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Technology and older faculty: A descriptive study of older Florida community college faculty

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Technology and Older Faculty: A Descriptive Study of Older Florida Community College Faculty

by

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DEDICATION

To my beloved wife, Ruth van der Kaay. I am eternally grateful for the many sacrifices you endured over the years—your love and never ending support made this dream a reality. I also dedicate this dissertation to my mother, Roseann van der Kaay, and the memory of my father, the late Erik van der Kaay.

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ABSTRACT

Institutions of higher learning across the United States are experiencing an aging faculty population. A significant proportion of college and university faculty are over 55, a growth expected to continue in future years. Parallel to this growth and change has been an expanding use of technology in higher education. Despite this trend and potential implications, few studies have provided in-depth insight into older faculty and technology.

The study used a quantitative descriptive design to provide a comprehensive look at older community college faculty and various aspects of technology. Areas examined included older faculty's perceptions of technology, their attitudes toward institutional technology support and professional development, and their self-reported use of technology. Further, the study determined if older faculty reported existence of barriers preventing technology use and explored perceived technology and technology related needs.

A 120-item questionnaire and cover letter was mailed to full-time faculty at five Florida community colleges. Respondents included 246 full-time faculty members; older faculty (age 55 and over) comprised 40.7% of the population sample. Descriptive and inferential statistical procedures were employed for data analysis. Overall technology use

among older faculty was slightly less than younger faculty; older faculty were no less likely than younger respondents to use technology. Both age groups used similar technologies and reported equivalent degrees of perceived skill with those technologies. Despite similarities in perceived technology use, older faculty considered technology a minor source of stress. Younger and older faculty were positive about their institution's support services and expressed similar technology related needs, including additional professional development and classrooms equipped with Internet/network access, audio/visual technologies, instructor computer stations, and multi-media projection capabilities.

Principally, the technological divide between younger and older faculty seems less striking than some have previously contended. Technology use and proficiency appear to vary widely across age groups. Older and younger respondents also had positive perceptions of technology. Findings suggest community colleges are serving adequately the technology needs of faculty. Recommendations for future research include broadening the population of community college faculty and exploring technology use among older four-year and university faculty.

CHAPTER 1

INTRODUCTION

Technological, medical, and pharmaceutical advances, in addition to dietary, fitness, and nutritional education, have dramatically influenced human life expectancy and the quality of life among older adults. Since the early 20th century, the average life expectancy of men and women in the United States has increased by more than 20 years, to 74 and 79 years respectively. Older adults currently comprise a significant proportion of the United States and world population. In 1900, only 4.1% of the American population was over the age of 65 (Administration on Aging, 2003). Presently, approximately 13% of Americans are 65 and over (Administration on Aging, 2003; National Council on the Aging, 2002). Research suggests that by the year 2025, this percentage will nearly double to 27% (National Council on the Aging, 2002). It is projected that in the year 2030, 71.5 million Americans will be 65 or older (Administration on Aging, 2003). The global population of older adults is similarly increasing. From 1998 to 2025, the world's population of older adults 65 and over is estimated to grow by more than two-fold (Bureau of the Census, 1999).

Due to the unprecedented increase in older workers, the current U.S. labor force consists of a greater number and proportion of older adults than at any time in American history. According to the U.S. Bureau of Labor Statistics (as cited by Rix, 2002), 12.9% of the U.S. workforce in 2000 was over the age of 55; this percentage will increase four percent to 16.9% by 2010 (Rix, 2002). The United States General Accounting Office

(GAO) reports similar figures and projects comparable growth on older workers age 55 and over. In 2000, workers age 55 and older represented 13.1% of the American workforce; this figure is expected to grow to 19.6% in 2015 and 20.1% in 2025 (United States General Accounting Office, 2001).

Americans over the age of 65 represented 3.1% of the American workforce in 2003 (Administration on Aging, 2003). The National Council on the Aging reports that in 1998, 3.8 million adults 65 and over were employed full-time or part-time (National Council on the Aging, 2002). It has been predicted that this number significantly increase to just over five million by 2006, or 15% of the total workforce (National Council on the Aging, 2002).

Paralleling the nationwide increase in older workers, universities and community colleges across the United States are experiencing a significant change in the number of older adults comprising their instructional faculty population. The GAO indicates that 23.3% of post-secondary teachers were age 55 and over in 2001 (United States General Accounting Office, 2001). This proportion is expected to grow to 27% by 2008 (United States General Accounting Office, 2001). However, figures reported by additional sources reveal a higher proportion and anticipated growth of older workers in post-secondary education. According to a recent, national survey of college and university faculty, older faculty members age 55 and over currently represent 36% of the faculty population at American community colleges and universities (Lindholm, Astin, Sax, & Korn, 2002). In comparison, 24% of college and university faculty were over the age of 55 in 1989 (Sax, Astin, Korn, & Gillmartin, 1999; Lindholm et al., 2002). Based on this data, it is probable that older adults will continue to comprise a substantial percentage of

college and university faculty. As El-Khawas (1991) observes, "Today, senior members of the professorate... make up a sizeable and significant presence... of all college faculty" (p. 3).

Technology progressively has changed post-secondary education, becoming an integral component of the modern community college and university. The use of different forms of technology in higher education has provided numerous benefits to the learner and instructor (Lewis, Massey, & Smith, 2001). For example, technology provides different media in which to present information to students—thereby "enriching the traditional learning experience" (Lewis et al, 2001, p. 7). An increasing number of college faculty are using some form of technology to supplement their instruction; technologies used with instruction include, but are not limited to, computer software and hardware, multimedia projectors, networks, and televisions (Bates & Poole, 2003). In 2001, 30% of college faculty reported using computers or some other form of technology with their instruction, an increase of 11% since 1995 (Lindholm et al., 2002).

Technology also permits institutions to expand the delivery of education beyond the conventional classroom setting. Student demographics, constrained funding, and recent advances in technology have led to a growing reliance upon alternative methods of providing education. Since the mid 1990s, online courses are becoming increasingly more common at community colleges and universities. Academic departments and distance learning programs are progressively using web-delivered or web-enhanced courses to replace traditional televised or taped courses. Instructional technologies such as Blackboard, WebCT, and computer assisted assessment tools offer instructors the ability to better manage and augment conventional and distance learning classes.

The professional lives of college faculty also have been impacted by technology. The Internet and e-mail, for example, have enhanced the sharing of information among academic researchers and scholars (Baldwin, 1998). The use of presentation software and teleconferencing tools help foster collaboration between colleagues. Community college and university libraries continually expand electronic resources, including databases, newspapers, and online electronic journals (e-journals).

Baldwin (1998) writes:

> These advanced technologies enable professors to work more quickly, to increase their overall level of research productivity, and to address research questions that heretofore would have been inconceivable because of the complexity of the data management and analysis involved" (p. 11).

Community colleges are at the forefront of this increased implementation of technology in the post-secondary classroom. Results from the 2001-2002 Higher Education Research Institute (HERI) study suggest that technology based instruction was more prevalent at community colleges than universities or four-year colleges (Lindholm et al., 2002). In response to a survey question assessing the most commonly utilized instructional methods, approximately 35% of community college faculty specified "computer or machine-aided instruction" (Lindholm et al., 2002). In contrast, over one-fourth (28%) of faculty at four-year colleges and universities responded similarly. These findings are consistent with other studies assessing technology use at community colleges. In an earlier 1994 national study of faculty at public and private institutions of higher learning, it was found that technology use was appreciably higher at community colleges than other institutions (Green & Eastman, 1994, as cited in Johnson, 1995). As stated by Johnson (1995), "community colleges are joining the global electronic community in incredible numbers" (¶3).

Limited research suggests that older faculty members are currently faced with the challenge of integrating and using technology in an academic setting. Studies (e.g., Sax, Astin, Korn, & Gillmartin, 1999) show that older faculty are comparatively less likely than younger faculty to use technology. In a 1998-1999 national college and university faculty survey conducted by the Higher Education Research Institute (HERI), researchers found differences in technology use among older and younger faculty (Sax et al., 1999). Older faculty were less likely to frequently use computers for communication, conducting research and data analysis, writing, developing presentations, and partaking in Internet-based discussion groups (Sax et al., 1999). Sax et al. (1999) cites, "The largest age differences in computing relate to some of the more 'interactive' uses of the computer: to communicate via e-mail and to conduct research using Internet resources" (p. 6). The same research also shows that older faculty report more stress than younger faculty from using and learning new technologies (Sax et al., 1999).

Older faculty members must keep pace with new technological developments to remain competitive and productive in the academic environment. In addition, with a growing number of older faculty members comprising the college and university faculty population, institutions will find it increasingly more important to provide effective technological assistance to older faculty members. This not only will improve the effectiveness of older faculty members and the faculty body as a whole, but also improve the service and delivery of education to students.

For institutions to provide adequate technology assistance and development for their aging faculty population, colleges and universities need to be aware of, and receptive to the issues affecting the use of technology among older faculty. Likewise, it

is essential to identify the attitudes of older faculty toward various technologies currently used in the academics. This chapter discusses the problem and purpose of the study, presents its significance, provides definitions to relevant terms, and identifies the various research questions.

Problem Statement

Community colleges and universities are experiencing a significant and progressive increase in the average age of instructional faculty (Lindholm et al., 2002). Academic scholars commonly refer to this trend as the "graying" of college and university faculty. Current studies suggest that approximately one-third of full-time faculty members are over the age of 55 (Creighton, 2001; Lindholm et al., 2002). In comparison, only 25% of faculty were over the age of 55 by the beginning of the 1990s (Creighton, 2001).

The role of technology in higher education has increased in recent years. A growing number of instructional faculty at colleges and universities are using various technologies with their instruction, especially at two-year institutions (Baldwin, 1998, Green & Eastman, 1994, Lindholm et al., 2002, Johnson, 1995). However, limited research suggests that technology has created a generational divide between older and younger faculty. A review of the available literature suggests that older faculty use technology less often than younger faculty and experience more stress associated with its use. In a national study conducted by the Higher Education Research Institute (HERI) in 1999, it was found that older college and university faculty (65 or older) were less likely to use technology than younger faculty (Sax et al., 1999). Moreover, older faculty members reported that technology was a source of stress (Sax et al., 1999).

Despite this data, a comprehensive survey of available literature revealed that the existing body of knowledge pertaining to older college faculty is quite limited—particularly pertaining to technology use. Additional research is needed to investigate if older faculty members may be confronted with obstacles to their technology use and obtaining support from their institution in order to use technology with their instruction and related scholarly endeavors.

Purpose of the Study

The ending of mandatory retirement policies in higher education was a significant factor that has changed faculty demographics at colleges and universities across the United States (Clark & Hammond, 2001). Older faculty members currently comprise a significant proportion of college faculty. Current research indicates that approximately one-third (36%) of college and university faculty are over the age of 55; this proportion is expected to grow in the following decades as an increasing number of older faculty decide to work beyond the traditional retirement age of 65 (Lindholm et al., 2002).

Technology plays an important role in higher education. A growing number of faculty members across many academic disciplines are using various technologies as a tool for instruction, to improve research productivity, student learning, and to assist with other academic related activities. This has been particularly demonstrated at public and private community colleges, where past research suggests that the use of technology with instruction is more common in community college classroom than other institutions of higher learning (Lindholm et al., 2002; Green & Eastman, 1994; Johnson, 1995). As a result of the increase in technology use among faculty, community colleges must provide

adequate technical support and professional development opportunities to ensure effective and continual use of technology.

The purpose of this study was to examine older community college faculty and various aspects related to technology. First, the study examined older faculty's perceptions of technology. Second, older faculty's attitude toward institutional technology support and professional development was explored. Third, it investigated perceived use of technology. Fourth, the study determined if older faculty reported barriers that prevent their use of technology. Fifth, the study examined perceived technology and technology related needs of older faculty. A 120-item Faculty Technology Survey was used to collect data for analysis (see Appendix I for a copy of the Faculty Technology Survey). The questionnaire utilized ordinal level response formats and Likert type scales). Composite scores (sum of item responses) were calculated for each scale integrated in the instrument. The mean of composite scores for older faculty (age 55 and over) was explored. A comparative analysis was also conducted to determine if statistically significant differences existed between older and younger faculty (age 54 and under) with regard to the variables considered in the study.

Research Questions

1. What are older community college faculty's perceptions of technology?
2. What are the attitudes of older community college faculty toward institutional technology support and professional development?
3. To what degree do older community college faculty report the use of technology with their academic activities in comparison to their younger counterparts?

4. What are the perceived barriers, if any, that prevent older community college faculty from using technology? If so, what are these barriers, to what degree do they affect technology use, and how are they different from barriers for younger faculty?
5. What are the perceived technology and technology related needs of older community college faculty?

Significance of the Study

According to numerous studies (e.g., Connecticut Community College System, 2002; Lindholm et al., 2002; Office of Policy Analysis and Research: University of Wisconsin, 1999), older faculty comprise a significant proportion of the faculty population among many colleges and universities. In 2002, 36% of college and university faculty were over the age of 55. Despite this evidence, relatively little attention has been given to this increasingly growing segment of faculty in higher education. Bland and Bergquist (1997) assert that older faculty largely are ignored by administrators and leaders in higher education because of negative attitudes and preconceived notions.

In addition to the trend of an aging faculty population, the role of technology at colleges and universities has increased in recent years. Technology has developed into an integral component of higher education, a trend that is expected to continue in future years. College and university faculty presently use various technologies to improve instruction, student learning, and research. As different technologies become more complex, institutions will find it essential to provide faculty with adequate support services. Based on the limited literature and research reviewed, higher education administrators and faculty leaders may need to recognize the importance of adequate

technology support and professional development for older faculty. As suggested by Komives (2002), poor institutional support for technology, combined with generational differences among faculty concerning technology, leaves many campuses with older faculty unable to learn or use new technologies.

This significance of the study is three-fold. First, the results of the study are intended to assist community colleges with developing or improving technology related services and support for older faculty members. As technology plays a greater role in higher education, the productivity of faculty will not only be affected by the degree to which technologies are used in an academic setting, but by the support institutions provide for these technologies. In order to improve technology support and professional development opportunities for older faculty, administrators and faculty leaders must have an understanding of the barriers that might affect an older faculty member's use of technology. The results of the study may provide institutions with the necessary information to develop successfully programs for older faculty that address their technology related needs

Second, the study aims to broaden the existing body of knowledge pertaining to older faculty and technology. Available research on the use of technology by older faculty is narrow and limited—suggesting that little may be known about an increasing segment of the faculty population. Empirical data provided by this study may serve to increase the understanding of older faculty.

Few attempts have been made to review and analyze the literature concerning older faculty. In addition to exploring older faculty and technology, a third outcome of this study is to provide a comprehensive review of the available literature pertaining to older

faculty. This review of relevant literature is intended to serve as an informative reference for higher education scholars and researchers interested in conducting future research on, or relevant to older faculty.

Definitions

The following section provides definitions of various terms related to the study.

Academic Activities: Scholarly pursuits, research, or positions held at an institution of higher education. Examples include, but are not limited to, teaching, conducting research, publishing, serving on committees, sponsoring student organizations, and presenting at conferences.

Attitude: An "[internal state] that influences an individual's choice of personal action" (Carey, 1994, p. 344).

Barriers: External or internal obstacles that restrict or prevent a faculty member from implementing, and/or effectively using technology.

Community College: A public postsecondary (tertiary) educational institution based on the principles of "open access and equity, comprehensive program offerings, a community-based philosophy, a commitment to teaching and a commitment to lifelong learning" (American Association of Community Colleges, n.d., http://www.aacc.nche.edu/Content/NavigationMenu/AboutCommunityColleges/Trends_and_Statistics/InsightintoCommunityColleges/Insight_into_Community_Colleges.htm).

Older Faculty: A term ascribed to university and college faculty based on chronological age and referring to faculty age 55 and over.

Senior Faculty: Tenured faculty that have significant, academic related experience. This term is commonly used with the assumption that senior faculty are generally older faculty.

University: A public or private postsecondary (tertiary and quaternary) institution of learning and research, that grants undergraduate and graduate level academic degrees.

Limitations

The study employed survey research, a form of descriptive research that uses self-report questionnaires to obtain data. As defined by Wiersma (1991), survey research "deals with the incidence, distribution, and relationships of educational, psychological, and sociological variables in nonexperimental settings" (p. 430). Although survey research is an efficient and effective method to acquire information on sizeable samples, researchers must effectively address possible limitations associated with their study's research methodology, instrument design, and survey techniques.

Response bias and low response accuracy are two potential limitations associated with survey research. Response bias in survey research occurs when participants attempt to provide socially acceptable or desirable responses (Tuckman, 1998). For example, a respondent might knowingly provide false information for fear of potential implications associated with others becoming aware of their responses—thereby leading to response bias (Gall, Gall, & Borg, 1999). Since results obtained from self-report questionnaires are dependent upon the participant's ability to provide honest and truthful responses, efforts were made to control or minimize the effects of response bias. The questionnaire used in the study does not collect identifiable information in order to maintain the

anonymity of participants. Moreover, to eliminate possible noninvolvement from questionnaire items, undecided response choices (e.g., undecided or neither agree or disagree) were not included in the instrument (Tuckman, 1999).

In contrast to response bias, response accuracy is dependent on the participant's ability to comprehend survey instructions or questionnaire items (Gall, Gall, & Borg, 1999). Accordingly, a pilot study was conducted to obtain feedback on the survey's readability, wording, content, and format. Findings from the pilot study also served to evaluate the unidimensionality (inter-item reliability) of scales incorporated in the survey. Results were used to maximize response accuracy by evaluating and modifying the questionnaire based on participant input.

Summary

Older community college faculty and various aspects related to technology were investigated. Areas specifically examined included attitudes toward institutional technology support and professional development; perceived technology use; perceived barriers to the use of technology; perceptions of technology; and technology needs. Survey results from older (≥ 55) and younger (< 55) were statistically compared. Data and analysis of the aforementioned areas are intended primarily to improve institutional technology support, programs, and services for older college faculty.

CHAPTER 2

REVIEW OF THE LITERATURE

Many colleges and universities across the United States are experiencing an increase in the number of older adults comprising their full-time instructional faculty population (Lindholm et al., 2002). This trend frequently is referred to in journal and texts as the "graying of college faculty" (Bland and Bergquist, 1997; Brown, 1996; Kreisman, 1996; Office of Policy Analysis and Research: University of Wisconsin, 1999). Primarily the result of changes in retirement policies, a growing amount of college instructors are working beyond the traditional retirement age of 65 (Bahrami, 2001; Fleck, 2001). According to Finkelstein and LaCelle-Peterson (1993), "senior faculty constitute a plentiful and largely untapped resource at a time when resources for higher education are exceedingly scarce and overtaxed" (p. 96).

However, in comparison to other topics and issues in higher education, the amount of available research concerning older faculty is comparatively small and limited. As indicated by the Educational Research Information Center (ERIC) Higher Education Trends (2000), the increase in older faculty has opened the door to various potential areas of research (e.g., retirement policies, generational differences, older faculty and technology, etc.), many of which have not been thoroughly and adequately examined (Kezar, 2000). Nonetheless, the available body of literature, albeit sometimes unclear and contradictory, has provided some limited insight on the older faculty population.

The literature review will provide a framework for the study—including a comprehensive review and analysis of the existing literature pertaining to older college faculty. Moreover, the literature review will include a synthesis of material relevant to older faculty and technology. The literature review is organized into four main sections: (1) Older and Senior Faculty Defined; (2) The Graying of College and University Faculty; (3) Older College and University Faculty in Higher Education; and (4) Faculty use of Technology.

Based on a survey of the literature, the first section provides an operational definition of the term older faculty. Moreover, this section discusses how these terms have been used throughout the literature. The second section of the literature review concerns the trend toward a progressively aging faculty population at American colleges and universities. This section includes a review and discussion of various major studies that discuss the aging of faculty in higher education—quantitative, descriptive data is provided on the proportion of older faculty at colleges and universities. The third section provides an overview of the literature regarding older and senior college and university faculty. Areas explored include social roles of senior faculty at institutions of higher learning, attitudes and perceptions towards older faculty, and the academic performance of older faculty. The fourth and final section discusses technology use as it relates to university and college faculty. Additionally covered in this section of the literature review is the use of technology by older faculty, barriers to the use of technology, and technology support for older faculty.

Older and Senior Faculty Defined

Age often is considered the single most obvious and defining characteristic of an individual. However, numerically defining old age is a subjective process based on policies (e.g., retirement policies and social security) and convention (American Psychological Association, 2004). For example, many disciplines within the social sciences, including gerontology, psychology, and sociology typically use 60 or 65 to classify an individual as an older adult. Federal government agencies, such as the Social Security Administration and Medicare, use age 65 as a basis for administering full Social Security and Medicare benefits (American Psychological Association, 2002). In a 2001 report conducted by the United States General Accounting Office, older workers were classified as employees age 55 and over (United States General Accounting Office, 2001).

A survey of the literature reveals two commonly used terms to describe aging faculty members: older faculty and senior faculty. The first term, older faculty, is based on the chronological age of the faculty member. However, no single criteria for defining older faculty is used throughout the literature. In a majority of studies and articles, the term older faculty refers to faculty members over the age of 55. For example, Bianchi and Bugge (2000); Berry, Hammons, and Denny, 2001; and Fleck (2001) use the term "older faculty" in regard to faculty members over the age of 55. The Higher Education Research Institute (HERI), in its comprehensive studies of college and university faculty, similarly uses the age of 55 for its definition of older faculty (Lindholm et al., 2002; Sax et al., 1999). In comparison, a smaller number of studies and texts (Hammond and Morgan, 1991; Kreisman, 1996; Linnell, 1979) use age 65 or 70 for their criteria of older

faculty. It is important to note that age does not necessarily imply experience. A caveat to the use of the term older faculty concerns an assumption that age and experience are directly proportional. A younger faculty member (age 54 and below), for example, might have significantly more academic experience than a much older faculty member.

The term senior faculty is also used in the literature, yet differs significantly from older faculty. Similar to the term older faculty, senior faculty uses chronological age as a basis for its definition. In contrast to the term older faculty, senior faculty relies on academic rank and tenure status, in addition to age (Bland & Bergquist, 1997; Rice & Finkelstein, 1993). Senior faculty members are often assumed "older" with significant experience at their institution. As cited in Bland and Bergquist (1997), Rice and Finkelstein (1993) provide a thorough explanation of the term senior faculty:

> The most traditional definition of senior faculty is an organizational one; that is, those faculty who have achieved seniority in the employing institution as defined by tenure and the rank of associate (at least) and preferably full professor. Such a definition says nothing about seniority in one's discipline, in the sense of scholarly distinction, which may be highly independent of organizational seniority – particularly given the current academic job market. It also says nothing about longevity in an academic career or even at the employing institution (Rice & Finkelstein, 1993, p. 9).

Rice and Finkelstein (1993) further indicate that the term senior faculty carries a fundamental assumption that these members of the faculty population are most often chronologically older than other faculty members—suggesting that most senior faculty are older faculty. Moreover, the term senior faculty as occasionally used in research has included both late career and mid-career faculty (Rice and Finkelstein, 1993). Nevertheless, a survey of the literature reveals that a majority of studies use senior faculty in the context of faculty close to the end of their academic career and nearing retirement age.

Bland and Bergquist (1997) provide a similar definition of senior faculty. Consistent with Rice and Finkelstein (1993), Bland and Bergquist (1997) indicate that the term senior faculty is not solely chronologically based. Instead, the term senior faculty must include various different requisites. Bland and Bergquist (1997) cite:

> The term [senior faculty] is at best a composite of... four variables. Those authors who have addressed the issue of senior faculty's vitality in recent years usually include all members of the faculty who are (1) full time, (2) tenured (or at the highest level of their profession), (3) working in a collegiate institution for many years (usually at least 15), and (4) more than 45 years of age (p. 3).

