chose to participate. The number of faculty who responded to the electronic survey was 421.

Summary of Findings

Twenty-one research questions and null hypotheses guided the study. Findings are organized by the research questions. The conclusions for the 21 research questions are organized by the seven principles of good practice in undergraduate education.

Research Question 1 – Student-Faculty Contact

Research question 1 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote student-faculty contact?" The null hypothesis stated, "Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to promote student-faculty contact." Results of the statistical analysis of the aggregate mean for the six survey statements pertaining to research question 1 indicated that faculty do not use technology to a significant extent to promote student-faculty contact.

Research Question 2 – Reciprocity and Cooperation Among Students

Research question 2 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to encourage reciprocity and cooperation among students?" The null hypothesis stated, "Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to encourage reciprocity and cooperation among students." Results of the statistical analysis of the aggregate mean for the six survey statements pertaining

to research question 2 indicated that faculty do not use technology to a significant extent to encourage reciprocity and cooperation among students.

Research Question 3 – Active Learning

Research question 3 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote active learning?" The null hypothesis stated, "Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to promote active learning." Results of the statistical analysis of the aggregate mean for the six survey statements pertaining to research question 3 indicated that faculty do not use technology to a significant extent to promote active learning.

Research Question 4 – Prompt Feedback

Research question 4 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to provide prompt feedback to students?" The null hypothesis stated, "Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to provide prompt feedback to students." Results of the statistical analysis of the aggregate mean for the six survey statements pertaining to research question 4 indicated that faculty do not use technology to a significant extent to promote prompt feedback to students.

Research Question 5 – Time on Task

Research question 5 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote time on task?" The null hypothesis stated, "Full-time faculty members teaching undergraduate

courses at private colleges and universities do not use technology to a significant extent to promote time on task." Results of the statistical analysis of the aggregate mean for the six survey statements pertaining to research question 5 indicated that faculty do not use technology to a significant extent to promote time on task.

Research Question 6 – High Expectations

Research question 6 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to communicate high expectations?" The null hypothesis stated, "Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to communicate high expectations." Results of the statistical analysis of the aggregate mean for the six survey statements pertaining to research question 6 indicated that faculty use technology to a significant extent to communicate high expectations to students.

Research Question 7 – Diverse Talents and Ways of Learning

Research question 7 asked, "Do full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to support diverse talents and ways of learning?" The null hypothesis stated, "Full-time faculty members teaching undergraduate courses at private colleges and universities do not use technology to a significant extent to support diverse talents and ways of learning." Results of the statistical analysis of the aggregate mean for the six survey statements pertaining to research question 7 indicated that faculty use technology to a significant extent to support diverse talents and ways of learning.

Research Question 8 – Student-Faculty Contact–Gender

Research question 8 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on gender?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on gender." Results of the statistical analysis of the aggregate mean scores for males and females for the six survey statements pertaining to research question 8 indicated that a statistically significant difference existed by gender in use of technology to enhance student-faculty contact. Females use technology significantly more than males to enhance student-faculty contact.

Research Question 9 – Reciprocity and Cooperation–Gender

Research question 9 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on gender?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on gender." Results of the statistical analysis of the aggregate mean scores for males and females for the six survey statements pertaining to research question 9 indicated that a statistically significant difference existed by gender in use of technology to encourage reciprocity and cooperation among students. Females use technology significantly more than males to encourage reciprocity and cooperation among students.

Research Question 10 – Active Learning–Gender

Research question 10 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on gender?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on gender." Results of the statistical analysis of the aggregate mean scores for males and females for the six survey statements pertaining to research question 10 indicated that a statistically significant difference existed by gender in use of technology to promote active learning. Females use technology significantly more than males to promote active learning.

Research Question 11 – Prompt Feedback–Gender

Research question 11 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on gender?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on gender." Results of the statistical analysis of the aggregate mean scores for males and females for the six survey statements pertaining to research question 11 indicated that a statistically significant difference existed by gender in use of technology to provide prompt feedback. Females use technology significantly more than males to provide prompt feedback to students.

Research Question 12 – Time on Task–Gender

Research question 12 asked, "Are there significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities

to promote time on task based on gender?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on gender." Results of the statistical analysis of the aggregate mean scores for males and females for the six survey statements pertaining to research question 12 indicated that a statistically significant difference existed by gender in use of technology to promote time on task. Females use technology significantly more than males to provide promote time on task.

Research Question 13 – High Expectations–Gender

Research question 13 asked, "Are there significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on gender?" The null hypothesis stated, "There are no significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on gender." Results of the statistical analysis of the aggregate mean scores for males and females for the six survey statements pertaining to research question 13 indicated that a statistically significant difference existed by gender in use of technology to communicate high expectations. Females use technology significantly more than males to communicate high expectations to students.

Research Question 14 – Diverse Talents–Gender

Research question 14 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on gender?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based

on gender." Results of the statistical analysis of the aggregate mean scores for males and females for the six survey statements pertaining to research question 14 indicated that a statistically significant difference existed by gender in use of technology to support diverse talents and ways of learning. Females use technology significantly more than males to support diverse talents and ways of learning.

Research Question 15 – Student-Faculty Contact–Age Group

Research question 15 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on age group?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on age group." Results of the statistical analysis of the aggregate mean scores for the four age groups for the six survey statements pertaining to research question 15 indicated that use of technology to enhance student-faculty contact was not affected significantly by age.

Research Question 16 – Reciprocity and Cooperation–Age Group

Research question 16 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on age group?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on age group." Results of the statistical analysis of the aggregate mean scores for the four age groups for the six survey statements

pertaining to research question 16 indicated that use of technology to encourage reciprocity and cooperation among students was not affected significantly by age group.

Research Question 17 – Active Learning–Age Group

Research question 17 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on age group?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on age group." Results of the statistical analysis of the aggregate mean scores for the four age groups for the six survey statements pertaining to research question 17 indicated that use of technology to promote active learning was not affected significantly by age.

Research Question 18 – Prompt Feedback–Age Group

Research question 18 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on age group?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on age group." Results of the statistical analysis of the aggregate mean scores for the four age groups for the six survey statements pertaining to research question 18 indicated a significant difference existed in use of technology to provide prompt feedback between age groups 40-49 and under 40 and age groups 50-59 and under 40. Faculty who are age 40-59 use technology significantly more than faculty who are under the age of 40 to provide prompt feedback to students. No significant differences existed between any other age groups.

Research Question 19 – Time on Task–Age Group

Research question 19 asked, "Are there significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on age group?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty members teaching undergraduate courses at private colleges and universities to promote time on task based on age group." Results of the statistical analysis of the aggregate mean scores for the four age groups for the six survey statements pertaining to research question 19 indicated a significant difference existed in use of technology to promote time on task between age groups 40-49 and under 40 and between age groups 50-59 and under 40. Faculty who are age 40-59 use technology significantly more to promote time on task than faculty who are under 40. No significant differences existed between any other age groups.

Research Question 20 – High Expectations–Age Group

Research question 20 asked, "Are there significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on age group?" The null hypothesis stated, "There are no significant differences in the use of technology by faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on age group." Results of the statistical analysis of the aggregate mean scores for the four age groups for the six survey statements pertaining to research question 20 indicated that use of technology to communicate high expectations was not affected significantly by age group.

Research Question 21 – Diverse Talents and Ways of Learning–Age Group

Research question 21 asked, "Are there significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on age group?" The null hypothesis stated, "There are no significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on age group." Results of the statistical analysis of the aggregate mean scores for the four age groups for the six survey statements pertaining to research question 21 indicated a significant difference existed in use of technology to support diverse talents and ways of learning between age groups 40-49 and under 40 and between age groups 50-59 and under 40. Faculty who are 40-59 use technology significantly more to support diverse talents and ways of learning than faculty who are under 40. No significant differences existed between any other age groups.

Conclusions

The conclusions reached by the researcher relate to the findings related to the 21 research questions. The survey contained six statements about each of the seven principles of good practice in undergraduate education. The researcher aggregated the survey data by principle for analysis. The results of the analysis informed the researcher as to whether the null hypotheses should be retained or rejected. Conclusions drawn by the researcher were based solely on the aggregate data and not the individual survey statements; that is, statistical analyses by individual survey statements are not reported. The conclusions drawn by the researcher are that faculty participants in this research study use technology to a significant extent to advance two of the seven principles of good practice in undergraduate education. Faculty use technology to communicate high expectations to students and to support diverse talents and ways of learning.

However, faculty do not use technology to a significant extent to enhance student-faculty contact, encourage reciprocity and cooperation among students, promote active learning, provide prompt feedback to students, promote time on task. The researcher also reached the conclusion that gender and age can be factors in use of technology. In this study, results indicated that female faculty use technology more than male faculty to support the seven principles of good practice in undergraduate education. With regard to age, this study found that faculty who are 40-59 use technology more than faculty who are under 40 to promote prompt feedback, promote time on task, and support diverse talents and ways of learning. No significant differences exist between other age groups regarding these three principles. No significant differences exist between any age groups regarding use of technology to promote student-faculty contact, encourage reciprocity and cooperation, promote active learning, and communicate high expectations. A summary of results for the survey categories follows.

Student-Faculty Contact

Research question 1 asked if full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to enhance student-faculty contact. The six survey statements pertaining to student-faculty contact gathered data about use of electronic mail, discussion forums, blogs, text messaging, social networking, and social messaging. Results from the statistical tests indicated that faculty do not use technology to a significant extent to enhance student-faculty contact.

