AN EXAMINATION OF THE RELATIONSHIPS BETWEEN ORGANIZATIONAL FACTORS AND INFORMATION TECHNOLOGY SATISFACTION AND USE: A STUDY OF UNDERGRADUATE FACULTY

by

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**A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
in the University of Michigan
(Education)
2010**

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DEDICATION

To Marijean

ACKNOWLEDGEMENTS

When I learned that Marv Peterson had conquered everything from Harvard to the Himalayas, I knew I wanted him to be my advisor. I am grateful to him for his rigorous guidance which was exceeded only by his compassion and patience. I appreciate his willingness to review many revisions in order to help improve my study. I especially want to thank Steve DesJardins, who co-chaired my dissertation. Steve went above and beyond the call of duty by working with me even while travelling. Steve is one of the finest statistical scholars of our time. I also want to thank Kim Cameron, Eric Dey, and Peter Riley Bahr. Kim has always treated me with great kindness while bringing a complementary view of management and organizational behavior from the Yale perspective. I would like to thank Eric Dey for making the study of statistics accessible. I also wish to acknowledge Peter Riley Bahr for providing insights into research design and for joining my dissertation committee after the untimely passing of Professor Dey.

They say a dissertation is a solitary journey, but I could not have completed it without the assistance of Melinda Richardson, Linda Rayle and Margaret Hopkins, and the good humor and support of Greg Barrett, Ricardo Maestas, Marne Einarson, and Steve Ball. I would like to thank Joan McCoy for her encouragement and endless patience in guiding me through the maze that is doctoral work. I am also grateful for my family's emphasis on the importance of perseverance.

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CHAPTER 1

INTRODUCTION

In 2006, colleges and universities were expected to spend a record $6.94 billion on information technology hardware and software -- an increase of 35 percent over the previous year (Kiernan, 2006). In the same year, eighty six percent of surveyed colleges and universities had installed wireless networks and 68 percent offered distance learning courses (Kiernan, 2006). At one university, “100% of faculty respondents used the Internet and email; 97% used classroom instructor stations and created electronic presentations, 85% used electronic library databases, more than 50% used synchronous collaboration tools, scanners and course web sites (Bohannon, 2001)” in (Brzycki & Dudt, 2005, p. 623). However, few colleges and universities embrace that model, and despite substantial expenditures, information technology underuse is common. Moreover, this problem is not limited to higher education, but is found in many organizations.

> Low usage of installed systems has been identified as a major factor underlying the ‘productivity paradox’ surrounding lackluster returns from organizational investments in information technology (Sickel, 1997). Understanding and creating the conditions under which information systems will be embraced by the human organization remains a high-priority research issue.
>
> (Venkatesh & Davis, 2000, p. 186).

Sometimes faculty are dissatisfied with information technology because of practical concerns. Brzycki & Dudt (2005) observed faculty problems with firewalls, filters, poor Internet connections and various conflicts with Internet Service Providers. Such concerns are understandable and can be resolved easily. Of much greater concern is the larger issue of overall satisfaction with information technology. Indeed, this type of concern spans many organizational types. As computer users, faculty are consumers of information technology and if dissatisfied with their technology, they will underutilize or abandon that technology. Because of this, “many industry observers have recommended that customer satisfaction be given priority as a strategic objective. In fact, customer satisfaction appears to have replaced short-term profit maximizing as a major objective in many firms” (Kekre, Krishnan and Srinivasan, 1995, p. 1456). Furthermore, “Favorable perceptions are absolutely critical during the early adoption phases or a computer technology will be rejected or underutilized” (Venkatesh, 1999, p. 239).

Problem Statement

We do not understand fully the process by which faculty satisfaction with information technology can be influenced in order to overcome a common reluctance to accept and use unfamiliar technologies. This lack of insight makes it difficult for organizations to remain current in both information technology and pedagogy. This leads to the main research question of my study:

What are the relationships between organizational factors and faculty satisfaction with information technology and use?

By understanding and being able to predict the relationships among various influences upon faculty satisfaction with information technology and use, colleges and universities may be able to implement strategies that encourage faculty to embrace information technology more readily.

Contextual Influences

In a survey conducted by Whetstone and Carr-Chellman (2001), 76% of preservice teachers responded that computers were essential for school reform. Yet, despite years of substantial expenditures, "relatively few teachers routinely use computer based technologies for instructional purposes and when computers are used, 'they are generally used for low-level tasks such as drills and word processing' (Abdal-Haqq, 1995, p. 1)" in (Johnson and Howell, 2005, p 644).

Brzycki and Dudt (2005) report that although the amount of information technology used in education in 2005 has increased, the technology continues to be used for very low level tasks such as email and presentations. Furthermore, despite the passage of time, Brzycki and Dudt (2005) assert that the problems and barriers that existed decades earlier are still fundamentally the same. The barriers become most visible at four key points. First, when attempts are made to move a technology from the early adopters to mainstream users. Second, when attempting to move a technology to late adopters whom Rogers (1995) called "laggards." Third, when information technology budgets are reduced sharply. Fourth, when a new technology emerges (Brzycki and Dudt, 2005, p. 624).

Adams (2002), on the other hand, noted that university faculty were dissatisfied with the lack of technology training and time for learning new technology. Rakes & Casey (2002) reported that 18% of K-12 teachers also reported dissatisfaction with a lack of time for learning new technology, while a much larger percentage, 27%, of the faculty were dissatisfied with their computer equipment. Brzycki and Dudt (2005) assert that training and support are useless if faculty classrooms and offices do not have appropriate hardware and software. Ali & Ferdig (2002) observed that many educational institutions lack the funding to secure the needed hardware and software to stay current.

Although 2006 saw record spending on computer technology in higher education, information technology budgets can be volatile. Green (2000) discovered that approximately one-third of all colleges and universities in his survey reported a decline in academic computing budgets. At publicly supported colleges and universities, more than half of the institutions reported declines in their computing budgets. When budgets are tight, information technology spending may become even more vulnerable to the perceived attitudes of users on campus-- particularly faculty who make recommendations regarding program expenditures. Waddoups & Earle (2002) offer a solution using multiple types of support, such as stipends, awards, technical support, on-site training and off-campus classes. However, extrinsic rewards may not address fully the deeper problems.

In Adam's (2002) longitudinal study, 25% of the faculty were still at the most basic levels of technology acceptance, even three years after a new technology was introduced. Furthermore, "Faculty may still question whether technology devalues their profession, threatens the traditional campus, and enables students to learn as well as face-to-face instruction" (Brzycki & Dudt, 2005, p. 622). Other faculty "see the call to incorporate more technology as an 'imposition on their academic freedom, their personal time and teaching competency'"(Bunch & Broughton, 2002, p. 748). Others have detected the persistence of widespread computer anxiety (Christensen & Knezek, 2002).

Computer anxiety not only engenders affective distress in the subjects, it also impedes the acceptance of new technology.

Efforts to impose acceptance have met with mixed results. Technology adoption has become an important requirement for some accreditation agencies such as the National Council for Accreditation of Teacher Education (NCATE). NCATE is authorized by the U.S. Department of Education to evaluate teacher education programs. Brzycki & Dudt (2005) report that rather than encouraging faculty to embrace technology using a system of punishments and rewards, "over time, however, NCATE itself became a barrier as some faculty came to perceive it as heavy handed. The issue became a rallying point for resistance to technology and the accreditation process" (Brzycki & Dudt, 2005, p. 633).

Apparently, these were not isolated experiences. In studies by Adams (2002), Christensen & Knezek (2002) and Hord et al. (1987), 20-25% of potential users refused to accept the information technology or participated only at minimal levels even several years after the technology was first introduced. Ali & Ferdig (2002) observed that with each new technology, the same barriers kept appearing. While there may be several explanations for the low usage of information technology by teachers, Zhao & Cziko (2001) found that faculty satisfaction with technology was the most critical variable.

Purpose of the Study

The purpose of this study is to examine what are the relationships between organizational factors and faculty satisfaction with information technology and use**.** This study examined whether there were differences in satisfaction with information technology by institutional characteristics, employment characteristics, research and teaching characteristics, disciplinary characteristics, demographic characteristics and overall organizational satisfaction characteristics, and by using extant research literature develop a model that empirically explicates and predicts relationships among these factors and addresses which organizational factors affect faculty satisfaction with information technology and use.

Significance of the Study

Reluctance to adopt new information technology is not just a problem for higher education. Despite extraordinary advances in information technology, “performance gains are often obstructed by users’ unwillingness to accept and use available systems (Bowen, 1986; Young, 1984). Because of the persistence and importance of this problem, explaining user acceptance has been a longstanding issue in information technology research (Swanson, 1974; Lucas, 1975; Schultz and Slevin, 1975; Robey, 1979; Ginsberg, 1981; Swanson, 1987)” (Davis, 1989. p. 319).

This study used both empirical and theoretical literature to develop a model that may be used to express the relationships among organizational factors and faculty satisfaction with information technology and use. This study drew upon literature streams from education, psychology, organizational behavior and management information systems. Seminal theories in this area include Biglan’s (1973a) Classification of Disciplines, Bandura’s (1982) Self-Efficacy Theory, Roger’s (1995) Innovation Diffusion Theory, and Davis’ (1989) Technology Acceptance Model. This study offers suggestions for interventions that may facilitate an improvement in faculty satisfaction with information technology and use, thus making it more likely for information technology utilization to take place.

Overview of the Study

I begin Chapter 2 of my study by discussing the research that has been conducted on my dependent constructs: faculty satisfaction with information technology and faculty use of information technology. Next I review definitions of information technology and the literature on technology satisfaction and technology use. Then, I discuss elements that may influence faculty satisfaction with information technology and use, including institutional characteristics, demographics, employment characteristics, research orientation, disciplinary characteristics, and overall organizational satisfaction. I conclude the second chapter with the subsidiary research questions that flowed from the empirical and theoretical literature. I operationalized the major constructs including the dependent variables, the independent variables, and depicted the scaling used to measure those variables.

In Chapter 3, I introduce my conceptual framework, and dependent and independent variables derived from my dependent constructs and independent constructs. In Chapter 4, I discuss my rationale for selecting baccalaureate-only institutions, and present the research design planned for this study. Specifically, I discuss the population of the study, sample selection procedure, sample collection, and sample sizes. I also provide a descriptive overview of the results of the study. Chapter 4 concludes with the analyses that were conducted and a statement of the limitations of the study design. Chapter 5 analyzes the research questions. In Chapter 6, several multiple regression models are presented, and Chapter 7 includes a discussion and conclusion for my investigation.

CHAPTER 2

LITERATURE REVIEW

Chapter Overview

I begin this chapter with a section that discusses how technology has been defined in the organizational literature and conclude the section with the definition of technology that was used in this study. In the next section, I discuss research that has been conducted on the information technology satisfaction and information technology use constructs.

Next, I discuss four of the most widely cited models including the Theory of Reasoned Action, the Technology Acceptance Model, the Venkatesh Model, and the Karahanna, Straub and Chervany Model. The Technology Acceptance Model is the most widely cited information technology model in both the educational and organizational literature. The Theory of Reasoned Action model is also widely cited in information technology studies because the Technology Acceptance Model is derived directly from the Theory of Reasoned Action. The Venkatesh Model and the Karahanna, Straub and Chervany Model both evolved from the Technology Acceptance Model. The Karahanna, Straub, and Chervany Model was important for my study because it enhanced the Technology Acceptance Model by identifying differences between pre-adoption and post-adoption attitudes about information technology.

In the next section of this chapter, I review the research literature related to independent variables that may be applied to a model that will examine which organizational factors affect faculty satisfaction with information technology using the Karahanna, Straub and Chervany (1999) post-adoption user construct.

The next section of this chapter consists of a conceptual framework developed from the research literature, subquestions, and a discussion of a proposed model as well as the expected relationships among the study variables.

In the final section of this chapter, I define the dependent and independent constructs. Finally, I list the constructs identified in the literature along with the associated items and scales as they appear in the federal database I used which was the National Study of Postsecondary Faculty 2004 study (the NSOPF:04 dataset is discussed in more detail in Chapter 3). The constructs and the items that were used to form those constructs appear in Table 3.1 and are listed in the order they appeared in the research questions. Appendix A1 lists the academic disciplines identified in the survey and Appendix A2 lists faculty distributions by disciplinary categories.

Organizational Research on Technology

The dependent constructs in this study were faculty satisfaction with information technology and faculty use of information technology. While technology has been a major area of study for organizational scholars, the definition of this construct has varied over time. According to Perrow (1967), technology is defined as "the actions that one individual performs on an object with or without the aid of tools or mechanical devices, in order to make some change in that object. The object, or 'raw material' may be a living being, human or otherwise, a symbol or an inanimate object" (pp. 195-196).

Hage and Aiken (1969) defined technology as overall routiness in work. Perrow (1967) investigated the technology of industrial companies while Zwerman (1970), Fullan (1970), Meissner (1969), and Grimes, Klein and Shull (1972) defined technology as the complexity of the means of production. Most researchers in the 1960s studied only top administrators and extrapolated those findings onto all the members of the organization (Lynch, 1974, p. 339). Lynch (1974) observes that “by using responses from one or several major administrators the investigator assumes that technology is observable on all dimensions and that the perceptions of the managers are the same as those of his subordinates and other organizational participants” (Lynch, 1974, p. 342). This study attempted to remedy that limitation by studying faculty rather than administrators.

Several organizational scientists have conceptualized technology differently. For Bell (1967), technology was the amount of complexity and uncertainty in work, while Hage and Aiken (1969) defined technology in term of the overall routineness of work. On the other hand, Hickson, Pugh & Pheysey (1969), examined how technology affected workflow and were concerned primarily with an organizational unit of analysis rather than an individual unit of analysis.

Furthermore, past studies were limited in their generalizability across organizational types. For example, Hage and Aiken (1969) studied health and welfare agencies, Hickson, Pugh and Pheysey (1969) examined manufacturing and service organizations and Lynch (1974) investigated libraries. As Lynch (1974) points out, “future studies must consider whether any single measure of technology can compare the technologies of many different kinds of organizations” (p. 350).

More recent organizational studies have identified potential problems with technology. Mac Cormack et al. (2001) and Verganti and Buganza (2005) noted that too much technological expertise may be detrimental to organizations because it can lead to organizational inertia. As more individuals adopt and use a technology, they may become comfortable with it and may be more likely to resist replacing that technology. This can be particularly problematic in organizations where the rate of change is high. From an organizational perspective, technology can sometimes be difficult to manage because of its dynamic nature. As Karlsson et al. (2010) pointed out, the implementation and use of new technology often requires individuals within an organization "who operate with different norms, attitudes, time orientations, technical languages, patterns of interactions, work traditions, and practices (Ranft and Lord, 2002; Nambisan, 2002, Karlsson and Loven, 2005)" p. 678. In order to get individuals to use technology, it may be necessary to use non-financial and symbolic incentives (Grote, et al., 2009, Ellingsen and Johannesson, 2007). Kleinbaum and Tushman (2007) noted that social networks within and across departments help in the adoption and use of technology. Furthermore, Persaud (2005) and Barczak et al. (2008) reported that the use of information technology also tended to enhance organizational communication, and enhanced organizational communication can strengthen social networks. These observations may be useful in research that examines faculty use of technology because salaries and other financial incentives tend to be severely constrained in most colleges and universities.

Other recent organizational behavior research has examined technology using an interorganizational unit of analysis and concluded that the less an adopting organization understands a new technology, the greater the need for inter-organizational interaction (Stock and Tatikonda, 2004).

In my study, "information technology" was defined as computer hardware and software as well as Internet and locally networked resources.

Dependent Constructs

Information Technology Satisfaction

This study examined two dependent constructs. The first was information technology satisfaction, and the second was information technology use. The information technology satisfaction construct is worthy of study for a number of reasons. "There is substantial evidence that negative attitudes toward a situation (e.g. computer-mediated work) negatively affect learning (Ames and Archer, 1998; Diveck, 1986; Keith, 1982; Lepper, 1985)" in (Gattiker and Hlavka, 1992, p. 90). Furthermore, "[Noe (1986)] hypothesized that, if one were to assume similar ability levels among trainees, those with positive or enthusiastic attitudes toward the subject (e.g. computer-mediated work) would likely acquire more knowledge and skills" (Gattiker & Hlavka, 1992, p. 90). Gattiker and Hlavka (1992) conducted a study which suggested that computer ownership led to more positive attitudes toward computers as well as increased satisfaction with computers.

Noe and Schmitt (1986) found that attitude affects learning and retention and Gattiker and Paulson (1987), Lepper (1985), and Keys and Wolfe (1988) (in Gattiker & Hlavka 1992, p. 89) found that attitude had important training implications in business and higher education. While Chen (1986) and Morrison (1983) examined general attitudes toward computers, Gattiker and Hlavka (1992) narrowed their focus to how computer ownership influenced their attitudes toward computers, and how those attitudes affected learning outcomes. Previously, Menashian (1985) conducted studies that had shown that purchasing a computer favorably improved one’s satisfaction with information technology. However, Gattiker & Hlavka (1992) showed that the link between ownership and academic performance in information technology is tenuous because the key factor may, in fact, be extended exposure. It may be that extensive access to a computer may be the reason for improved performance and the important factor is time on task rather than ownership. Nevertheless, those individuals who own their hardware and software will generally have much greater access to a computer than someone whose access is limited to restricted lab hours or crowded offices. Individuals who own their computers are more likely to use them at home. Thus, access time may be more accurate as a variable than machine ownership.

Indeed, Liu, Maddux, and Johnson (2004) studied 609 teachers and noted that time on task was an important factor in computer attitude and computer learning. While many studies have suggested that user attitudes toward information technology affect learning about information technology (Francis & Evans, 1995; Freedman & Liu, 1996; Mitra & Steffernsmeier, 2000; Houtz & Gupta, 2001).

Other researchers focused on specific aspects of attitudes toward technology in education:

> In the past, attitude studies have focused on investigating computer users’ attitudes measured by one or more variables such as: Enjoyment--the degree to which students enjoy learning and using technology (Temple & Lips, 1989; Cooper & Stone, 1996; Liu & Johnson, 1998; Christensen & Knezek, 2001); Motivational---the degree to which students are willing to learn and use technology (Clariana, 1993; Kellenberger, 1996, Liu & Johnson, 1998, 2001; Christensen & Knezek, 2001); Importance---the extent to which students see learning and using technology as important (Pelton & Pelton, 1996; Corston & Colman, 1996; Liu & Johnson 1998, 2001); and Computer Anxiety---the degree of fear that students feel while learning and using technology (Schumacher,

> Morahan-Martin, & Olinsky, 1993; Ayersman, 1996; Liu, 1997; Christensen & Knezek, 2001). Findings from these studies have suggested that such attitude variables are related to students' success in learning to use computer technologies.

(Liu, Maddux & Johnson, 2004, pp. 593-594).

Liu, Maddux, and Johnson (2004) found that those users who were satisfied with information technology tended to devote more time to using and learning information technology. In addition, there is a positive correlation between time spent using and learning computers and computer achievement. Thus, Liu, Maddux, and Johnson (2004) concluded "computer attitude variables have a linear relationship with computer achievement (p. 603), and, "time spent on computers influences computer achievement directly. Computer attitudes influence computer achievement indirectly, through intermediate variable(s)" (p. 604).

"Empirical evidence suggests that attitudes based on direct experience with an attitude object predict behavior better than attitudes formed based on indirect experience (Fazio & Zanna, 1981; Fazio, et al., 1982)" in (Karahanna, Straub, Chervany, 1999, pp 188-189). In the studies conducted on information technology usage, these researchers examined the role of cognition and affect in estimating future computer usage and satisfaction and concluded that experience is more important than cognition or affect in determining future computer usage.

Information Technology Use

The second dependent construct used for this study was information technology use. Hartwick and Barki (1994) examined how mandatory or voluntary computer usage affected attitude. They investigated the influence of attitude and social pressure on computer usage and found that when usage was mandatory, the effects of attitude and social pressure on usage were drastically reduced-- at least temporarily. Another factor, such as satisfaction, would have to be used in order to be able to predict longer term usage and voluntary usage. In other words, requiring individuals to use a particular information technology would compel usage of that information technology at work. It would not, however, predict very well, information technology usage away from work or upon the departure of the person mandating use of that particular technology. On the other hand, satisfaction may be a better construct for predicting future usage. If usage is mandatory and satisfaction is low, it is likely that the information technology was used only at work and only on a temporary basis. If information technology satisfaction is high, then information technology usage may increase at work and may continue outside of the workplace.