Although there are consistent patterns in the use and definition of older faculty and senior faculty, both terms do not have a universally accepted definition. This study will examine older faculty, regardless of academic experience, rank, or tenure status. Corresponding with previous research, older faculty will be specifically defined in this study as a faculty member over the age of 55. Unless otherwise stated, this particular definition for older faculty will be used throughout the study.

The Graying of College Faculty

Perhaps the most documented and complete research pertaining to older college faculty concerns their increasing numbers at institutions across the United States. Since the early 1990s, the number of older, full-time, and part-time instructors employed by universities, four-year colleges, and community colleges has increased markedly and is predicted to grow significantly in future years (Clark & Hammond, 2001; Kezar, 2000). This trend has resulted in a dramatic, nation-wide increase in the mean-age of higher education faculty. In 2001, an estimated 36% of college and university faculty were over the age of 55 (Lindholm et al., 2002). In comparison, only 15% of faculty were under the

age of 40 (Lindholm et al., 2002; Office of Policy Analysis and Research: University of Wisconsin, 1999).

The primary reason for a nationwide increase in older faculty at colleges and universities is a change in policies governing faculty retirement. In 1978, the Age Discrimination in Employment Act (ADEA) was amended to increase mandatory retirement to the age of 70, with the exception of tenured faculty members (Calvin, 1984; Chronister, 1987). Nine years later, the ADEA was amended to permit colleges and universities to extend mandatory retirement for tenured faculty to 70 years of age (Ehrenberg, 2000; Hammond & Morgan, 1991). In 1994, the amendments expired—effectively ending all mandatory retirement policies for higher education faculty (Bahrami, 2001; Clark & Hammond, 2001; Creighton, 2001; Kreisman, 1996). As stated in Ehrenberg (2000), the ADEA "prevents academic institutions from requiring that tenured faculty members retire" (p. 126).

The elimination of mandatory retirement through the ADEA has had a significant impact on the average age of college and university faculty (Creigthon, 2001). Clark and Hammond (2001) report that in three North Carolina Universities (Duke University, North Carolina State University, and the University of North Carolina), the mean age of faculty at all three institutions had significantly increased subsequent to the ending of mandatory retirement. Moreover, several recent studies have provided information pertaining to faculty age distributions at American colleges and universities. Results suggest that the proportion of older college and university faculty members age 55 and over is markedly increasing. Moreover, these studies suggest that the percentage of faculty working beyond the traditional retirement age of 65 is steadily growing. This

section outlines and discusses four major descriptive studies (Connecticut Community College System, 2002; Lindholm et al., 2001; Office of Policy Analysis and Research: University of Wisconsin, 1999; Northern Virginia Community College, 1999) that support the notion of an aging faculty population at American colleges and universities.

Higher Education Research Institute (HERI) Faculty Survey

Perhaps the most comprehensive examination of college and university faculty is provided in a series of national surveys of instructional faculty conducted by the Higher Education Research institute (HERI), located at the University of Southern California, Los Angeles' (UCLA) Graduate School of Education & Information Studies. Since 1989, HERI has published five faculty survey reports on higher education faculty from participating institutions. The primary purpose of the HERI Faculty Surveys is to provide colleges and universities with comprehensive information pertaining to faculty. Results from the HERI Faculty surveys were obtained from self-questionnaires assessing teaching practices and research activities, interactions with students and colleagues, professional activities, attitudes and values, perceptions of the institutional climate, and job satisfaction. The survey also examined several demographic and biographic characteristics of faculty, including age, gender, degrees held, and experience. Lindholm et al. (2002) cites, "the responses [of the surveys] are weighted to provide a normative profile of the American faculty population for use by individuals engaged in policy analysis, campus administration, and educational research" (p. 3).

The most recent 2001-2002 faculty survey report includes data obtained from 32,840 full-time instructional faculty members at 358 colleges and universities across the United States (Lindholm et al., 2002). Similar to previous faculty survey data from 1989,

results from the 2002 national survey revealed a significant change in the number of older faculty members (55+) comprising colleges and universities (Lindholm et al., 2002). In 2001, 36% of college faculty were over the age of 55—an increase of 12% from 1989. The most significant increase of older faculty was among faculty members between the ages of 55-64. Between the years 1989 to 2001, this age group increased in proportion from 21% to 30%. Among all age categories reported in the study (<35, 35-44, 45-54, 55-64, 65+), the greatest growth was noted in the 55-64 age category. Older faculty 65 and over represent a smaller percentage (6%) and increased slightly (3%) since 1989. In comparison, slight decreases in proportion were noted in the less than 35 and 35-44 faculty age groups. Faculty age 35 and below decreased in proportion from 10% in 1989 to 8% in 2001. The 35-44 age category notably decreased 9% to 22%. No change in proportion was observed among the 45-54 age group. Lindholm et al. (2002) report:

> Continuing a trend reported in previous faculty surveys, the much-discussed aging of American college and university faculty is demonstrated clearly by the results: 36% of all faculty are 55 or older (compared with 24% in 1989). The percentage who are younger than 45 has declined from 41 % in 1989 to 30 % today, with just 8% who are younger than 35 (p. 4).

The 2002 HERI survey of college and university faculty also suggests that the "graying" of faculty is similarly occurring among male and female faculty members. Between 1989 and 2001, older male faculty (55-64) increased 10% to 34% of all male faculty members. Older female faculty (55-64) represent 23% of female faculty members; this percentage is an 8% increase since 1989. Male and female faculty members over the age of 65 slightly increased. Female faculty members over the age of 65 increased 1% and comprised 3% of the female faculty population in 2001. Male

faculty members over the age of 65 represent 7% of the male faculty population, an increase of 3% since 1989.

University of Wisconsin System

Additionally, information on college and university faculty age distributions has been provided through recent retirement studies conducted by various post-secondary institutions. In addition to predicting faculty retirement trends for successive years, these studies support the national trend toward an aging faculty population as suggested by the HERI study. In 1998, the University of Wisconsin System, Office of Policy Analysis conducted a descriptive study examining changes in faculty age distributions and retirement patterns over a 13-year period, from 1985-1998. (Office of Policy Analysis and Research: University of Wisconsin, 1999). The primary purpose of the study was to estimate future retirement trends of faculty at the University of Wisconsin in the subsequent decade. Information obtained from the faculty analysis was also intended to explore the potential effects of faculty aging and retirement. The sample population included full-time tenured and tenure-track faculty.

The study found that between the years of 1985 to 1998, the proportion of full-time faculty age 55 and over notably increased from 8% to 35%; this figure is comparable to national results (36%) obtained from the 2002 HERI study. In 1985, the number of full-time faculty members over the age of 55 was 1,834. By 1998, the number of full-time faculty members had increased to 2,164. In contrast, full-time faculty under the age of 40 at the University Wisconsin declined from 14% in 1985 to 8% in 1998. The change in faculty age distributions had a significant effect on the mean age of faculty. From 1985 to 1998, the mean age of University of Wisconsin faculty increased by six years from 45

to 51 years of age. The study also found changes in age distributions based on academic discipline. During the year 1998, nearly 40% of faculty in engineering, physical sciences, and the humanities were over the age of 55. In agricultural, life sciences, and the social and behavioral sciences, older faculty (55+) comprised a significant proportion (33%) of faculty. In comparison, the proportion of older faculty in 1985 for these academic disciplines was 27%, indicating an estimated 13% increase of older faculty members during a 13-year period.

Other academic disciplines, including non-clinical and clinical health sciences, had smaller proportions of older faculty. However, the overall increase in older faculty members from 1985 to 1998 closely approximated the increase experienced by other academic disciplines. In 1985-1986, non-clinical and clinical health sciences reported 61 full-time faculty members over the age of 55. The number of older full-time faculty members increased to 99 in 1997-1998. The percentage of older, non-clinical health science faculty in 1985-1986 was 14.2%. In 1997-1998, this percentage increased to 30.8%. Older faculty members comprised 20.2% of the clinical health science faculty and increased to 27.9% by 1997-1998.

The aging of faculty in the University of Wisconsin system has important implications, all of which are germane to numerous institutions nationwide experiencing a similar aging of their faculty population (Kezar, 2000). Universities and colleges will find it necessary to contend with major personnel and hiring issues. A large number of retired faculty will need to be replaced during a time of increasing student enrollments.

According to the Office of Policy Analysis and Research: University of Wisconsin (1999):

> Some academic departments may be decimated by a large number of retirements. Additionally, shortages may develop in specific disciplines where substantial numbers of faculty need to be replaced. (p. 12)

Northern Virginia Community College

An additional retirement study that reveals a growth in older faculty members was conducted in 1999 by Northern Virginia Community College's (NVCC) Office of Institutional Research. The primary purpose of the study was to forecast faculty retirement trends until 2003:

> In an effort to determine in Northern Virginia Community College (NVCC) is facing the loss of a significant number of faculty members within the next five years (1998-2003), the Office of Institutional Research (OIR) looked at the data on faculty members' age, years of service, and past retirement patterns (Northern Virginia Community College, 1999, p. 6).

Demographic information on NVCC faculty members obtained from the study indicates that older adults comprise a significant percentage of the instructional faculty. In 1999, NVCC faculty over the age of 60 comprised 16 % of the total faculty population; most faculty (66 %) were age 50 and over. Moreover, it was found that the median age of NVCC faculty members is increasing. From 1988 to 1998, the median age for full-time instructional faculty increased seven years to age 50. The median age of nine-month instructional faculty was 53 years of age, an increase of eight years. Data on median age of NVCC faculty is consistent with information acquired from the University of Wisconsin study. In comparison, the University of Wisconsin reported that the mean age of instructional faculty had increased six years between 1985 and 1998 to 51 years of age.

Connecticut Community College System

The Connecticut Community College System conducted a descriptive analysis (case study) on the age of full-time instructional faculty (Connecticut Community College System, 2002, p. 3). The sample was based on all full-time instructional faculty, or 735 faculty members, at the Connecticut Community College System. Four major areas were explored by the study: (1) mean and median age of the entire full-time faculty population at the Connecticut Community College System; (2) mean and median age of faculty participating in different retirement plans; (3) mean and median age of faculty according to academic rank; and (4) the mean age of faculty members associated with various academic bargaining units. Similar to other research examining faculty age distributions, findings from the study suggest that older adults (55 and over) comprise a substantial portion of faculty at the Connecticut Community College System. Thirty-nine percent of faculty or 286 faculty members were over the age 55. The University of Wisconsin System and the HERI faculty survey reported comparable percentages of 35 % and 36 % respectively. Moreover, the mean and median age of faculty at the Connecticut Community College System closely corresponds to Northern Virginia Community College and the University of Wisconsin System. The mean and median age of faculty at the Connecticut Community College System was 51 years and 52 years of age, respectively.

Older Faculty in Higher Education

The Social Roles of Senior Faculty

Corresponding with the significant growth of older faculty members in community colleges and universities, a few scholars have examined senior faculty from a

sociological perspective—identifying various social roles senior faculty adopt in a college or university. It has been asserted among these scholars that, although senior faculty members provide community colleges and universities with years of valuable experience and knowledge in their respective academic discipline, they also impart wisdom—providing guidance, advice, and passing on to newly hired faculty a greater appreciation for the institution (Bland & Bergquist, 1997; Finkelstein & LaCelle-Peterson, 1993; McGehee, 1990; Tierney & Rhoads, 1994).

The sociological role of mentor is defined as a social and professional relationship between a younger, less experienced faculty member and an older, more experienced faculty member (Bland & Bergquist, 1997). It is suggested that senior faculty are generally proficient researchers and instructors vis-à-vis their years of academic experience and are often willing to impart their acquired knowledge, expertise, and experience with younger faculty (Becker, 1995; Borisoff, 1997; Finkelstein & LaCelle-Peterson, 1993; Horton & Hintz, 2002). In an ASHE-ERIC Higher Education Report discussing senior vitality, Bland and Bergquist (1997) assert:

> Given the large turnover in faculty expected with the retirement of many senior faculty and the necessary recruitment of many new faculty into institutions… the role of mentor is crucial" (p. 108).

Newly hired faculty and faculty with limited experience often perceive senior faculty as mentors. Less experienced faculty typically rely on effective mentorship because of their insufficient academic experience (Bland & Bergquist, 1997; Finkelstein & LaCelle Peterson, 1993; Tierney & Rhoads, 1994). Academic related skills necessary for the success of a young faculty member, such as effective teaching and research, are not typically refined in graduate education (Bland & Bergquist, 1997). As a result,

younger faculty members often seek direction from senior faculty to acquire or further develop these essential skills. For example, older post-tenured faculty are a valuable resource to younger, tenure-track faculty throughout the demanding process of tenure (Tierney & Rhoads, 1994). Finkelstein and LaCelle-Peterson (1993) also suggest that mentorship from senior faculty members is an invaluable tool for increasing research productivity, improving teaching evaluation ratings, and positively affecting the career of younger faculty—thereby directly benefiting both the students and the institution. Queralt (1982) conducted a descriptive study examining the effect of mentorship from senior faculty on career development. Participants of the study included 450 higher education faculty and administrators employed by the Florida University System. Using self-reporting questionnaires, it was found that guidance and direction from senior faculty had a positive impact on the careers of younger faculty. Results suggest that faculty with mentors had a higher degree of career development than those without mentors. The effect of mentorship on career development included improvements in publication records, yearly gross incomes from professional activities, career development satisfaction, leadership record, job satisfaction, grant records, and academic rank (Queralt, 1982).

The available literature also implies that senior faculty may additionally provide support for younger faculty with various other academic related and scholarly activities. According to Finkelstein and LaCelle-Peterson (1993), older faculty members are invaluable for "arranging supports and resources for new faculty" (p. 39). Experienced faculty are able to guide younger faculty with the publication process, preparing course syllabi, institutional service (e.g., serving on college wide committees), and membership

with professional associations (Borisoff, 1997). Bland and Bergquist (1997): "senior faculty members can fill an important role by running interference, formulating supportive policies, providing encouragement, or serving as [a critic]…" (p. 105).

Older, more experienced faculty also socialize younger faculty within the current academic culture of an institution vis-à-vis mentorship (Tierney & Rhoads, 1994). This relationship has the potential of offering beneficial support and direction with the intent of advancing new faculty members within the institution (Becker, 1995). By adopting the social role of mentor, older faculty members are not only able to provide valuable guidance and support to new faculty, but often contribute to the integration of new faculty into the culture of the university or community college (Becker, 1995; McGehee, 1990). In an examination on faculty socialization within institutions of higher education, Tierney and Rhoads (1994) discuss the varied rituals and cultures associated with faculty life, and the different social roles faculty members take on within an academic setting. It is suggested that senior faculty often fulfill the role of socializers and integrators of new faculty—relating campus values, traditions, and core beliefs. McGehee (1990), emeritus professor of sociology at Central Washington University, discusses the importance of socializing and integrating faculty. In an essay discussing older faculty and mentorship, McGehee (1990) suggests that the academic success of a new faculty member is dependent on his/her level of integration into campus culture. Older, more experienced faculty who are familiar with campus history, policies, and procedures are essential participants in the social integration process. McGehee (1990) cites:

> The old in every tradition are carriers of the culture, and from them the new can learn the ways and values… older faculty must take the lead in integrating new faculty into the university community (http://www.cwu.edu/~chasm/03mentor.htm).

In addition to mentor, Tierney and Rhoads (1994) discuss several other social roles adopted by senior faculty at colleges and universities. These roles are identified and described as symbolic leader, trail guide, and oral historian. The symbolic leader is a role senior faculty adopt through their acquired years of academic experience. In addition, senior faculty members are often viewed as leaders because of their extensive familiarity with the institution's traditions and culture. According to Tierney and Rhoads (1994), "senior faculty are capable of giving symbolic meaning to events that the faculty novice might see as perplexing or chaotic" (p. 54). In the role of trail guide, senior faculty provide assistance to younger faculty with regard to academic culture, appropriate behaviors, and unwritten or unofficial rules of the college or university. The role of oral historian refers to an older, experienced faculty member's knowledge of the institution's history, past traditions, and changes in the institution's academic culture over the years. Similar to the trail guide, the oral historian is a role dependent upon the idea that senior faculty possess a strong tie and extensive familiarity with the accepted values, norms, and customs of the college or university (Tierney and Rhoads, 1994).

Each of the four social roles discussed by Tierney and Rhoads (1994) is founded on the notion that older, experienced faculty members may have an important function in higher education: socializers of younger, less experienced faculty (Becker, 1995; Bland & Bergquist, 1997; Borisoff, 1997; Finkelstein & LaCelle-Peterson, 1993; Tierney & Rhoads, 1994). Younger faculty require socialization and integration into the academic community to progress and succeed in their careers. A few scholars also assert that mentor is a commonly ascribed social role of older, experienced faculty members. It is through positive and successful mentorship by senior faculty that less experienced faculty

members learn to be capable instructors, researchers, and leaders. According to McGehee (1990):

> For their part, new faculty need to recognize that those who have been here longer are not all self-serving old goats… for among the old are great reservoirs of knowledge and maybe even a little wisdom (http://www.cwu.edu/~chasm/03mentor.htm).

Attitudes and Perceptions Toward Older Faculty

Stereotypes and negative attitudes toward older faculty remain common at colleges and universities. Attitudes and perceptions toward older faculty are largely based on assertions, assumptions, and preconceived notions of the aging process. Older faculty are commonly perceived as individuals that consistently hold on to long-standing beliefs and concepts, while failing to adopt new methods or innovations. Younger faculty often characterize their older colleagues as unproductive, unwilling to change, and no longer at their scholarly peak. Kreisman (1996) writes, "other concerns that are raised about 'greying' faculty are that they may be out of touch with new developments in their disciplines" (p. 8). However, a survey of the literature concerning older and senior faculty reveals little empirical data supporting these beliefs. Negative perceptions and attitudes concerning older faculty members also extend to issues regarding the hiring of new faculty. Older faculty are often considered as obstacles to the hiring of younger faculty. Younger faculty are characterized as having more enthusiasm, greater productivity, and research potential than their older counterparts (Calvin, 1984; Epstein & Maclane, 1991). In an article supporting mandatory retirement, Epstein and Maclane (1991) reflect this sentiment:

> In view of the rapid intellectual and technical advances, the access to the new is generally best provided by younger faculty members, full of energy and not weighted down with older ideas… (p. 15)

Prior to the ending of mandatory retirement in higher education, concerns were raised over the consequences of extending the age of retirement or terminating mandatory policies all together. Supporters of mandatory retirement policies suggested that community colleges and universities would be unable to hire younger, more productive and research oriented faculty if current retirement policies were changed—senior faculty were considered obstacles to the hiring of younger, and more productive faculty members. Another concern raised was over the issue of affirmative action in higher education. In a paper presented at the National Conference on Higher Education in 1979, Dr. Robert Linnell of the University of Southern California discussed affirmative action in higher education and the effects of ending mandatory retirement on future employment opportunities at colleges and universities. Linnell (1979) suggested that the retention of older, tenured faculty would prevent the hiring of younger minorities and women faculty. Linnell (1979) cites:

> When an over-age-65 faculty member retains a full time position, someone else—probably a woman, ethnic minority, and/or young person—is deprived of a position. The problem of age discrimination against older people becomes probably the worse problem of age discrimination against younger people. (p. 1)

John Silber, former president and chancellor of Boston College, similarly expresses concern over the aging of faculty and the consequence of fewer opportunities for younger and minority faculty (Kreisman, 1996). As cited in Kreisman (1996), John Silber states, "As long as we are keeping someone over the traditional age of retirement we are denying the opportunity to hire someone who is Black or female or young" (p. 8).

Reports by Epstein and Maclane (1991), Kreisman (1996), and Linnell (1979) are examples of literature that do not acknowledge or recognize the benefits experienced, older faculty members provide to the institution. Rather, a consistent theme was a belief

that older faculty should be forced to retire to facilitate the hiring of younger and minority faculty. Only in recent years have older faculty been recognized as having a positive and important role in higher education—contradicting preconceived notions stemming from the mandatory retirement debate of the 1970s and 1980s. Bland and Bergquist (1997) suggest that most experienced older faculty have attained a highly developed social network and are often committed to their institution, but largely have been ignored by higher education leaders and administrators. In contrast, the small percentage of older faculty who do not support the institution generally feel unsatisfied with their careers as a result of unmet goals, failure to achieve recognition in their field, limited research productivity, and career stagnation (Bland & Bergquist, 1997).

Academic Performance of Older Faculty

Several texts and studies (e.g., Bland & Bergquist, 1997; El-Khawas, 1991; Fleck, 2001; Hammond & Morgan, 1991; Kreisman, 1996) have discussed the academic performance and productivity of older faculty. In an analysis of faculty retirement issues, Fleck (2001) indicates that past studies on senior faculty have failed to find a correlation between age and teaching performance. However, despite this evidence negative stereotyping based on age (ageism) continues to influence the hiring practices of universities and colleges, and how older faculty are perceived by faculty, students, and administrators. According to Fleck (2001), aging does not correlate with declining academic performance. Current research shows no evidence of declining faculty performance because of age (Bland & Bergquist, 1997; El-Khawas, 1991; Fleck, 2001; Kreisman, 1996). In comparison to younger faculty, older faculty typically have similar course loads, and provide academic advising for an equal or greater number of students

(Bland & Bergquist, 1997). Achieving tenure and increasing research productivity is no longer a primary concern among senior faculty. As a result, many senior faculty members are able to focus more time on student advising (Fleck, 2001). According to Hodgkinson (1974), the years of acquired academic experience among older faculty result in quality instruction and academic writing. Bland and Bergquist (1997) cite:

> On average, research productivity drops off with age, although many [older] faculty members remain highly productive. Further, what they produce is at least comparable in quality to that produced by younger faculty. The conclusion that age causes and decline in quantity is not supported. (p. 1)

Bland and Bergquist (1997) further indicate that factors such as increased responsibilities and a shift in focus on high quality are potential reasons why older faculty have maintained their productivity into later adulthood.

Data from various, national higher education faculty surveys suggest that older faculty remain productive and active in their academic careers. In 1991, Elaine El-Khawas, Vice President for Policy Analysis and Research at the American Council on Education in Washington, D.C., conducted a study on older college and university faculty. El-Khawas (1991) analyzed data obtained from three national faculty surveys: 1989 faculty survey conducted by the Higher Education Research Institute, 1989 faculty survey from the Carnegie Foundation, and the American Council on Education's 1972-1973 report. The focus of the study was to examine the teaching and academic-related activities of senior faculty; the term senior faculty was defined as a faculty member over the age of 55.

Results from the study suggest that older faculty are active in the teaching role. Most older faculty (61%) at four-year colleges and universities are teaching at least nine hours or more per week. At two-year colleges, a majority of older faculty (93%) report

teaching nine hours or more per week. The study also revealed that older faculty regularly advise students, conduct research, and produce scholarly publications. El-Khawas (1991) states that 87% of older faculty at four-year colleges and universities dedicate their time each week to research and academic writing. Moreover, 60% of older faculty indicate that they have produced one or more publications in the last two years.

Based on the data obtained from national, higher education faculty surveys, El-Khawas (1991) concludes that older faculty have a similar, if not greater, commitment to and interest to teaching. Similar to Bland and Bergquist (1997), El-Khawas (1991) asserts that the research productivity of older faculty does not decline dramatically with age. Instead, older faculty continue to be productive members of the academic community.

El-Khawas (1991) cites:

> [Older faculty] do not appear to be "burned out" or otherwise disillusioned by their work. Rather, the large majority express interest in new developments in their discipline and most have engaged in some form of scholarly activity (p. 12).

Faculty Use of Technology

A small number of studies have provided a comprehensive look at technology use among college faculty. In 1998-1999, the Higher Education Research Institute (HERI) at UCLA conducted a national survey of full-time instructional college and university faculty. The study included responses from 33,785 full-time instructional faculty members at 378 two-year and four-year colleges and universities (Sax et al., 1999).