One of the most important factors in student motivation and engagement is contact between students and faculty in class and outside the classroom. Technology enhances student-faculty contact by increasing student access to faculty (Chickering & Ehrmann, 1996). Faculty

who embrace technology and find ways to integrate email and other technology into the educational process improve their connection with students (Yates et al., 2009).

Research question 8 asked if there are any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on gender. The results of the statistical analysis indicated that females use technology significantly more than males to enhance student-faculty contact. Also, gender was a factor with regard to using technology to enhance student-faculty contact. Findings from previous research based on gender are presented at the end of the Conclusions section.

Research question 15 asked if there are significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to enhance student-faculty contact based on age group. Results of the statistical analysis indicated that use of technology to enhance student-faculty contact was not affected significantly by age. The researcher concluded that the age of faculty who responded to the survey for this research study was not a factor with regard to use of technology to enhance student-faculty contact. Findings from previous research based on age are presented at the end of the Conclusions section.

Reciprocity and Cooperation Among Students

Research question 2 asked if full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to encourage reciprocity and cooperation among students. The six survey statements pertaining to reciprocity and cooperation collected data about use of discussion boards, chat rooms, blogs, electronic mail, collaboration technology, and presentation technology. Results from the statistical tests

indicated that faculty do not use technology to a significant extent to encourage reciprocity and cooperation among students.

Technology facilitates reciprocity and cooperation among students through study groups, collaborative learning, group problem solving, and discussion of assignments (Chickering & Ehrmann). Collaborating with others in solving problems or mastering difficult material prepares students not only for college but also for future careers (Indiana University Center, 2008; Kuh et al., 2005). Learning outcomes and the quality of the learning experience are enhanced through collaboration, interaction, connection and relevance (Gourley, 2010; Oblinger, 2012a; Puzziferro & Shelton, 2009).

Research question 9 asked if there are any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on gender. The results of the statistical analysis indicated that females use technology significantly more than males to encourage reciprocity and cooperation among students. Also, gender was a factor with regard to using technology to encourage reciprocity and cooperation among students. Findings from previous research based on gender are presented at the end of the Conclusions section.

Research question 16 asked if there are significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to encourage reciprocity and cooperation among students based on age group. Results of the statistical analysis indicated that use of technology to encourage reciprocity and cooperation among students was not affected significantly by age. The researcher concluded that the age of faculty who responded to the survey was not a factor with regard to use of technology to

encourage reciprocity and cooperation among students. Findings from previous research based on age are presented at the end of the Conclusions section.

Active Learning

Research question 3 asked if full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote active learning. The six survey statements pertaining to active learning collected data about use of technology to facilitate real-world learning, real-world problem solving, student engagement, and online research; and use of electronic response systems and presentation technology. Results from the statistical tests indicated that faculty do not use technology to a significant extent to promote active learning.

Technology supports active learning through resources for learning by doing, time-delayed exchange, and real-time conversation (Chickering & Ehrmann, 1996). In collaborative or interactive learning, students construct knowledge through interaction with one another and with faculty or other sources of knowledge. Technology can support traditional didactic, active, and interactive learning experiences (Means et al., 2010). Learning management systems provide a platform that engages students and allows them to take charge of their learning experiences. Student engagement and active learning occur through self-assessments and feedback, discussions, and chats. Active engagement with other students occurs through information sharing, for example, through web links (McCabe & Meuter, 2011). Effective use of technology supports the development of critical thinking, adaptability, and collaboration, essential skills for achieving success in today's rapidly changing information age (Koç, 2005).

Research question 10 asked if there are any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and

universities to promote active learning based on gender. The results of the statistical analysis indicated that females use technology significantly more than males to promote active learning. Also, gender was a factor with regard to using technology to promote active learning. Findings from previous research based on gender are presented at the end of the Conclusions section.

Research question 17 asked if there are significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote active learning based on age group. Results of the statistical analysis indicated that use of technology to promote active learning was not affected significantly by age. The researcher concluded that the age of faculty who responded to the survey was not a factor with regard to use of technology to promote active learning. Findings from previous research based on age are presented at the end of the Conclusions section.

Prompt Feedback

Research question 4 asked if full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to provide prompt feedback to students. The six survey statements pertaining to active learning collected data about use of technology to post student grades online, provide feedback to students via a learning management system, provide feedback via embedded comments in students' electronic documents, provide feedback via electronic mail, provide online quizzes, and provide an online portfolio to allow students to store papers and projects for instructor evaluation. Results from the statistical tests indicated that faculty do not use technology to a significant extent to provide prompt feedback to students.

Feedback enhances learning by providing students with guidance as to whether or not they are on track and enables them to make changes in their studies when necessary. Students

place high value on quick responses (Oblinger & Oblinger, 2005). Discussion based tools such as email, chat, and discussion boards can be used by faculty to provide virtual office hours where students may ask questions and get instant feedback from faculty (McCabe & Meuter, 2011).

Research question 11 asked if there are any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on gender. The results of the statistical analysis indicated that females use technology significantly more than males to provide prompt feedback to students. Also, gender was a factor with regard to using technology to provide prompt feedback to students. Findings from previous research based on gender are presented at the end of the Conclusions section.

Research question 18 asked if there are significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to provide prompt feedback to students based on age group. Results of the statistical analysis indicated that use of technology to provide prompt feedback to students was affected significantly by age group. The results indicated that faculty who are 40-59 use technology to promote prompt feedback to students more than faculty who are under 40. The researcher concluded that use of technology to provide prompt feedback to students was affected by the age of faculty who responded to the survey and, therefore, age was a factor. Findings from previous research based on age are presented at the end of the Conclusions section.

Time on Task

Research question 5 asked if full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent to promote time on task. The six survey statements pertaining to time on task collected data about use of technology to

facilitate online learning, blended learning, online classroom components for traditional classes, online participation monitoring, online resource availability, and modularized course content and release. Results from the statistical tests indicated that faculty do not use technology to a significant extent to promote time on task.

According to Chickering and Ehrmann (1996) technology can dramatically improve time on task for students by making study time more efficient and reducing commuting time. Online students may have an advantage over traditional students because online students spend more time on task than traditional students (Stewart et al., 2010). The use of technology often increases time on task and might be one explanation for the link between use of technology and positive educational outcomes (Guidry & BrckaLorenz, 2010).

Research question 12 asked if there are any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote time on task based on gender. The results of the statistical analysis indicated that females use technology significantly more than males to promote time on task. Also, gender was a factor with regard to using technology to promote time on task. Findings from previous research based on gender are presented at the end of the Conclusions section.

Research question 19 asked if there are significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to promote time on task based on age group. Results of the statistical analysis indicated that use of technology to promote time on task was affected significantly by age. The results indicated that faculty who are 40-59 use technology to promote time on task significantly more than faculty who are under 40. The researcher concluded that use of technology to promote time on task was affected by the age of faculty who responded to the survey for and, therefore, age was a factor.

Findings from previous research based on age are presented at the end of the Conclusions section.

High Expectations

Research question 6 asked if full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent communicate high expectations to students. The six survey statements pertaining to time on task collected data about use of technology to facilitate posting an online syllabus, providing challenging assignments, creating assignments that develop students' critical thinking skills, using an asynchronous lecture capture system to enhance and extend instructional activities, creating assignments that require students to collect and analyze data and communicate their findings, and posting scoring rubrics online so students will have a clear understanding of what is expected. Results from the statistical tests indicated that faculty use technology to a significant extent to communicate high expectations to students. .

According to Chickering and Ehrmann (1969) expectations are important for all students and expectations for students to perform well will become a self-fulfilling prophecy. They asserted that technology enables faculty to more clearly articulate criteria for evaluating student work. Challenging intellectual and creative work is crucial to student learning (Indiana University Center, 2008). Faculty set high expectations when they provide students with challenging and achievable goals. Learning management system tools can be used to define goals, provide examples of exemplar work, and specify requirements for assignments (McCabe & Meuter, 2011).

Research question 13 asked if there are any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and

universities to communicate high expectations to students based on gender. The results of the statistical analysis indicated that females use technology significantly more than males to communicate high expectations to students. Also, gender was a factor with regard to using technology to communicate high expectations to students. Findings from previous research based on gender are presented at the end of the Conclusions section.

Research question 20 asked if there are significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to communicate high expectations to students based on age group. Results of the statistical analysis indicated that use of technology to communicate high expectations to students was not affected significantly by age. The researcher concluded that the age of faculty who responded to the survey had no significant effect on use of technology to communicate high expectations to students. Findings from previous research based on age are presented at the end of the Conclusions section.

Diverse Talents and Ways of Learning

Research question 7 asked if full-time faculty members teaching undergraduate courses at private colleges and universities use technology to a significant extent support diverse talents and ways of learning. The six survey statements pertaining to time on task collected data about use of technology to facilitate real-world learning opportunities, availability of online digital materials and audio-visual information, varied online assignments and presentation formats, and blended learning strategies. Results from the statistical tests indicated that faculty use technology to a significant extent to support diverse talents and ways of learning.

Technology allows students to learn by methods that are most effective for them (Chickering & Ehrmann, 1996). Technology enables the learning environment to be broadened

beyond the regular classroom and allows learning to occur by a variety of methods and without the constraints of time and location (Adcock, 2008; Tate & Klein-Collins, 2012). Online courses can be used to reach students with diverse learning styles (Brooks, 2009).

Research question 14 asked if there are any significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on gender. The results of the statistical analysis indicated that females use technology significantly more than males to support diverse talents and ways of learning. Also, gender was a factor with regard to using technology to support diverse talents and ways of learning. Findings from previous research based on gender are presented at the end of the Conclusions section.