Johnson and Howell (2005) examined mandatory information technology usage from another perspective. Instead of investigating how attitudes affect behavior-- in this instance information technology usage-- they examined how usage affected attitudes. This is particularly noteworthy because Pajares (1992) noted "change in beliefs follows, rather than precedes, change in behavior" (p. 321) and Kagan (1992) observed that faculty base their beliefs on their own experiences and that of their peers rather than on factual knowledge. Furthermore, Downes (1993) found that as users gained experience, their levels of computer anxiety decreased. "Thus, teaching practice (e.g., the use of instructional technology) may lead to change in beliefs and attitudes (Lumpe & Chambers, 2001; Windschitl & Sahl, 2002; Zhao, Pugh, Sheldon & Bryers, 2002)" (Johnson & Howell, 2005, p. 645). In their study, Johnson & Howell (2005) divided teachers into two groups. For one group, use of an instructional technology called

“WebCT” was mandatory while for the other group use of WebCT was optional. Prior to the study both groups reported positive attitudes toward information technology. After the study was concluded, a follow-up survey showed that both groups showed increased information technology satisfaction, but the group for whom information technology use was mandatory, information technology satisfaction increased considerably more than for the group for whom information technology use was optional. Instead of observing resentment on the part of the group which was forced to use information technology, the researchers noticed a greater increase in satisfaction within the mandatory group.

Bern (1972) offers a possible reason why user satisfaction increased in the mandatory use group but not in the group where information technology use was not mandatory. When individuals spend a great deal of time in a behavior, they tend to feel more positively about that behavior. However, Johnson & Howell (2005) believe that the increase in satisfaction was the result of prolonged exposure to high quality information technology which made it possible for the users to absorb more fully and to understand more easily the myriad features of the software. This begs the question: would the results be the same if the study involved inferior software or poorly constructed information technology?

Seyal, Rahman, and Rahim (2002) determined that computer experience and perceived usefulness affected user satisfaction with information technology. It is not certain if the conclusions about satisfaction with information technology would be diminished if the extended experience revealed a lack of perceived usefulness, or if users would still find merit in the information technology to justify their time and effort investment in line with the Cognitive Dissonance theory.

In the next section, I discuss the major research models that contributed to the conceptual framework of my study. These models include the Theory of Reasoned Action, the Technology Acceptance Model, the Venkatesh Motivation Model, and the Karahanna, Straub and Chervany Model.

Theory of Reasoned Action Model

According to the Ajzen and Fishbein's (1980) Theory of Reasoned Action, a person's performance of a particular behavior is determined by his or her intention to perform the behavior, which, in turn, was determined by subjective norm and that person's attitude. Subjective norm consisted of social pressure from peers and superiors.

Figure 2.1. Theory of Reasoned Action Conceptual Framework

In a formulaic representation, A represents Attitude SN represents subjective norm BI represents behavioral intent B represents behavior A + SN => BI => B Attitude and Subjective Norm lead to behavioral intent which leads to actual behavior.

body of empirical data in support of TRA has accumulated" (p. 985). The Theory of Planned Behavior (Ajzen, 1988) extended the Theory of Reasoned Action by adding a perceived behavior control construct.

Technology Acceptance Model

Davis (1989) tightened the focus of technology research by narrowing the focus to acceptance of computer technology. Davis (1989) offered a very influential theory known as the Technology Acceptance Model or TAM. This was intended to extend Ajzen and Fishbein's (1980) Theory of Reasoned Action (TRA) although the TRA was "designed to explain virtually any human behavior" (Ajzen and Fishbein, 1980, p. 4), while the Technology Acceptance Model was designed specifically to explain only one behavior – computer adoption and usage. In the Technology Acceptance Model, the dependent variable is whether or not people use a particular technology. He offered two independent variables: perceived ease of use of the information technology and perceived usefulness of the information technology. Davis (1989) hypothesized that if a person felt that an information technology were easy to use and useful, then that person would adopt and use that technology/innovation.

However, it seems that Davis (1989) may have been too restrictive in his definition of perceived usefulness. He states "<u>perceived usefulness</u> [sic] is defined here as 'the degree to which a person believes that using a particular system would enhance his or her job performance' " (Davis, 1989 p. 320). By limiting the parameters of this construct to work-related environments, Davis excludes all other environments in which an information technology may be used. Furthermore, Davis suggests that as a result of improved work performance, the adopted technology would provide extrinsic work rewards: "within an organizational context, people are generally reinforced for good performance by raises, promotions, bonuses and other rewards (Pfeffer, 1982; Schein, 1980; Vroom, 1964)" (Davis, 1989, p. 320). The Davis (1989) Technology Acceptance

Model’s perceived ease of use construct is derived from Bandura’s (1982) research which defined self-efficacy as consisting of “judgments of how well one can execute courses of action required to deal with prospective situations” (p.122).

A second research flow that helped create the ease of use construct comes from Rogers’ and Shoemaker’s (1971) work on innovation diffusion. Perceived ease of use is seen as being antithetical to complexity. Rogers and Shoemaker (1971) defined complexity as “the degree to which an innovation is perceived as relatively difficult to understand and use” (p. 154).

Barki and Huff (1985), Baroudi et al. (1986) and Davis (1989) also noted strong correlations between technology use and technology satisfaction. In the Technology Acceptance Model, a person’s behavior to use an information technology is determined by the perceived ease of use of the information technology and the perceived usefulness of the information technology.

Figure 2.2 Conceptual Framework for the Technology Acceptance Model

EOU represents ease of use

U represents usefulness

TA represents technology acceptance

EOU + U => TA

Ease of use and Usefulness lead to technology acceptance.

A weakness of the Davis model is its reliance on extrinsic rewards. As Davis states, “Robey’s expectancy model was a key underpinning for the definition of perceived usefulness stated in this article,” (Davis, 1989, p. 333). However, with the omnipresence of computers in the workplace, computer competency is increasingly expected and rewards for proficiency are becoming less likely.

Shortly after the introduction of the Technology Acceptance Model, a number of confirmatory studies were launched. Davis, Bagozzi, and Warshaw (1989) conducted a fourteen week long longitudinal test of the Technology Acceptance Model using 107 MBA students. At the end of the study, perceived ease of use and perceived usefulness still predicted acceptance of the technology although perceived usefulness had a stronger effect than perceived ease of use. The researchers also found that subjective norms had no effects upon information technology acceptance.

It should be noted, that when Davis (1989) and Davis, Bagozzi and Warshaw (1989) refer to technology, they specifically mean computer systems. “TAM, introduced by Davis (1989), is an adoption of TRA specifically tailored for modeling user acceptance of information systems,” (Davis, Bagozzi and Warshaw, 1989 p. 985). Furthermore, Davis, Bagozzi and Warshaw (1989), want the model to apply to a wide range of computer systems, “The goal of TAM is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified” (Davis, Bagozzi, and Warshaw, 1989, p. 985).

In the Davis, Bagozzi and Warshaw (1989) enhancement of the Technology Acceptance Model, an implied driving force is extrinsic reward, which they believe supersedes any attitudes the user may have toward a given technology: “within organizational settings, people form intentions toward behaviors they believe will increase their job performance, over and above whatever positive or negative feelings may be evoked toward the behavior per se” (Davis, Bagozzi, Warshaw, 1989 p. 986). According to the Technology Acceptance Model, perceived ease of use and perceived usefulness of technology are valuable constructs because they can be observed, recorded and measured. However, TAM ultimately states that these constructs are actually manifestations of extrinsic rewards. Perceived ease of use and perceived usefulness not only lead to computer acceptance, they also lead to enhanced user work performance. This, according to TAM, is critically important “because enhanced performance is instrumental to achieving various rewards that are extrinsic to the content of the work itself, such as pay increases and promotions” (Davis, Bagozzi, Warshaw, 1989, p. 986). Furthermore, “people form intentions toward using computer systems based largely on a cognitive appraisal of how it will improve their performance” (Davis, Bagozzi, and Warshaw, 1989, p. 986).

However, Davis, Bagozzi and Warshaw (1989) also impute aspects of intrinsic motivation to perceived ease of use. Perceived ease of use is also linked with Bandura’s (1982) concept of self-efficacy (p. 987). While perceived ease of use was an important construct in the Technology Acceptance Model, Davis, Bagozzi and Warshaw (1989) found that perceived usefulness was the most important construct. “Users may be willing to tolerate a difficult interface in order to access functionality that is very important, while no amount of use will be able to compensate for a system that does not do a useful task" (Davis, Bagozzi, and Warshaw, 1989, p. 1000).

A major limitation of the Technology Acceptance Model has been its reliance on self reporting. Szajna (1994) attempted to compensate for this shortcoming by testing the model's dependent variable--information technology acceptance--and measuring the actual choices a subject made rather than using self reports of a subject's actions. Ultimately, the Szajna (1996) study confirmed the results of the original Technology Acceptance Model.

The Venkatesh Motivation Model

Venkatesh (1999) enhanced the Technology Acceptance Model by adding an element of intrinsic motivation. Venkatesh (1999) observed that users often use a new technology in the workplace "even if they did not have a positive attitude (affect) toward the behavior" (p. 240). Venkatesh (1999) defines intrinsic motivation as "the pleasure and inherent satisfaction derived from a specific activity" and "extrinsic motivation" emphasizes performing a behavior to achieve a specific goal (e.g. rewards)"(p. 240). An advantage of intrinsic motivation is that is tends to be more likely to lead to sustained behavior than extrinsic motivation.

Venkatesh (1999) further posits that intrinsic motivation is more likely to generate greater perceptions of ease of use (a major building block of the Technology Acceptance Model) than extrinsic motivation (p. 243). He proceeds to offer game playing training methods as vehicles for intrinsically motivating technology users. While the study confirmed that game playing did increase reported levels of ease of use, it did not appear to increase the perceived usefulness of the technology (the other major construct in the Technology Acceptance Model).

Karahanna, Straub, and Chervany Model

While the Technology Acceptance Model led to a substantial amount of subsequent research, it lacked a temporal element. The Technology Acceptance Model has, as its dependent variable, acceptance and use. However, later researchers have noted that technology acceptance and technology use are indeed two separate phenomena. Karahanna, Straub, and Chervany (1999) observed that technology acceptance occurs before technology use and is theoretically more aligned with the technology adoption literature while technology use typically occurs after technology acceptance and is allied conceptually more closely with technology diffusion. Karahanna, Straub and Chervany (1999) proceed to assign two separate identities to a person who is exposed to the technology. While a person is deciding whether to accept the new technology, he or she is called a “potential adopter.” After that person has decided to adopt the technology, he or she is called a “user” (Karahanna, Straub, Chervany, 1999 p. 183).

These researchers also examined the pre-adoption and post-adoption phases of technology acceptance and observed that it would be inaccurate to use the same constructs for both phases. They also examined whether Ajzen and Fishbein’s (1980) subjective norm construct should be applied to the Technology Acceptance Model.

During the pre-adoption phase, the target behavior is adoption while during the post-adoption phase the target behavior is continued usage (p. 185). Karahanna, Straub, and Chervany (1999) assert that while research had been conducted on user attitudes about specific technologies after adoption, few studies have examined construct importance during the pre-adoption and post-adoption phases using a longitudinal study (p. 185). They also identify the possibility of the influence of the cognitive dissonance theory (Cummings and Venkatesan, 1976; Festinger, 1957) which states that after a person uses a product his or her satisfaction with that product may change.

Triandis (1971) suggested that subjective norms and individual affect will have an important influence during the pre-adoption phase, but that influence will diminish during the post-adoption phase. Thompson, et al. (1994) examined subjective norm and individual affect by comparing users with significant technological experience against users with limited technological experience. Thompson et al. (1994) found that inexperienced users were more likely to be influenced by subjective norms and affect than experienced users.

However, Karahanna, Straub and Chervany (1999) disagree with other technology research. “[The] results contradict earlier findings (Cooper and Zmud, 1990; Laudon, 1985) that pre-adoption is better explained by ‘rational’ task-technology fit, and post-adoption by more sociopolitical and ‘learning’ approaches” (p. 199). In the pre-adoption phase, Karahanna et al. (1999), found that trialability, perceived usefulness, result demonstrability, visibility, and ease of use were most important, while during the post-adoption phase, perceived usefulness and image were most important (p. 200).

Prior to Karahanna et al. (1999), research on the Technology Acceptance Model generally ended with an examination of decisions on whether or not to adopt a technology. Karahanna et al. (1999) enhanced that model by examining user attitudes before and after they decided to adopt a technology. My study contributed to the literature by examining which organizational factors affect faculty information technology satisfaction, and how faculty satisfaction with information technology affects faculty use of information technology. Just as Karahanna et al. (1999) divided the original Technology Acceptance Model's technology use and acceptance dependent variable into two separate variables, I felt information technology adoption and use needed to be examined more closely for a user satisfaction component because information technology adoption and use may not necessarily be congruent with information technology satisfaction. For example, an unsatisfactory information technology may be adopted and used because of extreme cost constraints or because of a lack of a suitable alternative. However, low satisfaction levels may impede future information technology use.

In the previous section I discussed prior research on the dependent constructs for my study. In the next section, I examine the research literature related to independent constructs that may lead to the construction of a model that will help understand the organizational factors that affect faculty satisfaction with information technology, and how faculty satisfaction with information technology may affect their use of information technology.

Independent Constructs

A review of the literature suggests that six major constructs may be useful in the construction of my model because they tend to affect faculty satisfaction and faculty information technology use. Furthermore, Rousseau (1978a) asserts that organizational satisfaction in one area tends to affect satisfaction in other areas. These include institutional characteristics, employment characteristics, disciplinary characteristics, demographic characteristics, research and teaching characteristics, and organizational satisfaction characteristics.

Institutional Characteristics

Anderson (1981) found that departments offering only bachelors' degrees were much less likely to have instructional computing adopters than those departments that offered graduate and professional degrees. Furthermore, according to this study, faculty at the full professor rank were found to be much less likely to use computers than instructors, assistant professors, and associate professors.

Anderson (1981) reported a bifurcation in perceptions is the reason for limited faculty use of computer technology. Faculty believe the greatest obstacle is a lack of time while program and department chairpersons see the greatest obstacle to be a lack of faculty training. In this study, both faculty and chairpersons also cited dissatisfaction with the computer technology and a lack of funding.

Brzycki and Dudt (2005) tend to concur with Anderson's (1981) observation with regard to organizational lethargy in technology adoption. They noted that large, decentralized institutions tend to adopt technology slowly and to implement that technology only partially. This was particularly the case with web course authoring tools and video conferencing (Brzycki and Dudt, 2005, p. 626).

Hynes and Stretcher (2005) analyzed organizational attitudes toward information technology by examining their acceptance of electronic journals as a legitimate means of conveyance of scholarly articles. Although electronic journals are more timely and efficient in the rapid review, evaluation and dissemination of knowledge, many universities do not acknowledge electronic journal publication as legitimate scholarship even when published by established prestigious organizations. Most accredited business schools require evidence of scholarly activity in the form of research publications. Hynes and Stretcher (2005) found that 84% of business school deans indicated that their promotion and tenure policies involved rating the quality of the journals in which a candidate publishes (p. 74). Indeed, it is easier to define the institutions that do not rate journals: “The business schools that do not [sic] rate journal quality fit a clear demographic profile. In general, these schools have fewer than 1,500 business students, (72.2%); are in the Southern Association (52.23%); and fall into the Carnegie classification of Masters I (72.2%)” (Hynes and Stretcher, 2005, p.74).

The institutions that did not regard electronic journals to be legitimate scholarly outlets regardless of which organization sponsored the publication included large academic units within midsize institutions -- typically large business schools within medium sized universities. Most of those institutions are classified as Carnegie Research Extensive and have been AACSB International members for more than 25 years (p. 74). This subset of organizations is rather substantial since it represents 30% of the institutions that evaluate faculty journal research (p. 74).This tends to support Brzycki and Dudt’s (2005) and Anderson’s (1981) assertions that large, established universities tend to be hesitant in adopting information technology innovations.

I subdivided the Institutional Characteristics major construct into five constructs: institutional control, organizational size, student-faculty ratios, institutional instructional expenditures, and degree of urbanization. The organizational size construct was subdivided further into two independent variables: number of faculty employed at an institution and number of students enrolled at an institution.

Institutional Control

My first institutional characteristics construct was institutional control and was used to determine whether private or public control affected faculty satisfaction or usage of information technology. Lee, Dedrick and Smith (1991) examined how institutional control affected faculty overall satisfaction in public and private schools. They used the Administrative and Teacher Survey from High School and Beyond which included 8,488 full-time teachers, and applied organizational behavior principals to analyze teachers' overall satisfaction. They found, "how schools are organized as workplaces strongly influences teachers' overall satisfaction and efficacy (Bryk and Driscoll 1988; Little 1982; Rosenholz 1989; Rutter 1986)" (in Lee, Dedrick and Smith 1991, p. 192). Specifically, Lee, Dedrick and Smith (1991) found:

> A fundamental difference between public and private schools in this regard makes the organization of public schools far more likely to show both high internal complexity and distant connections between administrators and the school's technical core of instruction. Chubb and Moe (1990) suggested that the bureaucratic organizations of public schools renders them both less willing to respond to their clients (parents and students) and more able to respond to the political environment to which they are accountable. The market orientation of private schools, on the other hand, encourages responsiveness to clients' demands, usually directed toward academic activities (in Lee, Dedrick and Smith, 1991, p 193).

Lee, Dedrick and Smith (1991) felt that there were several organizational factors that differentiated public and private educational institutions. Schools that were publicly controlled "tend to develop what Weber (1947) called a bureaucratic-legalistic authority structure, in which members must move through formalized mechanisms to interact with other members. Collegial interaction is typically limited, which results in little communication about work either among teachers or between the principal and teachers (Herriot and Firestone 1984)," (in Lee, Dedrick and Smith, 1991, p. 193).

By contrast, private schools were found to be more collegial and more likely to exhibit cultural linkages among the faculty. Lee, Dedrick and Smith (1991), found that "staff collegiality (communal organization, staff influence in decision making, collaboration time, and knowledge of others' courses" was stronger in private schools than in public schools (p. 196). They also supported their quantitative findings with the following qualitative observations: "Schools in which teachers feel more efficacious are likely to be environments in which human relationships are supportive ('You can count on most staff members to help,' 'a great deal of cooperative effort,' 'a big family'), where teachers 'share beliefs and values about…the central mission of the school,' and where they 'feel accepted and respected'" (Lee, Dedrick and Smith, 1991, p. 204).

According to these studies, institutional control affects faculty job satisfaction. More specifically, faculty at private institutions exhibited greater overall job satisfaction than faculty at public institutions. Furthermore, Rousseau (1978b) found that job satisfaction in one area tends to affect satisfaction in other areas. In my study, I attempted to determine if faculty in higher education would also exhibit varying levels of information technology satisfaction depending on institutional control. I expected the level of faculty information technology satisfaction and use to be higher at private institutions than at public institutions.

Organizational Size

My second institutional characteristics construct, organizational size, has been linked with elements of employee satisfaction for many years. Metzner and Mann (1953) demonstrated links between employee absenteeism and job satisfaction while Baumgartel and Sobel (1959) revealed a link between organizational size and absenteeism. They asserted that as organizations became larger, absenteeism increased which in turn was associated with lower job satisfaction. Worthy (1950) concluded that when organizations were relatively small, there tended to be closer and friendlier relationships than in larger organizations.

Other researchers made similar observations: "Indik (1961) noted that as organizations became larger, communication problems increased, employee participation decreased, job satisfaction decreased, and overall perception of bureaucratic inflexibility increased regardless of whether the organization was a company or a non-profit institution" (in Beer, 1964, p.39). These non-profit institutions included educational institutions. Terrien and Mills' (1955) study of California school districts concluded that as an institution's size increased, the structural complexity and the percentage of the institution's resources devoted to administration increased. In addition, "Hewitt and Parfit (1953) postulated that organizational size was negatively correlated with job satisfaction levels because dissatisfaction was highly contagious and it was more likely to find dissatisfied employees in large organizations than in smaller organizations" (Beer, 1964, p.42). However, not all studies agree that job satisfaction is inversely related to organizational size. Kerr, Koppelheimer, and Sullivan (1951) found that employment-related satisfaction was positively related with organizational size, even when occupational hazards were considered.

When Beer (1964) offered an early definition of organizational size, he defined it as “the number of employees at any given geographic location,” (p. 34). In my study, I used two independent variables to measure organizational size: number of faculty employees, and number of undergraduate students enrolled. Although students are not usually thought of as employees, they do contribute to organizational size. An institution with a small number of faculty and a small number of students is typically organized very differently from an institution with a small number of faculty and a large number of students. I expect to find an association between institutional size and faculty satisfaction with information technology.

Student-Faculty Ratio

My third institutional characteristics construct, student-faculty ratio, has been identified as an important measure of institutional characteristics. Zheng and Stewart (2000) felt that an institution’s student-faculty ratio is a critical variable in evaluating its “instructional effectiveness” (p. 10). In their study, as a student-faculty ratio rises, instructional effectiveness decreases. Cunningham and Cochi-Ficano (2002) also found that an institution’s student-faculty ratio is correlated with the levels of alumni donations for that institution. In addition, this correlation existed for both public and private institutions. Furthermore, in examining the baccalaureate preparation of faculty who held a Ph.D., Dolan, Jung, and Schmidt (1985) found that a low student-faculty ratio and a commitment to a baccalaureate education were the most important institutional factors in predicting doctoral production.