Similar to the later 2004 HERI study previously cited, the survey collected data on a variety of issues pertaining to higher education faculty. Sax et al. (1999) cites:

> In addition to demographic and biographic information, the revised questionnaire focuses heavily on issues such as how faculty members spend their time, how they interact with students, their preferred methods of teaching and examining students, their perceptions of the instructional climate, and their primary sources of stress and satisfaction. The 1998-99 instrument also includes… new items related to faculty's experiences with information technology (p. 3).

Data from the HERI study reveals information germane to faculty use of technology. The study examined faculty's frequent use (at least twice a week) of computers for sending e-mail, drafting documents, working from home, academic writing, creating multimedia presentations, conducting Internet research, data analysis, participation on online discussion groups, and teaching courses via the Internet. Survey results indicate that most faculty use computers for sending e-mail (87%) and generating documents (85%) (Sax et al., 1999). Approximately one-half of faculty surveyed use technology for their academic writing and to work from home (Sax et al., 1999). A third of faculty frequently produced presentations with computers and conducted online research. A smaller percentage of faculty surveyed used computers for data analysis (27%) and online discussion groups (11%) (Sax et al., 1999).

The HERI survey also indicates that a majority of faculty do not use technology as a tool for instruction. Approximately one-quarter (22%) of faculty use computers in undergraduate instruction, while a slightly larger proportion (36%) retrieve and post assignments online (Sax et al., 1999). Moreover, the study additionally found that few faculty members teach online courses. According to Sax et al. (1999), "only 2% [of faculty] have taught a course exclusively through the Internet" (p. 6).

Older Faculty and Technology

The existing body of literature presents little information examining technology use among older faculty. Only a handful of studies (Gueldenzoph, Guidera, Whipple, Mertler, and Dutton, 1999; Hazen et al., 1999; Sax et al., 1999) provide insight on older faculty technology use. According to results obtained from the 1999 HERI faculty survey, older faculty use computers less frequently than younger faculty for a variety of academic related activities--the term "frequently" is defined as at least twice a week (Sax et al., 1999). Sixty-seven percent of faculty age 65 or over frequently use e-mail, compared to 94% of faculty age 35 or under and 92% of faculty between the ages of 35 and 44. Less than half (46%) of faculty 65 or over frequently use computers for their scholarly writing. In contrast, 61% of faculty age 44 or under often use e-mail for communication.

Significant differences between older and younger faculty members are also apparent in the 1999 HERI study with regard to using computers for data analysis, creating presentations, and Internet research (Sax et al., 1999). Approximately 45% of faculty 35 and under and 42% of faculty between the age of 35 and 44 frequently use computers for Internet research. However, approximately one-quarter of faculty members age 55 or over conducted frequent Internet research (28% of faculty age 55-64 and 21% of faculty over the age of 65). Concerning data analysis, frequent use was reported by only 20% of faculty 65 and over and 23% of faculty age 55 through 64—compared to 33% under the age of 35, 31% age 35 through 44, and 26% age 45 through 54. Similarly, faculty over the age of 55 were less likely to use computers for creating presentations than younger faculty members. Twenty-eight percent of faculty age 65 or

over and 32% of faculty between the ages of 55 and 64 frequently create presentations with computers. Yet, almost half of faculty (42%) under the age of 44 frequently made presentations with computers.

Two additional studies have also suggested that older faculty infrequently use technology. Hazen et al. (1999) conducted a descriptive, quantitative study to determine the relationship between e-mail use among faculty and their perceived effectiveness of e-mail as an instructional tool. Faculty were also surveyed on their attitudes toward technology as a tool for enhancing instruction and student learning. Surveys were distributed to 308 faculty members from Wake Forest University with a response rate of 50% ($N = 154$). According to their study and similar to the 1999 HERI survey results, older faculty were less likely to employ electronic mail for communicating with students (Hazen et al., 1999). A correlation was also found between the attitudes faculty have toward e-mail as an instructional tool and the general use of technology. Older faculty were found to have less exposure to technology and believed that technology did not make teaching easier or more effective. Results also suggest that older faculty lacked sufficient confidence with technology (Hazen et al., 1999).

A further study to examine the use of technology by older faculty was conducted by Gueldenzoph et al. (1999). The study questioned faculty ($N = 168$) on their use of instructional technologies (dependent variable) and faculty demographics, experience teaching styles, and faculty opinions on the effectiveness of instructional technology, technology access, and administrative support for new and existing technology (independent variables) (Gueldenzoph et al., 1999). Instructional technologies included electronic mail, the Internet, file transfer protocol (FTP), and Gopher. Analysis of

variance (ANOVA) and symmetric lambda was used for data analysis. Correlations were also obtained between the dependent variables and independent variable. The study suggests that that older faculty with more years of experience used technology less often than younger faculty with less years of experience.

An additional glimpse on technology use among older faculty stems from the 1999 HERI study. The study also implies that the older faculty may associate stress with their use of technology (Sax et al., 1999). Data from the 1999 HERI faculty survey indicate 69% of faculty over the age of 65 experience stress associated with technology use (Sax et al., 1999). Moreover, 73% of faculty between the ages of 55-64 similarly report stress—this slightly higher percentage in comparison to older faculty members is likely a result of less technology use among faculty aged 65 and over. Survey results further show that younger faculty members report significantly less stress with technology (Sax et al., 1999). Less than half (48%) of faculty 35 and under indicate that the use of technology is a source of stress. The 1999 HERI faculty survey results assert that although older college and university faculty use technology less frequently than younger faculty members, they experience significantly greater stress with its use. Sax et al. (1999) note:

> Older faculty members... experience more stress related to information technology: among faculty who are 45 or older, more than two-thirds are stressed about keeping up with technology, compared with less than half of the faculty who are younger than 35... Therefore, even though older faculty are less likely than younger faculty to use computers, information technology causes them even more stress (p. 6).

Barriers to the Use of Technology

The successful use and integration of technology will continue to be an important issue in higher education. In recent years, college and university faculty are contending

with a growing demand placed by their institutions to use increasingly technology in instruction and scholarship (Baldwin, 1998; Tiffin & Rajasingham, 2003). However, institutions must contend with barriers that prevent faculty from using and integrating technology successfully. Baldwin (1998) discusses various barriers to the use of technology in a chapter text concerning the ways technology has affected the professional lives of higher education faculty. A main barrier identified relates to the notion of apathy towards technology (Baldwin, 1998). This apathy toward technology is rooted in apprehension toward taking risks, fear of change, and failure to understand the advantages associated with the use of a particular technology (Baldwin, 1998). Moreover, the failure to integrate technology is often attributed to the sentiment among some faculty that using technology demands excessive time, training, and work but provides relatively little benefits (DeSieno, 1995 as cited in Baldwin, 1998). Institutions can address this challenge by making clear the values of using a particular technology. According to Baldwin (1998):

> Unlike early adopters, mainstream faculty may need to be convinced of the benefits that come from using technology. Information on success stories with technology and role models to emulate may be an essential part of this conversion process (p. 13-14).

In addition to the reasons previously cited, Gilbert (1996) and the article An 'Online' Experience (1995) (as cited in Baldwin, 1998) provide six additional factors commonly affecting technology use at many colleges and universities: (1) lack of institutional support; (2) aging computer hardware and software; (3) limited time and money; (4) need for knowledge on how to best utilize technology; (5) no incentives or rewards for faculty, and (6) not anticipating the difficulty with implementing a new technology. Epper (2001) additionally identifies obstacles colleges and universities must

content with in order to promote faculty adoption of technology. In a discussion concerning challenges associated with supporting the integration of technology in instruction, Epper (2001) asserts that a lack of faculty incentives and rewards is an obstacle to the use of technology. It is suggested that institutions must incorporate a reward system to create an "enabling environment" for faculty to use technology (Epper, 2001).

Technology Support Services for Older Faculty

Colleges and universities have significantly increased their reliance upon technology as a supplement to traditional forms of instruction. As technology increasingly becomes more complex, professional development and training for faculty teaching courses enhanced by technology will shift from an option to necessity. Institutions eager to include or expand technology in their curricula will find it essential to provide adequate support services for faculty, especially for the growing segment of older adults comprising the ranks of college and university faculty. To facilitate technology support for senior faculty, Seldin and Seldin (1998) indicate that institutions must be willing to make a long-term commitment to their faculty. Seldin and Seldin (1998) define "long-term" as at least a three to five year commitment with incentives for continual participation. During this time, the institution should provide regular technology training workshops led by skilled instructors that provide both instruction and adequate opportunities for experimentation—an example identified is hands on training (Seldin & Seldin, 1998).

Based on the limited literature and research reviewed, higher education administrators and faculty leaders may need to focus their attention on providing

adequate technology support and professional development for older faculty. Few studies, articles, and texts have addressed the significance of, or proposed methods for providing technology support for older, higher education faculty. Poor institutional support for technology, combined with the consequences of generational differences among faculty in technology use and proficiency, leaves many campuses with older faculty who are unable to learn or adapt to new technology (Komives, 2002). Senior faculty unfamiliar with a particular technology should also receive guidance on how to incorporate that technology effectively into their courses (Duffin & Faskowitz, 1996). As a result, a growing emphasis should be placed on support services for faculty to promote the development of quality, technology facilitated instruction. Older faculty need to be trained adequately in the use of hardware and software since, as studies have suggested, they will best recognize the significance of technology in instruction if they are knowledgeable and proficient with its use.

Summary

According to recent studies, older adults over the age of 55 constitute a growing segment of the faculty population at institutions of higher learning. It has been estimated that older adults over the age of 55 comprise approximately one-third of the community college and university faculty population. In a 2002 study conducted by the Higher Education Research institute (HERI), it was found that older male and female adults between the ages of 54 and 65 comprised 34% and 23% of the faculty population, respectively. The growing proportion of faculty age 55 and over was also reported in studies conducted by the University of Wisconsin System, North Virginia Community College, and the Connecticut Community College System.

Despite this trend, the literature concerning older college faculty is limited and largely based on speculative beliefs. Scholars have suggested that older faculty may serve important social roles at many institutions. In addition, it has also been asserted that older faculty continue to remain productive and quite active in their academic careers—especially in contrast to younger faculty members. The scant literature, however, portray older faculty in a different light with regard to technology. A small number of studies and scholars indicate that older faculty utilize technology less often than their younger counterparts (e.g., Gueldenzoph et al., 1999 and Sax et al., 1999) Moreover, the available literature suggests older faculty members are less positive toward technology and experience greater stress and with it use.

CHAPTER 3

METHOD

The purpose of study was to provide a comprehensive and descriptive analysis of older community faculty and various aspects concerning technology. Five key areas related to technology were examined: perceived technology use, perceived technology and technology related needs, attitudes toward institutional support services for technology, attitudes toward technologies used in higher education, and perceived barriers to the use of technology. Specific barriers investigated included accessibility, availability, time, skills, cost, incentives, support, training, and professional development. A statistical comparative analysis was conducted to ascertain if significant differences existed between the responses of older and younger faculty.

Chapter three describes the methodology used to conduct the research. The chapter is organized into six main sections: research questions, study design, variables, population and sample, data collection instrument, and summary.

Research Questions

The study investigated five research questions examining older community college faculty and different aspects related to technology.

Research question 1. What are the perceptions of older community college faculty concerning technology?

Research question 2. What are the attitudes of older community college faculty toward institutional technology support and professional development?

Research question 3. To what degree do older community college faculty report the use of technology with their academic activities in comparison to their younger counterparts?

Research question 4. What are the perceived barriers, if any, that prevent older community college faculty from using technology? If so, what are these barriers, to what degree do they affect technology use, and how are they different from barriers for younger faculty?

Research question 5. What are the perceived technology and technology related needs of older community college faculty?

Study Design

The study employed a quantitative, descriptive-comparative design that examined perceived use of various technologies, perceptions of technology; attitudes toward technology support and professional development, perceived technology and technology related needs, and perceived barriers to the use of technology among older faculty (age 55 and over). Data for each variable was measured cross-sectionally. A comparative analysis was conducted between younger faculty (age 54 and under) and older faculty on all variables measured in this study. Demographic data was also collected on faculty age, gender, race/ethnicity, and education.

Variables

Independent variables examined in the study included age, gender, highest degree earned, and race/ethnicity. For the independent variable age, survey participants were grouped in two age categories: ≤ 54 and ≥ 55. The variable age was measured on both a nominal scale (dichotomous categorical) and ordinal scale, depending on the specific statistical technique used for data analysis. The independent variable race/ethnicity and

gender were measured on a nominal scale. An ordinal scale of measurement was used for the remaining independent variable, highest degree earned.

Dependent variables in the study included attitude toward technology professional development, perceived technology use, perceived technology skill, perceptions of technology, technology and technology related needs, attitude toward institutional technology support, and barriers to technology use.

Population

The population consisted of full-time community college faculty. Full- time faculty were defined as instructional staff employed at the institution on a full-time basis and holding the academic rank of professor, associate professor, assistant professor, instructor, or lecturer. Excluding part-time faculty, such as adjunct instructors, was based on the following rationale. First, the study included survey questions measuring faculty perceived use and attitudes on the institution's technology resources and support systems. Part-time faculty may have limited experience with and access to campus technology resources and support. Second, most of the literature, studies, and research examined and used as a foundation for the study exclusively referred to full-time faculty.

Five Florida community colleges were selected in order to obtain a sample of full-time faculty. The first participating institution reported 263 full-time instructional faculty employed in 2005 with 109 faculty members (41.4%) age 55 and over. The second community college that participated in the study reported 130 full-time instructional faculty employed in 2005; 48 (36.9%) are at or over the age of 55. Full-time faculty at the third institution totaled 104 in 2005 with 41 (39.4%) over the age of 55. The fourth institution to participate reported 272 full time faculty members in 2005 with more than

one-third (36%) age 55 and over. Full-time faculty at the fifth community college numbered 430 with older faculty comprising more than one-half (55%) of the full-time instructional staff. The population size of the study was 1199 community college faculty members: 666 under the age of 55 and 533 age 55 and over. Older faculty (age 55 and over) represented 44.4% of the population. Frequencies of older full-time faculty (age 55 and over) and younger full-time faculty (age 54 and under) for all participating institutions are provided in Table 1.

Table 1

Population

Community College	Older Faculty Frequency	Younger Faculty Frequency	Total
Institution 1	109	154	263
Institution 2	48	82	130
Institution 3	41	63	104
Institution 4	98	174	272
Institution 5	237	193	430
Total	533 (44.5%)	666 (55.5%)	1199

Data Collection Instrument

Survey

The study used a 120-item questionnaire to collect information on perceived barriers to technology use, perceptions of technology, attitudes toward institutional technology support and professional development, perceived use of technology,

perceived technology and technology related needs, perceived technology skills, and demographic information of survey participants. The instrument used to collect data in the study was adapted from the University of Southern Mississippi's (USM) 2004 Faculty Technology Survey; permission was received from the University of Southern Mississippi to use the instrument for the study. The USM 2004 Faculty Survey was modified to include a demographic questionnaire to collect information on faculty age, gender, race/ethnicity, and highest degree earned; no attempt was made in the study to identify personally respondents. In order to use the survey with faculty affiliated with other institutions, references to USM were removed from questions in the survey. Moreover, numerous items from the original USM 2004 Faculty Survey were significantly revised, reordered, or omitted—new questions were also developed and added to the questionnaire for the purpose of the study.

Conducted by USM's Title III-A grant office, the primary purpose of the 2004 Faculty Survey was to "provide evaluation data for existing technology grant projects, to develop needs assessment data for future grant proposals, and to guide administrative decisions in instructional technology acquisition and faculty development" (p. 2). This instrument was based on an instructional technology faculty survey developed by Dr. Carl Berger, Director of Advanced Academic Technologies at the University of Michigan.

The 2004 Faculty Survey was developed to assess changes since a previously conducted faculty survey at USM in 2001. Results from the faculty survey revealed that technology support services at USM campuses were inadequate with 40% of faculty reporting the need for additional technology training. It was also found that insufficient

technology in classrooms, unavailable computer hardware, lack of institutional support, few incentive programs to use technology, and limited funds to purchase software were major barriers affecting the use of technology among USM faculty. The study identified various technology related needs: classroom computer stations, audio/video, multimedia projectors, computers for students, and electronic pointers. Concerning support, most faculty (57.5%) were satisfied with institutional technology support services. The 2001 and 2004 USM study did not report or examine survey response data based on age.

Research Questions

The following section presents the relationship between the survey and the research questions of the study. The section is organized according to the dependent variables examined: perceptions of technology, attitudes toward institutional technology support and professional development, perceived use of technology, perceived technology skills, perceived barriers to technology use, and perceived technology and technology related needs. The survey questions associated with each scale and the response formats used to collect data are discussed. Items for each domain examined in the study are listed in Appendix B.

Perceptions of Technology

The first purpose of the study was to examine older community college faculty's perceptions of technology. Five discrete survey items (questions 10, 13, 20, 23, and 34) were used to explore the participant's perception of technology. Each item utilized a four-point ordinal response format indicating the respondent's level of agreement with a statement (1 = strongly disagree to 4 = strongly agree). Items focused on technology as a tool to: increase productivity (question 10), improve communication with colleagues and

students (question 13), enhance instruction (question 20), technology having an important role in education (question 23), and improve student learning (question 34).

Sax et al. (1999) suggest that older faculty consider technology a source of stress. A three-item scale (Questions 14, 40, and 114), incorporating a 4-point ordinal response format, was used to investigate the degree to which faculty perceive technology as a source of stress. Responses ranged from 1 = strongly disagree to 4 = strongly agree. The degree to which respondents reported that keeping-up-to date with technology is stressful was measured with question 40. Item 114 asked respondents if "using technology can be stressful." A composite scale score ranging from 3 to 12 was determined by calculating the sum of item responses. Scores represented the degree to which respondents considered technology a source of stress.

Attitudes Toward Institutional Technology Support

The second purpose of the study was to investigate older faculty's attitude toward their institution's technology support and professional development services. For the purpose of the study, technology support referred to technical support provided by the community college. A 4-item reflective scale (questions 11, 16, 39, and 44) measured the respondent's overall attitude toward their institution's technology support. Items used a 4-point ordinal response scale (1 = strongly disagree to 4 = strongly agree). Question 11 examined to what degree the respondent perceived their institution's technical support as "adequate or better". Question 16 explored if the technical support for technology at the respondent's institution met their needs. The remaining two items (questions 39 and 44) investigated whether the respondent was "satisfied with the technical support provided by [their] institution" and if the technology support has been "helpful and responsive". A

composite measure, ranging from 4 to 16, was ascertained by generating the sum of item responses. This scale score represented the respondent's attitude toward their institution's technology support. A high scale score suggested a positive attitude, while a low scale score represented a negative attitude.

Attitude Toward Professional Development for Technology

A four-item scale (questions 17, 41, 116, and 118) was used to quantify faculty's attitude toward their institution's professional development for technology. A four-point ordinal response format was used (1 = strongly disagree to 4 = strongly agree) for all items in the scale. Question 17 assessed to what degree the respondent believed that professional development and training services provided by their institution was "adequate or better". Question 41 explored if professional development and training for technology met the needs of respondents. The participant's satisfaction with their institutions professional development and training was measured by item 116. The remaining item in the scale (question 118) asked respondents if their institution's technology related professional development and training was useful. A composite scale score, representing the sum of item responses, was calculated; possible values ranged from 4 to 16. High scores indicated a more favorable attitude toward technology professional development.

Perceived Use of Technology

Limited research suggests that older faculty use technology less often than younger faculty. The third purpose of the study was to investigate technology use among older faculty. A comprehensive, 15-item formative scale was developed to gauge overall technology use. Questions 83-97 assessed the degree to which a faculty member used

various technologies at their institution. Technologies included the following: course management software, LISTSERV, web designing software, Microsoft Word, Microsoft Excel, PowerPoint, Microsoft Access, Microsoft Publisher, various Adobe productivity and designing software (Distiller, Page Maker, and InDesign), video players, multimedia projectors, and statistical software. Response options ranged from 1 = never to 6 = frequently. In order to gauge overall technology use, a composite measure was ascertained by calculating the sum of item responses. Composite scores representing the respondent's frequency of technology ranged from 15 to 90. High aggregate scores represented frequent use of technology.

Perceived Technology Skills

In addition to self-reported technology use, technology skills were also probed. Similar to the survey items examining technology use, 15-items (questions 98 - 112) assessed the respondent's self-reported proficiency with technology. The following technologies were assessed: course management software, LISTSERV, web designing software, Microsoft Word, Microsoft Excel, PowerPoint, Microsoft Access, Microsoft Publisher, various Adobe productivity and designing software (Distiller, Page Maker, and InDesign), video players, multimedia projectors, and statistical software. Questions were measured on a five-point ordinal scale ranging from 1 = low to 5 = very high. A response of zero indicated not applicable.

Perceived Barriers to Technology Use

As suggested by a limited number of studies and scholars (e.g., Gueldenzoph et al., 1999; Hazen et al., 1999; Sax et al., 1999), younger faculty use technology more frequently than their older counterparts. The study's fourth purpose was to determine the

specific barriers older faculty perceive as affecting their use of technology. In addition, the study examined to what degree, if any, faculty perceive these barriers as affecting their technology use. The instrument included eight Likert type scales to measure the following potential barriers to technology use: accessibility, availability, cost, incentives, lack of skills, technical support, time, and professional development/training. Questionnaire items used a 4-point ordinal scale assessing the degree to which a respondent agrees or disagrees with a statement (1 = strongly disagree to 4 = strongly agree); a response of zero represented not applicable. Composite scale scores were obtained by summing the item responses. This aggregate measure represented the degree that a respondent perceived a particular barrier as affecting their use of technology.

Accessibility. The instrument examined limited accessibility to technology as a barrier to technology use. Four survey items (questions 8, 12, 19, and 35) assessed whether the respondents considered limited technology accessibility as an obstacle to their use of technology. Composite scores, calculated by summing item responses, ranged from 4 to 16. Question 12 was reverse scored to be consistent with the scaling direction of other items.

Availability. Four items (questions 7, 24, 43 and 120) investigated limited technology availability as a perceived barrier to the use of technology. Item 7 and 120 focused on lack of technology availability as a barrier to technology use. Item 24 stated "my institution is unable to provide, or does not provide the technology I would like to use." The remaining item (question 43) asked participants if the technological equipment and resources they need are available in the classrooms they use. The sum of item responses, ranging from 4 to 16, was used to obtain a composite score.

Cost. Question*s* 9, 38, and 117 measured cost as a barrier to the use of technology. Questions 9 stated, "I do not use the technology I would like to use because the financial cost is high." Item 38 asked respondents if lack of available funds prevented them from using the technology they would like to use. The final item, question 117, examined if the technology the respondent would like to use is too expensive. A scale score was obtained by calculating the sum total of responses; possible values of the scale ranged from 3 to 12.

Incentives. The affect of incentive programs on technology use was addressed in questions 6 and 33. Items focused on reward systems to include leave time, financial incentives, and contributions toward tenure. An aggregate measure, ranging from 2 to 8, was obtained by calculating the sum of item responses.

Technology skills. Three questions (questions 3, 21, and 37) examined lack of technology skills as a barrier to the use of technology. A sum ranging from 3 to 12 was calculated to obtain a composite scale score.

Technical support. Limited campus technical support as perceived barrier to technology use was measured with two-items (Questions 4 and 36). Item four stated, "I do not use the technology I would like to use because there is not enough technical support at my institution." Item 36 asked the respondent if a lack of information technology assistance kept them from using the technology they would like to use. Composite scale scores (sum of responses) represented the degree to which the respondent considered lack of technical support as an obstacle to their use of technology; possible values for the scale ranged from 2 to 8.