Research question 21 asked if there are significant differences in the use of technology by full-time faculty teaching undergraduate courses at private colleges and universities to support diverse talents and ways of learning based on age group. Results of the statistical analysis indicated that use of technology to support diverse talents and ways of learning was affected significantly by age. The results indicated that faculty who are age 40-59 use technology to support diverse talents and ways of learning significantly more than faculty who are under 40 to support diverse talents and ways of learning. The researcher concluded that use of technology to support diverse talents and ways of learning was affected by the age of faculty who responded to the survey and, therefore, age was a factor. Findings from previous research based on age are presented at the end of the Conclusions section.

Previous Findings from Research Based on Gender and Age

Gender. The conclusion by the researcher that females use technology significantly more than males to support good practice in undergraduate education is consistent with conclusions

from some previous research and contrary to conclusions from other previous research. Previous research indicated that demographic factors such as gender influence orientation toward technology (Gibson et al, 2008; Osika et al., 2009; Parker et al., 2008; Zayim et al., 2006). Zhou and Xu (2007) found that there were no significant differences in five of seven statements based on gender in responses to perceived impacts of computers on teaching and learning. Male and female responses were consistent to some degree when asked if use of technology allows faculty to spend more time with individual students, to spend less time lecturing to the entire class, and to have time for research. Male and female responses also were consistent to some degree when asked if use of technology allows students to communicate better with the instructor and classmates and to manage their learning activities better. However, responses were significantly different to the questions of whether technology enables students to learn material more easily or thoroughly and whether technology allows faculty to present more complex material to students. Males were more likely than females to believe computers would have a positive effect on faculty teaching and student learning (Zhou & Xu, 2007). Ahadiat (2008) examined differences in the use of technology among faculty based on demographic factors and found no significant difference in use of technology with regard to gender.

The findings from the current study are in agreement with previous findings by Gibson et al. (2008), Osika et al. (2009), Parker et al. (2008), and Zayim et al. (2006) that demographic factors such as gender influence orientation toward technology. However, findings are contrary to previous findings by Ahadiat (2008) who found no significant differences in use of technology with regard to gender and Zhou and Xu (2007) who found no significant differences in five of seven statements based on gender responses to perceived impacts of computers on teaching and learning. Zhou and Xu found significant differences in the remaining two statements about

whether technology enables students to learn material more easily or thoroughly and whether technology allows faculty to present more complex material to students. However, males had a more positive attitude than females about using technology. The current study found that females use technology significantly more than males to support all seven principles of good practice in undergraduate education.

The findings of this study are contrary to findings in a similar study by Wood (2009) at a community college. Wood found no significant differences between male faculty and female faculty with regard to use of technology to improve student-faculty contact, encourage cooperation among students, promote active learning, provide prompt feedback, increase time on task, communicate high expectations to students, and address diverse talents and ways of learning. Although Wood found no overall significant differences between male and female faculty, results of the study indicated that males were not quite as likely as females to use technology in all categories except prompt feedback, where there was very little difference.

Age. The results of this research study indicated that the age of faculty has a significant effect on use of technology to provide prompt feedback to students, support time on task, and support diverse talents and ways of learning. In 2008 Ahadiat examined differences in the use of technology among faculty based on demographic factors including age. Ahadiat found significant differences in use of technology by faculty between 25 and 44 years of age with 5 or fewer years of experience and faculty 45 years and older with 6 or more years of teaching experience. The less experienced and younger faculty members were more likely to use technology than the older and more experienced faculty. Lane and Lyle (2011) researched how user traits impact the adoption of educational technologies and found that age was less important than expertise in minimizing barriers and providing support. The current study found a

significant difference in use of technology by age groups 40-49 and under 40 and age groups 50-59 and under 40. Faculty who are 40-59 use technology significantly more than faculty who are under 40. No significant differences existed between any other age groups. These findings are contrary to some previous research. Ahadiat reported that younger faculty were more likely to use technology, whereas findings of the current study indicated that, where significant differences existed, older faculty were more likely than younger faculty to use technology.

Recommendations

Based on the results of this study, the researcher makes the following recommendations for policy, practice, and future research.

Implications for Policy

The results of this study may be used to inform institutional policies with regard to integration of technology into teaching and learning. Previous research has documented that technology can be used to improve teaching and learning (Bickel et al., 2012; Bitner et al., 2012; Chelliah & Clarke, 2011; Chickering & Gamson, 1987; Georgina & Hosford, 2009; Humphreys, 2012; Koç, 2005; Mendenhall, 2012; Oblinger, 2012b; Tate & Klein-Collins, 2012; Thille, 2010; U.S. Department of Education, Office of Educational Technology, 2010). Institutions should consider implementing an institutional approach to teaching and learning with technology. Connors and Tally (2015) stated that an institutional approach is necessary to determine, efficiency, effectiveness, sustainability, and quality. According to Connors and Tally,

> A systematic approach may not be appropriate for all technology, but this approach is ideal for those technologies that have a broad applicability across the institution. A more individualized approach may be appropriate for specific technologies and for use in a specialized area of study such as nursing. However, to truly transform

> education with technology, technology integration needs to be part of the mission and goals of the institution, not used arbitrarily by a few educators across the institution. (p. 71)

The findings of this study indicate that faculty use technology significantly to advance two of the seven principles of good practice in undergraduate education. All seven principles developed by Chickering and Gamson (1987) ". . . continue to be applicable in today's digital-enabled classrooms and web-based learning environments" (Connors & Tally, 2015, p. 72). Institutions can influence faculty use of technology use by including requirements for technology use in policies relating to instruction evaluation, tenure status, promotion in rank, and faculty development and training. Where appropriate, course evaluations by students should include questions about use of technology by faculty and faculty expertise with technology. Institutional plans to implement technology must focus on learning outcomes and provide innovative technologies and strategies to achieve those outcomes. When the emphasis is on the technology itself and not on the teaching practices, education is not transformed (Connors & Tally, 2015).

Implications for Practice

Faculty who responded to the survey indicated they are using technology to a significant extent to advance two of the seven principles of good practice in undergraduate education. Faculty are using technology to a significant extent to communicate high expectations to students and to support diverse talents and ways of learning. Faculty are not using technology to a significant extent to promote student-faculty contact, to encourage cooperation and reciprocity among students, to promote active learning, to provide prompt feedback to students, or to promote time on task. Thus, the following recommendations are made to facilitate faculty adoption of technology to improve teaching and learning:

1. Provide general technology training to all faculty. This should include technology that has broad use such as computers, learning management systems, network technologies, social networking technologies, wireless technologies, and classroom technology that may include teaching stations, overhead projectors, and document cameras. Training on software applications such as word processing, spreadsheet, and presentation tools should be included.
2. Provide individualized technology training to faculty when appropriate. This should include discipline-specific applications such as statistical analysis software, programming software, and simulation tools.
3. Establish a mentoring program where faculty who have technology expertise mentor faculty who need assistance in acquiring skills to implement technology.
4. Provide an infrastructure that includes adequate support for faculty use of technology. The infrastructure should be secure, available 24/7, and adaptable to new technologies.
5. Showcase exemplary use of technology to inspire other faculty to use technology.

Implications for Future Research

1. Institutions should consider exploring why faculty are not using technology to advance all seven principles of good practice in undergraduate education. This could be accomplished with focus groups or a follow-up survey asking questions about barriers such as inadequate funding, support, and training for technology.
2. Institutions should consider exploring why there is a difference in use of technology by gender. The results of this study indicated that female faculty use technology significantly more than male faculty to advance the seven principles of good practice in undergraduate education. This could be accomplished with focus groups or a follow-up survey asking questions about barriers such as inadequate funding, support, and training for technology.

3. Institutions should consider exploring why there is a difference in use of technology by some age groups to provide prompt feedback to students, to promote time on task, and to support diverse talents and ways of learning. The results of this study indicated that faculty who are age 40-59 use technology significantly more than faculty who are under the age of 40 to provide prompt feedback to students, to promote time on task, and to support diverse talents and ways of learning. This could be accomplished with focus groups or a follow-up survey asking questions about barriers such as inadequate funding, support, and training for technology.
4. Other 4-year institutions of higher education in the Appalachian Region should replicate this research study and compare the results to the findings of this study.
5. Four-year institutions of higher education in other geographical regions should replicate this research study and compare the results to the findings of this study.
6. A follow-up study should be conducted after participating institutions have designed and implemented an institutional approach to teaching and learning with technology. Because technology changes rapidly, the survey instrument should be adjusted to remove obsolete technology and add new technology.

The potential transformative power of technology is well documented (Parker et al., 2008). Justification for the recommendations was presented in the Conclusions section. Another reason for examining technology use by faculty is that technology has the potential to help meet the demand for accountability and lower costs in postsecondary education (Oblinger, 2012b; Sheets & Crawford, 2012; Tamarkin & Rodrigo, 2011; Thille, 2010; U.S. Department of Education, Office of Educational Technology, 2012; Young, 2012). Institutions continue to

invest heavily in current technologies with the expectation that faculty will use them to enhance their teaching and the learning experiences of students (Brill & Galloway, 2007).

Chapter Summary

Chapter 5 presented a brief summary of the research study. Findings for each of the research questions and conclusions drawn by the researcher based on the findings were discussed. The researcher provided conclusions for each of the seven principles of good practice in undergraduate education, a brief discussion of previous research related to the conclusions, and recommendations for good practice and future research.