Small institutions tend to be teaching institutions and faculty information technology use tends to be associated with instructional activities. Consequently, I expected to find an inverse relationship between student-faculty ratios and faculty information technology use.

Degree of Urbanization

My fourth institutional characteristic construct was the degree of institutional urbanization. The degree of urbanization affects the financial, political, demographic, and cultural nature of an educational institution. Dowd (2004) observed that, “colleges located outside urban areas have revenues 13-18% higher than those in large cities, controlling for enrollment size and the proportion of part-time students” p 251. Dowd (2004) also noted a number of political and demographic elements that are related to an institution’s degree of urbanization:

> “The political perspective focuses on partisan divisions expected to disadvantage urban areas in legislative arenas. This disadvantage stems from tensions of race, economics, and geography that serve to isolate cities from the suburbs and rural areas. Changes in urban demographics underway since the 1960s have led to a power shift that favors predominantly White Republicans over Democratic Blacks and other people of color in cities” (p. 254).

Degree of urbanization is more than an accident of geography for colleges and universities: “Cities have faced the loss of industry and the middle class, in addition to higher population density, unemployment, and incidence of crime than non-urban areas. Facing a greater demand for public services, cities have higher tax rates, but lower levels of support for education (Rury and Mirel, 1997)” (in Dowd, 2004, p 254). Dowd (2004) reports that: “colleges located in towns and rural areas are predicted to have a revenue position 12.8-17.5% higher than colleges with otherwise similar characteristics in large cities," (p. 264). In addition, "the outcomes of territorial strategies are also determined by the distribution of power in the legislature and by regional 'splits' in which suburban lawmakers oppose spending plans that shift benefits to cities (Wong, 1994, p. 274)" (in Dowd, 2004, p 255).

In addition to affecting the financial, political, demographic aspects of an institution, an institution's degree of urbanization may also affect faculty satisfaction. "Katzell, Barrett, and Parker (1961), found that job satisfaction was related to 'small town culture' rather than an 'urban culture.' Organizations located in large urban areas tended to exhibit lower levels of employee job satisfaction than organizations situated in rural or suburban areas," (Beer, 1964, p. 40).

Institutional Instructional Expenditures

My final institutional characteristics construct, institutional instructional expenditures, is an important indicator of an institution's commitment to instruction as well as a proxy for institutional wealth. Baccalaureate-only institutions were selected for this study because of their unique characteristics. Students are often drawn to these institutions because of their supportive environments. When they compared baccalaureate institutions with other institutions, Pike, Smart, Kuh, and Hayek (2005) found, "institutional characteristics and expenditures accounted for more than half (54%) of the variance in the Enriched Educational Experience benchmark, with being a liberal-arts college and expenditures for instruction significantly and positively, related to the measure. Being a doctoral-research university was significantly, and negatively, related to the Supportive Campus Environment benchmark," (p. 17). Pike, Smart, Kuh, and

Hayek (2005) felt that institutional instructional expenditures allowed for special academic offerings which led to enriched educational experiences and enhanced the attractiveness of an institution. However, institutional instructional expenditure was a unique contributor to an enriched educational experience-- simply spending money on students was not effective. “Few substantive relationships were found between student engagement and the three remaining expenditure categories (i.e. research, public service, and student service)” (p. 19), and, “where an institution invests its resources may make a non-trivial difference in the messages it sends about institutional priorities and values,” (Pike, Smart, Kuh, and Hayek, 2005, p.24). Because information technology is often considered an institutional instructional expense, an increase in instructional expenditures may lead to greater faculty satisfaction and use of information technology. It is possible that faculty with current software and hardware may be less frustrated than faculty with obsolete computer systems. Consequently, I expect that an institution’s instructional expenditures will be positively associated with faculty use of information technology and faculty satisfaction with information technology.

In the next section, I discuss the employment characteristics constructs, disciplinary classifications constructs, demographics constructs, research and teaching constructs, and organizational satisfaction constructs used in this study.

Employment Characteristics

According to Anderson’s (1981) research, faculty at the full professor rank (who also tend to be full-time, permanent, tenured appointments and earn more than part-time, untenured,) use technology less than other faculty. I examined whether employment characteristics such as full-time or part-time status, part-time job is primary job, tenure status, rank, highest degree attained, or income affected faculty satisfaction with or use of information technology. I expected to find greater levels of satisfaction with information technology among faculty tenured, full-time faculty and less favorable levels of satisfaction with information technology among part-time and untenured faculty.

Disciplinary Characteristics

Stark (1998) pointed out that every discipline has a unique character of teaching, learning assessment and governance. Furthermore, there are clusters of fields that may be grouped together according to various criteria. Biglan (1973a) and Biglan (1973b) developed three major categories: 1) hard/soft, 2) pure/applied, and 3) life/non-life. Several scholars have offered extensions of the Biglan taxonomy including Creswell & Roskens (1981), Smart & Elton (1982), Drees (1982), and Stoecker (1993). Other researchers have offered somewhat different classifications. Mcglothlin (1964) labeled fields “helping” or “facilitating” depending on the relative focus on social understanding versus technical competence. Anderson (1974) divided fields into “enterprising” or “helping,” while McGahie (1993) discerned four major disciplinary categories: “helping,” “entrepreneurial,” “technical,” or “performing.” Harris (1993) on the other hand, felt disciplines should be categorized on whether a discipline saw itself as providing instruction in a technology, a craft, or an art.

According to Bucher and Stelling (1977), disciplines should be classified on the basis of knowledge base, length of preparation required to enter the profession, the relative service orientation of the discipline, and the amount of autonomy enjoyed by the discipline within the host institution. By contrast, Stark (1998) promulgated a classification based on the following four categories: 1) human client service, 2) information service, 3) enterprise/production service, and 4) artistic service. According to these studies, information technology use should vary according to disciplinary classification. A similar variation should appear in faculty use of information technology by disciplinary classification. One outcome of my study would have been a possible confirmation of which disciplinary models provide the most useful classifications for understanding faculty satisfaction with information technology. Employee affiliation is an important element in organizational behavior studies. An association between faculty disciplines and faculty information technology satisfaction and use would assist in responding to the overarching research question of how organizational factors affect faculty information technology satisfaction and use. Based on the studies by Stark (1998), I expect to find a positive association between faculty disciplines and faculty information technology satisfaction and use.

Demographic Characteristics

One of the most salient limitations of technology model studies (particularly the Technology Acceptance Model or TAM) is that “while TAM has been validated in a field setting (e.g. Adams, et al. 1993), it has typically been tested using students (e.g., Davis, et al. 1989; Taylor and Todd, 1995(b); Venkatesh and Davis, 1996),” (in Venkatesh, 1999, p. 254).

Venkatesh (1999) attempted to remedy this situation at least partially by conducting a study using a variation of the Technology Acceptance Model by examining whether age differences would affect the model outcomes. In that study, the subjects were divided into two groups -- one under 40 and the other 40 and over. Both groups were then asked to learn new software using unfamiliar playful computer games.

Venkatesh (1999) found no difference in learning ability or interest in technology by age. Thus, the research suggested there should not be a significant difference in information technology satisfaction by age alone. After conducting multiple regression analyses I expected to observe similar findings in my study.

Perolle (1987), Mankin, Bikson, and Gutek (1984) reported gender differences in attitudes toward computers. However, Jacklin (1989) reported no differences. While the results are inconclusive, it is nevertheless important to study gender-based differences in information technology satisfaction and use. “Today’s young adults are really going to be the first generation of ‘information age’ workers. Technology may be causing an increase or decrease in gender differences. Therefore, understanding gender-based attitudinal differences, or lack thereof, will have important implications pertaining to training and the application of training in the workplace (Gattiker, 1990a; Bikson, Gutek and Mankin, 1987)” in (Gattiker and Hlavka, 1992, p. 90).

Gefen and Straub (1997) examined gender in a study of information technology diffusion. Gefen and Straub (1997) offer what they call the social presence information richness “addendum” (or model) to technology diffusion. Social presence is defined as human contact expressed in a medium. The social presence and information richness dimension of a technology was intended as a construct that would allow the addition of gender to the technology diffusion debate since Gefen and Straub (1997) believe that women are more likely than men to include perceived social presence and information richness to inform their decisions on whether to use a given technology.

“The original TAM work (Davis, 1986, 1989) makes no reference to gender differences nor does subsequent research (Adams et al. 1993; Chen and Gopal, 1995;

Moore and Benbasat, 1991; Straub, 1994). Gender, moreover, is not examined in IT acceptance models (Markus, 1983; Szajna and Scamell, 1993)" in (Gefen and Straub, 1997, p. 390).

Gilroy and Desai (1986) conducted a study of 326 undergraduate and graduate students, evenly divided by gender, and found that female college students experienced greater levels of computer anxiety than their male counterparts. Morrow et al. (1986), Igbaria and Chakrararti (1990); Bozionelos (1996); and Frankel (1990) observed similar results. Other researchers (Hunt and Bohlin, 1993) have demonstrated a negative relationship between computer anxiety and Bandura's (1977) self efficacy construct which in turn can lead to lowered information technology use and information technology satisfaction.

A more recent study by Venkatesh and Morris (2000) reported a more complex response in examining male and female attitudes toward information technology. Vankatesh and Morris (2000) observed that while perceived usefulness was the most important element for men when deciding whether to use a particular information technology, for women, perceived ease of use was the most important deciding factor.

Another construct that may affect differences in gender satisfaction with information technology include "subjective norm." Fishbein and Ajzen (1975) understood subjective norm to be the degree to which important individuals influence a person's behavior. Mathieson (1991) and Taylor and Todd (1995a), and Taylor and Todd (1995b) further subdivided subjective norm into two parts: peer influence and superior influence. Venkatesh and Morris (2000) believed that it is important to examine whether men and women are affected differently by peer influence and superior influences when deciding whether to use a particular technology.

> While men still represent a majority of the work force, the number of women at all levels of the organizational hierarchy continues to rise. Therefore, technology acceptance theories and models that overlook gender as an important factor may overestimate the importance of productivity-oriented factors while simultaneously underestimating the importance of ease of use perceptions and social influences.
>
> (Venkatesh and Morris, 2000, p. 132).

The empirical literature on gender satisfaction with information technology is inconclusive.

Research and Teaching Characteristics

Many state colleges and universities that were once considered regional teaching institutions are rapidly and radically changing their fundamental character. “In these ‘transitional’ (Stark, 1986, p. 64) or ‘incoherent’ (Clark, 1987, p. 115) universities, faculty members are expected to publish while carrying heavy teaching loads, which leads to role conflicts” (Tang & Chamberlain, 1997, p. 213). Orlans (1962), Bowen and Schuster (1986) have suggested that time spent on research diminishes the time for classroom preparation. Conversely, time spent on teaching may reduce time available for research. Indeed, according to Elbe and McKeachie (1985), 54% of faculty reported that serious conflicts arose when allocating time among teaching, research, and service.

At Stanford University, Hinds, Dornbusch and Scott (1974) found that most faculty indicated a preference to increase the amount of time they spent on research and to limit even further the amount of time they spend on teaching and classroom preparation. A national survey of postsecondary faculty supported this preference for increased research time and decreased teaching time (Carter, 1989). However, despite these preferences, Porter & McKibbin (1988) and Tang & Chamberlain (1997) point out that information technology will continue to become increasingly important in both content and pedagogy. I expected to find a positive association between teaching orientation (both at the individual and institutional levels) and faculty satisfaction with information technology.

Organizational Satisfaction Characteristics

Rousseau (1978a,1978b) examined how technology use within an organization could be used to predict employee attitudes. Rousseau used three separate scales to conduct her study: the Brayfield-Rothe Satisfaction Index, Miller’s Measure of Alienation; and Patchen’s Job Involvement Scale. The Brayfield-Rothe Satisfaction Index measures general satisfaction with one’s job. Miller’s Measure of Alienation measures employee work pride, while Patchen’s Job Involvement Scale is a self reported measurement of one’s willingness to work. Rousseau (1978a) administered the instruments to 19 different types of organizations and combined the three scales. After submitting the data to multiple regression analyses, Rousseau concluded that individuals whose work was routinized because of technology reported lower levels of employment satisfaction than employees who were permitted greater discretion and problem solving.

Previously, I had noted that some obstacles to faculty satisfaction with information technology were a perceived loss of autonomy threat and concerns about possible mandatory standardization of the educational process. In this study, I wanted to determine if there was a relationship between overall faculty satisfaction with work and faculty satisfaction with information technology. The literature suggested that there may be a positive association between overall faculty satisfaction and faculty satisfaction with information technology.

In the next section, I discuss how I developed a conceptual framework from the research literature and how the major constructs in my study are used to examine the overarching research questions in this research.

Development of a Conceptual Framework

In the development of my exploratory study, a major objective was to construct a model that might further our understanding of how organizational factors affected faculty satisfaction with information technology and use in undergraduate institutions by extending the work of Davis (1989) , Karahanna, Straub, and Chervany (1999), Brzycki and Dudt (2005), Venkatesh (1999), Gefen and Straub (1997) , Anderson (1981), and Ajzen and Fishbein (1980).

Davis (1989) developed a model that focused on a single dependent variable -- the adoption of information technology. Since then, considerable research has been conducted on information technology adoption (Jacobsen, 1998, Knutel, 1998, Mitra et al., 1999). Karahanna, Straub, and Chervany (1999) refined Davis'(1989) Technology Acceptance Model by splitting the original dependent variable into a pre-acceptance dependent variable and a post-acceptance dependent variable. My study benefitted from this refinement since it allowed me to develop a faculty use of information technology dependent variable. In addition, the individuals in my study were in the post-acceptance phase as identified by the Karahanna, Straub, and Chervany (1999) model.

Institutional Characteristics

Brzycki and Dudt's (2005) research stated that institutional size as well as type of control might also affect faculty use of information technology. Specifically, the study posited that larger colleges and universities adopted technology more slowly than smaller institutions. I examined institutional size, as well as type of control, institutional instructional spending, and degree of urbanization as factors that might affect information technology satisfaction or use by faculty at baccalaureate-only institutions. This led to the development of my first research question:

What are the relationships between institutional characteristics and faculty satisfaction with information technology and faculty use of information technology?

Employment and Disciplinary Characteristics

Since each faculty member is assigned a principal activity within an academic discipline, employment characteristics and disciplinary affiliation may influence information technology satisfaction and use. Indeed, Biglan (1973a) and Stark (1998) posited that disciplinary affiliations had wide ranging influences on academic attitudes and behaviors. This led to an examination of whether faculty satisfaction with information technology and use was affected by faculty employment characteristics, disciplinary affiliation, and research and teaching characteristics and this elicited my second and third research questions:

What are the relationships between employment characteristics and faculty satisfaction with information technology and faculty use of information technology?

What are the relationships between disciplinary affiliations and faculty satisfaction with information technology and faculty use of information technology?

Demographic Characteristics

While the Venkatesh (1999) Motivational Model bifurcated subjects into a younger cohort and an older cohort to examine differences in information technology use, my study extended this research by dividing faculty into three age groups -- up to 29 years old, 30 to 49 years old, and 50 years old and above, and then examining each group's satisfaction with and use of information technology. I divided my sample into three parts for the following reasons: faculty who were 29 years old or younger were typically heavily involved with nascent research and publication efforts and deeply concerned with the extrinsic rewards of employment renewal and achieving tenure. The second age group, 30 to 49 years old, was selected because faculty in this age group typically have achieved tenure and are comfortable in their research and teaching, but still look forward to the extrinsic rewards of substantial promotions and raises. In the third age group: 50 and above, faculty typically have achieved the highest academic rank and pay increases become less dramatic. By creating these three categories, it might be possible to examine whether extrinsic motivation played a role in faculty satisfaction with information technology and use.

A limitation of the Venkatesh (1999) study was that it drew subjects from a small nearby geographic sample. By contrast, this study included faculty in baccalaureate-only institutions from across the country. I also included additional demographic characteristics such as gender and ethnicity. Much has been written about race and the digital divide, and Gefen and Straub (1997) have observed markedly different patterns of information technology use by gender. In order to confirm any race or gender differences in information technology satisfaction and use, this study employed faculty email use as one measure of faculty use of information technology. This was the same main measure used by Gefen and Straub (1997) and by Davis (1989) in the development of the seminal Technology Acceptance Model. This led to my fourth research question:

What are the relationships between demographic characteristics and faculty satisfaction with information technology and faculty use of information technology?

Research and Teaching Characteristics

Studies by Fairweather and Rhodes (1995), Gray, Froh, and Diamond (1992), and Clark (1987) found that higher education tended to reward research activities over teaching. However, by limiting my sample to baccalaureate-only institutions, small teaching institutions tended to predominate in this study. As baccalaureate granting institutions, research was still important, but teaching activities were also valued. If there has indeed been a paradigm shift from the use of information technology primarily for major research projects to more diffuse pedagogical functions, it is important to examine which research activities as well as which teaching activities may be related to faculty satisfaction with information technology and use. It would have been more difficult to achieve the same degree of clarity if the study had included the full spectrum of higher education institutions. I decided to include research and teaching activities since traditional classifications such as disciplinary affiliations by themselves may not be sufficient to explain patterns of faculty satisfaction with information technology and use. Indeed, Mitra et al. (1999) noted that over time, computer usage tended to converge regardless of faculty technical background or disciplinary affiliation.

Anderson (1981) contributed to the debate by examining low levels of information technology use by faculty. He reported two possible causes for this phenomenon. One possibility was a lack of training, the other was a lack of time. Jacobsen (1998) sided with the lack of faculty training argument, however, Mitra et al.(1999) reported that faculty had satisfactory levels of computer training. By including research and teaching variables that measured time commitment, I hoped to determine whether faculty satisfaction with information technology and use changed in relation to the amount of time expended on those activities, thus furthering insight into the lack of time versus lack of training debate. This led to my fifth research question:

What are the relationships between research and teaching characteristics and faculty satisfaction with information technology and faculty use of information technology?

Organizational Satisfaction Characteristics

As Rousseau (1978b) pointed out, organizational satisfaction is a major concern of organizational scholars. In a national study of organizational satisfaction among faculty, Zabriskie, Dey, and Riegle (2002) found, “The strongest individual predictor found within the environmental domain for all models is faculty perception of a caring and supportive environment, followed by themes of student learning, collegial respect and trust,” (p. 17). I expect to replicate those finding in this study. While studies have been conducted on student, faculty, and staff satisfaction with various aspects of their institutions, little work has been done to date on faculty satisfaction with information technology and use that focused on baccalaureate-only institutions. Although the Zabriskie, Dey and Riegle (2002) study included institutional prestige and student characteristics variables, which have been associated with faculty satisfaction, unfortunately those variables were not available in the NSOPF:04 database. Those findings on organizational satisfaction led to my sixth research question:

What are the relationships between organizational satisfaction characteristics and faculty satisfaction with information technology and faculty use of information technology?

Relationship Between Information Satisfaction and Use

I also relied on research by Ajzen and Fishbein (1980) and Bern (1972). The Ajzen and Fishbein (1980) Theory of Reasoned Action examined the role of attitude in general behavior while my study focused on one attitude--information technology satisfaction, and one behavior--information technology use. Bern (1972), on the other hand, noted that when individuals spend a great deal of time in a particular behavior, they tend to feel more positively about that behavior. Thus, using these research streams, increased faculty use of information technology should lead to increased faculty information technology satisfaction, and increased faculty satisfaction with information technology might lead to increased faculty use of information technology. This led to the development of my seventh and eighth research questions:

What are the relationships between faculty use of information technology and faculty satisfaction with information technology?

What are the relationships between faculty satisfaction with information technology and faculty use of information technology?

Chapter Summary

User satisfaction with technology has been the focus of considerable research. Institutional, employment, demographic, as well as research and teaching characteristics, and organizational satisfaction have been identified as factors that may be associated with faculty satisfaction with information technology and use. The research literature suggests that the following constructs may be measured by the independent variables listed below. The independent variables for the institutional characteristics construct were: institutional control, total undergraduate enrollment, the number of faculty at an institution, the student/faculty ratio, degree of urbanization, and institutional instructional expenditures.

The independent variables representing the employment construct included: principal activity, part-time versus full-time employment status, part-time job is primary job, tenure status, union membership, highest degree attained, type of employment contract, and income categories.

The disciplinary construct was represented by the Biglan (1973a) model and the Stark (1998) model. The demographic characteristics construct was represented by the following independent variables: gender, age, and race.

The research construct was represented by the following independent variables: number of career book chapters published, number of career books published, number of career exhibitions and performances, number of career journal articles published, number of career non-refereed articles published, number of career patents granted or software developed, number of career presentations, and number of hours spent per week on thesis advising. The teaching construct was represented by the following independent variables: number of hours spent per week on administrative committees, number of hours spent per week on advising, number of credit classes taught per term, number of distance education classes taught, number of non-credit classes taught per term, number of hours spent per week on office hours, number of remedial classes taught, use of a teaching assistant (yes/no), and undergraduate instruction as a percent of overall duties.