Time. Questions 2, 15, and 42 measured if lack of time affected the use of technologies available to the respondent. Question 42 was reverse scored to be consistent with the scaling direction of the remaining questionnaire items. A sum score, with values ranging from 3 to 12, represented the degree to which limited time was perceived as an obstacle to technology use.

Training and professional development. Survey items 5 and 113 determined whether limited training and professional development opportunities was perceived as a barrier to technology use. Responses to each item were summed to generate an aggregate score ranging from 2 to 8.

Technology and Technology Related Needs

The fifth purpose of the study was to examine the technology and technology related needs of older community college faculty. Survey questions 25-32, and 119 assessed the respondent's need for several technologies. Technologies included Internet access (item 25), network connections (item 26), computer projection capabilities (item 27), lapel microphones (item 28), electronic pointers (item 29), student computers, (item 30), instructor computer stations (item 31), audio/video capabilities (item 32), and upgraded hardware/software (item 119). Two further items measured the respondent's need for additional professional development and training (item 22) and technical support (item 115). Question 18 gauged whether the respondent needed a forum or process to express their technology needs.

To explore further the support needs of older faculty, a series of additional questions examined if technical support (questions 48-63) and professional development (64-82) services for various technologies met the respondent's needs. Responses were

based on a four-point ordinal scale (1 = strongly disagree to 4 = strongly agree); not applicable was included as a response option. Technical support and professional development for the following technologies were assessed: web pages with course material, e-mail lists, web-based electronic bulletin boards/forums, multimedia, computer simulations, self paced- practice and tests of routine tasks, self-paced tutorials with multimedia, multimedia presentations, and the Internet as tool for communication, research, and instruction.

Instrument Validation

Two distinct types of instrument validation were determined: face validity and content validity. Content validity addresses the logic, appropriateness, and comprehensiveness of a research instrument (Fraenkel & Wallen, 1996; Wiersma, 1991). As cited by Moore (1983), content validity is the "degree to which a sample of test items represents the area of content the test is designed to measure" (p. 212). The content validity of an instrument is generally established by a panel of experts—individuals with expertise relevant to the study (Moore, 1983).

The content validation panel consisted of five university professors with academic and scholarly backgrounds in instructional/educational technology. Participants included an (1) assistant professor of educational technology; (2) associate professor of instructional methods and technology; (3) assistant professor of educational technology; and a (4) professor of instructional technology. Two members additionally served as instructional technology program coordinators. The panel provided collective expertise in faculty development, survey and research design, technology integration, hardware, software, and multimedia.

Each member serving on the content validation panel was asked to review and evaluate the instrument to determine if questionnaire items and scales adequately measured the area of content intended to be studied. Moreover, the panel served to provide suggestions and recommendations for improvement of the instrument. All participants received an electronic copy of the survey, summary detailing the study's purpose and significance, narrative explaining the relationship between the survey and research questions, and a table describing the item-domain relationships.

Based on the feedback provided by panel members, several recommendations for improvement were incorporated into the questionnaire. First, the wording and content of various items were revised to improve readability and clarity, and to correct grammatical errors. Second, several survey items and stems failed to match grammatically (verb tenses)—these questions were corrected to avoid potential inaccurate responses. Third, participants provided recommendations to include additional technologies in scales assessing technology use and proficiency, as well as items examining respondent satisfaction with professional development and technical support services for various technologies. Fourth, questions considered too similar in wording were revised to avoid item redundancy.

In contrast to content validity, face validity refers to whether the instrument utilized in the study appears to successfully measure what it was designed to measure (i.e., does the instrument appear to be valid). Face validity does not rely on a panel of experts, but rather the subjective opinion from individuals selected by the researcher—preferably individuals with knowledge and experience in the content area. Although face validity is not considered a primary type of validity, it is useful for providing the researcher with a

rudimentary assessment of the appropriateness of questionnaire items. In order to establish the face validity of the instrument, the survey was furnished to leaders and administrators of technology related programs and departments at various community colleges (see Appendixes C and D for correspondence letters). Face-validity participants, (N = 18), represented community colleges from the Florida, North Carolina, and Virginia Community College System. Participants included administrators (directors and coordinators) of distance learning and instructional technology programs, deans, and department chairs. The questionnaire was provided online for downloading and viewing (Appendix F). Participants were asked to evaluate the format, wording, and readability of survey items. In addition, they were instructed to assess if the instrument appeared well designed and able to function reliably. A reminder message (Appendix E) was sent to participants that previously agreed to participate, but did not forward their comments to the researcher following two-weeks. As a result of the comments, suggestions, and feedback received, the following revisions to the instrument were performed:

1. Questions 1a, 1b, 1c, and 1d were revised to permit the circling of responses instead of writing a letter. The rationale for this change was to maintain a consistent method throughout the survey for indicating item responses.
2. Items assessing use and skill of Microsoft Word were revised to include Corel WordPerfect and other word processing software.
3. With regard to questions examining technology related services, the text "technical support" and "professional development and training" were underlined to highlight the particular service addressed in the survey item.

4. Survey items assessing WebCT and BlackBoard (item 83 and 98) were revised to include “other course management systems”.

Instrument Reliability

Two forms of instrument reliability were examined: internal consistency and test-retest reliability. Internal consistency reliability of the instrument was established for all reflective scales by calculating an alpha coefficient (Cronbach's Alpha); questionnaire items were reverse scored where necessary. The second form of reliability assessed was test-retest reliability. This type of reliability assessment measures the temporal stability of an instrument within a specific time interval—providing the researcher with information to gauge the reproducibility of a survey’s item responses. Spearman rank order correlation was used to generate a test-retest reliability index.

Pilot Study

Pilot studies are an effective tool for determining if potential problems exist with a study’s instrument and procedures (Fraenkel & Wallen, 1996). Wiersma (1991) indicates that pilot studies are “conducted for the purpose of gaining additional information by which the major study can be improved” (p. 427-428). Accordingly, a pilot study was conducted to evaluate the Faculty Technology Survey and data collection procedures. The survey used in the pilot study incorporated a comment section to solicit feedback on the format, wording, and content of the questionnaire.

Successful pilot studies include participants who are similar to the target population or sample to be included in the primary study (Tuckman, 1999). As a result, the sample used in the pilot study was comprised of full-time instructional personnel

employed at a central Florida Community College. In 2005, the institution reported 60 full-time instructional faculty members with approximately 38% age 55 and over. Questionnaires were distributed to faculty via interdepartmental mail—permission was received from the dean of arts and sciences. Data analysis procedures intended for the full study was conducted on data obtained from the pilot study. Results obtained from the pilot study were used to establish the instrument's internal consistency reliability.

Data Collection Procedures

All five Florida community colleges selected for the study were contacted to acquire permission prior to the distribution of questionnaires. Approval was received from an appropriate administrative contact at each institution, including a senior vice president of academic affairs, president of academic and student services, executive vice president and chief learning officer, vice president of academic affairs, and vice president of education and student development. Several administrators expressed interest in participating and subsequently receiving the study's findings.

The college mailing address of faculty members, including department mail codes, were obtained from each institution's faculty directory. A cover letter detailing the nature of the study, confidentiality of data, and deadline for returning the survey, was provided with the questionnaire (see Appendix G for a copy of the cover letter). A self-addressed stamped envelope addressed to the researcher was included with the questionnaire and cover letter. Following two-weeks after the initial mailing of the survey, a follow-up postcard was provided (Appendix H). The follow-up postcard described the nature of the study and reminded potential respondents to complete and promptly mail the questionnaire to the researcher via the self-addressed stamped

envelope provided in the initial mailing. As indicated by McMillian and Schumacher (1989), a follow-up correspondence after the initial mailing of the survey can increase the response rate by approximately 10% to 20%. Surveys received prior to and following the follow-up correspondence were numerically coded in order to determine the existence of non-respondent bias.

Data Analysis

The data collected for the study was analyzed using appropriate descriptive and inferential statistical techniques. Data compilation, computation of descriptive statistical procedures, and comparative analyses, were performed with the Statistical Package for the Social Sciences (SPSS) statistical program (version 10.1). Sum scores for each scale incorporated in the questionnaire were computed with Microsoft Office Excel 2003 and subsequently transferred to SPSS for further statistical analysis. The 120-question instrument incorporated a five-item demographic questionnaire assessing faculty status (full-time or part-time), age (< 55 or ≥ 55), race/ethnicity, gender, and education. Results for all demographic variables were reported with frequency and percent distribution tables.

The survey utilized several formative and reflective scales to measure the constructs of interest. All items used an ordinal level response format. An aggregate score was generated for each scale by ascertaining the sum total of individual item responses; minimum and maximum values of scales were dependent on the number of items used incorporated in the scale. Scale scores were summarized using various descriptive statistics. Central tendency was reported with means (*M*) and medians (*Mdn*).

Standard deviation (*SD*) and range was used to quantify the variability of scale scores. Data distributions were also described with skewness and kurtosis figures.

Homogeneity of variance (heteroscedascity) was assessed with Levene's test for equality of variance; Levene's statistic (*F*) and the exact *p* value was reported. Independent samples t-tests were performed to determine if the mean scale scores between older and younger faculty were statistically different. Welch's t-test was applied for statistical evaluation when unequal variances were detected between groups. Effect size, as measured with Cohen's *d* statistic for independent groups, was provided with all t-test results.

In addition to Likert style scales, the questionnaire contained several discrete items examining variables of interest. All questions followed an ordinal level response format measuring the respondent's level of agreement or disagreement with a particular statement. Tables were provided describing the frequency and percent distribution of responses. Central tendency was reported with medians (*Mdn*) and modes. Variability was reported by calculating the interquartile range (*IQR*). Frequently used with ordinal level data, the interquartile range is a measure of variability representing the difference between the 25th and 75th percentile (Q3 – Q1). A high value for the interquartile range suggests a large degree of dispersion; a low value suggests a small degree of dispersion.

A Mann-Whitney U test (*U*) of significance was performed to identify statistically significant differences between the item responses of older and younger faculty. The Mann-Whitney U procedure is a non-parametric test, similar to the parametric t-test, used to compare rank order scores (ordinal level data) of two independent groups—determining whether two samples come from the same distribution (Cohen, Lawrence, &

Morrison, 2000; Fraenkel & Wallen, 1996; Gorard, 2001; Tuckman, 1999; Wiersma, 1991). According to Gorard (2001), "[The] Mann-Whitney does much the same thing as a t-test or one-way analysis of variance but for ordinal, rather than interval values" (p. 185). The independent variable age was considered a dichotomous grouping variable (younger and older faculty) for the purpose of the Mann-Whitney statistical analysis.

A priori alpha level (α) was set at $p < .05$ for all tests of significant differences. Exact p-values were reported for $p > .01$.

Non-Respondent Bias

In survey research, the presence of nonresponse bias can have an appreciable effect on the generalizability of a study (Edwards, Thomas, Rosenfeld, & Booth-Kewley, 1997; McMillan & Schumacher, 1989). Several attempts were made to control for non-response bias. The survey responses of early and late responders were statistically compared; late responders were characterized as participants that furnished a completed survey subsequent to the mailing of a follow-up postcard. This particular procedure is based on the notion that non-respondents and late respondents respond similarly, yet differently than early respondents (Mott, Pedersen, Doucette, Gaither, Schommer, 2001). Chi-square analysis was used to compare statistically the demographic characteristics of early and late respondents. Moreover, the known demographic characteristic of the target population (age) was compared to the sample via a Chi-Square Goodness-of-fit test. Complete results of the non-respondent analysis are presented in Chapter 4.

Summary

A quantitative descriptive study was developed to assess older faculty and various aspects related to technology; older faculty were defined as faculty members age 55 and

over. A 120-item questionnaire, incorporating several formative and reflective scales, was used to assess variables of interests. Areas examined included perceptions of technology, self-reported use, attitudes toward technical support and professional development, perceived barriers to technology use, and perceived technology related needs. Demographic information pertaining to age, gender, race/ethnicity, and education were also collected.

The population included 1199 full-time faculty members at five Florida community colleges, with less than half (44.4%) consisting of older faculty members. A survey packet containing a questionnaire and cover letter was mailed to potential participants. Follow-up post-cards were mailed two-weeks after the initial mailing to improve the participant response rate

Survey responses were analyzed using descriptive and inferential statistical techniques. Central tendency and variability was reported with means, medians, ranges and interquartile ranges. Data was also presented with frequency and percent distributions. Independent samples t-test and its nonparametric equivalent, the Mann Whitney U test, were used to identify statistically significant differences between the responses of younger and older faculty.

CHAPTER 4

RESULTS

Pilot Study

A pilot study was performed to assess the reliability of the instrument prior to conducting the main study. Surveys were distributed via mail to 60 full-time faculty members at a Florida public community college. Nineteen surveys were received (32% response rate); one survey respondent did not include their demographic information (age, gender, race, and education). Response rates for older and younger faculty were 65% and 35% respectively.

All respondents reported their race/ethnicity as White, not of Hispanic origin. Consistent with the pilot study's population, older faculty represented 36.8% of the sample (Table 2). A majority of participants (63.2%) reported a master's degree as their highest degree earned, with a significantly small percentage holding a doctoral level degree (31.6%) and a bachelor's degree (5.3%). Among older faculty, most (57.1%) held a doctoral degree, while 42.9% held a master's level degree. A majority of younger faculty (66.7%) held a master's level degree, while a smaller proportion held a doctoral level degree (25%) and a bachelor's level degree (8.3%). Concerning gender, the sample consisted of an equal proportion (50%) of male and female respondents. A significant percentage of younger faculty (66.7%) were female. In contrast, almost three-quarters (71.4%) of older faculty were male.

Table 2

Demographic Data: Pilot Study

	Frequency	%
Age		
Younger (< 55)	12	63.2
Older (≥ 55)	7	36.8
Gender[a]		
Male	9	50
Female	9	50
Race/Ethnicity[a]		
White, not of Hispanic/Latino Origin	18	100
Hispanic or Latino Origin	0	0
Black or African American	0	0
Asian	0	0
Native Hawaiian and Pacific Islander	0	0
Mixed Ethnicity or Other	0	0

Note. Percents are represented as valid percents.

[a]One participant failed to report race/ethnicity and gender.

Reliability

Two forms of reliability analysis were used to assess the instrument: test-retest (stability) and inter-item consistency (Cronbach's alpha). Inter-item correlations were reported with Cronbach's alpha coefficient. Moderate to high levels (≥ .70) of internal consistency were found for all reflective scales. Three scales (attitude toward technology

support, lack of skills, and access) exhibited high Cronbach alpha coefficients (≥ .88). Alpha coefficients for the remaining scales ranged from .74 to .85, indicating acceptable unidimensionality. Table 3 summarizes alpha coefficients for reflective scales; coefficients for the full study are provided for comparison.

Table 3

Scale Reliability Measures

		Alpha Coefficient
Scale	No. of Items	Pilot Study
Attitude toward professional development	4	.85
Attitude toward technology support	4	.96
Stress	3	.80
Barriers to technology use		
Time	3	.80
Cost	3	.79
Incentives	2	.75
Skills	3	.89
Professional development and training	2	.74
Technical support	2	.85
Availability	4	.79
Access	3	.88

Note. Formative scales were not included in table because inter-item correlations are not relevant.

For the purpose of the study, a correlation coefficient was used as an index of test reliability (stability); a test-retest interval of two weeks was used. Participants for the assessment included four full-time and six part-time community college faculty members ($N = 10$); one full-time faculty participant did not return a retest questionnaire and was omitted from the test-retest analysis. Using Spearman's rank order correlation, the average test-retest reliability across all items was considered acceptable ($r_s = .92$).

Survey Response

The population surveyed included 1199 full-time faculty members at five community colleges. Older and younger community college faculty members comprised 44.4% and 55.6% of the population, respectively. The following section presents a descriptive analysis of the survey response rates. Response rates according to age and participating institutions are provided.

The study yielded an overall response rate of 20.5% ($N = 246$). Four incomplete surveys were received and not included in the response rate calculations or descriptive and inferential statistical analyses. The mean response rate among all participating institutions was 22.8% ($SD = 9.2$). See table 4 for response rates and sample sizes according to institution.

Table 4

Response Rates and Sample Size According to Community College

Community College	*N*	Response Rate %
Institution 1	44	16.7
Institution 2	50	38.5
Institution 3	24	23.1
Institution 4	44	16.2
Institution 5	84	19.5
Total	246	

An analysis of response rates according to age revealed that older faculty were slightly less likely to respond than younger faculty. The response rate for older faculty was 18.8%. A slightly larger proportion of younger faculty (21.9%) returned a completed questionnaire. As shown in table 5, the average response rate for older faculty among all institutions was 23.2% (*SD* = 9.5). By comparison, the average response rate of younger faculty was nearly equal at 23.5% (*SD* = 11.5).

Table 5

Response Rates for Younger and Older Faculty According to Institution

Community College	Younger[a]		Older[b]	
	n	Response Rate %	*n*	Response Rate %
Institution 1	18	11.7	26	23.9
Institution 2	32	39	18	37.5
Institution 3	15	23.8	9	22
Institution 4	23	13.2	21	21.4
Institution 5	58	30	26	11

Note. The term older faculty is reserved for faculty members age 55 and over; younger faculty members are defined as under the age of 55.

[a]$n = 146$. [b]$n = 100$.

Non-Respondent Bias

Survey responses received prior to and following the survey follow-up were compared for statistically significant differences to determine if non-respondent bias would affect the generalizability of the study's results. A Chi-Square Goodness-of-ft test was applied to compare statistically the distribution of older and younger faculty between the sample and population. Pearson's Chi-Square analysis was conducted to determine if significant differences existed between the demographic variables (age, race/ethnicity, gender, and highest degree earned) of pre and post follow-up respondents. Independent samples t-test and Mann-Whitney analysis were used to statistically compare pre and post follow-up respondents with regard to several key variables.

Analysis using a chi-square goodness of fit test revealed that the representation of older and younger faculty respondents was similar to the population, $\chi 2(1, N = 246) = 1.26, p = .26$. Pearson's Chi-Square analysis revealed no statistically significant difference ($\chi 2(1, N = 246) = 1.02, p = .31$) between the age of pre and post follow-up respondents. As indicated in table 6, it was observed that older faculty members were more likely to send a completed survey following the follow-up letter. By comparison, younger faculty were somewhat less likely to respond after the follow-up letter.

Table 6

Frequency According to Age and Survey Response Time

		Pre Follow-up	Post Follow-up	Total
Young Faculty	*n*	124	22	146
	%	60.8	52.4	59.3
Older Faculty	*n*	80	20	100
	%	39.2	47.6	40.7
Total	*n*	204	42	246
	%	82.9	17.1	100

Due to low cell frequencies, non-White subgroups were combined prior to conducting the Pearson's Chi-Square analysis. No significant difference was found between the race/ethnicity of pre and post follow-respondents, $\chi 2(1, N = 246) = 0, p = .99$. Frequencies and percents are presented in table 7.

Table 7

Frequency According to Race/Ethnicity and Survey Response Time

		Pre Follow-up	Post Follow-up	Total
White	*n*	175	36	211
	%	85.8	85.7	85.8
Non-White	*n*	29	6	35
	%	14.2	14.2	14.2
Total	*n*	204	42	246
	%	82.9	17.1	100

The gender of pre and post follow-up respondents showed no significant difference, $\chi 2(1, N = 246) = .19, p = .67$. The frequency of respondents by gender suggested that females, in comparison to males, were only somewhat more likely to respond following the post follow-up letter (see table 8).

Table 8

Frequency According to Gender and Survey Response Time

		Pre Follow-up	Post Follow-up	Total
Male	*n*	90	17	107
	%	44.1	40.5	43.5
Female	*n*	114	25	139
	%	55.9	59.5	56.5
Total	*n*	204	42	246
	%	82.9	17.1	100

The final demographic variable to be considered for the non-respondent analysis was highest degree earned. The survey included six response options with regard to education: associate's, bachelor's, master's, specialist's degree, doctorate, and other. Education levels were amalgamated into three groups because of low expected cell counts: (1) associate's and bachelor's; (2) master's and specialist's; and (3) doctorate. No respondents reported "other" as their highest degree earned. Consistent with all other demographic variables tested, no significant difference was detected, $\chi 2(2, N = 246) = 2.65, p = .27$.

Table 9

Frequency According to Education and Survey Response Time

		Pre Follow-up	Post Follow-up	Total
Associate's and Bachelor's	*n*	5	3	8
	%	2.5	7.1	3.3
Master's and Specialist's	*n*	145	27	172
	%	71.1	64.3	70
Doctorate	*n*	54	12	66
	%	26.5	28.6	26.8
Other Degree	*n*	0	0	0
	%	0	0	0
Total	*n*	204	42	246
	%	82.9	17.1	100

No significant difference was detected between early and late responders with regard to their overall use of technology ($t(244) = .79, p = .43; d = .10$), attitudes toward

technical support ($t(244) = .07$; $p = .94$; $d = 0$), and attitudes toward training and professional development, $t(244) = .94$, $p = .35$; $d = .12$). Similarly, analysis also revealed no statistical difference between both group's perceptions of technology (see table 10).

Table 10

Mann-Whitney U for Perceptions of Technology by Response Time

	Mean Ranks			
	Pre Follow-up[a]	Post Follow-up[b]	*U*	*p*
Productivity	125.12	115.64	3954	.39
Communication	124.68	117.76	4043	.53
Instruction	124.08	120.68	4165.5	.75
Role in Education	123.81	122.92	4220	.86
Student Learning	122.92	126.32	4165.5	.75

[a]$n = 200$. [b]$n = 46$.

Demographic Variables

The sample consisted of 246 full-time faculty members (20.5% response rate) from five Florida community colleges. Demographic variables collected from participants include age, gender, race/ethnicity, and education (highest degree earned). The following section provides a comprehensive description and analysis of the sample's demographic characteristics.

Age

The variable age was considered a dichotomous variable. Younger faculty were described as faculty age 54 or under, while older faculty were described as age 55 and over. Approximately 59.3% of respondents were under the age of 55; older faculty (≥ 55) comprised 40.7% of the sample. In comparison, older faculty represented 44.4% of the population.

Gender

Over half (56.5%) of respondents reported their gender as female; male faculty members represented 43.5% of the sample population. Among older respondents, 45% were male, while more than half (55%) were female. A similar gender distribution was found among younger respondents. Approximately 42.5% and 57.5% of younger respondents were male and female, respectively.

Race/Ethnicity

The demographic variable race/ethnicity included six subgroups: (1) White, not of Hispanic/Latino origin; (2) Hispanic or Latino Origin; (3) Black or African American; (4) Asian, Native Hawaiian and other Pacific Islander; and (5) mixed ethnicity or other. A significant majority (85.8%) of respondents reported their race/ethnicity as White, not of Hispanic/Latino origin. All other races/ethnicities (non-White) represented less than 14.2% of the sample. Frequencies and percents of participants, according to race and ethnicity, are provided in table 11.

Table 11

Race/Ethnicity of Sample

Race/Ethnicity	Frequency	%
White, not of Hispanic/Latino Origin	211	85.8
Hispanic or Latino Origin	8	3.3
Black or African American	12	4.9
Asian	6	2.4
Native Hawaiian and Other Pacific Islander	0	0
Mixed Ethnicity or Other	9	3.7
Total	246	

According to age, the sample of older community college faculty were primarily White, comprising 92% of the subgroup. In comparison to older faculty, non-White participants comprised a larger proportion of younger faculty (18.5%), with African-Americans representing the largest non-white group (6.2%). Individuals of Hispanic or Latino origin were the second largest ethnic group at 4.8%. Table 12 presents a profile of younger and older faculty participants based on race/ethnicity.