REFERENCES

Adcock, P. (2008). Evolution of teaching and learning through technology. *The Delta Kappa Gamma Bulletin*, *74*(4), 36-43. Retrieved November 4, 2014, from http://eds.b.ebscohost.com.ezproxy.etsu.edu:2048/ehost/pdfviewer/pdfviewer?sid=e21043ab-ef66-441f-9e48-9f4a74bb4b56%40sessionmgr113&vid=0&hid=126

Ahadiat, N. (2008). Technologies used in accounting education: A study of frequency of use among faculty. *Journal of Education for Business*, *83*(3), 123-134. Retrieved November 4, 2014, from http://web.b.ebscohost.com.ezproxy.lmunet.edu/ehost/pdfviewer/pdfviewer?sid=8a92d9a8-eb8e-47f3-b5ff-39daa4d2e9a3%40sessionmgr114&vid=2&hid=123

Anderson, T., Rourke, L., R., Garrison, D.R., & Archer, W. (2001). Assessing teacher presence in a computer conferencing context. *Journal of the Asynchronous Learning Network*, *5*(2), 1-17.

Appalachian College Association (2014). About the ACA. Retrieved November 4, 2014, from http://www.acaweb.org

Bartlett, J.E., Bartlett, M.E., & Reio, T.G. (2008). Analysis of nonresponse bias in research for business education. *Delta Pi Epsilon Journal*, *50*(1), 45-58.

Bass, R. (2012). Disrupting ourselves: The problem of learning in higher education. *EDUCAUSE Review*, *47*(2), 23-33. Retrieved November 4, 2014, from: http://www.educause.edu/ero/article/disrupting-ourselves-problem-learning-higher-education

Bickel, B., Shewbridge, W., & Suess, J. (2012). Stories in our classrooms: A faculty community of practice as an agent of change. In D.G. Oblinger (Ed.), *Game changers: Education and information technologies*. Lawrence, KS: Allen Press, 349-353.

Bitner, M.J., Ostrom, A.L., & Burkhard, K.A. (2012). Service blueprinting: Transforming the student experience. *EDUCAUSE Review*, *47*(6), 38-50. Retrieved November 4, 2014, from https://net.educause.edu/ir/library/pdf/ERM1266.pdf

"Blended Learning." (n.d.) In *EDUCAUSE Library*, para 1. Retrieved November 4, 2014, from http://www.educause.edu/library/blended-learning

Bluman, A.G. (2008). *Elementary statistics* (4th ed.). Boston, MA: McGraw Hill.

Brill, J.M., & Galloway, C. (2007). Perils and promises: University instructors' integration of technology in classroom-based practices. *British Journal of Educational Technology*, *38*(1), 95-105, doi:10.1111/j.1467-8535.2006.00601.x

Brooks, M. (2009). The excellent inevitability of online courses. *The Chronicle of Higher Education*. Retrieved November 4, 2014, from http://chronicle.com/article/The-Excellent-Inevitability-of/44251/

Brown, J.S., & Adler, R.P. (2008). Minds on fire: Open education, the long tail, and learning 2.0. *EDUCAUSE Review*, *43*(1), 17-32. Retrieved from http://www.educause.edu/ero/article/minds-fire-open-education-long-tail-and-learning-20

Brown, M. (2009). Learning and technology – In that order. *EDUCAUSE Review*, *44*(4). Retrieved November 14, 2014, from http://www.educause.edu/ero/article/learning-and-technology-order

Brownell, J.E., & Swaner, L.E. (2010). *Five high-impact practices: research on learning outcomes, completion, and quality*. Washington, DC: Association of American Colleges and Universities.

Chelliah, J., & Clarke, E. (2011). Collaborative teaching and learning: Overcoming the digital divide. *On the Horizon*, *19*(4), 276-285. Doi:10.1108/10748121111179402

Chen, H.L., & Light, T.P. (2010). *Electronic portfolios and student success: Effectiveness, efficiency, and learning*. Washington, DC: Association of American Colleges and Universities.

Chickering, A., & Ehrmann, S.C. (1996). Implementing the seven principles: Technology as a lever. *AAHE Bulletin*, *49*(2), 3-6. Retrieved November 4, 2014, from http://www.tltgroup.org/programs/seven.html

Chickering, A.W., & Gamson, Z.F. (1987). Seven principles of good practice in undergraduate education. *AAHE Bulletin*, *39*(7), 3-7. Retrieved November 4, 2014, from http://files.eric.ed.gov/fulltext/ED282491.pdf

Clayton-Pedersen, A.R., & O'Neill, N. (2005). Curricula designed to meet 21st-century expectations. In Oblinger, D.G., & Oblinger, J.L. (Eds.), *Educating the net generation* (pp. 9.1-9.16). Washington, DC: Educause. Retrieved November 4, 2014, from https://net.educause.edu/ir/library/pdf/pub7101i.pdf

Clery, S.B. (2012). Faculty salaries: 2010-2011. *The NEA 2012 almanac of higher education*. Washington, DC: National Education Association, 7-26. Retrieved November 4, 2014, from http://www.nea.org/assets/docs/2012_Almanac_Faculty_Salaries.pdf

Connors, H.B., & Tally, K. (2015). Integrating technology in education. In Oermann, M.H., *Teaching in nursing and role of the educator: The complete guide to best practice in teaching, evaluation, and curriculum development* (pp. 71-79). New York, NY: Springer. Retrieved November 4, 2014, from http://books.google.com/books?id =r6BNAgAAQBAJ&pg=PA71&lpg=PA71&dq=%22institutional+approach+to +teaching+and+learning+with+technology%22&source=bl&ots=YXTDCrXPuJ&sig=Di VZyPFGeBPP-HsdsSTCdw26z1U&hl=en&sa =X&ei=7X9CVJq1EciGigKJzYD4BA &ved=0CB4Q6AEwAA%20-20v=onepage&q=%22institutional%20approach%20to %20teaching%20and%20learning%20with%20technology%22&f=false#v=snippet&q= %22institutional%20approach%20to%20teaching%20and%20learning%20with%20techn ology%22&f=false

Crews, T.B., Brown, C.M., & Miller, J.L. (2009). Assessing faculty's technology needs. *EDUCAUSE Quarterly*, *32*(4). Retrieved November 4, 2014, from http://www.educause.edu/ero/article /assessing-facultys-technology-needs

Creswell, J.W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Upper Saddle River, NJ: Pearson.

DiLullo, C., McGee, P., & Kriebel, R.M. (2011). Demystifying the millennial student: A reassessment in measures of character and engagement in professional education. *Anatomical Science Education*, *4*(4), 214-226. doi:10.1002/ase.240

Doherty, I., Blake, A., & Cooper, P. (2009). Staff development workshops: Web 2.0 for teaching and learning. In I. Gibson et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2009* (pp. 864-871). Chesapeake, VA: AACE. Retrieved November 4, 2014, from http://www.editlib.org /results/?q=doherty&source=SITE%2F2009%2F1

Dunlap, J.C., & Lowenthal, P.R. (2009). Tweeting the night away: Using Twitter to enhance social presence. *Journal of Information Systems Education*, *20*(2), 129-135. Retrieved November 4, 2014, from http://search.proquest.com.ezproxy.lmunet.edu/docview /200135030?accountid=12101

Elam, C., Stratton, T., & Gibson D.D. (2007). *Journal of College Admission*. Retrieved November 4, 2014, from http://files.eric.ed.gov/fulltext/EJ783953.pdf

"Flipped classrooms." (n.d.). In *EDUCAUSE Library*. Retrieved from https://net.educause.edu/ir/library/pdf/ELI7081.pdf

Flores, J.G. (2010). *Enabled by broadband, education enters a new frontier*. Retrieved November 4, 2014, from http://news.heartland.org/sites/all/modules/custom /heartland_migration/files/pdfs/29026.pdf

Fraenkel, J.R., & Wallen, N.E. (2009). *How to design and evaluate research in education* (7th ed.). Boston, MA: McGraw Hill.

Futhey, T., Luce, R., & Smith, J. (2010). Drivers of change in higher education. *EDUCAUSE Review*, *45*(1), 12-13. Retrieved November 4, 2014, from http://www.educause.edu /ero/article/drivers-change-higher-education

Gappa, J.M., Austin, A.E., & Trice, A.G. (2007). *Rethinking faculty work: Higher education's strategic imperative*. San Francisco: John Wiley & Sons.

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

Georgina, D.A., & Olson, M.R. (2008). Integration of technology in higher education: A review of faculty self-perceptions. *Internet and Higher Education*, *11*, 1-8. doi:10.1016/j.iheduc.2007.11.002

Gibson, S.G., Harris, M.L., & Colaric, S.M. (2008). Technology acceptance in an academic context: Faculty acceptance of online education. *Journal of Education for Business*, *83*(6), 355-359. Retrieved November 4, 2014, from https://login.ezproxy.etsu.edu:3443 /login?url=http://search.proquest.com.ezproxy.etsu.edu:2048/docview /202821214?accountid=10771

Gourley, B. (2010). Dancing with history: A cautionary tale. *EDUCAUSE Review*, *45*(1), 30-41. Retrieved November 4, 2014, from http://www.educause.edu/ero/article/dancing-history-cautionary-tale

Green, S.B., & Salkind, N.J. (2008). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (5th ed.). Upper Saddle River, NJ: Pearson.