Finally, the organizational satisfaction construct was measured using the following independent variables: a belief that female faculty were treated fairly, a belief that minority faculty were treated fairly, overall job satisfaction, a belief that part-time faculty were treated fairly, and a belief that teaching was rewarded.

In the next chapter, I present a conceptual framework drawn from the literature followed by eight subquestions that flow from prior research. That section is followed by a discussion of my research model, expected relationships among the variables, and definitions of the dependent and independent variables.

In the final section of that chapter, I summarize the dependent and independent variables along with their scales in Table 3.1. The table also lists the NSOPF: 04 survey items that were used to develop each construct. Appendix A1 lists the academic discipline categories used in NSOPF:04.

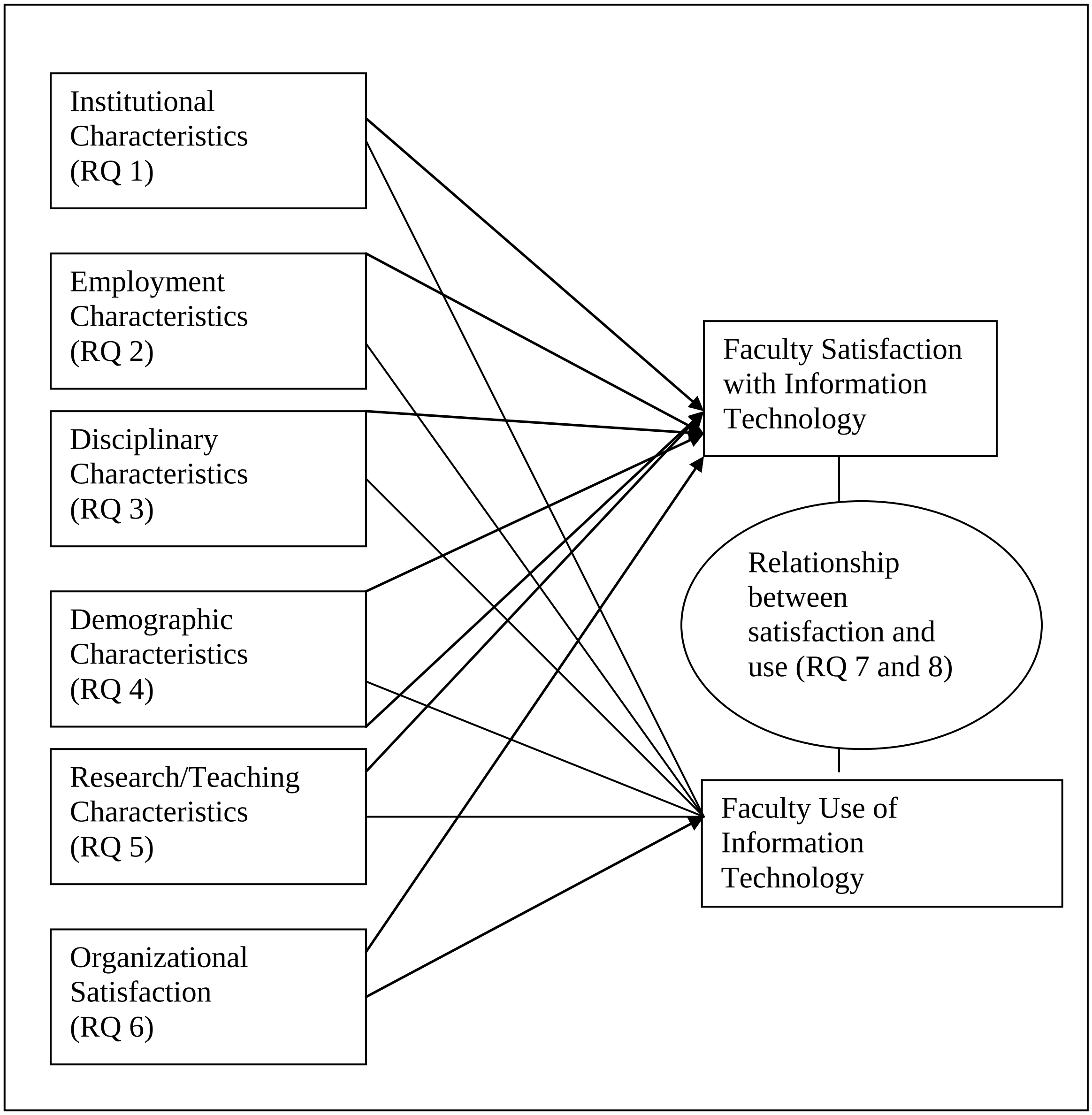
CHAPTER 3

CONCEPTUAL FRAMEWORK

In Chapter 2, the literature revealed several domains that could be used to investigate faculty satisfaction with information technology and use. These domains include: institutional characteristics, employment characteristics, disciplinary characteristics, demographic characteristics, research and teaching characteristics, and organizational satisfaction characteristics. These domains and their associations with faculty satisfaction with information technology and faculty use of information technology correspond to research questions one through six. I also wished to test the association between faculty use of information technology and faculty satisfaction with technology (research question seven). I then tested the correlation between faculty satisfaction with information technology and faculty use of information with technology (which corresponded to research question eight). It should be noted the investigation occurred at baccalaureate-only institutions.

The conceptual framework is shown below in figure 3.1 and represents correlational associations rather than causal relationships.

Figure 3.1 Conceptual Framework for this Study.



Based on the theoretical and empirical literature, I used the following research questions for my study.

Main Research Question

What are the relationships between organizational factors and faculty satisfaction with information technology and use?

Subquestions:

1) What are the relationships between institutional characteristics and faculty satisfaction with information technology and faculty use of information technology?

2) What are the relationships between employment characteristics and faculty satisfaction with information technology and faculty use of information technology?

3) What are the relationships between disciplinary affiliations and faculty satisfaction with information technology and faculty use of information technology?

4) What are the relationships between demographic characteristics and faculty satisfaction with information technology and faculty use of information technology?

5) What are the relationships between research and teaching characteristics and faculty satisfaction with information technology and faculty use of information technology?

6) What are the relationships between organizational satisfaction characteristics and faculty satisfaction with information technology and faculty use of information technology?

7) What are the relationships between faculty use of information technology and faculty satisfaction with information technology satisfaction?

8) What are the relationships between faculty satisfaction with information technology and faculty use of information technology?

Research Model Discussion

The dependent constructs for this study were faculty satisfaction with information technology and faculty use of information technology. The faculty satisfaction with information technology construct was operationalized through the following two dependent variables: faculty satisfaction with equipment and faculty satisfaction with technology. The faculty use of information technology construct was operationalized through the following two dependent variables: faculty email use, and faculty web site use for instructional purposes. The model includes the following independent constructs: institutional characteristics, employment characteristics, disciplinary characteristics, demographic characteristics, research and teaching characteristics, and overall organizational satisfaction.

Expected Relationships Among the Constructs

In this section I discuss the expected associations between the variables examined in this study arranged by subquestion. The anticipated relationships are grounded in extant literature discussed earlier in this study.

> 1) What are the relationships between institutional characteristics and faculty satisfaction with information technology and faculty use of information technology?

Lynch (1974) pointed out that organizational studies of technology were flawed because most researchers examined only one type of organization. Since then, numerous studies have been conducted on technology in higher education, but most have been limited either to one institution, typically the researcher's home institution, or a small group of related institutions. I examined faculty satisfaction with information technology at many colleges and universities including both public and private institutions. Brzycki and Dudt (2005) found that larger academic institutions tended to adopt technology slowly and then did not embrace that technology fully. Furthermore, Hynes and Stretcher (2005) observed that more established colleges and universities tended to have less favorable attitudes toward technology than smaller and newer institutions. Since prestige is a difficult construct to measure, and age of institution is not included in the NSOPF:04 survey, these elements will not be included in this study. Instead, I used institutional category to determine if there was an association between institutional characteristics and faculty satisfaction with information technology.

> 2) What are the relationships between employment characteristics and faculty satisfaction with information technology and faculty use of information technology?

This question examined whether there are differences among part-time, full-time, untenured, tenure track, and tenured faculty with regard to faculty satisfaction with information technology. I expected that part-time faculty who are seeking full-time academic positions would have the least favorable satisfaction with information technology while tenured faculty would have more favorable satisfaction with information technology.

3) What are the relationships between faculty disciplinary affiliation and faculty satisfaction with information technology and faculty use of information technology?

Biglan (1973a), Creswell and Roskens (1981), Smart and Elton (1982), Drees (1982), Stoecker (1993), Mcglothlin (1964), Anderson (1974), McGahie (1993), Harris (1993), Bucher and Stelling (1977), and Stark (1998) have all conducted studies to classify disciplines in meaningful ways. Each researcher contributed different perspectives, but most tended to group technological fields together. Because of their frequent use of information technology, faculty in mathematics, the natural sciences and engineering were expected to experience greater levels of satisfaction with information technology than faculty in the humanities, social sciences and the arts.

4) What are the relationships between demographic characteristics and faculty satisfaction with information technology and faculty use of information technology?

Prior studies have been inconclusive regarding gender and ethnic differences in information technology preferences and it was likely that other factors such as disciplinary affiliation, employment characteristics, institutional type, research / teaching orientation, and overall organizational satisfaction would be more strongly related to faculty satisfaction with information technology than gender or ethnic categories. Age, on the other hand, was expected to have an inverse relationship with faculty satisfaction with information technology. Gender and information technology research findings have also been inconclusive with some studies suggesting a negative association while others have suggested no association between gender and information technology attitudes.

The conflicting results may be explained by the passage of time, increased exposure to information technology, and successful placement in information technology oriented disciplines. Gender satisfaction with information technology is a critical issue for both academe and industry as the number of female students enrolled in information technology curricula has dropped sharply in the past decade. Should this trend continue, the existence of many information technology programs may be in doubt and the future production of computer scientists and information technology faculty may be seriously curtailed.

5) What are the relationships between research and teaching characteristics and faculty satisfaction with information technology and faculty use of information technology?

When categorizing postsecondary institutions, the Carnegie Foundation (2001) uses an institution's relative research involvement as an important element in its classifications. While all educational institutions exist to educate students, teaching-oriented institutions such as liberal arts colleges, and regional universities tend to favor instructional activities, while research-oriented institutions such as research universities , medical, dental, and law schools understandably tend to reward research more than teaching. While both teaching-oriented and research-oriented institutions use information technology, teaching-oriented institutions may have higher levels of faculty information technology satisfaction. Teaching-oriented faculty may be drawn more to instructional technology such as web based assignments, software enhanced presentations, email, Internet based courses, and electronic course development than faculty at research-oriented institutions who may see such technology as distractions from more theoretical pursuits. I expected that faculty at teaching-oriented institutions would exhibit greater levels of satisfaction with information technology while faculty at research-oriented institutions would experience lower levels of satisfaction with information technology on campus.

6) What are the relationships between overall organizational satisfaction and faculty satisfaction with information technology and faculty use of information technology?

I expected overall organizational satisfaction to be positively associated with faculty satisfaction with information technology since they are similar constructs. Nevertheless, there were instances where the relationship was not positively associated, and those cases may shed some light on issues that are unique to information technology. In other words, a person who is very satisfied with an organization in general will tend to respond favorably on other satisfaction items. However, individuals who report high levels of organizational satisfaction and low levels of satisfaction with information technology may help focus on issues directly related to technology on campus.

7) What are the relationships between faculty use of technology and faculty satisfaction with information technology?

8) What are the relationships between faculty satisfaction with information technology and faculty use of information technology?

Subquestions 7 and 8 are closely related, but are presented separately here to show explicitly the potential interrelationship between the two constructs. The faculty use of information technology construct is comprised of two variables: faculty web use and faculty email use. Prior studies by Zhao & Cziko (2001), Seyal, Rahman, and Rahim (2002), and Liu, Maddux, and Johnson (2004) suggested a positive relationship between information technology use and information technology satisfaction. Grunwald (2004) studied web use among college and university faculty using the National Center for Educational Statistics National Study of Postsecondary Faculty 1999 dataset and found that faculty satisfaction positively affected faculty web use.

Section Summary

In this section I discussed my conceptual framework, the supporting model and the expected relationship among the constructs. In the next section, I define the dependent constructs and then the independent constructs and their components. Next I summarize the survey items and their scales organized by construct as they appear in order of subquestion in Table 3.1. The NCES disciplinary categories referenced in item Q16cd2 are listed in Appendix A1.

Operationalizing the Dependent Constructs

As was discussed earlier in this chapter, the dependent constructs in this study were faculty satisfaction with information technology and faculty use of information technology. Information technology was defined as computer hardware, software, Internet as well as locally based network facilities. The first dependent construct, faculty satisfaction with information technology, was defined as an affective response to information technology after exposure to that information technology. This construct was operationalized using item Q61c (faculty satisfaction with equipment) and item Q61b (faculty satisfaction with technology at current institution). Both are Likert scale variables that appear in the NCES NSOPF:04 study.

The second dependent construct in this study was faculty use of information technology. This construct was defined as faculty interaction with readily available information technology on campus. This construct was operationalized through two dependent variables:

(1) faculty member use of a web site for instructional purposes (item Q39), and

(2) number of hours per week spent emailing students (item Q41).

The two dependent and the six independent constructs are listed along with their scales and component items in Table 3.1. Table 3.1 summarizes the constructs, variables, survey items and scaling measures discussed above. The table is a subset of the variables as defined in NSOPF:04 and are shown in the order they were used in this dissertation. Appendix A1 lists the academic disciplines as defined by NCES and used in NSOPF: 04.

Table 3.1. Operationalized constructs used in this study

Construct	Variable	Question number	Scale
Satisfaction with technology	Faculty satisfaction with technology at current institution	Q61b	1=very satisfied 2=somewhat satisfied 3=somewhat 4=dissatisfied 5=very dissatisfied
	Faculty satisfaction with equipment	Q61c	1=very satisfied 2=somewhat satisfied 3=somewhat 4=dissatisfied 5=very dissatisfied
Faculty use of technology	Faculty web site use for instructional purposes	Q39	Yes/no
	Faculty emailing students	Q41	Number of hours per week
Institutional characteristics	Institutional control	X120Q0	5=Public bacc.only 6=Private bacc. only
	Enrollment (undergraduate)	X11Q0	Continuous

Table 3.1. Operationalized constructs used in this study (continued).

Construct	Variable	Question number	Scale
	Number of faculty at institution	FACTOTAL	Continuous
	Student to faculty ratio	X10Q0	Continuous
	Degree of urbanization	X09Q0	1=large city 2=midsize city 3=urban fringe city 4=urban fringe midsize city 5=large town 6=small town 7=rural
	Institutional instructional expenditures	X31Q0	Continuous
Employment characteristics	Principal activity	Q4	1= teaching 2=research 3=public service 4=clinical service 5=administrative 6=sabbatical 7=other

Table 3.1. Operationalized constructs used in this study (continued).

Construct	Variable	Question number	Scale
	Employment status	Q5	1=full time 2=part time
	Rank	Q10	0=No ranks 1=Professor 2=Assoc. Prof. 3=Asst. Prof. 4=Instructor 5=Lecturer 6=All others
	Tenure Status	Q12	1=tenured 2=tenure track 3=not on tenure track 4=no tenure system
	Union membership	Q14	0=no 1=yes
	Highest Degree	Q17a1	0=no degree 1=doctoral degree 2=first prof degree 3=MFA or MSW 4=Other MA or MS 5=BA or BS 6=associates degree 7=certificate

Table 3.1. Operationalized constructs used in this study (continued).			
Construct	**Variable**	**Question number**	**Scale**
	Type of contract	Q67	1=9 or 10 month 2=11 or 12 month 3=ind. course
	Academic income	Q66b2	1=$1-24,999 2=$25,000-49,999 3=$50,000-74,999 4=$75,000-99,999 5=$100,000-149,999 6=$150,000-199,999 7=$200,000-300,000 8=more than $300,000
Disciplinary characteristics	Academic discipline	Q16cd2	very extensive drop-down list (please refer to Appendix A1)
Demographic characteristics	Gender	Q71	1= male 2=female

Table 3.1. Operationalized constructs used in this study (continued).

Construct	Variable	Question number	Scale
	Age	X01Q72	Age in 2004
	Race	X03Q74	Am. Indian/ Native American Asian American Black/African American Hispanic White
Research Char.	Career books, Textbooks, reports	Q52ad	Continuous
	Career book reviews, chap.	Q52ac	Continuous
	Career exhibitions, presentations	Q52af	Continuous
	Career presentations	Q52ae	Continuous
	Career articles (refereed journals)	Q52aa	Continuous
	Career articles (non refereed journals)	Q52ab	Continuous

Table 3.1. Operationalized constructs used in this study (continued).

Construct	**Variable**	**Question number**	**Scale**
	Career patents, Computer software	Q52ag	Continuous
	Hours per week (thesis advising)	Q48	Number of hours
Teaching Char.	Hours per week Admin. Committees	Q49	Number of hours
	Hours per week (meeting advisees)	Q50	Number of hours
	Number of classes taught (credit)	Q35a1	0-20 classes
	Number of classes taught (distance education)	Q35c	0-20 classes
	Number of classes taught (non-credit)	Q35a2	0-20 classes
	Hours per week (office hours)	Q51	Number of hours
	Number of classes taught (remedial)	Q35b	0-20 classes
	Teaching assistant in any class	Q36	0=no 1=yes

Table 3.1. Operationalized constructs used in this study (continued).			
Construct	**Variable**	**Question number**	**Scale**
	Percent of time spent on teaching undergraduates	Q32b	0-100 percent
Organizational satisfaction	Female faculty are treated fairly	Q82c	1=strongly agree 2=somewhat agree 3=somewhat disagree 4=strongly disagree
	Racial minorities are treated fairly	Q82d	1=strongly agree 2=somewhat agree 3=somewhat disagree 4=strongly disagree
	Overall job satisfaction	Q62d	1=very satisfied 2=somewhat satisfied 3=somewhat dissatisfied 4=very dissatisfied

Table 3.1. Operationalized constructs used in this study (continued).			
Construct	**Variable**	**Question number**	**Scale**
	Part time faculty are treated fairly	Q82b	1=strongly agree 2=somewhat agree 3=somewhat disagree 4=strongly disagree
	Teaching is rewarded	Q82a	1=strongly agree 2=somewhat agree 3=somewhat disagree 4=strongly disagree

Operationalizing the Independent Constructs

In this section, I discuss how I operationalized the major independent constructs used for this study as variables. The six constructs were: institutional characteristics, employment characteristics, disciplinary characteristics, demographic characteristics, research or teaching characteristics, and organizational satisfaction characteristics.

The **institutional characteristics construct** consisted of the following variables: **institutional control, undergraduate enrollment, number of faculty at an institution, student/faculty ratio, degree of urbanization,** and **institutional instructional expenses. Institutional control** consisted of only public baccalaureate-only institutions, and private baccalaureate-only institutions.

Undergraduate enrollment measured the total number of undergraduate students enrolled at an institution as a continuous variable.

Number of faculty at an institution measured the total number of faculty employed at an institution as a continuous variable.

Student/faculty ratio measured the number of full-time equivalent students divided by the number of full-time equivalent faculty at an institution as a continuous variable.

Degree of urbanization evaluated the location of an institution on the following scale: 1=large city; 2=midsize city; 3=urban fringe city; 5=large town; 6=small town; 7=rural.

Institutional instructional expenses reported the amount of money an institution spent on instructional expenses in thousands of dollars.

The **employment characteristics construct** included the following variables: **principal activity, full-time or part time status, part-time job is primary job**, **rank, tenure status, union membership, highest degree attained, contract type, and income categories**. The independent variables were defined as shown below:

Principal activity included teaching, research, public service, clinical service, administrative service, sabbatical, or "other."

The full-time or part time status, part-time job is primary job variables were detected by yes or no responses.

Rank was listed as either no rank within that institution; full professor; associate professor; assistant professor; instructor; lecturer; and all others.

Tenure status was determined by detecting whether a person is tenured; on a tenure track; not on a tenure track, or in an institution without a tenure system.

Union membership was detected through a yes or no response.

Highest degree attained included the following:0=no degree; 2=first professional degree; 4=Master of Fine Arts or Master of Social Work; 5=Master's degree other than Master of Fine Arts or Master of Social Work; 6=Bachelor of Arts or Bachelor of Science; 7=Associate's degree; or 8= Certificate.

The **type of contract** was recorded as a 9 or10 month contract--which is typical for most full time faculty; an 11 or 12 month contract--common for faculty who have administrative duties; or an individual course contract.

Income was measured as falling into one of the following eight categories of academic income: $1 to $24,999; $25,000 to $49,999; $50,000 to 74,999; $75,000 to $99,999; $100,000 to $149,999; $150,000 to $199,999; $200,000 to $300,000; and more than $300,000.