Table 12

Race/Ethnicity of Faculty Sample According to Age

	Younger Faculty[a]		Older Faculty[b]	
Race/Ethnicity	Frequency	%	Frequency	%
White, not of Hispanic/Latino Origin	119	81.5	92	92
Hispanic or Latino Origin	7	4.8	1	1
Black or African American	9	6.2	3	3
Asian	5	3.4	1	1
Native Hawaiian and Other Pacific Islander	0	0	0	0
Mixed Ethnicity or Other	6	4.1	3	3

[a]$n = 146$. [b]$n = 100$.

Education

Respondents were asked via the Faculty Technology Survey to indicate their highest degree earned. Response options included the following degrees: associate's, bachelor's, master's, specialist's, doctorate, and "other degree". Most older faculty (61%) reported having a master's degree as their highest degree earned. Nearly one-third (39%) had earned a doctorate degree. A significantly smaller proportion indicated associate's (1%) and bachelor's degrees (1%). Only 10% reported specialist degrees.

Comparatively, a similar proportion of younger faculty (69%) indicated having earned a master's degree as their highest degree earned. Doctorate degree holders comprised 26.7% percent of younger faculty respondents. A small proportion of

respondents indicated an associate's degree (3%) or bachelor's degree (3%) as their highest academic degree earned.

It was also found that a significantly higher percentage of male, older faculty members held a doctorate degree (40%) than female faculty members (16.4%). A tabular distribution (percents and frequencies) of highest degrees earned among older faculty (according to gender) is provided in table 13.

Table 13.

Highest Degree Earned Among Older Male and Female Faculty

	Male[a]		Female[b]	
Highest Degree Earned	Frequency	%	Frequency	%
Associate	1	2.2	0	0
Bachelor	0	0	1	1.8
Master	22	48.9	39	70.9
Specialist	4	8.9	6	10.9
Doctorate	18	40	9	16.4
Other Degree	0	0	0	0

[a]$n = 45$. [b]$n = 55$.

Research Questions

What are the Perceptions of Older Community College Faculty Concerning Technology?

The instrument incorporated five discrete survey items (questions 10, 13, 20, 23, and 34) to examine older faculty's perceptions of technology. All items were based on a 4-point ordinal response format (1 = strongly disagree to 4 = strongly agree). Items

focused on technology as a tool to: increase productivity (question 10), improve communication with colleagues and students (question 13), enhance instruction (question 20), and improve student learning (question 34). Item 23 asked if technology had an important role in education.

In addition, the extent to which older faculty associated stress with technology was assessed via a three-item scale (questions 14, 40, and 114). Each item utilized a 4-point ordinal scale (1 = strongly disagree to 4 = strongly agree). A composite scale score was generated; results ranged from 3 to 12.

Item 10

Survey question 10 asked respondents to indicate their level agreement with the following statement: the use of technology has increased my productivity. The median item response for older faculty was 3 (*IQR* = 1). A sizeable proportion (80%) of older faculty agreed (47%) or strongly agreed (33%); twenty-percent indicated some level of disagreement with the statement.

The median item response for younger faculty was 3 (*IQR* = 1). Similar to older faculty, a majority of younger faculty (87%) responded with some level of agreement to the statement. However, a greater percentage (approximately 47%) strongly agreed. In comparison to older faculty, a smaller proportion (13%) of younger respondents disagreed (5.5%) or strongly disagreed (7.5%) with the item. Descriptive statistics, including frequencies and percentages, for item 10 are identified in tables 14 and 15.

Table 14

Descriptive Statistics: Item 10

Younger Faculty[a]					Older Faculty[b]				
Mdn	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
3	4	4	2	1	3	3	4	2	1

[a]$n = 146$. [b]$n = 100$.

Table 15

Response Summary: Item 10

	Younger Faculty[a]		Older Faculty[b]	
Response	Frequency	%	Frequency	%
Strongly Disagree	11	7.5	5	5
Disagree	8	5.5	15	15
Agree	59	40.4	47	47
Strongly Agree	68	46.6	33	33

[a]$n = 146$. [b]$n = 100$.

A Mann-Whitney U test (non-parametric equivalent of the t-test) was conducted to determine if any significant difference existed between the responses of older and younger faculty concerning item 10. Results from the Mann-Whitney U analysis showed a significant difference, $U(N = 246) = 6228$, $p = .03$. Mean ranks for both age groups are provided in table 16.

Table 16

Mann-Whitney Analysis: Item 10

	Mean Ranks	*U*	*p*
Younger Faculty[a]	130.84	6228	.03
Older Faculty[b]	112.78		

[a]*n* = 146. [b]*n* = 100.

Item 13

Survey question 13 addressed technology as a tool to improve communication with faculty and students. The item stated, "I am better able to communicate with my colleagues and students because of technology." Response options included strongly agree, agree, disagree, and strongly disagree. The median response for younger faculty was 4 (*IQR* = 1); a majority of younger respondents (88.3%) indicated agreement with the statement, while only 11.6% disagreed or strongly disagreed.

The median response for older faculty was 3 (*IQR* = 1). Similar to younger faculty, most (88%) either agreed or strongly agreed with the statement. Tables 17 and 18 provide a descriptive summary of item 13 responses, grouped according to age.

Table 17

Descriptive Statistics: Item 13

Younger Faculty[a]					Older Faculty[b]				
Mdn	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
4	4	4	3	1	3	3	4	3	1

[a]*n* = 146. [b]*n* = 100.

Table 18

Response Summary: Item 13

	Younger Faculty[a]		Older Faculty[b]	
Response	Frequency	%	Frequency	%
Strongly Disagree	5	3.4	3	3
Disagree	12	8.2	9	9
Agree	52	35.6	49	49
Strongly Agree	77	52.7	39	39

[a]$n = 146$. [b]$n = 100$.

Results from a Mann-Whitney analysis indicated no significant difference between the response distributions of older and younger faculty with regard to item 13, $U(N = 246) = 6406$, $p = .07$. See table 19 for a complete summary of Mann-Whitney U test results.

Table 19

Mann-Whitney Analysis: Item 13

	Mean Ranks	*U*	*p*
Younger Faculty[a]	129.62	6406	.07
Older Faculty[b]	114.56		

[a]$n = 146$. [b]$n = 100$.

Item 20

For survey question 20, participants were asked to indicate their level of agreement (strongly disagree to strongly agree) with the following statement: technology enhances

classroom instruction. As shown in table 20, the median response for older faculty and younger faculty was 3 (*IQR* = 1) and 4 (*IQR* = 1), respectively. A sizeable majority of older (90%) and younger respondents (95.9%) either agreed or strongly agreed. However, a greater proportion of younger faculty, approximately two-thirds, responded to the item with "strongly agree", in comparison to only 44% of older faculty members. Table 21 provides a summary of frequencies and percentages for item 20

Table 20

Descriptive Statistics: Item 20

Younger Faculty[a]					Older Faculty[b]				
Mdn	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
4	4	4	3	1	3	3	4	3	1

[a]*n* = 146. [b]*n* = 100.

Table 21

Response Summary: Item 20

	Younger Faculty[a]		Older Faculty[b]	
Response	Frequency	%	Frequency	%
Strongly Disagree	1	.7	4	4.0
Disagree	5	3.4	6	6
Agree	44	30.1	46	46
Strongly Agree	96	65.8	44	44

[a]*n* = 146. [b]*n* = 100.

Mann-Whitney U analysis was used to compare the results of item 20 according to age. As indicated in table 22, analysis revealed a statistically significant difference ($U(N = 246) = 5623$, $p < .01$) between the responses of older and younger faculty.

Table 22

Mann-Whitney Analysis: Item 20

	Mean Ranks	*U*	*p*
Younger Faculty[a]	134.99	5623	< .01
Older Faculty[b]	106.73		

[a]$n = 146$. [b]$n = 100$.

Item 23

In survey question 23, participants were asked to indicate their level agreement with the following statement: technology has an important role in education. Younger faculty were more likely to strongly agree with the statement. The median response for older respondents was 3 ($IQR = 1$), while younger respondents had a median of 4 ($IQR = 1$); descriptive statistics for item 23 are provided in table 23. An overwhelming majority (96%) of older faculty agreed (48%) or strongly agreed (48%) with the statement. In contrast, over two-thirds (69.2%) responded with strongly agree, with slightly over a quarter (26.2%) agreeing. Frequency and percent distributions of item 22 are summarized in table 24.

Table 23

Descriptive Statistics: Item 23

Younger Faculty[a]					Older Faculty[b]				
Mdn	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
4	4	4	3	1	3	3	4	3	1

[a]$n = 146$. [b]$n = 100$

Table 24.

Response Summary: Item 23

	Younger Faculty[a]		Older Faculty[b]	
Response	Frequency	%	Frequency	%
Strongly Disagree	1	.7	1	1
Disagree	5	3.4	3	3
Agree	44	30.1	48	48
Strongly Agree	96	65.8	48	48

[a]$n = 146$. [b]$n = 100$.

A Mann-Whitney U test of statistical significance was conducted to determine if a significant difference existed with regard to the responses of older and younger faculty. Results of the non-parametric analysis (see table 25) revealed a statically significant difference, $U(N = 246) = 5819$, $p < .01$.

Table 25

Mann-Whitney Analysis: Item 23

	Mean Ranks	*U*	*p*
Younger Faculty[a]	133.64	5819	< .01
Older Faculty[b]	108.69		

[a]*n* = 146. [b]*n* = 100.

Item 34

Survey question 34 measured the respondent's level of agreement with the following statement: technology is an effective tool for improving student learning. As shown in table 26, the median response for older faculty members was 3 (*IQR* = 1). Most older respondents (85%) indicated agreement with the statement, with 45% agreeing and 40% strongly agreeing. Younger respondents had a slightly higher median response (*Mdn* = 4, *IQR* = 1). In contrast to the responses of older faculty members, a greater proportion of younger faculty respondents (95%) agreed or strongly agreed with item 34. Moreover, a larger percentage (62.3%) indicated a strong agreement with the statement (see table 27).

Table 26

Descriptive Statistics: Item 34

Younger Faculty[a]					Older Faculty[b]				
Mdn	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
4	4	4	3	1	3	3	4	3	1

[a]*n* = 146. [b]*n* = 100.

Table 27

Response Summary: Item 34

	Younger Faculty[a]		Older Faculty[b]	
Response	Frequency	%	Frequency	%
Strongly Disagree	1	.7	1	1
Disagree	6	4.1	14	14
Agree	48	32.9	45	45
Strongly Agree	91	62.3	40	40

[a]$n = 146$. [b]$n = 100$.

Consistent with items 10, 20, and 23, Mann-Whitney U test results for question 34 suggested a statistically significant difference ($U(N = 246) = 5471.5$, $p < .01$) in the median response of older and younger faculty. Table 28 provides a summary of the analysis.

Table 28

Mann-Whitney Analysis: Item 34

	Mean Ranks	*U*	*p*
Younger Faculty[a]	136.02	5471.5	< .01
Older Faculty[b]	105.21		

[a]$n = 146$. [b]$n = 100$.

Stress and Technology

In order to determine what degree older faculty perceive technology as a source of stress, a composite scale score was generated for each participant by calculating the sum

of item responses (question 14, 40, and 114); possible values for the composite scores ranged from 3 to 12. As indicated in table 29, the mean sum score for older faculty (M = 7.52, SD = 2.3) was slightly higher than younger faculty, M = 6.5, SD = 2.5.

Table 29

Descriptive Statistics: Stress and Technology

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	6.5	2.5	6	10	.03	-1.1
Older Faculty[b]	7.52	2.3	8	9	-.25	-.29

[a]n = 146. [b]n = 100.

Levine's test for equality of variances revealed a significant difference between variances, F = 4.69, p = .03. To determine if there was a significant difference between the composite scores score of older and younger faculty, an independent samples t-test was conducted (equal variances not assumed). Analysis revealed a statistically significant difference between the mean scores of older and younger faculty, $t(223.9) = -3.3$, $p < .01$; $d = -.44$.

What are the Attitudes of Older Community College Faculty Toward Institutional Technology Support and Professional Development?

A multi-question, reflective scale (survey items 11, 16, 39, and 44) was used to assess faculty's attitude toward institutional technology support. Questions utilized a 4-point ordinal level response format. A composite scale score was calculated by determining the sum of item responses; score values ranged from 4 to 16. Scale scores represented the respondent's attitude toward their institution's technology support. High values indicated a positive attitude and lower scores pointed toward a negative attitude.

A mean scale score was calculated for both older and younger faculty (table 30). The mean composite score for older faculty was 12.54 (*SD* = 2.71). The younger faculty age group reported a similar mean score, *M* = 12.1644, *SD* = 3.33. Differences in variances were assessed via Levene's test for equality of variances. Results of the analysis revealed unequal variances, *F* = 3.98, *p* = .05.

Table 30

Descriptive Statistics: Attitudes Toward Technology Support

	M	*SD*	Mdn	Range	Skewness	Kurtosis
Younger Faculty[a]	12.16	3.33	12	12	-.77	-.01
Older Faculty[b]	12.54	2.71	12.5	12	-.64	.08

[a]*n* = 146. [b]*n* = 100.

The attitude toward technology support scale scores between younger and older faculty members were statistically analyzed. An independent samples t-test was performed (equal variances not assumed) and revealed no statistically significant difference in scale scores, *t*(236.88) = -.97, p = .33; *d* = -.13.

Attitude toward professional development for technology was examined via a four item (questions 17, 41, 116, and 118) scale. Each question incorporated a 4-point ordinal level scale (1 = strongly disagree to 4 = strongly agree). The respondent's overall attitude toward professional development services for technology was gauged by calculating a composite score (sum of item responses). Possible values for the composite scores ranged from 4 to 16.

The mean scale score calculated for older and younger faculty members was 12.15 (*SD* = 2.74) and 11.77 (*SD* = 2.98), respectively. Levine's test indicated homogeneity of

variance, $F = 1.13$, $p = .29$. A complete summary of descriptive statistics for the attitude toward professional development scale is provided in table 31.

Table 31

Descriptive Statistics: Attitudes Toward Professional Development

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	11.77	2.98	12	12	-.35	-.37
Older Faculty[b]	12.15	2.74	12	12	-.46	-.29

[a]$n = 146$. [b]$n = 100$.

An independent sample t-test was performed (equal variances assumed) to determine if a statistically significant difference existed between the scale scores of younger and older faculty respondents. Analysis found no significant difference at the .05 level, $t(244) = -1$, $p = .32$; $d = -.13$.

To What Degree do Older Community College Faculty Report the Use of Technology With Their Academic Activities in Comparison to Their Younger Counterparts?

A 15-item scale was developed to assess older faculty's perceived use of technology. Each item in the scale used a 6-point ordinal level response format. Item response options ranged from 1 = never to 6 = frequently. For each respondent, a composite score, representing technology use, was generated by calculating the sum of item responses. Higher scale scores reflected more frequent use of technology. Potential values for the composite measures ranged from 15 to 80.

As indicated in table 32, the mean composite scale score for older faculty respondents was 43.36 ($SD = 13.92$). Younger faculty members reported a slightly greater use of technology, $M = 47.29$, $SD = 13.02$. Levine's test for equality of variances

was performed to ascertain homogeneity of variance; findings indicated equal variances between both groups, $F = 1.43$, $p = .23$. To determine if a significant difference existed between the scale scores of younger and older respondents, an independent samples t-test (equal variances assumed) was conducted. Results confirmed a significant difference between perceived technology use scores, $t(244) = 2.26$, p = .03; $d = .29$.

Table 32

Descriptive Statistics: Perceived use of Technology

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	47.29	13.02	47	59	.49	-.02
Older Faculty[b]	43.36	13.92	44	73	.34	.09

[a]$n = 146$. [b]$n = 100$.

Spearman's rank order correlation was computed to determine the degree of association between age and overall technology use. Findings revealed a very weak, negative correlation between age and overall technology use, $r_s(246) = -.14$, p = .03. In other words, there is no meaningful relationship between age and technology use.

An examination of individual items (table 33) indicated the highest degree of technology use by older respondents was word processing software (*Mdn* = 6, *IQR* = 0), such as Microsoft Word and Corel Word Perfect. Older faculty member also reported frequent use of multimedia data projectors (*Mdn* = 5, *IQR* = 3) and Microsoft PowerPoint (*Mdn* = 5, *IQR* = 3). The least used technologies by older faculty were statistical software (*Mdn* = 1, *IQR* = 1), Microsoft Publisher, (*Mdn* = 1, *IQR* =1), listservs (*Mdn* = 1, *IQR* = 2), and Adobe development and publishing software. By comparison, younger faculty were primarily using technology for word processing

(*Mdn* = 6, *IQR* = 0), data projection (*Mdn* = 5, *IQR* = 2), PowerPoint (*Mdn* = 5, *IQR* = 2), and Excel (*Mdn* = 5, *IQR* = 3). Younger faculty shared a similar list of least used technologies, with the addition of Microsoft Access. See table 34 for a summary of younger faculty's technology use according software, hardware, and application.

In addition to perceived use, the study probed faculty's reported proficiency with various technologies: Questions used a 5-point ordinal level scale, response options ranging from 1 = very low to 5 = very high. Corresponding with results obtained for technology use, older faculty reported being most skilled with word processing software (*Mdn* = 4.5, *IQR* = 1), Microsoft PowerPoint (*Mdn* = 4, *IQR* = 2), and using data projectors, *Mdn* = 4, *IQR* = 0. In contrast, younger faculty reported being highly skilled with word processing applications (*Mdn* = 5, *IQR* = 0), data projectors (*Mdn* = 4, *IQR* =2), and Microsoft PowerPoint (*Mdn* = 4, *IQR* = 2), but additionally indicated a high degree of skill with Microsoft Excel, *Mdn* = 4, *IQR* =2. See table 34 for a complete summary of descriptive statistics (median, mode, and inter-quartile range).

Table 33

Faculty Technology Use According to Software, Hardware, and Application

	Younger Faculty[a]			Older Faculty[b]		
Technology	*Mdn*	Mode	*IQR*	*Mdn*	Mode	*IQR*
Course Management	4	6	5	3	1	5
LISTSERV	1	1	2	1	1	2
Publisher	1	1	2	1	1	1
Web designing software	3	1	4	2	1	3
Word processing	6	6	0	6	6	0
Excel	5	6	3	4	6	4
PowerPoint	5	6	2	5	6	3
Access	1	1	2	2	1	2
Photoshop	2	1	3	2	1	2
Distiller	2	1	3	1	1	2
InDesign	1	1	1	1	1	1
Illustrator	1	1	1	1	1	1
Video Players	4	6	3	4	4	3
Data Projector	5	6	2	5	6	3
Statistical Software	1	1	2	1	1	1

[a]$n = 146$. [b]$n = 100$.

Table 34

Faculty Self-Reported Proficiency with Various Technologies

	Younger Faculty[a]				Older Faculty[b]			
Technology	*Mdn*	Mode	*IQR*	*n*	*Mdn*	Mode	*IQR*	*n*
Course Management	3	5	3	128	3	1	3	91
LISTSERV	2	1	2	90	2	1	2	60
Publisher	2	1	2	99	2	1	2	63
Web designing software	3	1	3	121	2	1	2	82
Word Processing	5	5	1	143	4.5	6	1	96
Excel	4	5	2	137	3	6	2	91
PowerPoint	4	5	2	144	4	6	2	88
Access	2	1	2	104	2	1	2	65
Photoshop	3	3	2	109	2	1	2	75
Distiller	2	1	3	98	2	1	2	62
InDesign	2	1	2	93	2	1	2	54
Illustrator	2	1	2	84	2	1	1	51
Video Players	3	3	2	135	3	4	2	86
Data Projector	4	5	2	136	4	6	2	87
Statistical Software	3	1	3	87	2	1	1	50

[a]$n = 146$. [b]$n = 100$.

What are the Perceived Barriers, if any, That Prevent Older Community College Faculty From Using Technology?

The study examined to what degree, if any, faculty perceived various barriers as affecting their use of technology. Barriers examined include time, cost, incentives, lack of skills, professional development and training, technical support, availability of technology, and access of technology. Eight reflective scales utilizing 4-point ordinal level response formats (1 = strongly disagree to 4 = strongly agree) were used to assess the before mentioned barriers. Aggregate scale scores were obtained by determining the sum of item responses.

Accessibility

A 4-item formative scale (questions 8, 12, 19, and 35) was used to assess limited technology accessibility as a barrier to technology use. Possible values of composite scores ranged from 4 to 16. The mean scale score for older faculty was 7.81 (SD = 1.91). Younger faculty reported a higher mean score, M = 8.27, SD = 2.02. Homogeneity of variance was confirmed via Levene's test for equality of variance, F = 1.22, p = .27. Table 35 provides a summary of descriptive statistics (mean, standard deviation, median, and range).

Table 35

Descriptive Statistics: Accessibility

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	8.27	2.02	8	10	.55	.04
Older Faculty[b]	7.81	1.91	7	9	1.02	1.15

[a]$n = 146$. [b]$n = 100$.

An independent samples t-test was conducted to determine if a significant difference existed between the composite scale scores of younger and older faculty members. Findings showed no statistically significant difference ($t(244) = 1.79$, p = .27; $d = .23$) between age groups.

Availability

Limited technology availability as a barrier to technology use was assessed by a four-item scale (questions 7, 24, 43, and 120). Items were summed to generate a composite score; possible values ranged from 4 to 16. Older faculty had a mean sum score of 7.75 ($SD = 2.61$). As shown in table 36, the mean scale score for younger respondents was ($M = 7.75$, $SD = 2.61$) was slightly higher than older faculty members. Levene's test for equality variance suggested homogeneity of variance, $F = 1.46$, $p = .23$. A comparative analysis was conducted to determine if any significant difference existed between the scale scores of younger and older respondents. Results from an independent samples t-test (equal variances assumed) revealed a significant difference ($t(244) = 2.78$, p < .01; $d = .36$) between age groups.

Table 36

Descriptive Statistics: Availability

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	8.71	2.71	8	12	.32	-.25
Older Faculty[b]	7.75	2.61	7	12	.8	.74

[a]n = 146. [b]n = 100.

Cost

The cost of technology as a barrier to technology use was examined with a three-item scale (question*s* 9, 38, and 117). The sum of item responses was calculated to generate a scale score ranging from 3 to 12. Descriptive analysis (table 37) revealed similar mean scale scores for older faculty (M = 5.35, SD = 2.3) and younger faculty, M = 5.82, SD = 2.39. Analysis of homogeneity of variances showed that variances were equal for both groups, F = .37, p = .54. An independent samples t-test (equal variances assumed) confirmed no significant difference ($t(244) = 1.55$, p = .12; d = .2) between faculty scale scores according to age.

Table 37

Descriptive Statistics: Cost

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	5.82	2.39	6	9	.51	-.79
Older Faculty[b]	5.35	2.3	5	9	.97	.44

[a]n = 146. [b]n = 100.

Incentives

A two-item scale (questions 6 and 33) investigated whether limited or no incentives were a perceived barrier to technology use. A composite score was calculated by summing the scale's item responses; possible values ranged from 2 to 8. For both faculty age groups, descriptive analysis (table 38) revealed similar mean composite scores between age groups. The mean score for older faculty was 4.8 (*SD* = 1.98). A mean of 4.7 (SD = 1.85) was found for younger respondents. Homogeneity of variance was demonstrated via Levene's test for equality of variances, $F = 1.10$, $p = .3$. Statistically significant differences between the mean composite scores were assessed using an independent samples t-test (equal variances). Comparative analysis detected no significant difference in scale scores, $t(244) = -.45$, $p = .65$; $d = -.06$.

Table 38

Descriptive Statistics: Incentives

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	4.7	1.86	5	6	.05	-.97
Older Faculty[b]	4.81	1.98	5	6	-.06	-1.16

[a]$n = 146$. [b]$n = 100$.