Guidry, K.R., & BrckaLorenz, A. (2010). A comparison of student and faculty academic technology use across disciplines. *EDUCAUSE Quarterly*, *33*(3). Retrieved November 4, 2014, from http://www.educause.edu/ero/article/comparison-student-and-faculty-academic-technology-use-across-disciplines

Hartman, J.L. (2008). Moving teaching and learning with technology from adoption to transformation. *EDUCAUSE Review*, *43*(6). Retrieved November 4, 2014, from http://www.educause.edu/ero/article/moving-teaching-and-learning-technology-adoption-transformation

Hawkins, B.L., & Oblinger, D.G. (2006). The myth about the digital divide: We have overcome the digital divide. *EDUCAUSE Review*, *41*(4), 12-13. Retrieved November 4, 2014, from http://www.educause.edu/ero/article/myth-about-digital-divide

Herreid, C.F., & Schiller, N.A. (2013). *Journal of College Science Teaching*, *42*(5), 62-66. Retrieved November 3, 2014, from http:/search.proquest.com/docview/1348257211 ?accountid=12101

Humphreys, D. (2012). The questions we need to ask first: Setting priorities for higher education in our technology-rich world. In D.G. Oblinger (Ed.), *Game changers: Education and information technologies*. Lawrence, KS: Allen Press, 25-35.

Indiana University (2013). About NSSE. Retrieved from http://nsse.iub.edu/html/about.cfm

Indiana University Center for Postsecondary Research (2008). *Promoting engagement for all students: The imperative to look within*. Bloomington: IN. Retrieved November 6, 2014, from http://nsse.iub.edu/NSSE_2008_Results/

Israel, G.D. (2013). *Determining sample size*. Retrieved November 6, 2014, from http://edis.ifas.ufl.edu/pd006

Jankowicz, A.D. (2005). *Business research projects* (4th ed.). Bedford Row, London, UK: Thompson Learning.

Januszewski, A., & Molenda, M. (Eds.) (2008). *Educational technology: A definition with commentary*. New York, NY: Lawrence Erlbaum.

Johnson, B., & Christensen, L. (2012). *Educational research: Quantitative, qualitative and mixed approaches* (4th Ed.). Thousand Oaks, CA: SAGE.

Jonassen, D.H. (2004). *Handbook of research on educational communication and technology: A project of the Association for Educational Communications and Technology* (2nd ed.) [e-Book version]. Retrieved November 4, 2014, from http://web.a.ebscohost.com.ezproxy.lmunet.edu/ehost/ebookviewer/ebook/bmxlYmtfXzEwMjIyMl9fQU41?sid=c203c742-9e6f-4f07-8488-75da800d7a89@sessionmgr4004&vid=0&format=EB&lpid=lp_iii&rid=0

Koç, M. (2005). Implications of learning theories for effective technology integration and pre-service teacher training: A critical literature review. J*ournal of Turkish Science Education*, *2*(1). Retrieved November 6, 2014, from http://www.tused.org/internet/tused/archive/v2/i1/fulltext/tusedv2i1s1.pdf

Kuh, G. (2010). High-impact practices: Retrospective and prospective. [Forward]. In J.E. Brownell & L.E. Swaner, *Five high impact practices: Research on learning outcomes, completion, and quality*. Washington, DC: Association of American Colleges and Universities, p. 3-7.

Kuh, G.D., Kinzie, J., Buckley, J.A., Bridges, B.K., & Hayek, J.C. (2007). *Piecing together the student success puzzle: Research, propositions, and recommendations*. San Francisco, CA: Jossey-Bass.

Kuh, G.D., Kinzie, J., Schuh, J.H., & Whitt, E.J. (2005). *Assessing conditions to enhance educational effectiveness: The inventory for student engagement and success*. San Francisco, CA: Jossey-Bass.

Lance, C.E., & Vandenberg, R.J. (Eds.) (2009). *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences*. New York, NY: Routledge.

Lane, A. (2009). The impact of openness on bridging educational digital divides. *International Review of Research in Open and Distance Learning*, *10*(5). Retrieved November 6, 2014, from http://www.irrodl.org/index.php/irrodl/article/view/637/1408

Lane, C.A., & Lyle, H.F. (2011). Obstacles and supports related to the use of educational technologies: The role of technological expertise, gender, and age. *Journal of Computing in Higher Education*, *23*(1), 38-59. Retrieved November 6, 2014, from http://search.proquest.com.ezproxy.lmunet.edu/docview/858121644?OpenUrlRefId=info:xri/sid:wcdiscovery&accountid=12101

LeCompagnon, B. (1995). Achieving widespread integration of IT in teaching and learning: What can information resources professionals do? *Change Magazine*, 43-44. Retrieved November 6, 2014, from http://net.educause.edu/ir/library/text/c95/c95-ci08.txt

Leedy, P.D., & Ormrod, J.E. (2013). *Practical research: Planning and design* (10th ed.). Upper Saddle River, NJ: Pearson.

Lefever, S., Dal, M., & Matthíasdóttir, A. (2007). Online data collection in academic research: Advantages and limitations. *British Journal of Educational Technology*, *38*(4), 574-582. Retrieved November 6, 2014, from http://eds.b.ebscohost.com.ezproxy.etsu.edu:2048/ehost/pdfviewer/pdfviewer?sid=ad621e51-7c53-44f3-8fdd-80501cc3a269%40sessionmgr111&vid=0&hid=121

Legg, A.M., & Wilson J.H. (2009). E-mail from professor enhances student motivation and attitudes. *Teaching of Psychology*, *36*(3), 205-211. doi:10.1080/00986280902960034

Liu, M., Kalk, D., Kinney, L., & Orr, G. (2012). Web 2.0 and its use in higher education from 2007-2009: A review of literature. *International Journal on E-Learning*, *11*(2), 153-179, Chesapeake, VA: AACE.

McCabe, D.B., & Meuter, M.L. (2011). A student view of technology in the classroom: Does it enhance the seven principles of good practice in undergraduate education? *Journal of Marketing Education*, *33*(2), 149-159. doi:10.1177/0273475311410847

McGill, M., Bagenal, R., Buttenfield, B., & Forsman, R. (2000). Beyond early adopter to full integration of technology in the curriculum. Retrieved November 6, 2014, from http://net.educause.edu/ir/library/pdf/EDU0017.pdf

McMillan, J.H., & Schumacher, S. (2010). *Research in education: Evidence-based inquiry* (7th ed). Upper Saddle River, NJ: Pearson.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. U.S. Department of Education, Office of Planning, Evaluation, and Policy Development, Policy and Program Studies Service. Retrieved November 6, 2014, from http://files.eric.ed.gov/fulltext/ED505824.pdf

Mendenhall, R.W. (2012). Western Governors University. In D.G. Oblinger (Ed.), *Game changers: Education and information technologies*. Lawrence, KS: Allen Press, 115-131.

Milem, J.F. (2000). Why race matters. *Academe*, 86(5), 26-29. Retrieved November 4, 2014, from http://search.proquest.com/docview/232305452?accountid=12101

Oblinger, D.G. (2010). Innovation: Rethinking the future of higher education. *EDUCAUSE Review, 45*(1), 4-5. Retrieved November 7, 2014, from http://www.educause.edu/ero/article/innovation-rethinking-future-higher-education

Oblinger, D.G. (2012a). Collaboration: A spark for innovation. *EDUCAUSE Review*, *47*(2). Retrieved November 7, 2014, from http://www.educause.edu/ero/article/collaboration-spark-innovation

Oblinger, D.G. (2012b). Introduction. In D.G. Oblinger (Ed.), *Game changers: Education and information technologies*. Lawrence, KS: Allen Press, 3-7.

Oblinger, D., & Oblinger, J. (2005). Is it age or IT: First steps toward understanding the net generation. In D. G. Oblinger, & J.L. Oblinger (Eds.), *Educating the net generation* (pp. 2.1-2.20). Washington, DC: EDUCAUSE.

Osika, E.R., Johnson, R.Y., & Buteau, R. (2009). Factors influencing faculty use of technology in online instruction: A case study. *Online Journal of Distance Learning Administration*, *XII*(I). Retrieved November 7, 2014, from http://www.westga.edu/~distance/ojdla /spring121/osika121.html

Parker, R.E., Bianchi, A., & Cheah, T.Y. (2008). *Perceptions of instructional technology: Factors of influence and anticipated consequences*. Retrieved from http://www.ifets.info/journals/11_2/20.pdf

Perkins, S., & Casdorph, M. (2011). The digital Swiss army knife. *EDUCAUSE Review*, *46*(2), 12-13. Retrieved November 7, 2014, from http://www.educause.edu/ero/article/digital-swiss-army-knife

Puzziferro, M., & Shelton, K. (2009). Supporting online faculty – Revisiting the seven principles (a few years later). *Online Journal of Distance Learning Administration*, *XII*(III). Retrieved November 7, 2014, from http://www.westga.edu/~distance/ojdla /fall123/puzziferro123.html

Roberts, G.R. (2005). Technology and learning expectations of the net generation. In D.G. Oblinger & J.L. Oblinger (Eds.), *Educating the net generation* (pp. 3.1-3.7). Washington, DC: Educause.

Salajan, F.D., Schönwetter, D.J., & Cleghorn, B.M. (2010). Student and faculty inter-generational digital divide: Fact or fiction? *Computers & Education, 55*, 1393-1403. doi:10.1016/j.compedu.2010.06.017

Schaffhauser, D. (2011). Putting the focus on performance. *Campus Technology*, *24*(7), 26-32.

Schwarz, N. (2007). Retrospective and concurrent self-reports: The rationale for real-time data capture. In Stone, A., Shiffman, S., Atienza, A. (Eds.), *Science of real-time data capture: Self-reports in health research* (p. 11).