The **academic discipline construct** consisted of the 138 items listed in Appendix A1.

The **demographic characteristics** construct included **gender; age;** and **race**. Gender was detected by a male or female response; age was detected by using the age in 2004 variable. Race was divided into American Indian or Alaskan Native; Asian American; Black/African American; Hispanic, or White.

The **research characteristics construct** was measured using the following independent variables: **number of books published in a career; number of book reviews or chapters published in a career; number of professional exhibitions or performances in a career; number of articles published in refereed journals in a career; number of non-refereed journal articles published in a career**; **number of patents or computer software developed in a career number of presentations in a career; and number of hours spent on thesis advising.** All of the research characteristics variables were continuous variables.

The **teaching characteristics construct** was operationalized through the following independent variables: **number of hours per week spent on administrative**

committees (continuous); number of hours per week spent on meeting with advisees (continuous); **number of credit classes taught (continuous); number of distance education classes taugh**t **(continuous); number of non-credit classes taught (continuous); number of hours per week spent on office hours (continuous)**; **number of remedial classes taught (continuous); use of a teaching assistant (yes/no); percent of the respondent's time spent on undergraduate instruction (percent).**

The **organizational satisfaction construct** was measured using the following five items: **female faculty are treated fairly**; **minority faculty are treated fairly; overall job satisfaction; part-time faculty are treated fairly; and teaching is rewarded.** Each of the five organizational satisfaction variables listed above used a Likert scale to measure a respondent's level of satisfaction. In the original NSOPF:04 instrument, the satisfaction items were scaled so that the highest value corresponded to the lowest level of satisfaction. When the satisfaction variables were used in this dissertation, they were recoded so that the highest values corresponded to the highest satisfaction levels.

CHAPTER 4

METHODOLOGY

Chapter Overview

In this chapter I describe the NSOPF:04 dataset, the instrument selected for my study and the population that was represented. Next, I present the rationale for selecting the dataset, followed by a discussion of the sampling criteria and procedure. In the next section, I present a brief overview of the methodology I used. I then discuss the descriptive characteristics of baccalaureate-only institutions. This section is followed by a discussion of specific statistical procedures that were used. I conclude this chapter with a section describing the limitations of the study.

NSOPF:04 Survey Instrument

NSOPF:04 Population

I conducted a quantitative, secondary data analysis upon data obtained by Research Triangle International (RTI) for the U.S. Department of Education's National Center for Education Statistics. (NCES). The specific dataset I analyzed was the 2004 National Study of Postsecondary Faculty (NSOPF:04). The NCES has conducted previous NSOPF studies in 1988, 1993, and 1999. NSOPF:04 is a nationally representative dataset on the characteristics, workload, and career paths of full-time and part-time faculty at two year and four year institutions, as well as publicly supported and independent institutions throughout the United States.

The NSOPF:04 survey was used for this study for two main reasons. First, the large size of the dataset made it possible to conduct parametric tests for many items. Had the dataset been considerably smaller, it may have been necessary to conduct non-parametric tests which tend to have less statistical power. The second reason for selecting the NSOPF:04 dataset was the encompassing nature of the institutions and respondents included in the survey. While several studies have been conducted on faculty satisfaction with technology within individual institutions, this study included all of the respondents who taught in baccalaureate-only institutions in the NSOPF:04 database. The large sample helped strengthen the generalizability of the findings.

NSOPF:04 Sampling Procedure: Institutional Selection

The primary qualifying criterion for institutional inclusion in the NSOPF:04 database was eligibility for Title IV participation and degree granting status. All fifty states and the District of Columbia were represented in the dataset. Each of the 1,070 eligible institutions was asked to provide a list of faculty who were employed at that institution during the fall 2003 term. Of the 1,070 eligible institutions, 980 provided usable listings.

Ten institutional types were identified by NCES:

- Public doctoral
- Public master's
- Public baccalaureate
- Public associate
- Public other/unknown
- Private not-for-profit doctoral
- Private not-for-profit master's
- Private not-for-profit baccalaureate
- Private not-for-profit associate
- Private not-for-profit other/unknown

(NSOPF: 04, p. 7).

Institutional selection requirements included the following criteria:

- Located in the 50 states or District of Columbia
- Participating in U.S. Department of Education Title IV student aid programs
- Public or private not-for-profit
- 2 or four-year degree granting
- Must offer education at the postsecondary level
- Must be academically, occupationally or vocational in nature
- Programs must be available to the public

(NSOPF:04, p. 8)

Proprietary institutions, certificate-only, and Puerto Rico based institutions were not included by NCES. Interestingly, the category of private for profit, the fastest growing segment in postsecondary education was omitted by NCES.

NSOPF:04 Individual Sampling Procedure

During the second sampling stage, 34,330 faculty were found to be eligible. The faculty surveys were administered through the Internet and by telephone. Of the 34,330 eligible faculty, 26,110 completed the survey. Of those who completed the survey, 76 percent completed the web survey while 24 percent completed the survey through a telephone interview.

NSOPF:04 Ethnicity

NCES categorized ethnicity as shown below:

- Hispanic
- Non-Hispanic Black or African American
- Native American, Native Hawaiian
- Asian and Pacific Islander
- White

(NSOPF:04, p.10)

NSOPF:04 Individual Sampling Selection Criteria

Eligible instructional staff included those individuals who:

- Were permanent, temporary, adjunct, visiting, acting or postdoctoral appointees;
- Were employed full or part time by the institution;
- Taught credit or noncredit classes;
- Were tenured, non-tenured but on tenure track, or non-tenured and not on tenure track;
- Provided individual instruction, served on thesis or dissertation committees, advised, or otherwise interacted with first-professional, graduate or undergraduate students;
- Were in professional schools (e.g. Medical, law, dentistry); or
- Were on paid sabbatical leave.

(NSOPF:04, p. 9).

Ineligible individuals for NSOPF:04 included staff who:

- Were graduate or undergraduate teaching or research assistants;
- Had instructional duties outside of the United States, unless on sabbatical leave;
- Were on leave without pay;
- Were not paid by the institution, e.g. Those in the military or part of a religious order;
- Were supplied by independent contractors; or
- Who otherwise volunteer their services

(NSOPF:04, p. 9).

Rationale for Selecting Baccalaureate-Only Institutions

While the NSOPF:04 database included data about many different types of institutions, my study was limited to baccalaureate-only institutions. In the following section I discuss the rationale for selecting only these institutions.

Undergraduate institutions are arguably the cornerstones of higher education. Higher education may be seen as consisting of a mixture of pre-undergraduate, undergraduate, and post-undergraduate institutions. Although it is not necessary to attend a two-year college in order to begin a collegiate career, many students attend community colleges in order to bolster their grades or to reduce expenses prior to matriculating at an undergraduate institution. Other students bypass community colleges and enroll directly in baccalaureate institutions. Upon completion of a baccalaureate degree, many students seek out institutions that offer a master's or doctoral degree. However, each group of institutions varies considerably in its values and missions, and, as Zheng and Stewart (2000) point out, "depending on the core values of the institutions and their assessment objectives, different approaches have different abilities (Campbell, 1977; Rohrbaugh, 1983). Each of these approaches is useful and relevant depending on the degree to which it fits the specific needs and situations of the organizations concerned" (Zheng and Stewart, 2000, p.3). In this study I focused on a specific group of postsecondary institutions.

Community Colleges

I began by considering whether community colleges and baccalaureate granting institutions should be studied together. It quickly became evident that the institutional characteristics of community colleges were sharply different from those of baccalaureate institutions. For example, Jacoby (2006) found that full-time faculty at community colleges earned $46,636 and part-time faculty earned $9,782. By contrast, full-time faculty at four year institutions earned $59,815 and part-time faculty earned $12,982 in that study. Also, Zimbler (2002) reported that 63.9% of the faculty at community colleges were part-time while four year institutions only 33.9% of the faculty were part-time. Additionally, "community colleges are often open-admission institutions whose non-traditional students tend to be less prepared relative to those admitted to four-year schools (Bailey & Alfonso, 2005; Cohen & Brawer, 1996)" (Jacoby, 2006, p. 1086). Furthermore, the overall graduation rate for four-year colleges in 2002 was 54.4% while the graduation rate for community colleges was only 27.8% (Jacoby, 2006, p. 1103).

Graduate Institutions

Next, I considered combining baccalaureate granting institutions and graduate degree granting institutions. Many scholars of higher education examine colleges and universities through the lens of organizational behavior theory. For example, Zheng and Stewart (2000) applied strategic management and resource theory research in his analysis of higher education.

> In the strategic management literature, superior organization performance is often posited to be the superior use of resources. In the resource-based theory of organizations (Varney, 1992) a firm's strategic use of resources is the basis for competitive advantage. In the resource-based view, organizations vary in their ability to effectively leverage common resources and vary in their access to unique resources. The extent to which firms or organizations can utilize resources often affects their market position and the probability of long term survival" (Zheng and Stewart, 2000, p. 21).

Furthermore, "…strategy research has found that maximizing efficiency and effectiveness in one resource area is enough of a challenge for most firms. Firms that can excel in more than one resource area create multiple forms of competitive advantage and often exhibit superior performance" (Zheng and Stewart, 2000, p.21). It then follows that "universities that achieve excellence on multiple dimensions will be superior performers" (Zheng and Stewart, 2000, p. 22).

However, there is a price to be paid for the pursuit of multiple dimensions. "Public Research I Universities are particularly likely to experience the schizophrenic tension of trying to excel in multiple dimensions" (Zheng and Stewart, 2000, p. 27). In addition, "while many universities strive to be 'in the top 20', few leaders have a clear sense, at an operational level, of what that entails or exactly how the institution may achieve that goal" (Zheng and Stewart, 2000, p. 27). While some students want the flexibility of comprehensive institutions, other students prefer institutions that offer a more focused mission.

Institutional Type and Instructional Characteristics

In order to conduct his research, Chen (2000) addressed the confusion of multidimensional directions in higher education by placing institutions into three categories. The first category consisted of two-year colleges, the second category consisted of "four-year non-doctoral institutions," and the third category consisted of "4 year doctoral institutions" (Chen, 2000, p. 3-4). In this taxonomy, "4 year non-doctoral institutions" included institutions that offered all degrees other than doctoral degrees. According to that study, "Doctoral 4 year institutions" were institutions which offered all degrees other than associate's degrees and certificates. Two-year colleges were those institutions that offered only associate's degrees and certificates. The study then examined instructional patterns in the various institutional categories.

When undergraduate teaching was defined as having taught at least one undergraduate credit class during the past year, at four-year non-doctoral institutions, 89% of full-time instructional faculty taught at least one undergraduate credit class during the past year while at four-year doctoral institutions, only 67% of full-time instructional faculty were in this category (Chen, 2000, p.6). The contrast becomes even more pronounced when undergraduate teaching was defined as teaching only undergraduate classes. In this case, 79% of full-time instructional faculty at four-year non-doctoral institutions fit that category while only 50% of full-time faculty at four-year doctoral institutions fit that category (Chen, 2000, p.6).

However, Chen (2000) argued that for faculty at four-year doctoral institutions, the undergraduate teaching load was comparable to the undergraduate teaching loads at non-doctoral four-year institutions when student credit hours were compared. A student credit hour was calculated by multiplying the number of classes taught by the number of students enrolled in a class, then multiplying the number of credit hours for each course taught. Chen (2000) believed that although faculty at four-year doctoral institutions taught fewer undergraduate classes than faculty at four-year non-doctoral institutions, four-year doctoral institution faculty taught larger classes. Thus, when the larger class sizes were factored in, the undergraduate instructional load at four-year doctoral institutions was equivalent to the undergraduate instructional load at four-year non-doctoral institutions. Faculty at four-year doctoral institutions taught classes that averaged 43 students while faculty at four-year non-doctoral institutions taught classes that averaged 28 students (p.27). Chen (2000) found other significant differences between four-year doctoral institutions and four-year non-doctoral institutions. In four-year doctoral institutions, full-time instructors or lecturers spent 10 hours per week teaching undergraduates while associate professors spent 8 hours per week teaching undergraduates, and full professors spent 6 hours per week teaching undergraduates. Thus, at four-year doctoral institutions, rank was inversely related to contact hours (p 11).

Chen (2000) concedes that "instructional faculty and staff at 4-year doctoral institutions were significantly less likely to teach only undergraduate classes than were their colleagues at four-year non-doctoral institutions even if other variables in the model were controlled…" (Chen, 2000, p. 22).

Winston (1994), p.9 noted "a frequent criticism is that the most senior and experienced faculty pay too much attention to their research and consulting and graduate students and too little attention to their undergraduates and lectures and advising and caring." One way for students to avoid having to compete with graduate students and the heavy research requirements for faculty is to seek out baccalaureate-only institutions.

Baccalaureate institutions are also unique in other ways. Cunningham and Cochi-Ficano (2002) concluded that baccalaureate granting four year institutions also produce alumni who are more likely to make donations after graduation. "We find strong evidence in support of the 'liberal arts' effect described by Clotfelter (2000) in that functionally defined 'four year' institutions receive between $38 and $49 more in average donations per alumni than do other institutions" (Cunningham, Cochi-Ficano, 2002, p. 552).

Perhaps as interesting were the factors that did not influence alumni donations: “Notable for their lack of statistical significance in our sample are soliciting efforts, the profile of sports on campus, religious affiliation, and percentage of enrolled graduates who are female/minority” (Cunningham, Cochi-Ficano, 2002, p. 552). They also found a correlation between faculty student ratios and alumni donations in both public and private institutions. Interestingly, family income was inversely related to alumni loyalty and donations. Middle and low income students who received financial support were more likely to express institutional gratitude in the form of donations than upper income graduates. However, when wealthy alumni did donate, the individual amounts were larger than the individual donations received from alumni with lower incomes.

But perhaps most importantly, four year baccalaureate-only institutions were worthy of study because of their role in graduating women and minority students who go on to complete doctoral degrees. “There are 84 HBCUs that grant baccalaureate degrees (College Entrance Examination Board, 1994)…” and yet, “in 1991-92 HBCUs [Historically Black Colleges and Universities] conferred 39% of the bachelor’s degrees earned by African Americans, though they represented only 3% of all institutions in the United States (National Center for Educational Statistics, 1994),” (Wolf-Wendel, Baker, Morphew, 2000, p. 166).

“Despite the small proportion of students who attend special focus institutions, results of previous studies suggest the important contribution of these institutions (Berrian, Primos & Shoats, 1982; National Association of Independent Colleges and Universities, 1991; Tidball, Smith and Wolf-Wendel, 1998). In particular, research has concluded that women’s colleges grant undergraduate degrees to a disproportionate number of women who subsequently earn doctorates (e.g. Fuller, 1986a, 1986b, 1989a, 1989b; Tidball, 1974, 1985, 1986; Wolf-Wendel, 1998)," Wolff-Wendel, Baker, Morphew, 2000, p. 167).

In addition to serving women and African American students, baccalaureate institutions are also highly successful in the production of Hispanic graduates: "the most successful group of undergraduate institutions for Latinos with doctorates were Hispanic-serving former women's colleges" (Wolf-Wendel, Baker, Morphew, 2000, p. 167). Wolf-Wendel, Baker, Morphew (2000) assert the critical importance of a well-defined institutional mission: "this study supports the findings of researchers who have argued for the importance of a focused mission (Astin, 1985; Chickering & Reisser, 1992; Kuh, Schuh, Whitt & Associates, 1991)" (Wolf-Wendel, Baker, Morphew, 2000, p. 180).

Wolf-Wendel, Baker, Morphew (2000) conclude that "from a methodological perspective, these data demonstrate the necessity of treating institutions differently by type rather than assuming that all institutions operate under comparable resource models," (Wolf-Wendel, Baker, Morphew, 2000, p. 181).

Summary of Rationale for Selecting Baccalaureate-Only Institutions

Baccalaureate-only institutions differ from community colleges on a number of factors including major contrasts in faculty salaries, the ratio of part-time to full-time faculty, student characteristics, and graduation rates. Baccalaureate-only institutions are also unlike institutions that offer graduate degrees in their relative emphases on research, teaching, and class size. Pike, Smart, Kuh, Hayek (2005) noted "being a doctoral-research university or a Masters university was negatively related to student-faculty interaction…" (p 16). Baccalaureate-only institutions also tend to have tightly focused missions, a greater degree of student-faculty interaction, more loyal graduates, and greater success in serving women and minorities than other types of institutions.

As I mentioned earlier, my study sample was limited to baccalaureate-only institutions within the NSOPF:04 database. Furthermore, cases which were missing data for variables used for analysis were not selected for this study sample.

In the next section I provide a summary of the characteristics of baccalaureate-only institutions used in this study.

Descriptive Summary of Baccalaureate-Only Institutions

Institutional and Employment Characteristics

This study was limited to only those institutions that granted the baccalaureate as the highest degree. For most faculty in these institutions, teaching was their primary activity, nevertheless, many faculty were involved in a myriad of scholarly pursuits. Although most faculty had full-time appointments, there was a sizeable part-time cadre. Furthermore, for a fairly large portion of the adjunct faculty, teaching part-time was their only employment. Among full-time faculty, the ranks were fairly evenly distributed among assistant professors, associate professors, and professors. Most faculty did not belong to a union. Roughly half held a doctorate, but this included part-time and temporary faculty. Similarly, approximately half of all faculty held a nine or ten month appointment, while the other half held either an eleven or twelve month appointment, or were part-time or temporary faculty. Faculty at baccalaureate-only institutions tended to earn substantially less than the mean faculty income in the overall NSOPF:04 sample.

Disciplinary and Demographic Characteristics

Even at the baccalaureate level, there appears to be a strong interest in career oriented study. Using both Biglan's (1973a) and Stark's (1998) disciplinary models, this study found that a large portion of undergraduate faculty were teaching in professional or career oriented fields. Although the specific distribution of programs tends to fluctuate with the vicissitudes of the economy, many students still tend to gravitate toward career based majors. The gender distribution in this study was nearly evenly balanced overall, and white faculty made up the largest single racial group in baccalaureate-only institutions.

Research and Teaching Characteristics

Not surprisingly, the number of publications at baccalaureate institutions was lower than at research institutions when only traditional outlets such as books or journal articles were counted. This does not necessarily indicate a lack of scholarly activity. When other expressions are included there is considerable evidence of scholarly activity--such as exhibitions/performances and presentations. Indeed, one professor reported 500 exhibitions/performances while another reported 500 presentations.

Organizational Satisfaction Characteristics

Most faculty were generally satisfied with their equipment, their technology and their institutions. They also used some information technology such as email, but most were still reluctant to use web sites for instructional purposes. Similarly, most faculty felt that female faculty, minority faculty, and part-time faculty were treated fairly and teaching was rewarded.

Summary data of institutional, employment, disciplinary, demographic, research and teaching, and organizational satisfaction characteristics may be found in Appendices B1 through B10.

In Chapter 5, I subject my research questions to statistical analyses and discuss the results. In Chapter 6, I subject the independent variables to regression analyses and begin by using faculty satisfaction with equipment as a dependent variable. Next, I used faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes as the dependent variables.

In the next two sections I describe the methodology I used. I begin by providing a general overview section, followed by a section which contains specific descriptions of my methodology.

Overview of the Analyses

I used descriptive measures in order to provide an overview of the data with regard to the number of cases in each category, as well as the means, and standard deviation for the continuous variables. A summary of institutions by institutional type is shown in Appendix C1. Bivariate measures were examined to detect correlations between variables. I used analyses of variance to determine whether there were significant differences between groups in the mean scores of faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes. Each analysis of variance was followed by a Games-Howell Post Hoc Test. I selected the Games-Howell test because it is accurate even if sample sizes are unequal (Field, 2005, p.341). Next, I executed a series of multiple linear regressions to determine if the independent variables identified in the research literature could be used to develop a model that could be used to predict how specific factors may influence faculty satisfaction with information technology. I then conducted binary logistic regressions on the dichotomous dependent variable component of the faculty use of information technology construct.

Specific Analyses

In chapter 5, I present the results of the statistical procedures that presented the relationships between my dependent variables and my independent variables as discussed below. In order to respond to my first research question, I began by executing a t-test of independent sample means to determine if there were significant differences between private and public institutions in faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web use as shown in Appendix C2. I then checked Levene's test of equality of variance before interpreting the results. For results that were significant at the .05 level, I used the "equal variances assumed" values, otherwise, I used the "equal variances not assumed" values from the t-test.

My second research question dealt with the relationship between faculty employment characteristics and faculty satisfaction with equipment, faculty satisfaction with equipment, faculty email use, and faculty web site use for instructional purposes. The independent variables included principal activity, part-time versus full-time, part-time was primary job versus part-time was not primary job, academic rank, tenure status, union membership, highest degree attained, employment contract, and faculty income. I explored these relationships using the statistical tests shown in Appendix C3.