Technology Skill

A 3-item reflective scale assessed technology skill as a barrier to technology use (questions 3, 21, and 37). The sum of item responses was used to ascertain a composite score ranging from 3 to 12. The mean scale score for older faculty was 6.43 (*SD* = 2.36). A lower mean score (*M* = 5.71, *SD* = 2.52) was calculated for younger respondents (see table 39). Levene's test for equal variances of both age groups suggested homogeneity of

variance, $F = 1.44$, $p = .23$. An independent samples t-test (equal variances assumed) found a significant difference between the mean composite scores of both age groups, $t(244) = -2.25$, $p = .03$; $d = .29$.

Table 39

Descriptive Statistics: Skill

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	5.71	2.52	5	9	.47	-.99
Older Faculty[b]	6.43	2.36	6	9	-.02	-1.04

[a]$n = 146$. [b]$n = 100$.

Technical Support

The study investigated whether older faculty perceived limited technical support as a barrier to their use of technology. A two-item reflective scale was used (questions 4 and 36). Responses were summed to obtain a composite measure; possible values ranged from 2 to 8. The mean composite score for older faculty (M= 3.72, $SD = 1.76$) was similar to the mean score for your faculty, $M = 3.49$, $SD = 1.72$. Levene's test for homogeneity of variance was not significant ($F = .08$, $p = .78$), indicating equal variances for both groups. An independent samples t-test for equal variances was carried out to detect if a significant difference existed between the mean scales scores of younger and older respondents. Analysis showed no significant difference, $t(244) = 1.01$, $p = .31$; $d = .13$. Descriptive statistics are presented in table 40.

Table 40

Descriptive Statistics: Technical Support

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	3.72	1.76	3.5	6	.76	-.33
Older Faculty[b]	3.49	1.72	3	6	1.01	.11

[a]$n = 146$. [b]$n = 100$.

Time

A 3-item reflective scale (questions 2, 15, and 42) was developed to gauge whether older faculty perceive time as a barrier to their technology use; item 42 was reversed scored to be consistent with the scaling direction of the remaining items in the scale. Item responses were summed to ascertain a composite scale score ranging from 3 to 12. The mean scale score for older respondents (see table 41) was 7.08 ($SD = 2.57$). Younger faculty had a similar mean score, $M = 7.16$, $SD = 2.53$. Equality of variances was assessed with the Levene's test and revealed homogeneity of variance, $F = 0$, $p = .96$. An independent samples t-test (equal variances) revealed no statistically significant difference ($t(244) = .26$, $p = .8$; $d = .29$) in the mean scores of younger and older respondents.

Table 41

Descriptive Statistics: Limited Time

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	7.16	2.53	7	9	0	-.87
Older Faculty[b]	7.08	2.57	7	9	.28	-.83

[a]$n = 146$. [b]$n = 100$.

Training and Professional Development

A 2-item scale (questions 5 and 113) measured whether a lack of training and professional development for technology was a perceived barrier to the respondent's use of technology. Item responses were summed to calculate a composite score. Possible values of scale scores ranged from 2 to 8. The mean scale score for older respondents (table 42) was 3.66 ($SD = 1.7$). A similar mean score was reported for younger faculty, $M = 3.73$, $SD = 1.7$. Homoscedascity was evaluated with Levene's test for equal variances; no significant difference was detected, $F = .23$, $p = .73$. Based on an independent samples t-test analysis (equal variances), no statistical significance was found between the mean scale scores among younger and older faculty, $t(244) = .34$, $p = .73$; $d = .04$.

Table 42

Descriptive Statistics: Training and Professional Development

	M	*SD*	*Mdn*	Range	Skewness	Kurtosis
Younger Faculty[a]	3.73	1.62	4	6	.69	-.34
Older Faculty[b]	3.66	1.7	3	6	.61	-.88

[a]$n = 146$. [b]$n = 100$.

What are the Perceived Technology and Technology Related Needs of Older Community College Faculty?

The fifth purpose of the study was to examine the technology and technology related needs of older community college faculty. Eleven items (questions 22, 25-32, 115, and 119) assessed the degree to which respondents' agreed or disagreed if various technologies and technology related services were needed. Item 18 additionally examined if respondents expressed a need for a process to express their technology needs. A 4-point ordinal level response format was used for each question.

Item 18 stated, "I need a forum or process to express my technology needs at my institution." Older faculty had a median response of 1 (*IQR* = 1). Most (81%) indicated some level of disagreement (agree of strongly agree) with the statement. In comparison, younger faculty had a median of 2 (*IQR* = 1) with a similar proportion (82.9%) providing a response of either agree or strongly agree. A summary of descriptive statistics and distribution of responses is provided in table 43 and 44 respectively.

Table 43

Descriptive Statistics: Item 18

Younger Faculty[a]					Older Faculty[b]				
Mdn	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
2	1	2	1	1	1	1	2	1	1

[a]*n* = 146. [b]*n* = 100.

Table 44

Frequency and Percent Distributions: Item 18

	Younger Faculty[a]		Older Faculty[b]	
Response	Frequency	%	Frequency	%
Strongly Disagree	72	49.3	58	58
Disagree	49	33.6	29	29
Agree	22	15.1	8	8
Strongly Agree	3	2.1	5	5

[a]$n = 146$. [b]$n = 100$.

A Mann-Whitney U test was conducted between the responses of older and younger faculty members. The analysis revealed no significant difference ($U(N = 246) = 6665$, $p = .2$) in the distributions of responses (see table 45).

Table 45

Mann-Whitney Analysis: Item 18

	Mean Ranks	*U*	*p*
Younger Faculty[a]	127.85	6665	.2
Older Faculty[b]	117.15		

[a]$n = 146$. [b]$n = 100$.

Survey item 22 measured the participant's need for professional development concerning the technology they use. The question stated, "I need additional professional development for the technology I use or would like to use." The median response for older faculty (table 46) was 3 (*IQR* = 1). Analysis of responses revealed that most (63%)

of older faculty agreed or strongly agreed with the statement (table 47). Similar to their older counterparts, the median response for younger faculty was 3 (*IQR* = 1). However, the distribution of responses for younger faculty indicated that a smaller proportion (56%) agreed or strongly agreed with the statement.

Table 46

Descriptive Statistics: Item 22

Younger Faculty[a]					Older Faculty[b]				
Mdn	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
3	3	3	2	1	3	3	3	2	1

[a]*n* = 146. [b]*n* = 100.

Table 47

Frequency and Percent Distributions: Item 22

	Younger Faculty[a]		Older Faculty[b]	
Response	Frequency	%	Frequency	%
Strongly Disagree	29	19.9	12	12
Disagree	35	24	25	25
Agree	65	44.5	51	51
Strongly Agree	17	11.6	12	12

[a]*n* = 146. [b]*n* = 100.

A nonparametric Mann-Whitney U test was conducted to detect a significant difference between the distribution of responses between younger and older faculty

respondents. No significant difference was detected at the .05 level, $U(N = 246) = 6692$, $p = .24$. Table 48 presents a complete summary of Mann-Whitney U test results.

Table 48

Mann-Whitney Analysis: Item 22

	Mean Ranks	*U*	*p*
Younger Faculty[a]	119.34	6692	.24
Older Faculty[b]	129.58		

[a]$n = 146$. [b]$n = 100$.

Survey questions 25 – 32 gauged the participant's need for various technologies in the classroom or classrooms they use. Technologies include Internet access (#25), network connections (#26), computer projection capabilities (#27), lapel microphone (#28), electronic pointer (#29), student computers (#30), instructor's computer station (#31), and audio/visual capabilities (#32).

Concerning older faculty respondents, the highest median score ($Mdn = 4$) was observed for items 27, 31, and 32 (see table 49). As shown in table 50, almost two-thirds (65%) of older faculty strongly agreed that they require computer projection capabilities in their classroom. Similarly, a large proportion of older respondents responded with "strongly agree" when asked if they needed instructor computer stations (63%) and audio visual/capabilities (61%) in their classroom. Older faculty also had a moderate need ($Mdn = 3$) for Internet and network access. Less than half (45%) of older faculty strongly agreed that they needed network connections in the classroom. Correspondingly, approximately 43% strongly agreed that they need Internet access.

In contrast, the highest median score for younger faculty (*Mdn* = 4) was calculated for items 25 – 27, 31 and 32. A notable proportion of younger respondents provided a response of strongly agree when asked if computer projection capabilities (72.6%), instructor's computer stations (70.5%), Internet access (63%), network connections (57.5%), and audio/visual capabilities (71.9%) were needed in the classroom or classrooms their use.

Table 49

Descriptive Statistics: Items 25 - 32

	Younger Faculty[a]					Older Faculty[b]				
Item	*Mdn*	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
25	4	4	4	3	1	3	4	4	2	2
26	4	4	4	3	1	3	4	4	2	2
27	4	4	4	3	1	4	4	4	3	1
28	1	1	2	1	1	1	1	3	1	2
29	2	1	3	1	2	2	1	3	1	2
30	2	2	4	2	2	2.5	3	3	1.25	2.75
31	4	4	4	3	1	4	4	4	3	1
32	4	4	4	3	1	4	4	4	3	1

[a]*n* = 146. [b]*n* = 100.

Table 50

Frequency and Percent Distribution: Items 25-32

	Younger Faculty[a]				Older Faculty[b]			
Item	SA	A	D	SD	SA	A	D	SD
25	63% (92)	20.5% (30)	6.2% (9)	10.3% (15)	43% (43)	23% (23)	12% (12)	22% (22)
26	57.5% (84)	21.2% (31)	8.2% (12)	13% (19)	45% (45)	25% (25)	8% (8)	22% (22)
27	72.6% (106)	16.4% (24)	2.1% (3)	8.9% (13)	65% (65)	16% (16)	7% (7)	12% (12)
28	6.8% (10)	8.9% (13)	24% (35)	60.3% (88)	17% (17)	11% (11)	20% (20)	52% (52)
29	8.2% (12)	23.3% (34)	27.4% (40)	41.1% (60)	23% (23)	22% (22)	20% (20)	35% (35)
30	26.7% (39)	19.2% (28)	30.8% (45)	23.3% (34)	24% (24)	26% (26)	25% (25)	25% (25)
31	70.5% (103)	15.8% (23)	4.1% (6)	9.6% (14)	63% (63)	19% (19)	5% (5)	13% (13)
32	71.9% (105)	13% (19)	6.8% (10)	8.2% (12)	61% (61)	21% (21)	5% (5)	13% (13)

Note. Values in parentheses represent frequencies.

SA = strongly agree; A = agree; SD = strongly disagree; D = disagree.

[a]$n = 146$. [b]$n = 100$.

A comparative analysis was conducted in order to determine if significant differences existed according to age. Mann-Whitney U test results revealed a significant difference ($U(N = 246) = 5596$, $p < .01$) between the distributions of responses for item 25 (Internet access). Significant differences were also detected for item 26 (network connections) and item 29 (electronic pointers). The remaining survey items examined (27, 28, 30 – 32) revealed no significant difference between responses. See table 51 for a complete summary of Mann-Whitney test results.

Table 51

Mann-Whitney U Analysis by Age: Items 25 – 32

	Mean Ranks			
Item	Younger Faculty[a]	Older Faculty[b]	*U*	*p*
25	135.17	106.46	5596	< .01 *
26	130.68	113.01	6251.5	.04 **
27	127.8	117.22	6672.5	.16
28	117.2	132.7	6380.5	.06
29	115.66	134.94	6156	.03 **
30	123.56	123.42	7291.5	.99
31	127.42	117.78	6728	.21
32	128.79	115.78	6528	.09

[a]$n = 146$. [b]$n = 100$.

*$p < .01$; ** $p < .05$

The participants needs for technical support was measured by question 115. The item stated. “I need additional technical support for the technology I use or would like to use.” As shown in table 52, the median response of older respondents was 2 (*IQR* = 1). The distributions of response options for older faculty (see table 53) revealed that most (60%) had some level of disagreement with the statement. In contrast, the median response for younger faculty members was slightly higher (*Mdn* = 2.5, *IQR* = 1) than older faculty members. Results also indicated an equal proportion of agreement and disagreement, with 50% of younger respondents either agreeing or strongly agreeing and 50% disagreeing or strongly disagreeing.

Table 52

Descriptive Statistics: Item 115

Younger Faculty[a]					Older Faculty[b]				
Mdn	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
2.5	3	3	2	1	2	2	3	2	1

[a]*n* = 146. [b]*n* = 100.

Table 53

Frequency and Percent Distributions: Item 115

	Younger Faculty[a]		Older Faculty[b]	
Response	Frequency	%	Frequency	%
Strongly Disagree	35	24	24	24
Disagree	38	26	36	36
Agree	60	41.1	29	29
Strongly Agree	13	8.9	11	11

[a]$n = 146$. [b]$n = 100$.

The distributions of responses between older and younger faculty respondents were statically compared via a Mann-Whitney U analysis. As indicated in table 54, results of the test revealed no significant difference, $U(N = 246) = 6885.5$, $p = .43$.

Table 54

Mann-Whitney Analysis: Item 115

	Mean Ranks	*U*	*p*
Younger Faculty[a]	126.34	6885.5	.43
Older Faculty[b]	119.36		

[a]$n = 146$. [b]$n = 100$.

Survey question 119 assessed the participant's need for upgraded hardware and/or software at their institution. The median response for older faculty was 2 ($IQR = 2$). More than half (56%) of older faculty members responded with some level of disagreement with the statement. Similar results were found with the responses of

younger faculty members. The median score for younger faculty was 2 (*IQR* = 1) with approximately half (52.7%) disagreeing or strongly disagreeing with the survey item. A summary of descriptive statistics and frequency/percent distributions is provided in table 55 and table 56, respectively.

Table 55

Descriptive Statistics: Item 119

Younger Faculty[a]					Older Faculty[b]				
Mdn	Mode	Q3	Q1	*IQR*	*Mdn*	Mode	Q3	Q1	*IQR*
2	3	3	2	1	2	3	3	1	2

[a]*n* = 146. [b]*n* = 100.

Table 56

Frequency and Percent Distributions: Item 119

	Younger Faculty[a]		Older Faculty[b]	
Response	Frequency	%	Frequency	%
Strongly Disagree	33	22.6	27	27
Disagree	44	30.1	28	28
Agree	47	32.2	34	34
Strongly Agree	22	15.1	11	11

[a]*n* = 146. [b]*n* = 100.

A Mann-Whitney U test was used to determine if there was a significant difference between the responses of older and younger faculty. Results from the analysis (see table

57) revealed no significant difference in the distributions of responses, $U(N = 246) = 6887$, $p = .43$.

Table 57

Mann-Whitney Analysis: Item 119

	Mean Ranks	*U*	*p*
Younger Faculty[a]	126.33	6887	.43
Older Faculty[b]	119.38		

[a]$n = 146$. [b]$n = 100$.

To explore further the support needs of older faculty members, nineteen survey items (questions 45-63) asked respondents if *technical support* for various technologies met their needs. All survey items utilized a four point likert-type scale (1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strong agree); a response of zero indicated non–applicable. Non-applicable responses were not used for descriptive (median and interquartile range) and inferential statistical analysis.

For older faculty members, the medians for items 45-63 ranged from 3 – 4 (see table 58 for medians, modes, and interquartile ranges). The highest median score (4) was reported for question 46 (using an E-mail list of students in their class.). Frequency and percent distributions (table 59) of item responses indicated that a majority of older faculty members responded with "agree" or "strongly disagree" for all items.

The median scores for younger faculty members ranged from 3 – 4; the highest median score (4) was reported for questions 46 (using an E-mail list of students in a class) and 54 (using the web to conduct research). Similar to older faculty members,

most younger respondents indicated some level of agreement (e.g., agree or strongly agree) with regard to questions 45-63.

In addition to technical support, nineteen survey items (questions 64 – 82) were used to investigate the *professional development* needs of older faculty for various technologies. Each item incorporated a 4-point ordinal level scale (1 = strongly disagree to 4 = strongly agree); a response of "0" was used to indicate not applicable. Responses of non-applicable were not used for descriptive (median and interquartile range) and inferential statistical analysis.

The medians, modes, quartiles, and interquartile ranges (variability) of item responses for older and younger faculty is presented in table 60. Older faculty respondents had medians of 3 for all items. Frequency and percent distributions of item responses (see table 61) show that for each question, most older faculty members responded with agreement (strongly agree or agree). Among younger respondents, medians of 3 were similarly calculated for items 64 -82. Frequency and percent distributions for questions 64 – 82 indicate that a majority of younger faculty members responded with agree or strongly agree for each item.

Table 58

Descriptive Statistics: Items 45-63

	Older Faculty				Younger Faculty			
Item	*Mdn*	*IQR*	Mode	*n*	*Mdn*	*IQR*	Mode	*n*
45	3	1	3	89	3	1	4	129
46	4	1	4	87	4	1	4	136
47	3	1	4	77	3	1	4	120
48	3	1	4	83	3	1	4	132
49	3	2	3	66	3	2	4	106
50	3	1	3	66	3	2	3	103
51	3	2	3	58	3	2	3	84
52	3	2	3	71	3	2	4	101
53	3	1	4	85	3	1	4	131
54	3	1	4	82	4	1	4	129
55	3	1	4	72	3	1	4	109
56	3	2	3	53	3	2	4	79
57	3	2	3	54	3	2	4	80
58	3	1	3	75	3	1	3	110
59	3	1	3	55	3	2	3	81
60	3	1	3	73	3	2	4	109
61	3	1	4	78	3	1	4	110
62	3	1	4	63	3	1	4	103
63	3.5	1	4	70	3	1	4	104

Table 59

Frequency and Percent Distributions: Items 45-63

	Younger Faculty[a]					Older Faculty[b]				
Item	SA	A	D	SD	N/A	SA	A	D	SD	N/A
45	41.8% (61)	33.6% (49)	3.4% (5)	9.6% (14)	11.6% (17)	39% (39)	39% (39)	5% (5)	6% (6)	11% (11)
46	51.4% (75)	28.1% (41)	5.5% (8)	8.2% (12)	6.8% (10)	46% (46)	27% (27)	9% (9)	5% (5)	13% (13)
47	37.7% (55)	27.4% (40)	9.6% (14)	7.5% (11)	17.8% (26)	34% (34)	27% (27)	10% (10)	6% (6)	23% (23)
48	39% (14)	31.5% (46)	14.4% (21)	5.5% (8)	9.6% (14)	38% (38)	26% (26)	14% (14)	5% (5)	17% (17)
49	28.1% (41)	23.3% (34)	14.4% (21)	6.8% (10)	27.4% (40)	22% (22)	24% (24)	13% (13)	7% (7)	34% (34)
50	23.3% (34)	27.4% (40)	12.3% (18)	7.5% (11)	29.5% (43)	23% (23)	29% (29)	8% (8)	6% (6)	34% (34)
51	15.8% (23)	19.2% (28)	15.1% (22)	7.5% (11)	42.5% (62)	20% (20)	23% (23)	8% (8)	7% (7)	42% (42)
52	25.3% (37)	24% (35)	14.4% (21)	5.5% (8)	30.8% (45)	22% (22)	28% (28)	11% (11)	10% (10)	29% (29)
53	43.8% (64)	31.5% (46)	11.6% (17)	2.7% (4)	10.3% (15)	35% (35)	33% (33)	11% (11)	6% (6)	15% (15)
54	49.3% (72)	29.5% (43)	8.2% (12)	1.4% (2)	11.6% (17)	36% (36)	33% (33)	8% (8)	5% (5)	18% (18)
55	32.9% (48)	28.8% (42)	11% (16)	2.1% (3)	25.3% (37)	30% (30)	27% (27)	11% (11)	4% (4)	28% (28)
56	18.5% (27)	16.4% (24)	15.1% (22)	4.1% (6)	45.9% (67)	17% (17)	21% (21)	10% (10)	5% (5)	47% (47)

Table 59 Continued

Frequency and Percent Distributions for Survey Items 45-63

	Younger Faculty[a]					Older Faculty[b]				
Item	SA	A	D	SD	N/A	SA	A	D	SD	N/A
57	17.8% (26)	16.4% (24)	11.6% (17)	8.9% (13)	45.2% (66)	15% (15)	20% (20)	12% (12)	7% (7)	46% (46)
58	28.1% (41)	29.5% (43)	12.3% (18)	5.5% (8)	24.7% (36)	25% (25)	38% (38)	6% (6)	6% (6)	25% (25)
59	14.4% (21)	17.8% (26)	15.8% (23)	7.5% (11)	44.5% (65)	13% (13)	23% (23)	10% (10)	9% (9)	45% (45)
60	29.5% (43)	25.3% (37)	12.3% (18)	7.5% (11)	25.3% (37)	27% (27)	34% (34)	7% (7)	5% (5)	27% (27)
61	30.8% (45)	30.1% (44)	8.2% (12)	6.2% (9)	24.7% (36)	32% (32)	31% (31)	9% (9)	6% (6)	22% (22)
62	28.1% (41)	26.7% (39)	8.9% (13)	6.8% (10)	29.5% (43)	26% (26)	24% (24)	7% (7)	6% (6)	37% (37)
63	34.9% (51)	21.9% (32)	8.9% (13)	5.5% (8)	28.8% (42)	35% (35)	22% (22)	9% (9)	4% (4)	30% (30)

Note. Values in parentheses represent frequencies.

SA = strongly agree; A = agree; SD = strongly disagree; D = disagree.

[a]$n = 146$. [b]$n = 100$.

Table 60

Descriptive Statistics: Items 64 - 82

	Younger Faculty				Older Faculty			
Item	*Mdn*	*IQR*	Mode	*n*	*Mdn*	*IQR*	Mode	*n*
64	3	1	4	135	3	1	4	88
65	3	1	4	137	3	1	4	88
66	3	2	4	118	3	1	4	77
67	3	2	4	119	3	1	3	80
68	3	2	4	103	3	2	3	66
69	3	2	3	100	3	1.5	3	73
70	3	2	3	87	3	2	3	61
71	3	2	3	104	3	2	4	71
72	3	1	4	119	3	1	4	83
73	3	1	3	119	3	1	4	83
74	3	1	4	111	3	1	3	76
75	3	2	3	77	3	2	3	55
76	3	2	3	87	3	2	3	59
77	3	2	3	109	3	1	3	76
78	3	2	2	77	3	2	3	54
79	3	2	4	107	3	1	3	73
80	3	2	4	111	3	1	4	74
81	3	1	3	100	3	2	3	66
82	3	2	4	108	3	1	3	78

Table 61

Frequency and Percent Distributions for Survey Items 64 - 82

	Younger Faculty[a]					Older Faculty[b]				
Item	SA	A	D	SD	N/A	SA	A	D	SD	N/A
64	40.4% (59)	32.2% (47)	10.3% (15)	9.6% (14)	7.5% (11)	40% (40)	32% (32)	12% (12)	4% (4)	12% (12)
65	43.8% (64)	31.5% (46)	8.9% (13)	9.6% (14)	6.2% (9)	40% (40)	32% (32)	9% (9)	7% (7)	12% (12)
66	31.5% (46)	26% (38)	15.8% (23)	7.5% (11)	19.2% (28)	34% (34)	29% (29)	10% (10)	4% (4)	23% (23)
67	30.1% (44)	28.1% (41)	14.4% (21)	8.9% (13)	18.5% (27)	24% (24)	42% (42)	6% (6)	8% (8)	20% (20)
68	24% (35)	19.2% (28)	17.8% (26)	9.6% (14)	29.5% (43)	20% (20)	27% (27)	10% (10)	9% (9)	34% (34)
69	21.2% (31)	25.3% (37)	13.7% (20)	8.2% (12)	31.5% (46)	27% (27)	28% (28)	11% (11)	7% (7)	27% (27)
70	15.1% (22)	21.2% (31)	13% (19)	10.3% (15)	40.4% (59)	20% (20)	22% (22)	10% (10)	9% (9)	39% (39)
71	18.5% (27)	27.4% (40)	14.4% (21)	11% (11)	28.8% (42)	27% (27)	23% (23)	12% (12)	9% (9)	29% (29)
72	33.6% (49)	31.5% (46)	10.3% (15)	6.2% (9)	18.5% (27)	36% (36)	33% (33)	9% (9)	5% (5)	17% (17)
73	32.9% (48)	33.6% (49)	10.3% (15)	4.8% (7)	18.5% (27)	38% (38)	33% (33)	8% (8)	4% (4)	17% (17)
74	30.1% (44)	27.4% (40)	12.3% (18)	6.2% (9)	24% (35)	30% (30)	33% (33)	8% (8)	5% (5)	24% (24)
75	15.1% (22)	15.8% (23)	14.4% (21)	7.5% (11)	47.3% (69)	16% (16)	23% (23)	8% (8)	8% (8)	45% (45)

Table 61 Continued

Frequency and Percent Distributions: Items 64 – 82

	Younger Faculty[a]					Older Faculty[b]				
Item	SA	A	D	SD	N/A	SA	A	D	SD	N/A
76	16.4% (24)	18.5% (27)	13% (19)	11.6% (17)	40.4% (59)	19% (19)	19% (19)	11% (11)	10% (10)	41% (41)
77	25.3% (37)	27.4% (40)	15.8% (23)	6.2% (9)	25.3% (37)	28% (28)	31% (31)	10% (10)	7% (7)	24% (24)
78	14.4% (21)	14.4% (21)	17.1% (25)	6.8% (10)	47.3% (69)	15% (15)	22% (22)	10% (10)	7% (7)	46% (46)
79	28.8% (42)	23.3% (34)	13.7% (20)	7.5% (11)	26.7% (39)	26% (26)	31% (31)	11% (11)	5% (5)	27% (27)
80	26% (38)	25.3% (37)	13.7% (20)	11% (16)	24% (35)	30% (30)	29% (29)	11% (11)	4% (4)	26% (26)
81	26% (38)	28% (41)	6.2% (9)	6.2% (9)	33.6% (49)	19% (19)	23% (23)	16% (16)	10% (10)	32% (32)
82	28.1% (41)	24.7% (36)	13% (19)	8.2% (12)	26% (38)	34% (34)	32% (32)	6% (6)	6% (6)	22% (22)

Note. Values in parentheses represent frequencies.