Shea, P., Li, C.S., & Pickett, A. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. *Internet and Higher Education*, *9*, 175-190. doi:10.1016/j.iheduc.2006.06.005

Sheets, R.G. & Crawford, S. (2012). Harnessing the power of information technology: Open business models in higher education. *EDUCAUSE Review*, *47*(2). Retrieved November 7, 2014, from http://www.educause.edu/ero/article/harnessing-power-information-technology-open-business-models-higher-education

Sheridan, K., & Kelly, M.A. (2010). The indicators of instructor presence that are important to students in online courses. *MERLOT Journal of Online Learning and Teaching*, *6*(4). Retrieved November 7, 2012, from http://jolt.merlot.org/vol6no4/sheridan_1210.htm

Smith, S.D., Salaway, G., & Caruso, J.B. (2009). *The ECAR study of undergraduate students and information technology (research study, vol. 6)*. Boulder, CO: EDUCAUSE Center for Applied Research. Retrieved from http://www.educause.edu/library/resources/ecar-study-undergraduate-students-and-information-technology-2009%C3%A2%E2%82%AC %E2%80 %9Dkey-findings

Stedman, L.P., Roberts, T.G., Harder, A., Myers, B.E., & Thoron, A.C. (2011). The relationship between experience and self-perceptions of knowledge and relevance of teaching competencies of faculty in a college of agriculture and life sciences. *Journal of Agricultural Education*, *52*(1), 50-60, doi:10.5032/jae/2011.01050

Stewart, C., Bachman, C., & Johnson, R. (2010). Predictors of faculty acceptance of online education. *MERLOT Journal of Online Learning and Teaching*, *6*(3), 597-616. Retrieved November 7, 2014, from http://jolt.merlot.org/vol6no3/stewartc_0910.htm

Straub, E.T. (2009). Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research*, *79*(2), 625-649. doi:10.3102/0034654308325896

Sue, V.M., & Ritter, L.A. (2007). *Conducting online surveys*. Thousand Oaks, CA: Sage.

Tabata, L.N., & Johnsrud, L.K. (2008). The impact of faculty attitudes toward technology, distance education, and innovation. *Research in Higher Education*, *49*(7), 624-646. doi:10.1007/s11162-008-9094-7

Tamarkin, M., Bantz, D., Childs, M., diFilipo, S., Landry, S., LoPresti, F., . . . Yang, C.W. (2010). You 3.0: The most important evolving technology. *EDUCAUSE Review*, *45*(6),

31-44. Retrieved November 7, 2014, from https://net.educause.edu/ir/library /pdf/ERM1061.pdf

Tamarkin, M., & Rodrigo, S. (2011). Evolving technology: A view to tomorrow. *EDUCAUSE Review 46*(6), 63-80. Retrieved November 7, 2014, from http://www.educause.edu /ero/article/evolving-technologies-view-tomorrow

Tapscott, D. (2009). *Grown up digital*. New York, NY: McGraw Hill, 121-148.

Tapscott, D., & Williams, A.D. (2010). Innovating the 21st-century university: It's time! *EDUCAUSE Review*, 45(1), 16-29. Retrieved November 7, 2014, from https://www.educause.edu/ero/article/innovating-21st-century-university-it%C3%A2%E2%82%AC%E2%84%A2s-time

Tate, P., & Klein-Collins, R. (2012). IT innovations and the nontraditional learner. In D. G. Oblinger (Ed.), *Game changers: Education and information technologies*. Lawrence, KS: Allen Press, 67-79.

Thille, C. (2010). Education technology as a transformational innovation. *Proceedings of the White House Summit on Community Colleges: Conference Papers*, 73-78. Retrieved November 7, 2014, from http://www2.ed.gov/PDFDocs/college-completion/11-education-technology-as-a-transformational-innovation.pdf

Umbach, P.D., & Wawrzynski, M.R. (2005). Faculty do matter: The role of college faculty in student learning and engagement. *Research in Higher Education*, *46*(2), 153-184. doi:10.1007/s11162-004-1598-1

U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences. (2002). *Findings from the condition of education 2002: Nontraditional undergraduates*. Retrieved November 7, 2014, from http://nces.ed.gov /pubs2002/2002012.pdf

U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, Digest of Education Statistics. (2012). *Full-time instructional faculty in degree-granting institutions, by race/ethnicity, sex, and academic rank: Fall 2007, fall 2009, and fall 2011* (Table 264). Retrieved from http://nces.ed.gov/programs/digest/2012menu_tables.asp

U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, Digest of Education Statistics. (2011). *Full-time instructional faculty in degree-granting institutions, by race/ethnicity, sex, and academic rank: Fall 2005, fall 2007, and fall 2009* (Table 264). Retrieved November 7, 2014, from http://nces.ed.gov/programs/digest/2011menu_tables.asp

U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, Integrated Postsecondary Education Data System. (n.d.). *Glossary*. Retrieved November 7, 2014, from http://nces.ed.gov/ipeds/glossary/?charindex=F

U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, Integrated Postsecondary Education Data System. (n.d.). *Look up an institution*. Retrieved November 7, 2014, from http://nces.ed.gov/ipeds/datacenter /InstitutionByName.aspx

U.S. Department of Education, Office of Educational Technology. (2010). *Transforming American education: Learning powered by technology* (draft). Retrieved November 7, 2014, from http://www.ed.gov/sites/default/files/NETP-2010-final-report.pdf

U.S. Department of Education, Office of Educational Technology. (2012). *Expanding evidence approaches for learning in a digital world*. Retrieved November 7, 2014, from http://www.ed.gov/edblogs/technology/evidence-framework/

U.S. Office of Technology Assessment (1995). *Teachers and technology: Making the connection*. (OTA-EHT-616) Washington, DC: U.S. Government Printing Office. Retrieved November 7, 2014, from http://ota-cdn.fas.org/reports/9541.pdf

Vaughan, M. (2014). Flipping the learning: An investigation into the use of the flipped classroom model in an introductory teaching course. *Education Research and Perspectives* (Online), 41, 25-41. Retrieved November 4, 2014,from http://search.proquest.com/docview /1545869209?accountid=12101

Waggener, S. (2012). E-content: Opportunity and risk. *EDUCAUSE Review*, *47*(5). Retrieved November 7, 2014, from http://www.educause.edu/ero/article/e-content-opportunity-and-risk

Wagner, J.J. (2005). Support services for the net generation. In D.G. Oblinger & J.L. Oblinger, (Eds.), *Educating the net generation* (pp. 10.1-10.18). Washington, DC: Educause.

Witte, R.S., & Witte, J.S. (2007). *Statistics* (8th ed.). Hoboken, NJ: John Wiley & Sons.

Wood, D.H. (2009). *Full-time faculty use of computer technology in enhancing student learning and development in Alabama community colleges*. Retrieved November 7, 2014, from http://search.proquest.com.ezproxy.lmunet.edu/pqdthss/docview/610143475/C9A7B83E256A4C0APQ/1?accountid=12101

Woodbridge, J. (2004). Technology integration as a transforming teaching strategy. *Tech & Learning*. Retrieved November 7, 2014, from http://www.techlearning.com/features /0039/technology-integration-as-a-transforming-teaching-strategy/41670#

Yates, B.L., Adams, J.W., & Brunner, B R. (2009). Mass communication and journalism faculty's perceptions of the effectiveness of email communication with college students: A nationwide study. *Learning, Media and Technology*, *34*(4), 307-321. doi:10.1080/17439880903338598

Young, J.R. (2012). Campuses look to digital tools for savings, and reinvention. *The Chronicle of Higher Education: Almanac of higher education 2012*. Retrieved November 7, 2014, from http://chronicle.com/article/Leaders-Look-to-Technology-for/133932/

Zayim, N., Yildirim, S., & Saka, O. (2006). Technology adoption of medical faculty in teaching: Differentiating factors in adopter categories. *Educational Technology & Society*, *9*(2), 213-222. Retrieved November 7, 2014, from http://search.proquest.com.ezproxy.etsu.edu :2048/docview/61871892?accountid=10771

Zhou, G., & Xu, J. (2007). Adoption of educational technology: How does gender matter? *International Journal of Teaching and Learning in Higher Education*, *19*(2), 140-153. Retrieved November 7, 2014, from http://www.isetl.org/ijtlhe/pdf/IJTLHE206.pdf

APPENDICES

Appendix A

Introductory Letter from ACA President

April 24, 2014

Appalachian College Association

Dear ACA Chief Academic Officers:

This letter serves as an introduction and a request that your institution consider participating in a research study on faculty perceptions about integration of technology into teaching and learning in undergraduate courses. The study is being conducted by Evelyn Smith, Assistant Vice President for Academic Affairs, at Lincoln Memorial University. Mrs. Smith is a student in the Doctor of Education (EdD) Program in Educational Leadership at East Tennessee State University. This topic is not only relevant to each ACA institution; it is relevant also to the ACA which has invested significant resources in training faculty of member institutions on integration of technology into teaching and learning.

Data collection will be completed using an electronic survey distributed via SurveyMonkey®. Full-time faculty who teach undergraduate courses will be asked to participate in the survey. Results of the study will be used specifically for the dissertation with aggregate data only being reported. The researcher will preserve the anonymity of survey participants and maintain confidentiality about participating institutions.

You will be receiving a letter from Mrs. Smith shortly requesting that your institution participate in the study by allowing a survey of full-time faculty who teach undergraduate courses at your institution. The survey is not intended to gauge satisfaction, but to understand faculty perceptions about using technology to advance good practice in undergraduate education.