In my third research question, I examined if any relationships existed between my dependent variables and academic categories based on Biglan's (1973a) and Stark's (1998) models. The NCES dataset contained 138 categories of academic disciplines. However, such a large number of disciplines would make data analysis unwieldy and limit the statistical power of the test. Consequently, I reduced the 138 categories into Biglan's (1973a) hard/soft; pure/applied; and life/non-life field classifications by using the transform and recode functions within SPSS. The results of the recoding is shown in Appendix C4. I then used One Way ANOVAs to compare faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web use by academic discipline. If a significant difference was detected between groups, I examined the results of the Games-Howell Post Hoc tests to examine the difference in mean scores among academic disciplines.

In order to examine how well Stark's (1998) taxonomy was associated with faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web use, I conducted a second data reduction. I once again started with the original 138 NCES categories, and reduced them to the following four categories using Stark's (1998) classification: 1) human client service, 2) information service, 3) enterprise/production service, and 4) artistic service. These reduced categories were used in a One Way ANOVA. The reduced categories reflecting Stark's (1998) taxonomy are shown in Appendix C5.

In addition to examining the results of the Games-Howell Post Hoc tests, I examined how well this method of classification explained differences in faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web use compared to a Biglan (1973a) based classification. Appendix C6 lists the model names and the statistical tests that were applied to them.

In my fourth research question, I investigated whether there were any associations between demographic factors such as gender, age, and race, and faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes. I transformed and recoded the respondent's age into three groups so that I could compare faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use scores by faculty age groups. The three faculty age groups consisted of "29 years old or below," "30 to 49 years old," and "50 years or above." I used the statistical tests shown in Appendix C7.

In my fifth research question, I investigated whether there were any associations between faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes and faculty research and teaching independent variables. The research independent variables were: number of book chapters published, number of books published, exhibitions and performances, journal articles published, number of non-refereed articles published, number of patents awarded or software developed, number of presentations, number of hours spent on thesis advising.

A list of the tests using research characteristics is shown in Appendix C8. The teaching characteristics independent variables used included: number of hours per week spent on administrative committees, advising, number of credit classes taught, number of distance education classes taught, number of non-credit classes taught, number of office hours per week number of remedial classes taught, use of a teaching assistant, and undergraduate instruction as a percent of total duties. A list of tests using teaching characteristics variables is shown in Appendix C9.

In my sixth research question, I examined the relationships between faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes and organizational satisfaction variables. The organizational variables included: a belief that female faculty were treated fairly, a belief that minority faculty were treated fairly, overall satisfaction, and a belief that teaching was rewarded. A list of the variables and the tests that were conducted are shown in Appendix C10.

In my seventh research question, I studied whether there was a relationship between faculty satisfaction with information technology and faculty use of information technology. This was realized by using the faculty satisfaction with equipment and faculty satisfaction with technology variables to examine faculty information technology satisfaction, and faculty email use and faculty web site use for instructional purposes to measure faculty use of information technology. Appendix C11 lists the variables and the tests that were used.

I then developed a multiple linear regression and executed it once for each independent variable block. I repeated the process for each of the continuous dependent variables. These dependent variables included faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. Next, I developed a binary logistic regression for the fourth dependent variable (faculty web site use for instructional purposes) which is a dichotomous variable. I executed that regression once for each model and combined the output in one table in chapter 6. The models and the independent variable blocks are shown in Appendix C12.

In order to examine the relationship between faculty satisfaction with information technology and faculty use of information technology, I conducted a Pearson's r correlation for the four dependent variables used in this study. Faculty satisfaction with equipment and faculty satisfaction with technology represented the faculty satisfaction with information technology construct while faculty email use and faculty web site use for instructional purposes represented the faculty use of information technology construct.

Limitations of the Study Methodology

Podsakoff and Organ (1986) have documented the innate problems that occur with self-report measures. Nevertheless, as a large, national cross sectional survey, this study provided insight into faculty satisfaction with information technology for a representative and widely diverse range of faculty within baccalaureate-only institutions. However, as with all secondary studies, the variables were limited to those available in the database. Another inherent limitation of all secondary studies is the necessity to sometimes use proxy variables.

CHAPTER 5

ANALYSES OF THE RESEARCH QUESTIONS

In this chapter I present the preliminary results of my study. I have divided this chapter into three major sections. The first major section is organized by research question. The second major section is organized around my four dependent variables: faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes. In the third major section, I discuss my results by independent variables across the four dependent variables.

Research Question 1: Institutional Characteristics

1) What are the relationships between institutional characteristics and faculty satisfaction with information technology and faculty use of information technology?

I conducted an independent sample t-test to evaluate the difference in faculty satisfaction with equipment between public baccalaureate-only institutions and private baccalaureate-only institutions. I then repeated the independent sample t-test for faculty satisfaction with technology, and then faculty email use. Finally, I conducted a chi-square test for faculty web site use for instructional purposes.

In the original NSOPF:04 survey, all the satisfaction variables were scaled from 1 through 4 with 1 indicating the highest level of satisfaction. This meant that higher scores indicated lower levels of satisfaction. I recoded the satisfaction scales so that higher scores meant higher levels of satisfaction. As shown in Appendix D1, faculty satisfaction with equipment and faculty satisfaction with technology were higher in private baccalaureate-only institutions than at public baccalaureate-only institutions, however, faculty email use and faculty web site use for instructional purposes was higher at public baccalaureate-only institutions than at private baccalaureate-only institutions. This may reflect the fact that public institutions may be more likely to receive government funding for technological initiatives such as email and web site development support than private institutions. On the other hand, since private institutions often depend on private donors more heavily than public institutions and many benefactors prefer to receive some form of ongoing recognition in the form of a named scholarship or building, funding for technological infrastructure such as email or web sites for instructional purposes may be more limited.

The higher levels of faculty satisfaction with equipment and faculty satisfaction with technology at private baccalaureate-only institutions also may reflect a greater level of overall faculty satisfaction at many private baccalaureate-only institutions which may offer faculty the opportunity to teach small classes or an environment that is in harmony with a faculty member's religious beliefs.

Next, I conducted a Pearson's r correlation to determine the association between enrollment, number of faculty, student/faculty ratio, degree of urbanization, faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use and faculty web site use for instructional purposes. As shown in Appendix D2, student/faculty ratios were negatively related to faculty satisfaction with equipment. Enrollment, number of faculty, degree of urbanization, and institutional instructional expenditures were not significant. There was a similar relationship between student/faculty ratios and faculty satisfaction with technology. This suggests that faculty who taught smaller classes exhibited higher levels of satisfaction with equipment and technology than faculty who taught larger classes. Institutional instructional expenses also exhibited a negative relationship with faculty satisfaction with technology, while enrollment, number of faculty at an institution, and degree of urbanization were not significantly related to faculty satisfaction with technology.

Enrollment and the number of faculty at an institution were both positively related to faculty email use. While email was a preferred means of communication across campus size, email was especially important at larger institutions. Student/faculty ratios, degree of urbanization, and institutional instructional expenditures were not significant.

When faculty web site use for instructional purposes was the dependent variable, the number of faculty at an institution was positively related to faculty web site use for instructional purposes while student/faculty ratios were negatively related to faculty web site use for instructional purposes. Faculty who were employed in institutions with low student/faculty ratios may have more time to develop web sites for instructional purposes than faculty at institutions which have high student/faculty ratios. Degree of urbanization, enrollment, and institutional instructional expenditures were not significantly related to faculty web site use for instructional purposes.

Research Question 2: Employment Characteristics

Principal Activity

2) What are the relationships between employment characteristics and faculty satisfaction with information technology and faculty use of information technology?

My second research question examined the association between faculty employment characteristics. I conducted a one-way between groups analysis of variance to examine the impact of employment characteristics on satisfaction with equipment. I then repeated the analysis of variance for faculty satisfaction with technology, and then faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes.

Subjects were divided into 7 groups according to the categories defined by NSOPF:04.

1 = Teaching
2 = Research
3 = Public service
4 = Clinical service
5 = Administration (e.g., Dean, Chair, Director, etc.)
6 = On sabbatical from this institution
7 = Other activity (e.g., technical activity such as programmer or technician; other institutional activities such as library services; subsidized performer, artist-in-residence, etc.)
Applies to: All faculty and instructional staff.

The results of the ANOVA and Post Hoc Tests are summarized in Appendix D3.

Faculty who held clinical service and "other" category appointments had higher levels of faculty satisfaction with equipment than faculty whose activity was teaching. However, none of the other faculty activity categories were statistically significant. Indeed, none of the faculty activity categories had a statistically significant relationship with faculty satisfaction with technology. In this set of relationships, the ANOVA indicated a low level of significance, and the Tukey Post Hoc test was significant, however, the Games-Howell Post Hoc test, which I used for all ANOVAs with unequal group sizes, is a more stringent test. Thus it is possible to obtain a significant ANOVA result while the Games-Howell Post Hoc results showed no significant differences in faculty satisfaction with technology.

On the other hand, there were several significant relationships between principal activities and faculty email use. Administrative faculty had the highest level of faculty email use followed by teaching faculty, research faculty, faculty classified as "other" activities (generally support staff activities), and faculty on sabbatical. A different pattern emerges for web site use for instructional purposes. Public service category faculty, teaching faculty, and administrative faculty were most likely to use a web site, while "other" category faculty and research faculty were in the middle range. Clinical service faculty and faculty on sabbatical were least likely to use a web site.

Part-Time vs. Full-Time Employment Status

I conducted an independent sample t-test to evaluate the difference in faculty satisfaction with equipment levels between full-time and part-time faculty. I then repeated the t-test for faculty satisfaction with technology, and faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes.

When faculty were divided into full-time and part-time categories, part-time faculty reported higher equipment and faculty satisfaction with technology scores than full-time faculty, but they spent less time using email, and their use of web sites for instructional purposes was much lower than it was for full-time faculty. The results are shown in Appendix D4. This does not reflect diminished institutional dedication in part-time faculty, but suggests that these faculty often may need to combine several jobs in order to survive financially. Consequently, part-time faculty may need to teach several different courses and commute to various institutions--both factors which may reduce time for faculty email use and faculty web site use for instructional purposes. An alternative explanation may be that part-time faculty may be more likely to use non-institutional email to communicate with students than full-time faculty.

Part-Time Teaching as Primary Job

I conducted an independent sample t-test to evaluate any differences in faculty satisfaction with equipment levels between part-time faculty whose teaching job was their primary job with part-time faculty whose teaching job was not their primary job. I then repeated the t-test for faculty satisfaction with technology, and faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes.

Subjects were divided into two groups according to the categories defined by NCES. Part-time teaching job as primary job was coded as “1” and not primary job was coded as “0.”As shown in Appendix D5, part-time faculty for whom teaching was their primary job, faculty satisfaction with equipment was lower than for faculty whose part-time job was not their primary job. Faculty satisfaction with technology and faculty email use was not significantly different for these two groups. However, web site use for instructional purposes was more likely for faculty whose part-time job was their primary job than it was for part-time faculty for whom teaching was not their primary job.

Academic Rank

I conducted a one-way between groups analysis of variance to examine the impact of academic rank on satisfaction with equipment. I then repeated the analysis of variance for faculty satisfaction with technology, and then faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes. Subjects were divided into 7 groups according to the categories defined by NSOPF:04.

0 = Not applicable (No formal ranks are designated at this institution)
1 = Professor
2 = Associate professor
3 = Assistant professor
4 = Instructor
5 = Lecturer
6 = Other title (e.g., Administrative, Adjunct, Emeritus, other)
Applies to: All faculty and instructional staff.

The results appear in Appendix D6.

Of the statistically significant relationships in this ANOVA, faculty classified as "other" by NCES had the highest faculty satisfaction with equipment scores followed by instructor, assistant professor, and associate professor. It seems as rank increased, faculty satisfaction with equipment decreased. The categories of professor, lecturer, and "institution has no ranks" were not statistically significant. The ANOVA results for academic rank and faculty satisfaction with technology were significant as was the Tukey Post Hoc test, however, the Games-Howell post hoc test which was used because of unequal group sizes, was not statistically significant. By contrast, when faculty email use was the dependent variable, all academic rank categories except lecturer were statistically significant. Faculty email use was lowest among faculty who were employed at institutions with no ranks. Faculty email use increased steadily from the ranks of "other," to instructor, and then peaked with assistant professor. It declined steadily from associate professor to full professor.

Faculty web site use for instructional purposes was also lowest for faculty employed at institutions with no ranks. It increased again from “other” rank, instructor, and peaked with assistant professor. Faculty web site use for instructional purposes declined again at the associate professor and full professor ranks.

Tenure Status

I conducted a one-way between groups analysis of variance to examine the impact of tenure status on satisfaction with equipment. I then repeated the analysis of variance for faculty satisfaction with technology, and then faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes. Subjects were divided into 4 groups according to the categories defined by NSOPF:04.

1 = Tenured
2 = On tenure track but not tenured
3 = Not on tenure track
4 = Not tenured because institution had no tenure system

The results are shown in Appendix D7.

Faculty who were not on a tenure track but in a tenure granting institution, had higher equipment and faculty satisfaction with technology scores than tenured faculty, however, tenure track faculty used email more often and were more likely to use web sites for instructional purposes than faculty in the other tenure status categories. Faculty in systems without tenure were least satisfied with equipment, least satisfied with technology and were least likely to use a web site. Faculty who were striving to achieve tenure used email most and were the most likely to use web sites for instructional purposes.

Conversely, faculty who were in a tenure system but were not on a tenure track were the most satisfied with equipment and technology. Perhaps faculty in this group had the highest satisfaction levels because they were not struggling to attain tenure. This does not imply that eliminating tenure would increase satisfaction since the faculty who taught in institutions without a tenure system reported the lowest levels of satisfaction with equipment and satisfaction with technology. It should be noted that faculty not striving for tenure also used email least and were least likely to use a web site for instructional purposes.

Union Membership

I conducted an independent sample t-test to evaluate the difference in faculty satisfaction with equipment levels among faculty who belonged to a union and those who did not belong to a union. I then repeated the t-test for faculty satisfaction with technology, and faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes.

Union membership was coded as “1” while non-members were coded as “0.” Faculty who belonged to a union had lower levels of faculty satisfaction with equipment and faculty satisfaction with technology than non-union members, but used email and web sites for instructional purposes more often. The results are shown in Appendix D8. Since faculty are more likely to belong to a union at teaching institutions rather than at research institutions, union faculty members are more likely to depend on instructional technology, and may also be more likely to be more sensitive to problems with technology than non-union faculty.

Highest Degree Attained

I conducted a one-way between groups analysis of variance to examine the impact of highest degree attained on faculty satisfaction with equipment. I then repeated the analysis of variance for faculty satisfaction with technology, and then faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes.

Subjects were divided into eight groups using the categories defined by NCES:

0 = Not applicable (Do not hold a degree)
1 = Doctoral degree (Ph.D., Ed.D., etc.)
2 = First-professional degree (M.D., D.O., D.D.S. or D.M.D., LL.B., J.D., D.C. or D.C.M., Pharm.D., Pod.D. or D.P., D.V.M., O.D., M.Div. or H.H.L. or B.D.)
3 = Master of Fine Arts, Master of Social Work (M.F.A., M.S.W.)`
4 = Other master's degree (M.A., M.S., M.B.A, M.Ed., etc.)
5 = Bachelor's degree (B.A., A.B., B.S., etc.)
6 = Associate's degree or equivalent (A.A., A.S., etc.)
7 = Certificate or diploma for completion of undergraduate program (other than associate's or bachelor's)

The results are shown in Appendix D9.

Although the ANOVA and Tukey Post Hoc Test I conducted using highest degree attainment as the independent variable and faculty satisfaction with equipment and then faculty satisfaction with technology as the dependent variables were both significant, the Games-Howell Post Hoc Test did not indicate any statistically significant relationships. There were, nonetheless, several relationships between highest degree attainment and faculty email use and faculty web site use for instructional purposes. Faculty holding a doctoral degree used email more often and were more likely to use a web site than faculty whose highest degree was a Master's degree other than a Master of Fine Arts (M.F.A) or Master of Social Work (M.S.W.). The remaining degree categories were not significantly different in faculty email use. Faculty who held a doctoral degree were most likely to use a web site followed by faculty who held a master's degree other than a MFA or MSW degree, then the MFA or MSW, bachelor's degree, professional degree, associate's degree, certificate, and finally no degree. Generally speaking, it appeared that higher degree levels were associated with a greater likelihood of faculty web site use for instructional purposes.

Employment Contract Type

I conducted a one-way between groups analysis of variance to examine the impact of contract type on faculty satisfaction with equipment. I then repeated the analysis of variance for faculty satisfaction with technology, and then faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes.

Faculty were divided into three groups. The first group consisted of faculty who had a nine or ten month contract. This group consisted primarily of full-time faculty. The second group consisted of faculty who had eleven or twelve month contracts and consisted of individuals who were administrators with faculty rank or faculty who had dual assignments that included teaching and administration. The third group consisted of faculty who were paid on an individual course basis. Faculty in this group consisted primarily of adjunct teachers.

Of these three groups, faculty who held individual course contracts followed by the eleven or twelve month faculty/administrative group were most satisfied with equipment and technology on campus. However, faculty who held individual course contracts used email less often and were less likely to use web sites for instructional purposes than the faculty with 9-10 month contracts or 11-12 month contracts. The results appear in Appendix D10.

Faculty who held 11 or 12 month appointments typically assume administrative roles within an institution. As such, they may have a greater influence on technology policies than teaching faculty, thus resulting in increased satisfaction for faculty who also had administrative duties.

Faculty Income

I conducted a one-way between groups analysis of variance to examine the impact of income on faculty satisfaction with equipment. I then repeated the analysis of variance for faculty satisfaction with technology, and then faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes.

Subjects were divided into the following categories.

1 = $1-24,999
2 = $25,000-49,999
3 = $50,000-74,999
4 = $75,000-99,999
5 = $100,000-149,999
6 = $150,000-199,999
7 = More than $200,000

The results are shown in Appendix D11.

Faculty whose income was $99,999 or below tended to have the lowest levels of faculty satisfaction with equipment and faculty satisfaction with technology while faculty whose income was $100,000 or above reported the highest levels of faculty satisfaction with equipment, faculty satisfaction with technology. Faculty email use and the likelihood of faculty web use also generally rose along with faculty income.

This phenomenon may be the result of several factors. Income almost always rises after the granting of tenure. Income usually also rises when faculty take on administrative responsibilities. Thus, the association between income and faculty satisfaction with equipment and faculty satisfaction with technology may result when faculty shift to administrative positions, or it may be that achieving tenure provides increased freedom to experiment with technology.

Research Question 3: Disciplinary Characteristics

2) What are the relationships between disciplinary affiliations and faculty satisfaction with equipment, faculty satisfaction with information technology and faculty use of information technology?

I conducted a one-way between groups analysis of variance to examine the impact of disciplinary classification on faculty satisfaction with equipment. I then repeated the analysis of variance for faculty satisfaction with technology, and then faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes.

The NCES faculty disciplinary codes are shown in Appendix A1 and faculty disciplinary distributions are shown in Appendix A2. First, I used Biglan’s (1973a) classifications, then I used Stark’s (1998) classification. The recoding of faculty categories using Biglan’s (1973a) taxonomy are shown in Appendix C4 while the recoding of faculty using Stark’s (1998) classification are shown in Appendix C5 The results of the analyses are shown in Appendix D12 and Appendix D13 respectively.

Biglan's (1973a) Model

Of the three classifications that had significantly different faculty satisfaction with equipment means, the Soft/Pure/Life classification had the highest means followed by the Soft/Applied/Life categories. None of the classifications were significantly different with regard to faculty satisfaction with technology. Although the Soft/Pure/Life category was not an applied area, scholars in life sciences still depend heavily on scientific equipment. Almost every Biglan classification revealed significant differences in mean faculty email use with the Hard/Applied/Non-life group showing the highest mean scores. However, there were no consistent patterns among faculty email users in this taxonomy. When applied to web site use for instructional purposes, Biglan's (1973a) classifications revealed generally greater web site usage among the "hard" disciplines and less web site usage among the "soft" disciplines.

Stark's (1998) Model

I conducted a one-way between groups analysis of variance to examine the impact of Stark's (1998) disciplinary classifications on faculty satisfaction with equipment. I then repeated the analysis of variance for faculty satisfaction with technology, and then faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes. Subjects were divided into four groups according to the categories defined by Stark's (1998) model: 1) human client, 2) information, 3) enterprise/production, and 4) artistic. The results are shown in Appendix D13.

An analysis of variance using Games-Howell Post Hoc Test to reveal differences in mean faculty satisfaction with equipment scores using Stark's (1998) classifications showed two groups that were significantly different: the information group and the artistic group. There were no statistically significant differences in the levels of faculty satisfaction with technology. On the other hand, the enterprise/production faculty reported the highest levels of faculty email use while the artistic and human client faculty and "other" faculty group reported the lowest levels of faculty email use. Not surprisingly, the information group and the enterprise/production group had the highest levels of web site use for instructional purposes while the human client, artistic, and "other" faculty groups reported the lowest levels of web site use for instructional purposes.