SA = strongly agree; A = agree; SD = strongly disagree; D = disagree.

[a]$n = 146$. [b]$n = 100$.

CHAPTER 5

SUMMARY OF RESULTS, IMPLICATIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

Problem Statement

Community colleges and universities are experiencing a significant and progressive increase in the average age of instructional faculty (Lindholm et al., 2002). Academic scholars commonly refer to this trend as the "graying" of college and university faculty. Current studies suggest that approximately one-third of full-time faculty members are over the age of 55 (Creighton, 2001; Lindholm et al., 2002). In comparison, only 25% of faculty were over the age of 55 by the beginning of the 1990s (Creighton, 2001).

The role of technology in higher education has increased in recent years. A growing number of instructional faculty at colleges and universities are using technology with their instruction, especially at two-year institutions (Baldwin, 1998; Green & Eastman, 1994; Lindholm et al., 2002, Johnson, 1995). However, limited research suggests that technology has possibly created a generational divide between older and younger faculty. A review of the available literature implies that older faculty use technology less often than younger faculty and experience more stress associated with its use. In a national study conducted by the Higher Education Research Institute (HERI) in 1999, it was found that older college and university faculty (65 or older) were less likely to use technology than younger faculty (Sax et al., 1999). Moreover, older faculty members reported that technology was a source of stress (Sax et al., 1999).

Despite this data, a comprehensive survey of available literature revealed that the existing body of knowledge pertaining to older college faculty is quite limited—particularly pertaining to technology use. Research is needed to investigate if older faculty members are confronted with obstacles to their technology use and difficulty obtaining support from their institution.

Purpose of the Study

The ending of mandatory retirement policies in 1994 was a significant factor that has changed faculty demographics at colleges and universities across the United States (Clark & Hammond, 2001). Older faculty members currently comprise a significant proportion of college faculty. Current research indicates that approximately one-third (36%) of college and university faculty are over the age of 55; this proportion is expected to grow in following decades as an increasing number of older faculty decide to work beyond the traditional retirement age of 65 (Lindholm et al., 2002).

Technology plays an important role in higher education. A growing number of faculty members across many academic disciplines are using technology as a tool for instruction, to improve research productivity, and assist with other academic related activities. This has been demonstrated particularly at public and private community colleges, where past research suggests the use of technology with instruction is more common at community colleges than other institutions of higher learning (Lindholm et al., 2002, Green & Eastman, 1994, and Johnson, 1995). As a result of the increase in technology use among faculty, community colleges must provide adequate technical support and professional development opportunities to ensure effective and continual use of technology.

The purpose of this study was to examine older community college instructional faculty and various aspects related to technology. First, older faculty's attitude toward institutional technology support and professional development was explored. Second, the study examined older faculty's perceptions of technology. Third, it investigated perceived use of technology. Fourth, the study determined if older faculty reported the existence of barriers that prevent their utilization of technology. Fifth, the study examined perceived technology and technology related needs of older faculty. A 120-item Faculty Technology Survey was used to collect data for analysis. The questionnaire incorporated various scales and non-scale items; all questions utilized ordinal response formats. A composite score (sum of item responses) was calculated for each scale integrated in the instrument. Results for non-scale items were also explored. Comparative analyses (nonparametric Mann-Whitney U and independent t-tests) were conducted to determine if significant differences existed between older and younger faculty with regard to the variables considered in the study.

Research Questions

1. What are the attitudes of older community college faculty toward institutional technology support and professional development?
2. What are the perceptions of older community college faculty concerning technology?
3. To what degree do older community college faculty report the use of technology with their academic activities in comparison to their younger counterparts?
4. What are the perceived barriers, if any, that prevent older community college faculty from using technology? If so, what are these barriers, to what degree do they affect technology use, and how are they different from barriers for younger faculty?

5. What are the perceived technology and technology related needs of older community college faculty?

Population

The population comprised full-time community college employed at select Florida community colleges. Full-time faculty were defined as instructional staff employed at the institution on a full-time basis and holding the academic rank of professor, associate professor, assistant professor, instructor, or lecturer. Excluding part-time faculty, such as adjunct instructors, was based on the following rationale. First, the study included survey questions measuring faculty perceived use and attitudes on the institution's technology resources and support systems. Part-time faculty may have limited experience with and access to campus technology resources and support. Second, most of the literature, studies, and research examined and used as a foundation for the study exclusively referred to full-time college and university faculty.

Five Florida community colleges were selected in order to obtain a sample of older full-time faculty. The first institution reported 263 full-time instructional faculty employed in 2005, with 109 faculty members (41.4%) age 55 and over. The second community college that participated in the study reported 130 full-time instructional faculty employed in 2005; 48 (36.9%) are at or over the age of 55. Full-time faculty at the third institution totaled 104 in 2005 with 41 (39.4%) over the age of 55. The fourth participating institution reported 272 full time faculty members in 2005 with more than one-third (36%) age 55 and over. Full-time faculty at the fifth community college numbered 430 with older faculty comprising more than one-half (55%) of the full-time instructional staff. The population size among all institutions included in the study was

1199 community college faculty members: 666 under the age of 55 and 533 age 55 and over. Older faculty (age 55 and over) represented 44.4% of the population.

Summary of Findings

In total, approximately 21% (N = 246) of mailed surveys were returned for descriptive and inferential statistical analysis. Older faculty respondents comprised nearly 41% of the sample (n = 100). Statistical analysis (chi-square goodness of fit) revealed that this proportion was similar to the population. Over-half of the sample (57%) was female, with non-white respondents making up just 14.2% of the total sample. With regard to older adults, most (57.5%) were female; almost all older participants (92%) reported their ethnicity as white.

Survey results were analyzed using quantitative descriptive and inferential statistics (nonparametric and parametric); a complete description of these findings is presented in chapter 4. The following section summarizes and discusses the results of the study pertaining to the five principal research questions examined.

What are Older Community College Faculty's Perceptions of Technology?

The first purpose of the study was to assess faculty perceptions of technology. Five general areas were examined: (1) technology as a tool to increase productivity; (2) technology as tool to improve communication with faculty and students; (3) technology enhancing classroom instruction; (4) technology as a tool to improve student learning; (5) technology having an important role in education.

A majority of older faculty believed the use of technology had increased their productivity. However, comparative analysis between age groups found that younger faculty agreed more strongly to this statement (item 10) than older respondents (p = .03).

An additional question gauged whether older faculty reported that their communication had been improved by technology. Item 13 stated, "I am better able to communicate with my colleagues and students because of technology." It was also found that a majority of older faculty members agreed or strongly agreed with the statement. Subsequent comparative analysis did not demonstrate that the responses between age groups were statistically significant ($p = .07$).

Hazen et al. (1999) asserted that older faculty members did not consider that their teaching had been improved by technology. Nonetheless, results of the study were not consistent with this assertion. Based on the medians and percent distributions for item 20, findings showed that a majority of older faculty members felt that "technology enhances classroom instruction." Yet, when compared to younger respondents, older faculty did express a similar level of agreement. A greater percentage of younger faculty provided a response of strongly agree; a higher median response to the statement was also observed. Statistical analysis revealed a significant difference ($p < .01$) between the responses of both faculty age groups, revealing that younger faculty agreed more strongly to this statement. Along the same line, older respondents also believed that "technology is an effective tool for improving student learning" (item 34). A significant difference was detected between the responses of older and younger faculty ($p < .01$). Based on descriptive and inferential investigation, it was found that younger faculty agreed more strongly with the survey item.

Older faculty's relative positive outlook on technology in education was also apparent in their response to item 23. Descriptive statistics showed that a large proportion of older respondents agreed with the view that "technology has an important

role in education". Consistent with previous findings in the study, analysis revealed that younger faculty agreed more strongly than their older counterparts ($p < .01$).

A final area examined concerned technology and stress. An aggregate scale score, ranging from 3 to 12, measured the degree to which older faculty associated stress with technology. Results suggest that older faculty consider technology to be a mild source of stress ($M = 7.52$, $SD = 2.3$, $Mdn = 8$). In contrast, younger faculty did not associate stress with technology to any substantial degree ($M = 6.5$, $SD = 2.5$, $Mdn = 6.5$). Subsequent analysis revealed a statistically significant difference between responses ($p < .01$). This particular finding reasonably corresponds to an earlier investigation conducted by the Higher Education Research Institute, which found that older faculty members were experiencing comparatively more stress than their younger counterparts with regard to using and keeping pace with technology (Sax et al., 1999).

What are the Attitudes of Older Community College Faculty Toward Institutional Technology Support and Professional Development?

A review of the available literature revealed older faculty's attitudes toward their institution's support services had not been previously examined. Likert-style scales were used to gauge older faculty's attitude toward technology support and professional development; the range of values (sum of item responses) was 4 to 16. It was suggested that older faculty, as well as their younger counterparts, felt positive about their institution's technical support and professional development services. No statistical difference ($p = .29$) was found between the responses of age groups. These findings imply that technology support services provided by community colleges are serving and addressing the needs of their faculty adequately.

To What Degree do Older Community College Faculty Report the Use of Technology With Their Academic Activities in Comparison to Their Younger Counterparts?

A limited number of studies (Gueldenzoph et al., 1999; Hazen et al., 1999; and Sax et al., 1999) have investigated technology use among older college faculty. According to Sax et al. (1999), older faculty used technology infrequently for communication, productivity, research, and instruction. Gueldenzoph et al. (1999) and Hazen et al. (1999) asserted similar conclusions with regard to faculty use of technology for communication. Several key findings from the study, however, did not support the limited body of research

A multi-item formative scale was used to gauge the reported, overall technology use of participants. This scale included several items assessing the use of a variety of software programs, productivity tools, and web-based applications. A composite score was used as an index to represent overall technology use. Descriptive and inferential analysis revealed that older faculty participants reported using technology only slightly less than younger faculty participants; word processing software and digital projectors were reported to be the most frequently used technologies by older faculty. Correlation analysis revealed a negligible relationship ($r(246) = -.14$, $p = .03$) between the participants' age and their technology use. Relatively high standard deviation scores for both age groups further suggested substantial variability in individual technology use.

In addition to technology use, older faculty's self-reported proficiency with various technologies was examined. Corresponding with their use of technology, older faculty respondents reported being most skilled with the use of word processing software, data projectors, and presentation software (Microsoft PowerPoint). By comparison, younger

faculty reported being highly skilled with similar technologies, but with the addition of Microsoft Excel.

What are the Perceived Barriers, if any, That Prevent Older Community College Faculty From Using Technology?

An objective of the study was to determine if older community college faculty confronted particular barriers that might affect their use of technology. A preliminary review of the literature revealed little information concerning obstacles to technology use that were specific to older faculty. Nevertheless, existing studies have shed light on various potential barriers pertaining to college faculty in general. For example, Gilbert (1996) (as cited in Baldwin, 1998) and Epper (2001) suggested that likely factors may include lack of time, high cost of certain technologies, failure to provide incentives, lack of technology availability, and limited professional development. For the purpose of the investigation, older faculty's perceptions concerning eight potential barriers to technology use were examined. Barriers assessed included time, cost, incentives, lack of skills, professional development and training, technical support, availability of technology, and access to technology.

Among the potential barriers investigated in the study, older faculty members identified none as a notable obstacle to their use of technology. Analogous findings were observed with younger faculty respondents. Although the study did not identify factors that affect technology use, a general conclusion may be implied from this finding. The perceptions of the community college faculty sample do not support the assertions expressed by Gilbert (1996) and Epper (2001) concerning possible barriers to technology use. Nevertheless, this particular finding does not necessarily suggest older faculty are

uninhibited from challenges to their use of technology. Rather, additional research is needed to identify and explore whether other factors, not identified in the study, may be inhibiting technology use.

What are the Perceived Technology and Technology Related Needs of Older Community College Faculty?

The study examined the self-reported technology and technology related needs of older faculty; results were statistically compared to younger faculty respondents. Despite reporting satisfaction with their institution's professional development, a sizeable majority of older faculty expressed a need for additional professional development for technology. Comparative analysis revealed no significant difference between age groups, suggesting both younger and older faculty expressed, to a similar degree, a desire to receive additional technology related training opportunities.

In regard to technical support, findings demonstrated that older faculty members did not report a sizeable need for additional technical support. No significant difference ($p = .43$) was detected between the responses of both age groups. These findings may suggest that older faculty, in general, are not experiencing technical challenges with the technology they are currently using, but might desire further training to increase their proficiency, learn more about the applicability of the technology, or perhaps acquire strategies to better integrate the technology with their instruction.

Findings indicated that older faculty, as well as their younger counterparts, expressed no need for a forum or process to convey their technology needs—possibly implying that faculty believe they have a "voice" and are capable of communicating successfully their technology related requirements and concerns at their institution.

Nonetheless, older faculty indicated a need for several technologies. Older faculty reported a strong need for audio/visual equipment, instructor computer stations, and computer projection capabilities in their classrooms. Older faculty also expressed, to a lesser degree, a need for Internet access and network connections in their classrooms. A possible implication of this finding is that older faculty are not only using technology, but also have a desire to use various technologies with their instruction.

Analysis revealed few differences concerning the technology needs of older and younger faculty. Similar to older respondents, younger faculty indicated a strong need for audio/visual equipment, instructor computer stations, and computer projection capabilities. However, younger faculty expressed a greater need for network and Internet capabilities in their classroom than older faculty – perhaps suggesting that younger faculty are more inclined to use the Internet, web-based resources, or online course management systems with their instruction.

An additional area examined concerned older faculty's reported need for upgraded technology. Findings indicated that older faculty were generally satisfied with the level of existing hardware and software provided by their institution. A comparative analysis was conducted to determine if a significant difference existed between the responses of both age groups. No statistical difference ($p = .43$) was observed between the responses of older and younger faculty respondents.

Finally, the specific technical support and professional development needs of faculty were investigated. Based on the perceptions of respondents, findings revealed that community colleges were largely meeting the professional development and technical support needs of older, as well as younger, respondents. A statistically

significant difference was detected ($p < .02$) between the responses of older and younger faculty concerning professional development for using the web for online courses reserves—suggesting that older faculty may require additional training with this particular service. Nevertheless, these findings imply that older faculty generally are satisfied with the level of technology support services provided by their institution.

The results of the study are based on an analysis of survey responses from 246 full-time college faculty at five Florida public community colleges. Older faculty members comprised approximately 41% of the sample. Data was statically compared between older and younger faculty respondents. Overall, the study's findings support the notion that older and younger faculty share a range of similarities, rather than differences concerning technology. The following highlights the study's principal findings.

1. Older community college faculty are using technology less frequently, albeit only slightly, than their younger counterparts. Nonetheless, there appears to be a great deal of individual variability concerning technology use among participants of both age groups.
2. Age does not appear to be a significant factor in predicting technology use. Analysis also revealed a very weak relationship between age and technology use. Findings suggest older community college faculty appear no less likely to use technology than their younger counterparts.
3. Word processing, Microsoft PowerPoint, and data projectors are the most frequently used technology among older community college faculty.

4. Older community college faculty considered technology a mild source of stress. In contrast, younger faculty do not, to any substantial degree, associate stress with technology.
5. Overall, older community college faculty feel positive about the technology related services they are receiving from their institution. Moreover, community colleges appear to be meeting the technology support and professional development needs of their older faculty members.
6. Older faculty perceive technology as having an important role in education, improving student learning, and enhancing classroom instruction. Likewise, they believe technology has improved their productivity and communication with colleagues and students.
7. Among the various barriers to technology use assessed in the study, none was perceived substantially as an obstacle to older faculty's use of technology.

In addition to the research-based findings previously discussed, several faculty respondents provided written comments on their returned surveys. Although this information is anecdotal, it offers limited, yet interesting insight from the perspective of several community college faculty members. The list below presents a summary of notable remarks offered by respondents:

1. One younger respondent observed that "younger instructors [were] more open to integrating technology in the classroom".
2. A few respondents expressed concern over technology training schedules. One younger respondent indicated that she was "not satisfied with the training schedules" at her institution.

3. In a succinct comment provided by an older respondent, the faculty member noted that she "was a much better teacher before [she] had to spend... time on technology". Moreover, the respondent indicated a disdain for Microsoft PowerPoint.
4. A younger faculty member with reported experience at various community colleges observed a "severe mismanagement of technology". Moreover, the respondent further commented that faculty's access to technology was "[reserved]... for an elite 'insider' group."
5. One younger faculty member described technology as "limited" and not useful.
6. An older respondent commented that he was pleased with the technical support at his institution. Similarly, another older respondent indicated that training was available and described the technology resources provided by his institution as "excellent".

The study provides a "snapshot" of older community college faculty from five institutions. However, various limitations of the study should be considered. First, the study was not a random sampling of the older faculty population from Florida community colleges. As a result, findings should not be generalized to this population. Second, although the response rate was quite acceptable for a conventional mail survey, it is probable that the survey length may have affected the study's response rate to some degree. Among the respondents that returned a completed survey, eight stated or implied that the questionnaire was too long. Third, the study did not identify whether survey respondents represented largely a particular academic department affiliation. For example, it is unknown if the sample may have comprised a sizeable proportion of

faculty from computer science or technology related fields—thereby presenting some degree of bias. Last, attrition of older faculty resistant to technology use is a plausible factor explaining the several similarities observed between both age groups. Older faculty unwilling to use technology, having limited technology proficiency, or who were unsatisfied with their institution's technology support services, may have retired in previous years—leaving a cohort of older faculty members who are more proficient with technology than their retired counterparts.

Implications

Research suggests that older adults presently comprise a sizeable percentage of the faculty population at many institutions of higher learning. It has been speculated by scholars that this proportion will continue to grow. Although additional research is needed to provide a clearer understanding of Florida's older community college faculty population, the study provides several implications for consideration.

Conventional wisdom and the limited body of research has supported the notion that younger and older adults are separated by a technological divide. Yet, the study demonstrated little difference in reported overall technology use and proficiency with various technologies. For example, it was found that older and younger faculty were frequently using similar technologies. Analysis also indicated little statistical relationship between age and the respondent's self-reported, overall technology use —suggesting older respondents were no less likely to use technology than their younger counterparts. These findings demonstrate that the figurative technological divide may be less remarkable than some scholars have previously contended. Technology use appears to

vary widely across age groups. Additional research is needed to determine if this assertion may also apply to four-year college and university faculty.

The study failed to identify perceived barriers affecting the technology use of both older and younger faculty. Community college faculty from all age groups are using the technology that they would like to use at their institution. Results further imply that community colleges are successfully facilitating technology availability and accessibility for their faculty.

The sample of older faculty felt quite positive about and satisfied with the training and professional development furnished by their institution. Despite the ever-constant demand to maintain and upgrade technology infrastructure, these findings suggest that community colleges are serving the needs of their faculty adequately. Nonetheless, older faculty and their younger counterparts similarly expressed a need for additional technology training—suggesting community colleges need to expand technology related professional development opportunities.

Although both age groups held positive perceptions of technology, younger and older faculty differed in the degree to which they believed technology improved instruction and student learning, increased their productivity, and had an important role in education. An implication of this finding is that older faculty may benefit from technology training and professional development, which focus on the pedagogical application and effective use of instructional technologies. Moreover, particular emphasis may need to be placed on using technology to advance student learning and understanding of content, or to improve instructional methods when working with older faculty.

Older faculty also perceived that technology was a minor source of stress, contrary to their younger counterparts. This may imply that older faculty may be less willing to accept and apply new technologies, or confront challenges with campus-wide implementation of new technologies. For example, it may be necessary during the initial adoption stage of a new technology for an institution to allocate additional support services to assist older faculty members. Older faculty may necessitate clear articulation of intrinsic rewards, additional training and technical support, or similar methods to better support their use of a new technology.

A final implication of the study concerns the technology and technology related needs of older faculty. Results suggested older and younger faculty demonstrated a need for similar technologies. Both faculty age groups expressed needs for audio/visual equipment, instructor computer stations, multimedia projectors, and an Internet/network capable classroom. Although technology availability and accessibility were not identified as significant barriers to technology use, institutions should formulate approaches to increase the presence of these technologies campus-wide.

Recommendations for Practice

The study yielded various conclusions and implications that might prove beneficial to community college administrators and faculty leaders. Due to the many similarities observed between younger and older respondents concerning technology, a number of the recommendations provided below are applicable to all faculty members.

1. Provide older faculty with additional guidance via professional development and training on how to apply instructional technologies for advancing student learning and understanding of content, or improving their instruction.

2. Consider strategies to expand and to promote technology related professional development offerings for faculty. Annual comprehensive need-assessments should be implemented to identify the scope, focus, and content of technology training opportunities.
3. Allocate technology support and training resources for older faculty members during campus-wide implementations of new technologies.
4. Focus additional technology resources on expanding Internet/network access or availability in classrooms.
5. Increase the presence of presentation technologies in classrooms, including audio/visual equipment, instructor computer stations, and multimedia projectors for faculty use.

Recommendations for Further Research

Descriptive studies often serve to foster research interest and initiate additional studies on the topic examined. Several recommendations for further investigation stem from the study's findings. These recommendations attempt to broaden research concerning older college faculty and technology, in order to assist institutions with serving this growing segment of the faculty population.

1. The study's population consisted of full-time faculty at five Florida community colleges. Therefore, the results of the study should not be generalized to the entire Florida Community College System, but rather to the specific population examined in the study. Findings of the study are also not generalizable to four-year colleges and universities. To extend the generalizability of findings,

Additional research could focus on broadening the population to faculty from other Florida community colleges, universities, and four-year institutions.