In the letter from Mrs. Smith, you will be asked to confirm your willingness of your faculty to participate in the survey. No further action will be required of you or your staff; Mrs. Smith will use publicly available data (faculty names and email addresses) available on your institution's website to distribute the survey. If faculty names and email addresses are not publicly available on your website, your institution will not be included in the survey.

I appreciate your consideration of this request, especially given the constraints of time and resources within which we all operate.

Sincerely,

Dr. Paul B. Chewning
President

Appendix B

Initial Email to Chief Academic Officers

Dear Dr. «LastName»,

This e-mail is a follow-up to the letter of introduction you received last Friday from Dr. Paul Chewning, President of the Appalachian College Association. I respectfully request permission to conduct a research study at «ACAInstitution». I am enrolled in the Doctor of Education (EdD) Program (Educational Leadership), at East Tennessee State University (ETSU) in Johnson City, Tennessee, and I am in the process of writing my dissertation. The research study is titled "Faculty Perceptions about Integration of Technology into Teaching and Learning in Undergraduate Courses at Private Colleges and Universities." My goal is to have all member institutions of the Appalachian College Association (ACA) participate in this study. I am employed by an ACA institution—Lincoln Memorial University—where I am Assistant Vice President for Academic Affairs and Assistant Professor of Computer Information Systems.

The purpose of this study is to investigate the perceptions of full-time faculty teaching undergraduate courses at private colleges and universities toward integration of technology into teaching and learning. For purposes of this study, integration of technology is defined as using technology as an instructional tool to advance good practice in undergraduate education. The study will explore the types of technology used, the extent of technology use, and the differences in the use of technology based on the demographic categories of gender, age group, number of years of higher education teaching experience, educational level, faculty rank, tenure status, and discipline category. In addition to contributing to the literature on teaching and learning with technology in higher education, this study may provide information that can be used by institutions to implement a successful approach to teaching and learning with technology.

If you grant permission for «ACAInstitution» to participate in this study, faculty members who teach undergraduate courses will be asked to complete an electronic survey (51 questions which should take no more than 10 minutes to complete) using SurveyMonkey. The ETSU Institutional Research Board (IRB) and the Lincoln Memorial University IRB have granted approval for my research project. The survey will be completely voluntary, anonymous and confidential, i.e., there will be no way to link faculty members or individual institutions with responses or published data. Only aggregate data will be reported.

Your approval to conduct this study will be appreciated immensely. If you approve, please reply to this e-mail and indicate your permission for me to conduct the survey at your institution. Please also indicate if I need to seek approval from your institution's IRB or if your institution's IRB will defer to ETSU's IRB.
No further action will be required of you or your staff; I will use publicly available data (faculty names and e-mail addresses) available on your institution's website to distribute the survey. If faculty names and e-mail addresses are not publicly available on your website, your institution will not be included in the survey.

Your institution's participation is very important to this study. Please let me know if you have questions (evelyn.smith@lmunet.edu; or 865.279.2017).

Evelyn G. Smith
Assistant Vice President for Academic Affairs
Assistant Professor of Computer Information Systems
Lincoln Memorial University
6965 Cumberland Gap Parkway
Harrogate, TN 37752
evelyn.smith@lmunet.edu
423.869.6360

Appendix C

Follow-up Email to Chief Academic Officers

Dear «CAOName»,

I am following up on my email of «date», to see if you will grant permission for «ACAInstitution» faculty to participate in my dissertation survey. Thank you.

Evelyn G. Smith
Assistant Vice President for Academic Affairs
Assistant Professor of Computer Information Systems
Lincoln Memorial University
6965 Cumberland Gap Parkway
Harrogate, TN 37752
evelyn.smith@lmunet.edu
423.869.6360

[original email (Appendix B) attached to follow-up email]

Appendix D

Initial Email Invitation to Faculty

Dear «ACAInstitution» Faculty Member,

I have received permission from «ACAInstitution» to conduct an electronic survey of the «College's/ University's» full-time faculty who teach undergraduate courses. I am enrolled in the Doctor of Education (EdD) Program (Educational Leadership), at East Tennessee State University in Johnson City, Tennessee, and I am in the process of writing my dissertation. My research study is titled "Faculty Perceptions about Integration of Technology into Teaching and Learning in Undergraduate Courses at Private Colleges and Universities." My goal is to have all full-time faculty members who teach undergraduate courses at member institutions of the Appalachian College Association (ACA) participate in this study. I am employed by an ACA institution—Lincoln Memorial University—where I am Assistant Vice President for Academic Affairs and Assistant Professor of Computer Information Systems.

The purpose of this study is to investigate the perceptions of full-time faculty who teach undergraduate courses at private colleges and universities toward integration of technology into teaching and learning (faculty classified as adjuncts, part-time employees, or emeriti are not included in the survey). For purposes of this study, integration of technology is defined as using technology as an instructional tool to advance good practice in undergraduate education. The study will explore the types of technology used, the extent of technology use, and the differences in use of technology based on the demographic categories of gender, age group, number of years of higher education teaching experience, educational level, faculty rank, tenure status, and discipline category. The study is not intended to gauge satisfaction, but to understand faculty perceptions about using technology to advance good practice in undergraduate education. In addition to contributing to the literature on teaching and learning with technology in higher education, this study may provide information that can be used by institutions to implement a successful approach to teaching and learning with technology.

If you agree to participate in this study, you will be asked to complete an electronic survey using SurveyMonkey (16 questions with a total of 51 response items, which should take no more than 10 minutes to complete). The survey is completely voluntary, anonymous and confidential. There will be no way to link faculty members with responses or institutions with published data. Only aggregate data will be reported. By completing and submitting the survey, you will be affirming your informed consent to participate in the survey. There are no foreseeable risks to your participation.

You may decline to answer one or more questions on the survey and you may exit the survey at any time without completing and submitting the survey. You may decline to participate in this study without any consequence. If you have questions about the research project, you may contact my dissertation chair, Dr. Bethany Flora at florab@etsu.edu. You may also contact the Chairman of the East Tennessee State University Institutional Review Board at 423.439.6054 for any questions you may have about your rights as a research subject.

Your participation in this survey is very important to this study and will be appreciated immensely. If you agree to participate, please go to https://www.surveymonkey.com/s/Smith_Faculty_Survey to complete and submit the survey by «date». Thank you for your support.

Evelyn G. Smith
Assistant Vice President for Academic Affairs
Assistant Professor of Computer Information Systems
Lincoln Memorial University, Harrogate, TN

Appendix E

Follow-up Email to Faculty

Dear «ACAInstitution» Faculty Member,

This is a follow-up email to say thank you to «ACAInstitution» faculty members who have completed my dissertation survey described in the email below and encourage faculty who have not completed the survey to do so by «date». Your input is very important to this research project. This is the last email you will receive regarding the survey. I appreciate your participation.

Have a pleasant summer!

Sincerely,
Evelyn G. Smith
Assistant Vice President for Academic Affairs
Assistant Professor of Computer Information Systems
Lincoln Memorial University
6965 Cumberland Gap Parkway
Harrogate, TN 37752
evelyn.smith@lmunet.edu
423.869.6360

[original email (Appendix D) attached to follow-up email]

Appendix F

Survey Instrument

Survey of Full-Time Faculty Who Teach Undergraduate Courses
regarding Their Perceptions about Integration of Technology into Teaching and Learning

May 2014

Full-time faculty members who teach undergraduate courses are being asked to participate in this survey (i.e., faculty who are classified as adjuncts, part-time employees, or emeriti are not included in this survey). If you received the survey and do not teach undergraduate courses, please do not respond. Your thoughtful and personal responses to these items are very important to this study. There are 16 questions (51 response items) which should take no more than 10 minutes to complete.

Questions 2 through 8 relate to using technology as levers to implement the seven principles for good practice in undergraduate education (Chickering and Gamson, 1987; Chickering and Ehrmann, 1996).

You may decline to answer one or more questions on the survey and you may exit the survey at any time without completing and submitting the survey. You may decline to participate in this study without any consequence.

By completing and submitting this survey, you are giving your informed consent to participate in the survey.

NOTE: For purposes of this survey, *a "real-world learning opportunity" is defined as any project that helps students form meaningful connections between classroom learning and the world beyond the campus, and/or helps students develop skills necessary for success in the 21st century (e.g., critical thinking, problem-solving, communication, creativity, and teamwork skills).*

A. Learning Management System

1. I use the following Learning Management System:

- ☐ Blackboard Learning System
- ☐ Desire2Learn (D2L)
- ☐ eCollege
- ☐ Moodle
- ☐ Sakai
- ☐ Other (please specify): _____

B. Principles for Good Practice in Undergraduate Education

Please select the number in the column that corresponds with the appropriate response. N = Never S = Sometimes O = Often V = Very Often					
Survey Item	**1. Student – Faculty Contact**	**N**	**S**	**O**	**V**
1.1	I use electronic mail to communicate with my students individually or as a group.	1	2	3	4
1.2	I use discussion forums to communicate with my students.	1	2	3	4
1.3	I use blogs to communicate with my students.	1	2	3	4
1.4	I use text messaging to communicate with my students individually or as a group.	1	2	3	4
1.5	I use a social networking page (e.g., Facebook®, Pinterest, LinkedIn, Google+) to communicate with my students.	1	2	3	4
1.6	I use a social messaging utility to communicate with my students (e.g., Twitter).	1	2	3	4