Research Question 4: Demographic Characteristics

> What are the relationships between demographic characteristics and faculty satisfaction with information technology and faculty use of information technology?

In order to evaluate the difference in faculty satisfaction with equipment levels between male and female faculty, I conducted an independent sample t-test. I then repeated the t-test for faculty satisfaction with technology, and faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes. Male faculty were coded as "1" and female faculty were coded as "2." The results are shown in Appendix D14.

The results did not indicate any gender differences in faculty satisfaction with equipment or faculty satisfaction with technology. However, there was a significant difference in faculty email use by gender with female faculty using email more than their male counterparts. Web site use was similar for both genders (male 47.1%, female 46.0%)

I conducted a one-way between groups analysis of variance to examine the impact of age on faculty satisfaction with equipment. I then repeated the analysis of variance for faculty satisfaction with technology, and then faculty email use. I concluded with a chi-square test for faculty web site use for instructional purposes.

There were no statistically significant differences in mean faculty satisfaction with equipment levels by age, however, faculty who were fifty years or older had the highest levels of satisfaction with technology, while faculty who were under thirty years old had the lowest levels of satisfaction with technology. However, there were no statistically significant differences in faculty email use by age group. The results appear in Appendix D15.

Interestingly, the likelihood of faculty web site use for instructional purposes more than doubled (from 22.6% to 46.5%) once faculty were over thirty. Since most faculty who attain tenure do so after thirty, this suggests that faculty may feel freer to pursue instructional innovations once the tenure barrier has been overcome.

An analysis of variance with a Games-Howell Post Hoc Test revealed no statistically significant differences by race or ethnicity in faculty satisfaction with equipment or faculty satisfaction with technology. While the ANOVA was significant for race and faculty email use, the Games-Howell Post Hoc Test was not significant. However, a Chi Square Test revealed that while most ethnic groups were similar in their rates of web site usage, African-American faculty reported the lowest percentage of faculty web use. This may be due to limited access to technology training and support. The results appear in Appendix D16.

Research Question 5: Research and Teaching Characteristics

> What are the relationships between research and teaching characteristics and faculty satisfaction with information technology and faculty use of information technology?

In this research question, I examined the correlation between various research and teaching variables and faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use and faculty web site use for instructional purposes. The results are shown in Appendix D17 and Appendix D18.

Research Characteristics

In the research area, only three variables -- number of career book chapters published, number of career non-refereed articles published, and number of hours per week spent on thesis advising were significantly correlated with faculty satisfaction with equipment. For faculty satisfaction with technology, only the number of career non-refereed articles was significantly correlated. Faculty email use correlated significantly only with the number of journal articles published in a career, the number of presentations, and the number of hours spent per week on thesis advising. On the other hand, the number of exhibitions and performances in a career, number of patents or software developed, and number of hours spent on thesis advising per week were all significant and correlated with faculty web site use for instructional purposes, although the number of exhibitions or performances in a career was negatively correlated with faculty web site use for instructional purposes.

Teaching Characteristics

Three teaching characteristics variables -- number hours spent per week on administrative committees, number of hours per week spent on advising per week, and the number of credit classes taught per semester--were significantly and negatively correlated with faculty satisfaction with equipment and faculty satisfaction with technology, but positively correlated with faculty email use and faculty web site use for instructional purposes. The results are shown in Appendix D18.

The number of distance education courses taught, the number of hours per week spent on office hours, the use of a teaching assistant were positively associated with faculty email use while the percentage of time spent on undergraduate instruction was negatively associated with faculty email use.

The number of hours per week spent on administrative committees, the number of hours per week spent on advising, the number of distance education courses taught, and the use of a teaching assistant were positively associated with faculty web use while the number of remedial classes taught was negatively associated with faculty web site use for instructional purposes.

One interpretation of these results is that as instructional and service duties increased, faculty email and web site use for instructional purposes increased, but faculty satisfaction with equipment, and faculty satisfaction with technology also decreased.

Research Question 6: Organizational Satisfaction

What are the relationships between organizational satisfaction characteristics and faculty satisfaction with information technology and faculty use of information technology?

I conducted a Pearson's r correlation to examine the relationship between organizational satisfaction and faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes. The results are shown in Appendix D19.

All organizational satisfaction variables correlated significantly and positively with faculty satisfaction with equipment and faculty satisfaction with technology. Surprisingly, though, there was a significant but negative correlation between all five independent variables (female faculty are treated fairly, minority faculty are treated fairly, overall satisfaction, part-time faculty are treated fairly, and a belief that teaching is rewarded) and the faculty email use dependent variable. Apparently, excessive faculty email use may ultimately be associated with diminished faculty satisfaction in other areas. The faculty web site use for instructional purposes results showed that a belief that minority faculty are treated fairly and a belief that part-time faculty are treated fairly were negatively associated with faculty web site use for instructional purposes. The remaining variables (a belief that female faculty were treated fairly, overall satisfaction, and a belief that teaching was rewarded) were not significant.

Research Questions 7 and 8: Relationship Between Usage and Satisfaction

What are the relationships between faculty use of information technology and faculty satisfaction with information technology satisfaction?

What are the relationships between faculty satisfaction with information technology and faculty use of information technology?

I conducted a correlation using Pearson's r to determine the relationship between faculty email use, faculty web site use for instructional purposes and the dependent variables faculty satisfaction with equipment and faculty satisfaction with technology. The results are presented in Table 5.1.

Faculty web site use for instructional purposes was positively correlated with both faculty satisfaction with equipment and faculty satisfaction with technology, but there were no significant correlations between faculty email use and either faculty satisfaction with equipment or faculty satisfaction with technology.

Table 5.1 Relationship Between Faculty Email and Faculty Web Site Use for Instructional Purposes and Faculty Satisfaction with Equipment and Faculty Satisfaction with Technology.				
Independent Variable	Dependent Variables			
	Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology	
Faculty email use	-.02		-.03	
Faculty web site use for instructional purposes	.05	**	.07	***
Pearson's r test of correlations was used to detect the association between faculty email use, faculty satisfaction with equipment, faculty satisfaction with technology, and faculty web site use for instructional purposes..* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$ Total N= 2443				

In the next section, I discuss my findings arranged by dependent variable: faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use and faculty web site use for instructional purposes.

Summary by Dependent Variable

1) Faculty Satisfaction with Equipment

Institutional Characteristics

Faculty at private baccalaureate-only institutions expressed greater satisfaction with equipment than faculty at public baccalaureate-only institutions. Small private baccalaureate-only institutions tend to depend heavily on organizational coexistence and satisfaction for faculty retention. Consequently, it is not unusual for faculty at private baccalaureate-only institutions to experience greater faculty satisfaction with equipment. A negative relationship between student/faculty ratios and faculty satisfaction with equipment, faculty satisfaction with technology may indicate that faculty appreciate smaller class sizes. The inverse relationship between student/faculty ratios and faculty web site use for instructional purposes may indicate that requisite technical support may not always accompany increased class sizes, thus discouraging faculty web use.

Employment Characteristics

Principal Activities

Faculty who reported their principal activity as clinical services or "other," were more satisfied with equipment than faculty who reported "teaching" as their principal activity. It would be difficult to surmise the cause of the difference between these two groups without knowing more about the "other" group. The classifications of research, public service, administrative service, or on sabbatical were not statistically significant.

Part-Time versus Full-Time and Part-Time Job as Primary Employment

Part-time faculty were more satisfied with equipment than full-time faculty and part-time faculty for whom a teaching job was not a primary job were more satisfied with equipment than those faculty for whom teaching part-time was a primary job. This suggests that part-time faculty may represent a cadre of new faculty still seeking a first permanent position. In this case, they still may retain their enthusiasm as expressed through faculty satisfaction with equipment. However, this enthusiasm may be diminished somewhat if multiple jobs are needed for financial survival. Furthermore, it is also possible that some of the faculty who responded that their teaching job was not their primary job did so because they were actually graduate students who taught part-time.

Rank and Tenure Status

Faculty who reported their rank as “other” also responded most favorably to faculty satisfaction with equipment, followed by instructors, assistant professors, and associate professors. This may indicate reduced organizational satisfaction or perhaps a greater willingness to be critical of an institution. The categories of lecturer, professor, and “institution has no ranks” were not significant.

Faculty who were in an institution that had tenure tracks, but were not themselves on a tenure track, were most satisfied with equipment, followed by tenured faculty, untenured faculty on a tenure track, and faculty in a system without tenure tracks. Faculty who apparently did not seek tenure appeared to be most satisfied with equipment. This suggests that these individuals may be retired or have other employment thus removing a major source of economic stress. This may translate into greater faculty satisfaction in a variety of areas including satisfaction with equipment.

Union Membership, Highest Degree Attained, Contract Type

Non-union members were more satisfied with equipment than union faculty. This tends to reinforce an economic theme of financial security. Faculty who are secure in their careers may not feel the need to belong to a faculty union. Furthermore, this career confidence may translate into greater faculty satisfaction with equipment.

Although an analysis of variance indicated significant results among the highest degree attained categories, the more sensitive Games-Howell Post Hoc test did not indicate statistically significant differences among the no degree, doctoral degree, professional doctorate, Master of Fine Arts or Master of Social Work, other master's degrees, bachelor's degrees, associate degrees or certificate only and faculty satisfaction with equipment.

Faculty who taught on a course by course basis had the highest levels of faculty satisfaction with equipment followed by 11-12 month contract faculty and 9-10 month contract faculty. Once again, it appears that faculty who hold contracts that suggest part-time or temporary teaching position are most satisfied with equipment. Teaching on a part-time or temporary basis often requires a secure outside source of income, thus perhaps making those faculty less sensitive to equipment shortcomings.

Income

Although faculty earnings between $150,000 and $199,999 were not statistically significant, there were generally positive relationships between income and faculty satisfaction with equipment. Faculty who earned $200,000 and above had the highest level of faculty satisfaction with equipment but this consisted of a very small group of individuals. Faculty at higher income levels tended to be more satisfied with equipment than their lower paid colleagues. However, it may not be the actual amount of income that results in enhanced faculty satisfaction with equipment, but the expectation of an increase. Thus, as long as faculty can expect steadily rising incomes (even if the increase is small), other forms of satisfaction will also increase.

Disciplinary Characteristics

When Biglan's (1973a) disciplinary categories were used, faculty in the Soft/Pure/Life and Soft/Applied/Life categories showed the highest faculty satisfaction with equipment levels. Faculty in the Hard/Applied/Non-Life, Soft/Pure/Non-Life, Soft/Applied/Non-Life, Hard/Pure/Life, Hard/Pure/Non-Life, Hard/Applied/Life, and "other" were not significant. As a result, there did not appear to be a clear pattern of faculty satisfaction with equipment using Biglan's (1973a) categories.

Somewhat more useful patterns appeared in Stark's (1998) disciplinary model. Faculty in the Information group were more satisfied with equipment than faculty in the Artistic group while Human Client, Enterprise/Production, and "Other," were not significant. Not surprisingly, Information field related faculty were more sensitive to technical facilities in the course of their teaching and research than faculty in other fields.

Demographic Characteristics

There were no significant differences between male and female faculty in faculty satisfaction with equipment. There were no significant differences in faculty satisfaction with equipment by age. Race was not a useful measure for faculty satisfaction with equipment since none of the racial groups, including Asian American, Black/African American, Hispanic, Native American, or white was statistically significant.

Research and Teaching Characteristics

Only the number of book chapters, and number of non-refereed articles published showed a positive association with faculty satisfaction with equipment while the number of hours spent on thesis advising per week showed a negative association. The number of books published, exhibitions and performances, journal articles, patents/software, presentations, or were not significant.

When teaching variables were examined, the number of hours per week spent on administrative committees, general advising, and number of credit hours taught were all negatively associated with faculty satisfaction with equipment. The number of distance education classes, non-credit classes, remedial classes taught, office hours, use of a teaching assistant, and undergraduate instruction as a percentage of overall duties, were not significant. This suggests that undergraduate teaching faculty are concerned about equipment availability and quality, but perhaps when time demands increase, faculty satisfaction with equipment may decrease.

Organizational Satisfaction Characteristics

When organizational satisfaction was considered, all variables were positively related to faculty satisfaction with equipment including a belief that female faculty were treated fairly, minority faculty were treated fairly, overall satisfaction, and teaching was rewarded. This suggests that when organizational satisfaction elements are attended to, other factors such as faculty satisfaction with equipment may tend to improve.

2) Faculty Satisfaction with Technology

Institutional Characteristics

Faculty at private baccalaureate-only institutions were more satisfied with technology than faculty at public baccalaureate-only institutions. This is compatible with the findings on faculty satisfaction with equipment. Private institutions tend to be smaller and more responsive to faculty than larger, public institutions. A negative relationship between student/faculty ratios and faculty satisfaction with technology may indicate that faculty technology support may not always accompany increased class sizes. Consequently, when class sizes increased, faculty satisfaction with technology decreased. There was a similar negative relationship between institutional instructional expenditures and faculty satisfaction with technology which suggests that increases in spending may not always include needed expenditures in technology infrastructure upgrades.

Employment Characteristics

Principal Activity. Part-Time / Full-Time and Part-Time as Primary Job Status

An analysis of variance indicated the presence of significant relationships, but when the more restrictive Games-Howell Post Hoc Test was applied, none of the variables in these categories were significant. These included: teaching, research, public service, clinical service, administrative service, sabbatical leave, and “other.”

As was the case with faculty satisfaction with equipment, faculty satisfaction with technology was greater among part-time faculty than full-time faculty. The part-time as primary job subset was not significant. These findings reinforce further the concept that when the part-time category includes faculty who still retain institutional enthusiasm, satisfaction levels tend to be high, but if a person teaches part-time because he or she has no other major source of income, economic distress may reduce satisfaction levels.

<u>Rank and Tenure Status</u>

An analysis of variance indicated the presence of a significant relationship between academic rank and faculty satisfaction with technology, however, a more restrictive Games-Howell Post Hoc Test indicated no significant relationships between "institution has no ranks," professor, associate professor, instructor, lecturer, "other," and faculty satisfaction with technology. On the other hand, tenure status was related to faculty satisfaction with technology with faculty not on a tenure track expressing the highest levels of satisfaction, followed by faculty with tenure. The untenured faculty on a tenure track category was not a significant category. Faculty who were in an institution without tenure tracks were least satisfied with equipment.

<u>Union Membership, Highest Degree, Contract Type, and Income</u>

In the previous test of faculty satisfaction with equipment, non-union faculty were more satisfied than union faculty. Similarly, when faculty satisfaction with technology was measured, non-union faculty were more satisfied than union faculty. This may reflect a connection between reduced organizational satisfaction and reduced faculty satisfaction with equipment and technology.

Although an analysis of variance indicated significance among the highest degree attained and faculty satisfaction with technology, a Games-Howell Post Hoc Test did not reveal any significance between “no degree,” doctoral degree, professional degree, Master of Fine Arts or Master of Social Work, other master’s degree, bachelor’s degree, associate’s degree, certificate and faculty satisfaction with technology.

As was the case with faculty satisfaction with equipment, faculty satisfaction with technology was highest among faculty who taught on an individual course basis, followed by 11-12 month contract faculty, and than 9 month contract faculty. This reflects, once again, that faculty who do not depend on their teaching position for financial sustenance are less likely to find fault with various aspects of the institution than full-time faculty.

When income was examined, there was a positive relationship between salary and faculty satisfaction with technology in all income ranges up to $149,999 (with the exception of faculty in the $25,000 to $49,999 group). Faculty income ranges from $150,000 and above were not significant. Faculty who enjoy higher incomes may also have higher disposable incomes which in turn could afford them the opportunity to acquire and become familiar with technology, and generally, technological comfort leads eventually to faculty satisfaction with technology.

Disciplinary and Demographic Characteristics

None of Biglan’s (1973a) or Stark’s (1998) disciplinary categories had a statistically significant relationship with faculty satisfaction with technology. Gender and race also were not significant. The only significant demographic variable was age. The 30 to 49 year age group was more satisfied with technology than faculty in the up to 29 year age group and faculty who were 50 or above were more satisfied with technology than faculty in the 30 to 49 year group. It appears that faculty satisfaction with technology rose with faculty age. The greater level of faculty satisfaction with technology among older faculty may be interpreted in at least two ways. One interpretation is that older faculty feel secure in their careers and this positive affect transfers to faculty satisfaction with technology. A second interpretation is that younger individuals are more familiar with the latest hardware and software and may be disappointed when their educational institutions are unable to acquire the most sophisticated technology.

Research and Teaching Characteristics

Only one research characteristic, number of non-refereed articles published, was statistically significant. However, three teaching characteristics were related to faculty satisfaction with technology. All three of those characteristics, number of hours spent per week on administrative committees, number of hours spent per week on advising, and number of credit classes taught had a negative association with faculty satisfaction with technology.

This tends to confirm an earlier observation in this study that factors which impinged on time availability also tended to diminish satisfaction -- in this case faculty satisfaction with technology. Nevertheless, the relationship may travel in only one direction; a reduction in time may lessen satisfaction, but an increase in time may not necessarily increase satisfaction.

Organizational Satisfaction Characteristics

All organizational satisfaction variables including a belief that female faculty were treated fairly, minority faculty were treated fairly, teaching was rewarded, and overall satisfaction, were positively associated with faculty satisfaction with technology. Organizational satisfaction may lead to faculty satisfaction with technology.

3) Faculty Email Use

Institutional Characteristics

Faculty at public baccalaureate-only institutions used email more often than faculty at private baccalaureate-only institutions. A possible explanation may be that public baccalaureate-only institutions are usually larger than private baccalaureate-only institutions, and public baccalaureate-only institutions tend to have larger class sizes. While it is common for students to interact with faculty in person at small private baccalaureate-only colleges, larger public baccalaureate-only institutions may need to depend on email more than small private baccalaureate-only institutions. This observation was substantiated by the positive correlation between enrollment, number of faculty, and faculty email use. When an institution grew in enrollment or number of faculty, faculty email use grew as well.

Employment Characteristics

Faculty email use was examined by principal activity including administration, teaching, research, "other," and on sabbatical (in that order). Public service, and clinical service were not significant. Teaching faculty used email far more often than research faculty and considerably more often than faculty on sabbatical.

Given that the primary responsibility of teaching faculty is to teach undergraduates, it was not unusual for this group to spend more time emailing students than research faculty. Likewise, it was not surprising that faculty on sabbatical would reduce sharply their email contact with students for a semester or two. What was surprising was the degree of the difference between teaching and research faculty. At some institutions, research faculty have appointments to work full-time in a grant funded laboratory. In such cases, one would not expect extensive contact between a researcher and many students. More commonly, research faculty are teachers who conduct research in exchange for a partial reduction in teaching load. In those instances, the institutional expectation is to have the research enhance teaching by bringing back new concepts (theoretical or applied) to the classroom. This faculty email use observation suggests that research may sometimes limit faculty/student interaction.

Part-Time Versus Full-Time

Full-time faculty used email much more often than part-time faculty while part-time faculty whose teaching job was their primary job did not have a statistically significant relationship with faculty email use. If a part-time faculty member is dependent on outside employment, then that other job may absorb time that would otherwise have been available to communicate electronically with students.

Rank, Tenure Status

Faculty email use rose steadily from “institution has no ranks,” to “other,” followed by instructor and then assistant professor. Faculty email use then dropped almost as steadily in the post-tenure ranks of associate professor and professor. The category of lecturer was not significant. It would be difficult to conjecture about the NCES category of “other” without knowing what constituted this category. The implications of this finding are somewhat unsettling. It seems faculty communication with students may be diminished somewhat for some faculty after tenure challenges are met.

A similar pattern manifested itself when actual tenure status was reported. Faculty email use was low for faculty not on a tenure track and lowest for faculty who taught in institutions without tenure systems. In institutions with tenure tracks, faculty email use declined once tenure was achieved. Thus, whether an indirect measure is used, such as rank, or a direct measure, such as “tenured” or “not tenured,” the results regarding faculty email are essentially the same -- faculty email use diminishes at many institutions upon the receipt of tenure.

Union Membership, Highest Degree Attained, and Contract Type

Faculty who belonged to a union used email more often than faculty who did not belong to a union. One explanation may relate to the types of institutions that are more likely to have faculty unions. Faculty unions tend to be found in large, public institutions and are quite rare at small private institutions. Given the larger institutional size and larger class sizes in which union faculty tend to teach, it is not unusual for union faculty to use email more often than their non-union counterparts.

Faculty who earned an academic doctorate reported the highest email usage followed by holders of non-M.F.A. or non-M.S.W. master’s degrees. The categories of professional doctorate degree, bachelor’s degree, associate’s degree, and certificate were not significant. Faculty who held 11 to 12 month contracts reported the most email usage, followed by faculty on 9 to 10 month contracts and faculty who taught on a course by course basis. Faculty who held 11 to 12 month contracts tended to serve both teaching and administrative roles. Consequently, it is not surprising that their faculty email use was higher than it was for the 9 to 10 month faculty group. Faculty who taught on a course by course basis had sharply lower email usage rates than either traditional faculty or administrative faculty. However, given the sporadic nature of course by course contracts, it is difficult to make assertions about this group.