2. The survey did not include items assessing the academic discipline of respondents. Further research could examine if perceived technology use, perceptions of technology, and other aspects related to technology differ according to the academic discipline or department affiliation of older faculty members.
3. Future research could reveal if differences exist between older faculty at four-year colleges and universities concerning the variables examined in the study. For example, do older university faculty have different perceptions of technology or experience particular barriers to their use of technology than community college faculty? Findings might indicate that community colleges and four-year colleges/universities must respond differently to promote technology use among their older faculty members.
4. A sizeable majority of faculty participants (approximately 86%) were of White origin. Further research should attempt to increase the representation of non-white faculty members.
5. Ascertaining the perception of personnel from students and technology services and resource (TSR) departments would likely compliment the findings of this research. For example, it may be found that their perceptions of older faculty's use of technology differ significantly from the perceived technology use reported by older faculty members.

6. A longitudinal approach to this study should be considered to probe if the use of technology, perceived barriers to technology use, and technology related needs vary over time.

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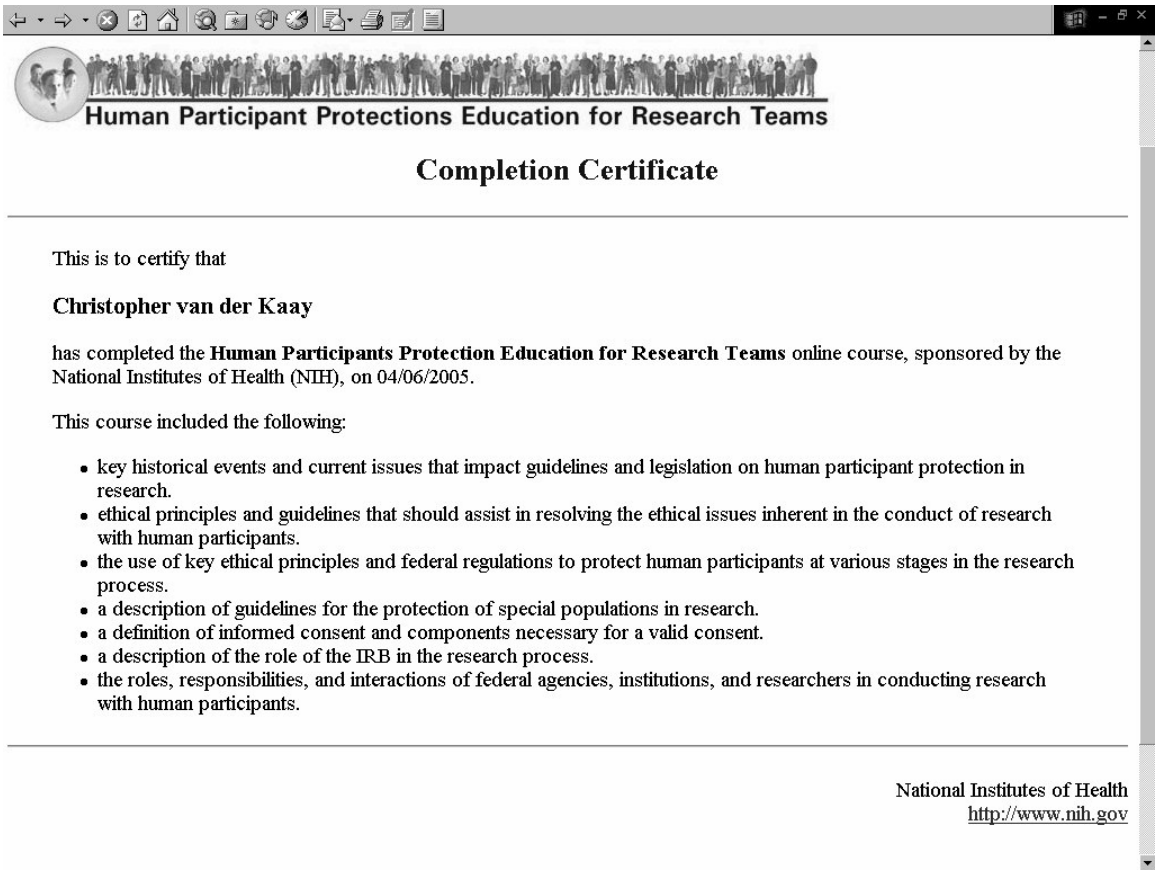
APPENDICES

Appendix A

Human Participant Protections Education for Research Teams Completion Certificate



Human Participant Protections Education for Research Teams

Completion Certificate

This is to certify that

Christopher van der Kaay

has completed the **Human Participants Protection Education for Research Teams** online course, sponsored by the National Institutes of Health (NIH), on 04/06/2005.

This course included the following:

- key historical events and current issues that impact guidelines and legislation on human participant protection in research.
- ethical principles and guidelines that should assist in resolving the ethical issues inherent in the conduct of research with human participants.
- the use of key ethical principles and federal regulations to protect human participants at various stages in the research process.
- a description of guidelines for the protection of special populations in research.
- a definition of informed consent and components necessary for a valid consent.
- a description of the role of the IRB in the research process.
- the roles, responsibilities, and interactions of federal agencies, institutions, and researchers in conducting research with human participants.

National Institutes of Health
http://www.nih.gov

Appendix B

Questionnaire Item and Domain Association

Domain	Item
Perceptions of technology	#10, #13, #20, #23, and #34
Perceived stress	#14, #40, and #114
Attitude toward professional development	#17, #41, #116, and #118
Attitude toward technical support	#11, #16, #39, and #44
Perceived technology use	#83 - #97
Perceived technology skills	#98 - #112
Perceived Barriers	
Time	#2, #15, and #42
Cost	#9, #38, and #117
Incentives	#6 and #33
Technology Skill	#3, #21, and #37
Training and Professional development	#5 and #113
Technical support	#4 and #36
Availability	#7, #24, #43, and #120
Access	#8, #12, #19, and #35
Perceived technology and technology related needs	#18, #22, #25 - #32, #45 - #63, #64 - #82, #115, and #119

Appendix C

Face Validity Introduction Letter

To: [E-MAIL ADDRESS]

From: Christopher D. van der Kaay

Re: Dissertation Study

Dear [NAME]:

I am a doctoral student attending the University of South Florida, Department of Adult, Career, and Higher Education. I recently defended my dissertation proposal, "Technology and Older Faculty: A Descriptive Study of Older Florida Community College Faculty." In order to ascertain the face validity of the survey instrument, I will be distributing the questionnaire for review to administrators of technology related programs and departments at various community colleges.

My study examines community college faculty and various aspects related to technology. These aspects include: (1) attitudes towards institutional technology support services; (2) perceptions of technology; (3) perceived use of different technologies; (4) perceived barriers to the use of technology; (5) and perceived technology and technology related needs. Data from younger (age 54 and under) and older faculty (age 55 and over) will be compared to determine if any significant differences exist.

As part of the face validation process, would you be willing to participate in a review and evaluation of the instrument? You would not be required to complete the questionnaire, but rather offer your feedback. I can provide you with an Internet link to the survey for viewing and subsequently receive your comments via e-mail. Alternatively, I can send the survey via mail, accompanied with a self-addressed stamped envelope.

Thank you in advance for your time and cooperation. Your feedback will be important for the success of this study.

Sincerely,

Christopher D. van der Kaay

Appendix D

Instructions for Face Validity Participants

To: [E-MAIL ADDRESS]

From: Christopher D. van der Kaay

Re: Dissertation Study

Dear [NAME]:

Thank you for your willingness to participate in the validation of my instrument. Once again, I greatly appreciate your time and cooperation.

Face validity refers to the validity of the instrument at face value (i.e., does the instrument appear well designed and able to function reliably to obtain the information the researcher is seeking). Additional considerations are the format, wording, and readability of the survey.

The survey can be viewed at http://home.earthlink.net/~vanderk/. Follow the link titled "Faculty Technology Survey". The instrument consists of a 120-item, Likert scale survey that measures five domains: (1) attitudes toward institutional technology support and professional development; (2) perceptions of technology; (3) perceived use of technology; (4) perceived barriers that prevent faculty from using technology; and (5) perceived technology and technology related needs of faculty. The instrument was adapted from the University of Southern Mississippi's (USM) 2004 Faculty Technology survey; permission was received from USM to use the instrument for this study.

Below the link, I have provided a brief summary of the study's purpose and significance for your reference. Once you have evaluated the instrument, please send your feedback via e-mail: vanderk@earthlink.net. I am hoping to complete the validation of my instrument in two weeks. If convenient, I would be most appreciative if could you provide your comments by August 5.

Please feel free to contact me if you have any questions or concerns.

Sincerely,

Christopher D. van der Kaay

Appendix E

Face Validity Follow-Up Letter

To: [E-MAIL ADDRESS]

From: Christopher D. van der Kaay

Re: Dissertation Study

Dear [NAME]:

Several weeks ago, I sent you an e-mail asking if you would participate in the face validation of my questionnaire. I realize that you are approaching a busy time with the start of the semester and hope that you would still be willing to provide your feedback. My study examines older community college faculty and various aspects related to technology. It is my intention and expectation that the results will be of significant value to community colleges. Your insight and input will be important for the success of this study.

Please note that your comments can be brief. Potential considerations include the wording of survey items, readability, content, and format. The survey can be viewed at http://home.earthlink.net/~vanderk/ Follow the link titled "Faculty Technology Survey".

Thank you in advance for your time and assistance.

Sincerely,

Christopher D. van der Kaay
vanderk@earthlink.net

Appendix F

Survey Access for Face Validity Assessment

TECHNOLOGY AND OLDER FACULTY: A DESCRIPTIVE STUDY OF OLDER FLORIDA COMMUNITY COLLEGE FACULTY

Faculty Technology Survey

Thank you for your willingness to participate in the face validation of my instrument. In summary, my study examines community college faculty and various aspects related to technology. These aspects include: (1) attitudes toward institutional technology support and professional development; (2) perceptions of technology; (3) perceived use of technology; (4) perceived barriers to the use of technology; (5) and technology needs. Data from younger (age 54 and under) and older faculty (age 55 and over) will be compared to determine if any significant differences exist. The results of the study are primarily intended to assist community colleges with developing or improving technology related services and support for older faculty members.

Your evaluation and feedback are greatly appreciated.

Thank you,

Christopher D. van der Kaay
E-Mail: vanderk@earthlink.net

Appendix G

Survey Cover Letter

December 2, 2005

Christopher D. van der Kaay
4504 Leucadendra Drive
Sebring, FL 33872
(863) 446-0735
E-Mail: vanderk@earthlink.net

Dear community college faculty member:

I am a doctoral student attending the University of South Florida, Department of Adult, Career, and Higher Education. As part of my dissertation research, I am conducting an anonymous survey of full-time faculty at select Florida community colleges. Please note that I have received permission from your institution to send you this questionnaire.

My study examines community college faculty and various aspects related to technology. These aspects include: (1) faculty attitudes toward institutional technology support and professional development; (2) perceived use of technology; (3) perceptions of technology; (4) perceived barriers to the use of technology; (5) and technology needs.

It is anticipated that results from this study will assist community colleges with improving technology-related services and support. In addition, data from this study may provide institutions with the necessary information for developing programs that promote the effective use of technology in instruction, research, and other academic-related activities.

Your responses will remain completely confidential. The enclosed questionnaire does not request identifiable information. Moreover, your participation is voluntary. No administrative action will be taken for your agreement or refusal to participate.

Please note that the survey utilizes various scales with two or more questions. Some questions within a scale are asked in a variety of different ways. This method permits the researcher to obtain a more precise measure of the participant's perceptions.

Enclosed are the survey and a self-addressed stamped envelope. In order to maintain participant confidentiality, do not include your name on the return address envelope. Please return the completed survey to me by **December 20, 2005**.

Thank you in advance for your time and willingness to participate.

Sincerely,

Christopher D. van der Kaay

Appendix H

Follow-up Post Card

Christopher D. van der Kaay
4504 Leucadendra Drive
Sebring, FL 33872

Place Postage Here

««Name»»
««Building_Office»»
««College»»
««Address_State_Zip»»

Dear Community College Faculty Member:

Two weeks ago, you received a faculty technology survey. If you have already completed and returned the questionnaire, please accept my sincere thank you. If not, please know that your response will be greatly appreciated and is important for the success of my study. It is anticipated that results from this study will assist community colleges with improving technology-related services and support for faculty.

The questionnaire only requires 10-15 minutes of your time and does not request identifiable information. Moreover, your participation is voluntary. No administrative action will be taken for your agreement or refusal to participate.

Sincerely,

Christopher D. van der Kaay

Appendix I

Faculty Technology Survey

Directions: Please <u>circle</u> the letter of your responses for each question:

1. a) Faculty status:
   A. Full-time B. Part-time

   b) Age:
   A. 54 or under B. 55 or over

   c) Race/Ethnicity:
   A. White, not of Hispanic/Latino origin
   B. Hispanic or Latino Origin
   C. Black or African American
   D. Asian
   E. Native Hawaiian and Other Pacific Islander
   F. Mixed Ethnicity or Other

   d) Gender:
   A. Male B. Female

   e) Highest degree earned:
   A. Associate's C. Master's E. Doctorate
   B. Bachelor's D. Specialist Degree F. Other degree

Directions: Please <u>circle</u> your response for each question:

		Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
(Questions 2-7) To what degree do you agree or disagree with the following statements? <u>I do not use the technology I would like to use because</u>:					
2.	I do not have time.	1	2	3	4
3.	I have not acquired the necessary skills.	1	2	3	4
4.	There is not enough <u>technical support</u> at my institution.	1	2	3	4
5.	There are not enough <u>training and professional development</u> opportunities at my institution.	1	2	3	4
6.	There are little or no incentives (e.g., leave time, contribution toward tenure, financial).	1	2	3	4
7.	It is not present at my institution.	1	2	3	4

Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 8-9) To what degree do you agree or disagree with the following statements?
I do not use the technology I would like to use because:

8.	I experience difficulty acquiring or checking-out existing technology provided my institution.	1	2	3	4
9.	The financial cost is high.	1	2	3	4

Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 10-21) To what degree do you agree or disagree with the following statements?

10.	The use of technology has increased my productivity.	1	2	3	4
11.	The technical support provided by my institution is adequate or better.	1	2	3	4
12.	I have access to all the technological equipment and resources that I need.	1	2	3	4
13.	I am better able to communicate with my colleagues and students because of technology	1	2	3	4
14.	Learning new technology is stressful.	1	2	3	4
15.	I am too busy to use the technology that I would like to use.	1	2	3	4
16.	The technical support for technology at my institution meets my needs.	1	2	3	4
17.	The professional development and training provided by my institution is adequate or better.	1	2	3	4
18.	I need a forum or process to express my technology needs at my institution.	1	2	3	4
19.	I am unable to use the technology I would like to use because it is difficult to access at my institution.	1	2	3	4
20.	Technology enhances classroom instruction.	1	2	3	4
21.	I am unable to use the hardware and/or software I would like to use because my technology skills are limited.	1	2	3	4

Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 22-24) To what degree do you agree or disagree with the following statements?

22.	I need additional professional development for the technology I use or would like to use.	1	2	3	4
23.	Technology has an important role in education.	1	2	3	4
24.	My institution is unable to provide, or does not provide the technology I would like to use.	1	2	3	4

Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 25-32) In the classroom(s) I use, I need but do not have:

25.	Internet access	1	2	3	4
26.	Network connections	1	2	3	4
27.	Computer projection capabilities	1	2	3	4
28.	A lapel microphone	1	2	3	4
29.	Electronic pointers	1	2	3	4
30.	Student computers	1	2	3	4
31.	Instructor's computer station	1	2	3	4
32.	Audio and video capabilities	1	2	3	4

Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 33-35) To what degree do you agree or disagree with the following statements?

33.	Limited or no reward systems for using technology at my institution keeps me from using the technology I would like to use.	1	2	3	4
34.	Technology is an effective tool for improving student learning.	1	2	3	4
35.	Limited technology accessibility at my institution keeps me from using the technology I would like to use.	1	2	3	4

Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 36-44) To what degree do you agree or disagree with the following statements?

36.	A lack of information technology assistance at my institution keeps me from using the technology I would like to use.	1	2	3	4
37.	I do not have the required knowledge to use the technology I would like to use.	1	2	3	4
38.	Lack of available funds keeps me from using the technology I would like to use.	1	2	3	4
39.	I am satisfied with the technical support provided by my institution.	1	2	3	4
40.	Keeping up-to-date with new technology is stressful.	1	2	3	4
41.	Professional development and training for technology at my institution meets my needs	1	2	3	4
42.	I have enough time to use the technologies available to me.	1	2	3	4
43.	The technological equipment and resources I need are not available in the classroom(s) I use.	1	2	3	4
44.	My institution's technical support for technology has been helpful and responsive to my needs.	1	2	3	4

Not Applicable 0	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 45-47) Existing technical support at my institution meets my needs for the following:

45.	Using a web page with course material.	0	1	2	3	4
46.	Using an e-mail list of students in my class.	0	1	2	3	4
47.	Using a class electronic bulletin board/forum on the web.	0	1	2	3	4

Not Applicable 0	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 48-63) Existing technical support at my institution meets my needs for the following:

48.	Using audio/video clips, animation, or slides.	0	1	2	3	4
49.	Using streaming video.	0	1	2	3	4
50.	Using self-paced practice and tests of routine tasks.	0	1	2	3	4
51.	Using computer simulations.	0	1	2	3	4
52.	Using self-paced tutorials with audio/video clips.	0	1	2	3	4
53.	Using multimedia presentations.	0	1	2	3	4
54.	Using the web to conduct research.	0	1	2	3	4
55.	Using the web to present work to individuals at my institution.	0	1	2	3	4
56.	Using the web to present work to people around the world.	0	1	2	3	4
57.	Using the web to conduct simulations or visualizations.	0	1	2	3	4
58.	Using the web to facilitate collaboration with individuals at my institution.	0	1	2	3	4
59.	Using the web to facilitate collaboration with individuals around the world	0	1	2	3	4
60.	Using the web to gather information via online quizzes, etc.	0	1	2	3	4
61.	Using the web for online materials archives.	0	1	2	3	4
62.	Using the web for online course reserves	0	1	2	3	4
63.	Using the web for online course delivery	0	1	2	3	4

Not Applicable 0	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 64-79) Existing <u>training and professional development</u> meets my needs for the following:

64.	Using a web page with course material.	0	1	2	3	4
65.	Using an e-mail list of students in my class.	0	1	2	3	4
66.	Using a class electronic bulletin board/forum on the web.	0	1	2	3	4
67.	Using audio/video clips, animation, or slides.	0	1	2	3	4
68.	Using streaming video.	0	1	2	3	4
69.	Using self-paced practice and tests of routine tasks.	0	1	2	3	4
70.	Using computer simulations.	0	1	2	3	4
71.	Using self-paced tutorials with audio/video clips.	0	1	2	3	4
72.	Using multimedia presentations.	0	1	2	3	4
73.	Using the web to conduct research.	0	1	2	3	4
74.	Using the web to present work to individuals at my institution.	0	1	2	3	4
75.	Using the web to present work to people around the world.	0	1	2	3	4
76.	Using the web to conduct simulations or visualizations.	0	1	2	3	4
77.	Using the web to facilitate collaboration with individuals at my institution.	0	1	2	3	4
78.	Using the web to facilitate collaboration with individuals around the world	0	1	2	3	4
79.	Using the web to gather information via online quizzes, etc.	0	1	2	3	4

Not Applicable 0	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4

(Questions 80-82) Existing <u>training and professional development</u> meets my requirements for the following:

80.	Using the web for online materials archives.	0	1	2	3	4
81.	Using the web for online course reserves.	0	1	2	3	4
82.	Using the web for online course delivery.	0	1	2	3	4

Never 1	Very Rarely 2	Rarely 3	Occasionally 4	Frequently 5	Very Frequently 6

(Questions 83-95) Please indicate <u>how often you use</u> the following information technology resources:

83.	WebCT, Blackboard, or other course management systems.	1	2	3	4	5	6
84.	LISTSERV	1	2	3	4	5	6
85.	Microsoft Publisher	1	2	3	4	5	6
86.	Web designing software (Dream Weaver, Composer, Front Page, or others).	1	2	3	4	5	6
87.	Word processing software (e.g., Microsoft Word, WordPerfect, or others).	1	2	3	4	5	6
88.	Microsoft Excel	1	2	3	4	5	6
89.	Microsoft PowerPoint	1	2	3	4	5	6
90.	Microsoft Access	1	2	3	4	5	6
91.	Adobe Photoshop	1	2	3	4	5	6
92.	Adobe Distiller (for creating PDF documents).	1	2	3	4	5	6
93.	Adobe InDesign	1	2	3	4	5	6
94.	Adobe Illustrator	1	2	3	4	5	6
95.	QuickTime, Windows Media Video, RealPlayer, or other video players.	1	2	3	4	5	6

Never 1	Very Rarely 2	Rarely 3	Occasionally 4	Frequently 5	Very Frequently 6

(Questions 96-97) Please indicate how often you use the following information technology resources:

96.	Using a data projector with laptop/computer/television	1	2	3	4	5	6
97.	Using statistical software (e.g., SPSS or SASS)	1	2	3	4	5	6

Not Applicable 0	Very Low 1	Low 2	Moderate 3	High 4	Very High 5

(Questions 98-112) Please indicate your skill level with the following information technology resources:

98.	WebCT, Blackboard, or other course management systems.	0	1	2	3	4	5
99.	LISTSERV	0	1	2	3	4	5
100.	Microsoft Publisher	0	1	2	3	4	5
101.	Web designing software (Dream Weaver, Composer, FrontPage, or others)	0	1	2	3	4	5
102.	Word processing software (e.g., Microsoft Word, WordPerfect, or others).	0	1	2	3	4	5
103.	Microsoft Excel	0	1	2	3	4	5
104.	Microsoft PowerPoint	0	1	2	3	4	5
105.	Microsoft Access	0	1	2	3	4	5
106.	Adobe Photoshop	0	1	2	3	4	5
107.	Adobe Distiller (for creating PDF documents)	0	1	2	3	4	5
108.	Adobe Page Maker	0	1	2	3	4	5
109.	Adobe InDesign	0	1	2	3	4	5
110.	QuickTime, Windows Media, RealPlayer, or other video players.	0	1	2	3	4	5
111.	Using a data projector with laptop/computer/television	0	1	2	3	4	5
112.	Using statistical software (e.g., SPSS or SASS)	0	1	2	3	4	5

		Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
(Questions 113-120) To what degree do you agree or disagree with the following statements?					
113.	Limited technology workshops at my institution keep from using the technology I would like to use.	1	2	3	4
114.	Using technology can be stressful.	1	2	3	4
115.	I need additional technical support for the technology I use or would like to use.	1	2	3	4
116.	I am satisfied with the professional development and training for technology provided by my institution.	1	2	3	4
117.	The technology I would like to use is too expensive.	1	2	3	4
118.	The technology related professional development and training provided by my institution are useful.	1	2	3	4
119.	I need upgraded hardware/software at my institution.	1	2	3	4
120.	Limited technology availability at my institution keeps me from using the technology I would like to use.	1	2	3	4

Thank you for your participation. Please send your completed questionnaire in the enclosed self-addressed, stamped envelope to:

Christopher D. van der Kaay
4504 Leucadendra Drive
Sebring, FL 33872

If you have any questions or concerns, please feel free to contact Mr. van der Kaay at: (863) 471-3346

ABOUT THE AUTHOR

Born in Fairfax, Virginia, Christopher D. van der Kaay has lived in Florida for most of his life. He received a bachelor's of arts degree in Gerontology from the University of South Florida in 1998 and a master's of arts degree in Gerontology from the University of South Florida in 2000. He resides in Sebring, Florida with his wife, Ruth.