Please select the number in the column that corresponds with the appropriate response. N = Never S = Sometimes O = Often V = Very Often					
Survey Item	**2. Reciprocity and Cooperation Among Students**	**N**	**S**	**O**	**V**
2.1	I provide an online discussion board and allow my students to post comments and questions to other members of the class.	1	2	3	4
2.2	I provide a chat room to allow my students to have real-time online discussions with each other.	1	2	3	4
2.3	I use a blog to allow my students to post and respond to comments online that other students can read.	1	2	3	4
2.4	I provide a method for my students to communicate with other class members via electronic mail (e.g., through Blackboard®, Moodle® or other learning management system).	1	2	3	4
2.5	I require my students to collaborate on one or more group projects using technology using technology such as wikis and Adobe Connect.	1	2	3	4
2.6	I require my students to do a group presentation using technology such as PowerPoint, Prezi, or other presentation tool.	1	2	3	4

Please select the number in the column that corresponds with the appropriate response. N = Never S = Sometimes O = Often V = Very Often					
Survey Item	**3. Active Learning**	**N**	**S**	**O**	**V**
3.1	I provide real-world learning opportunities for my students using technology such as the Internet; software communication, visualization, and simulation technologies; remote instruments; or mobile devices for accessing and inputting data during field-based investigations.	1	2	3	4
3.2	I provide real-world problem-solving opportunities for my students using technology such as simulations, role-playing exercises, collaborative case studies, or virtual communities of practice.	1	2	3	4
3.3	I use mini-lectures combined with student engagement components using technology (e.g., filling in missing information on a PowerPoint slide, or exploring a website related to the lecture) to keep students more attentive.	1	2	3	4
3.4	I use electronic response systems or clickers to engage my students.	1	2	3	4
3.5	I require students to present their work using PowerPoint, Prezi, or other presentation tools.	1	2	3	4
3.6	I require my students to research course-related topics online.	1	2	3	4

Please select the number in the column that corresponds with the appropriate response. N = Never S = Sometimes O = Often V = Very Often					
Survey Item	**4. Prompt Feedback**	**N**	**S**	**O**	**V**
4.1	I post grades online for students to access at their convenience using a learning management system such as Blackboard® or Moodle®.	1	2	3	4
4.2	I provide feedback for students pertaining to their graded assignments through a learning management system such as Blackboard® or Moodle®.	1	2	3	4
4.3	I provide feedback for students pertaining to their graded assignments by embedding comments in the students' electronic documents.	1	2	3	4
4.4	I provide feedback for students pertaining to their graded assignments via electronic mail.	1	2	3	4
4.5	I provide online quizzes or practice tests to help students prepare for exams.	1	2	3	4
4.6	I provide an online portfolio to allow students to store papers and projects for instructor evaluation.	1	2	3	4

Please select the number in the column that corresponds with the appropriate response. N = Never S = Sometimes O = Often V = Very Often					
Survey Item	**5. Time on Task**	**N**	**S**	**O**	**V**
5.1	I offer online learning to provide a more flexible and convenient course delivery option for my students.	1	2	3	4
5.2	I offer blended learning (combination of online and face-to-face classes) to provide a course delivery option that allows students more time outside of class.	1	2	3	4
5.3	I use a learning management system such as Blackboard® or Moodle® to provide an online classroom component for my traditional classes to allow students to access class materials and communication tools outside of class.	1	2	3	4
5.4	I monitor the amount of time students participate in my online classes.	1	2	3	4
5.5	I provide information to my students about online resources and databases so they can access these materials at their convenience.	1	2	3	4
5.6	I modularize course content and release only the modules I want students to focus on during a particular time period.	1	2	3	4

Please select the number in the column that corresponds with the appropriate response. **N = Never S = Sometimes O = Often V = Very Often**					
Survey Item	**6. Communicating High Expectations**	**N**	**S**	**O**	**V**
6.1	I post my syllabus online so students can access important class information (e.g., learning objectives, attendance policies, course schedules, exam dates).	1	2	3	4
6.2	I use technology to create assignments that challenge my students.	1	2	3	4
6.3	I use technology to create assignments that require my students to develop their critical thinking and problem solving skills.	1	2	3	4
6.4	I use an asynchronous lecture capture system (e.g., Mediasite, Camtasia, etc.) to enhance and extend instructional activities.	1	2	3	4
6.5	I use technology to create assignments that require my students to collect and analyze data and communicate their findings.	1	2	3	4
6.6	I post scoring rubrics online for assignments so students will have a clear understanding of what is expected.	1	2	3	4

Please select the number in the column that corresponds with the appropriate response. N = Never S = Sometimes O = Often V = Very Often					
Survey Item	**7. Diverse Talents/Ways of Learning**	**N**	**S**	**O**	**V**
7.1	I provide real-world learning opportunities for my students using technology such as the Internet; and software communication, visualization, and simulation technologies.	1	2	3	4
7.2	I post digital materials and classroom information for my students to access online (e.g., notes, syllabus, PowerPoint slides, web links).	1	2	3	4
7.3	I post audio-visual information for my students to access online (e.g., lecture videos, podcasts, graphics, multimedia).	1	2	3	4
7.4	I provide a variety of online assignments that allows students to utilize different learning styles.	1	2	3	4
7.5	I provide assignments that allow students to present information in a variety of formats (e.g., written, orally, online).	1	2	3	4
7.6	I use blended learning strategies (combination of online and face-to-face class time) to accommodate different learning styles.	1	2	3	4

Please respond to the following demographic items by checking the box beside the appropriate response.

C. Demographic Data

1. Gender:
   - ☐ Male
   - ☐ Female

2. Age group:
   - ☐ Under 30
   - ☐ 30-39
   - ☐ 40-49
   - ☐ 50-59
   - ☐ 60 or over

3. Number of years of higher education teaching experience:
   - ☐ 1-5
   - ☐ 6-10
   - ☐ 11-15
   - ☐ 16-20
   - ☐ 21-25
   - ☐ 26 or more

4. Educational level (highest degree earned):
   - ☐ Bachelor's
   - ☐ Master's
   - ☐ Doctorate

5. Rank
   - ☐ Instructor
   - ☐ Assistant professor
   - ☐ Associate professor
   - ☐ Professor

6. Tenure status
   - ☐ Tenured
   - ☐ Untenured

7. Discipline Category:
   - ☐ Investigative: biology and life sciences, economics, geography, math/statistics, physical sciences, finance, aeronautical engineering, civil engineering, chemical engineering, astronomy, earth science, pharmacy, anthropology, and sociology
   - ☐ Artistic: architecture, fine arts, foreign languages, English, music, speech, theater, and environmental design
   - ☐ Social: home economics, history, humanities, library science, physical and health education, psychology, social sciences, education
   - ☐ Enterprising: business, communications, computer/information science, entrepreneurship, law, public affairs, journalism, marketing, and industrial engineering

8. Institution:
   - ☐ Alderson-Broaddus University
   - ☐ Alice Lloyd College
   - ☐ Bethany College
   - ☐ Berea College
   - ☐ Bluefield College
   - ☐ Brevard College
   - ☐ Bryan College
   - ☐ Campbellsville University
   - ☐ Carson-Newman University
   - ☐ Davis & Elkins College
   - ☐ Emory & Henry College
   - ☐ Ferrum College
   - ☐ Johnson University
   - ☐ Kentucky Christian University
   - ☐ King University
   - ☐ Lee University
   - ☐ Virginia Intermont College
   - ☐ Warren Wilson College
   - ☐ Lees-McRae College
   - ☐ Lenoir-Rhyne University
   - ☐ Lincoln Memorial University
   - ☐ Lindsey Wilson College
   - ☐ Mars Hill University
   - ☐ Maryville College
   - ☐ Milligan College
   - ☐ Montreat College
   - ☐ Ohio Valley University
   - ☐ Tennessee Wesleyan College
   - ☐ Tusculum College
   - ☐ Union College
   - ☐ University of Charleston
   - ☐ University of the Cumberlands
   - ☐ University of Pikeville
   - ☐ University of the South
   - ☐ West Virginia Wesleyan College
   - ☐ Wheeling Jesuit University

This survey is a modified version of a survey conducted by Dr. Donna H. Wood for her dissertation entitled, "Full-Time Faculty Use of Computer Technology in Enhancing Student Learning and Development in Alabama Community Colleges" in 2009.

Thank you for your participation!

VITA

EVELYN G. SMITH

Education:	Ed.D. Educational Leadership, East Tennessee State University, Johnson City, Tennessee, 2014 M.S. Computer Science, Nova Southeastern University, Ft. Lauderdale, Florida 2002 B.S. Computer Science, Nova Southeastern University, Ft. Lauderdale, Florida 1994 Public Schools, Lee County, Virginia
Professional Experience:	Assistant Vice President for Academic Affairs, Lincoln Memorial University, Harrogate, Tennessee, 2007–present Assistant Professor of Computer Information Systems, Lincoln Memorial University, Harrogate, Tennessee, 2002–present Dean, Academic Services, Lincoln Memorial University, Harrogate, Tennessee, 2005–2007 Interim Chair, School of Business, Lincoln Memorial University, Harrogate, Tennessee, 2003–2005 Associate Vice President for Administration, Lincoln Memorial University, Harrogate, Tennessee 2001–2002 Executive Assistant to the President, Lincoln Memorial University, Harrogate, Tennessee, 1999–2001 Director of Foundation Research, Lincoln Memorial University, Harrogate, Tennessee, 1998–2001 Adjunct Instructor, Southeast Community College and Southeast Regional Technology Center, Middlesboro, Kentucky, 1995–1998 Computer Programmer, IBM, Boca Raton, Florida, 1983–1995
Awards:	General Robert E. Lee Service Award