Income

As was the case with academic rank, faculty email use rose with income until it reached the income bracket at which most faculty reach tenure. After reaching this level, faculty email use dropped steadily. This pattern was sustained in every category from $1 to $149,999. Income categories of $150,000 or above were not significant. This seems to support the observation first presented in the academic rank discussion, and supported again by the actual tenure status results which suggested that faculty email use increased as faculty approached tenure and dropped afterward.

Disciplinary Characteristics

Using Biglan's (1973a) categories, faculty in the Hard/Applied/Non-Life group used email most followed by the Soft/Pure/Non-Life, Soft/Applied/Non-Life, Soft/Pure/Life, Hard/Pure/Life, Hard/Applied/Life, Hard/Pure/Non-Life, and NCES "other" groups. The Soft/Applied/Life group was not significant.

With the exception of the Hard/Applied/Non-Life group (which was much higher than any other group) most of the groups were fairly close together in faculty email use; no clear pattern of faculty email use by academic discipline emerged. The Hard/Applied/Non-Life group's relationship with faculty email use was interesting because it challenged one aspect of Gefen and Straub's (1997) study which asserted that women use email more often than men because of a social presence aspect. This study questions one aspect of that claim by revealing that faculty in science and engineering may be using email for the transmission of large quantities of technical information rather than for social interaction purposes.

In Stark's (1998) model, faculty email use was highest in the Enterprise/Production group, followed by the Information group, Artistic group, Human Client group, and the NCES "other" group (although the last group was very small). The Stark model was more useful than the Biglan model since the patterns appeared to be more meaningful in identifying faculty email use with Enterprise/Production and Information group faculty appearing as the heaviest users of email. The Enterprise/Production group represents business and industrial faculty and faculty in this group may feel more comfortable interacting with many individuals, just as is done in the marketplace through marketing and sales. It is also natural for the Information group, which includes information systems faculty, to feel comfortable using electronic media for the dissemination of knowledge.

Demographic Characteristics

This study confirmed that female faculty used email more than their male counterparts. This provides some support for Gefen and Straub's (1997) theory of social presence. It would be interesting to conduct a study to investigate whether the gender difference existed in other forms of academic interaction such as participation in student presentations, honor societies, or academic fraternities or societies. There were no significant differences in faculty email use by faculty age. Although an analysis of variance indicated statistically significant differences, the Games-Howell Post Hoc Test did not reveal any statistically significant differences in faculty email use by race.

Research and Teaching Characteristics

The number of journal articles published, presentations and the number of hours spent per week on thesis advising were positively related to faculty email use, however, the number of book chapters published, number of books published, number of exhibitions and performances, number of non-refereed articles published, number of patents or software developed were not significant. This suggests that faculty may be especially interested in sharing the results of their finest works with students. Journal articles and presentations at professional conferences tend to be more polished than non-refereed articles and this may explain why journal articles and professional presentations were associated with increased faculty email use while non-refereed articles were not. Exhibitions and performances also were not associated with faculty email use, but in this case, it may have been related to the medium. While a professor may have devoted considerable effort to an artistic work or a musical performance, capturing a master work as a thumbnail image or a low quality audio file to be played on a personal computer may not capture adequately the nuances of the artistic creation. As the quality of digital visual and audio files increases in the future, the relationship between the number of artistic exhibitions created or musical performances and faculty email use may become stronger.

Within teaching characteristics, the number of hours spent per week on administrative committees, general advising, number of credit classes taught, number of distance education classes taught, number of office hours per week, and the use of a teaching assistant all were positively associated with faculty email use. Undergraduate instruction as a percentage of total teaching duties was negatively related to faculty email use while the number of non-credit classes and the number of remedial classes taught were not significant. For most of the significant variables, it appears that email may have been a mechanism used to save time while simultaneously serving as a measure of engagement. Some variables, such as the number of distance education classes taught are almost causally necessary. With distance education classes, email is the only practical means of remote communication and faculty typically use teaching assistants when teaching large classes. A small, but interesting finding was observed with regard to undergraduate instruction as a percentage of total duties. As this percentage increased, faculty email use declined slightly. This may suggest that undergraduate teaching may result in a greater demand on faculty time than other faculty activities such as advising, serving on committees, or publishing.

Organizational Satisfaction Characteristics

Faculty email use was negatively associated with all of the organizational satisfaction variables including a belief that female faculty were treated fairly, overall satisfaction, a belief that part-time faculty were being treated fairly, and a belief that teaching was rewarded. This suggests that when faculty email use becomes excessive, organizational satisfaction decreases. There were no statistically significant relationships between faculty email use and faculty satisfaction with equipment and faculty satisfaction with technology.

4) Faculty Web Site Use for Instructional Purposes

Institutional Characteristics

Faculty at public baccalaureate-only institutions were more likely to use web sites for instructional purposes than faculty at private baccalaureate-only institutions. This may suggest that faculty at public baccalaureate-only institutions may be more technically oriented than faculty at private baccalaureate-only institutions such as small liberal arts colleges. The number of faculty on campus variable exhibited a positive association with faculty web site use for instructional purposes, while the student/faculty ratios showed a negative association with faculty web site use for instructional purposes. If there are enough additional faculty on campus to reduce class size, it is understandable that web site use for instructional purposes may decline. Web sites are very effective tools for managing large classes and when class size decreases, the need for web sites for instructional purposes may also decrease slightly. The degree of urbanization, enrollment, and institutional instructional expenditures were not significant.

Employment Characteristics

Faculty whose principal activity was public service were most likely to use a web site followed by teaching, administrative duties, “other,” research, clinical service, and on sabbatical. Public service faculty are charged with the widest possible dissemination of information. Web sites are rapidly becoming the media of choice for broadcasting information. Similarly, public service faculty depend on other web sites for instructional purposes as sources of data which they then filter, enhance, and forward. It should be noted, though, that the public service group was composed of a small group of individuals.

Teaching faculty often use web sites to post announcements and assignments while administrative faculty may use web sites in the same fashion as teaching faculty and also to post administrative notices, thus accounting for the higher likelihood of usage. Research faculty rely on web sites to obtain and post study results. Although it is difficult to speculate about faculty who responded as “other,” clinical service faculty may access web sites in order to retrieve and post information about medications and treatments. Faculty on sabbatical leave were very unlikely to use a web site. This is possibly because many faculty see a sabbatical leave as a time for reading, traveling and writing. Once these faculty return to full-time teaching, it is possible web site use for instructional purposes may actually become higher for those faculty than for faculty who had not been on a sabbatical.

Part-Time versus Full-Time

Full-time faculty were much more likely to use a web site than part-time faculty, and part-time faculty for whom teaching was their primary job were much more likely to use a web site than part-time faculty for whom their teaching job was not their primary job. These findings were interesting for two reasons. First, comparisons between full-time and part-time faculty are more easily conducted since faculty were asked if they used a web site -- not how often they used a web site. By contrast, the inquiry on faculty email use asked respondents how many hours they used email per week. The results to that question could have been influenced by differences in the number of classes taught by full-time and part-time faculty. Consequently, the web site inquiry is better insulated from the effects of the number of classes taught, and concentrates specifically on the inclination of a faculty member to use an emblematic technological facility.

Rank

A strong linear pattern of faculty web site use for instructional purposes did not appear, however, there was a general bifurcation between academic ranks typically associated with tenure or tenure track faculty and the academic ranks typically associated with those faculty who were not eligible for tenure. With the exception of the rank of lecturer, the academic ranks typically associated with tenured or tenure track faculty were much more likely to use a web site than faculty who were in academic ranks typically not eligible for tenure, often because they were in part-time or temporary positions, or an institution did not have academic ranks.

Tenure Status

The previous finding was supported further when tenure status was requested explicitly. Faculty who were tenured or on a tenure track were much more likely to use a web site than faculty who were not on a tenure track but in an institution that offered tenure, or who taught in an institution that did not offer tenure. This suggests that tenure, or at least the possibility of attaining tenure, encourages faculty to pursue innovative instructional technologies. However, it is uncertain whether the possibility of tenure attracts individuals who are open to innovations or whether use of innovative technology is an institutional requirement for tenure consideration. Thus, a follow-up study could examine whether this phenomenon is the result of an intrinsic drive or an extrinsic institutional requirement.

Union Membership

Faculty who belonged to a union were more likely to use a web site than faculty who did not belong to a union. This phenomenon reinforces the findings that were obtained for faculty email use. Faculty unions are more common among large public institutions than in small liberal arts colleges. Furthermore, large public institutions tend to have large undergraduate classes which may encourage the use of web sites for instructional purposes. A well designed web site can easily accommodate hundreds (or even thousands) of routine requests for information. Thus, the increased likelihood for web site use for instructional purposes among union faculty may be more a function of the type of institution where they teach and less a function of labor status.

Highest Degree Attainment

Web site use was most likely among faculty who held an academic doctorate, followed by master's degree other than a Master of Fine Arts or Master of Social Work, bachelor's degree, Master of Fine Arts or Master of Social Work, professional doctorate, associate's degree, certificate only, and no degree. Faculty who held an academic doctorate were much more likely to use a web site than any other group. There appeared to be a pattern of faculty web use by highest degree attainment. The interesting aspect of this finding is that this challenges the widespread belief that an increase in age and job security result in a reduced openness to technology. In this study, senior professors reported considerable acceptance of information technology.

Contract Type

Faculty who held a 9-10 month contract were most likely to use a web site, followed by 10-12 month faculty, and course by course contract faculty. It appears that faculty who are primarily involved in teaching are also the most adventurous and willing to try new technologies, while faculty who teach only an occasional course are least likely to experiment. Perhaps this is related to the influence of relative time constraints. Faculty who hold joint teaching and administrative appointments may be under greater time pressure than full-time faculty who do not have joint appointments, Similarly, course by course faculty may have the least amount of free time since they may need to travel to multiple institutions in order to survive financially.

Income

As their incomes rose, the likelihood of faculty web site use for instructional purposes also tended to rise. Indeed, there was a steady increase from $1 to $74,999 (followed by a small drop in the $75,000 to $99,999 category) and then an increase in the $100,000 to $199,999 range, followed by a decline for the $200,000 and above groups. These findings suggest that as income rises, faculty willingness to use a web site also tended to rise. As faculty became more financially secure, they were generally more at ease with technological innovations.

Disciplinary Characteristics

Using Biglan's (1973a) classifications, faculty in the Hard/Applied/Non-Life group used web sites for instructional purposes most, followed by the Hard/Pure/Life, Hard/Pure/Non-Life, Soft/Applied/Life, Soft/Pure/Non-Life, Soft/Applied/Non-Life, Hard/Applied/Life, Soft/Pure/Life, and the NCES category "other" groups. It should be noted the "other" category consisted of only a few individuals. The Hard/Applied/Non-Life group used web sites for instructional purposes much more often than any other group --- otherwise there were no clear patterns of faculty web site use for instructional purposes by academic discipline using Biglan's (1973a) model. This suggests that science and engineering faculty felt comfortable using a technology based vehicle for the dissemination of information.

Stark's (1998) model was somewhat more useful in revealing faculty web site use for instructional purposes than the Biglan model. This model revealed that Information group faculty were most likely to use a web site followed by the Enterprise/Production group, the Human Client group, the Artistic group, and the NCES "other" group. It is not surprising that Information group faculty would be most likely to use web sites for instructional purposes since they teach others how to use new technologies. Likewise, Enterprise/Production faculty typically embody an entrepreneurial spirit and find it easy to embrace new technologies, particularly when those new technologies can expand an enterprise or promote production and sales.

Demographic Characteristics

There was no statistically significant difference in the likelihood of faculty web site use for instructional purposes by gender. There were, however, significant differences by age, though, with faculty usage approximately the same between the 30 to 49 year group and the 50 and above age group. However, the faculty age group of up to 29 years old was less likely to use web sites for instructional purposes than the above 30 age groups. However, this reflects more on possible tenure status than age. Most faculty below 30 do not have tenure while most permanent faculty above 30 do have tenure. Since the tenure process is often quite demanding, untenured faculty tend to focus on those activities that will enhance their portfolio. Since most institutions focus on teaching, publications and grants, web site development does not typically improve a candidate's chances for tenure.

When race was examined, Hispanic faculty, Native American (and unclassified faculty), white, and Asian-American faculty were most likely to use web sites for instructional purposes with Black/African-American faculty least likely to use a web site.

Research and Teaching Characteristics

Faculty web site use for instructional purposes was negatively correlated with the number of exhibitions and performances and positively correlated with the number of patents or software developed and the number of hours spent per week on thesis advising. The number of book chapters, books, journal articles, and non-refereed articles published, and the number of presentations all were not significant. This suggests that technically inclined faculty, such as those who write software or obtain patents, are also more likely to express themselves through a technological medium such as a web site. On the other hand, faculty who teach in the lively arts may prefer to express themselves in live performances rather than spend hours writing code. As time goes on, these two disparate groups -- the technologists and the artists -- may converge to produce exhibitions and performances on the web.

Many teaching characteristics were associated with faculty web site use for instructional purposes. The number of hours spent per week on administrative committees, number of hours spent per week on general advising, the number of credit classes taught, the number of distance education classes taught, and use of a teaching assistant were all positively associated with faculty web site use for instructional purposes while the number of remedial classes taught was negatively associated with faculty web site use for instructional purposes, while the number of non-credit classes taught, number of office hours per week, and undergraduate instruction as a percentage of overall duties were not significant.

The positive associations suggest that the more faculty become engaged in teaching and instructionally related activities, the more likely they were to use a web site. It is understandable that distance education courses and the use of a teaching assistant would be associated with faculty web site use for instructional purposes since most distance education courses depend heavily on web sites for instructional purposes to facilitate educational exchanges. As distance education moves away from expensive television studio productions and a few satellite locations to web based systems, this phenomenon is likely to grow dramatically. By the same token, teaching assistants usually support large class instruction. The use of web sites for instructional purposes helps to alleviate some of the burden of routine announcements thus providing an incentive for increased faculty usage. As the popularity of distance education grows, distance education class sizes may also increase, thus requiring the use of more teaching assistants in those courses. This would then intensify the relationship between distance education, faculty web site use for instructional purposes and the use of teaching assistants.

A disturbing finding was that faculty web site use for instructional purposes was negatively associated with the number of remedial classes taught. This suggests that faculty may be offering fewer web-based resources for remedial students even though they may need additional online assistance. The other negative association indicated that as teaching workload increased, the likelihood of web site use for instructional purposes decreased. This suggests that faculty may have an intrinsic interest in using web sites for instructional purposes, but as time becomes less available, web site use for instructional purposes declines.

Organizational Satisfaction Characteristics

Within the organizational satisfaction variables, only a belief that minority faculty were treated fairly, and a belief that part-time faculty were treated fairly, exhibited a negative association with faculty web site use for instructional purposes. A belief that female faculty were treated fairly, overall satisfaction, and a belief that teaching was rewarded were not significant. The findings that there was a small negative association between faculty web site use for instructional purposes and a belief that minority faculty were treated fairly, as well as a belief that part-time faculty were treated fairly was somewhat inconclusive since they do not form a clear pattern.

Faculty Web Site Use for Instructional Purposes' Relationship with Other Dependent Variables

Faculty web site use for instructional purposes was positively related to faculty satisfaction with equipment and faculty satisfaction with technology. Faculty who are comfortable with technology may be more likely to experiment with technology than individuals who experience fear or discomfort with technology. Conversely, one may posit that reducing that fear and addressing possible faculty satisfaction with equipment issues may enhance not only web site use for instructional purposes, but also lessen resistance to other forms of innovation on campus.

Usage and Satisfaction Relationship

There was a small positive correlation between faculty satisfaction with equipment, faculty satisfaction with technology and faculty web site use for instructional purposes, but faculty email use was not significant. This correlation suggests that faculty who use web sites for instructional purposes may also appreciate equipment and technology more than faculty who do not use web sites for instructional purposes. Given the technical connection between web sites for instructional purposes, technology and equipment, this association is not unusual.

Chapter Summary

In this section, I summarize all the findings of this chapter by comparing the independent variables across the dependent variables. A summary of the significant variable relationships is shown in Table 5.2 and is discussed below. Faculty at private baccalaureate-only institutions were more satisfied with equipment and technology, but used email and web sites for instructional purposes less than faculty at public baccalaureate-only institutions. This suggests that faculty at private baccalaureate-only institutions may not have access to the latest equipment or extensive technical support, however, the technological infrastructure they do have may be more aligned with their needs.

Student/faculty ratios were negatively related to faculty satisfaction with equipment, faculty satisfaction with technology, and faculty web site use for instructional purposes. This suggests that as class size increased, faculty satisfaction and faculty web site use for instructional purposes decreased. A reduction in class size has often been cited as benefiting students. This finding suggest that it also enhances faculty satisfaction as well as faculty use of information technology. Furthermore, when enrollment and number of faculty at an institution grew, faculty email use grew. This suggests a relatively straightforward correlation between institutional growth and a concomitant growth in the need for electronic communications.

When principal activities were taken into account, clinical services faculty had the greatest levels of satisfaction with equipment followed by faculty in the "other" activity category, and the teaching category. This suggests that since clinical services faculty depend heavily on equipment they are most likely to appreciate the equipment they use. Public Service faculty were most likely to use web sites for instructional purposes since this may be the most effective means of promulgating new policies and programs. Part-time faculty expressed greater satisfaction with equipment and technology than full-time faculty, but part-time faculty email use and web site use for instructional purposes was substantially lower than it was for full-time faculty. This suggest that adjunct faculty are eager to fit in at their institutions, but may not have the time to use technology as much as they might like.

Faculty satisfaction with equipment rose from instructor, "other," and peaked with assistant professor rank and then declined with the associate professor rank. Full professor, lecturer, and "institution has no ranks" were not significant. Faculty satisfaction with technology by academic rank was not significant. The faculty email use dependent variable was significant for every rank except for lecturer. Indeed, faculty email use rose from “institution has no ranks,” to “other”, instructor, and again peaked with assistant professor. It then declined at the associate professor rank and continued to decline at the professor rank. A similar pattern occurred with faculty web site use for instructional purposes. The lowest faculty web site usage was reported at the “institution has no ranks” category, followed by “other,” instructor, lecturer, and peaked at the assistant professor rank. Faculty web site use for instructional purposes then declined at the associate professor and professor ranks. This suggests that interaction with students grows until tenure is attained, at which point, interaction begins to decline. Faculty who were not on a tenure track but taught at tenure granting institutions were most satisfied with equipment and technology, but they used email and web sites for instructional purposes less than any other group. Union members had lower faculty satisfaction with equipment and faculty satisfaction with technology levels than non-union faculty, however, they used email and web sites for instructional purposes more than non-union faculty. Faculty who held an academic doctorate were more likely to use email than faculty who held a master’s degree other than a M.F.A. or M.S.W. With regard to income, faculty who earned $75,000 or above, expressed greater satisfaction with equipment and technology than their colleagues who made less. The higher income faculty also tended to be more likely to use web sites for instructional purposes than faculty who earned less than $75,000. This may be an indirect effect of gaining tenure rather than the effect of income itself.

After examining institutional characteristics and employment characteristics, I studied how disciplinary affiliation may influence faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes. I chose the Biglan disciplinary model and the Stark disciplinary model. In the Biglan disciplinary model, only the Soft/Pure/Life and the Soft/Applied/Life categories revealed significant relationships with faculty satisfaction with equipment. None of the Biglan categories was significantly related to the faculty satisfaction with technology dependent variable. However, several categories were significantly related to faculty email use. The highest faculty email use occurred among "applied" category faculty suggesting that technically oriented faculty may feel more at ease using email than their non-technical colleagues. There did not appear to be a consistent disciplinary pattern associated with faculty web site use for instructional purposes.

In the Stark disciplinary model, faculty in the Information category were more satisfied with equipment than any other category. Faculty satisfaction with technology was not significantly related to Stark's (1998) disciplinary categories, however, when faculty email use was the dependent variable, faculty in the Enterprise/Production category used email more than faculty in the Artistic category, the Human Client category, and the "other" disciplinary category. Faculty web use was more likely to occur in more career oriented faculty--specifically the "Information" and "Enterprise/Production" category faculty-- than among less vocationally oriented faculty in the "Artistic" and "Human Client" categories.

Next, I examined if gender, age or race affected faculty satisfaction with equipment or technology, faculty email use, or faculty web site use for instructional purposes. The analyses suggested that gender was not significantly related to faculty satisfaction with equipment, faculty satisfaction with technology or faculty web site use for instructional purposes. However, female faculty tended to use email more often than their male counterparts. There were no significant gender differences in faculty satisfaction with equipment, however, faculty satisfaction with technology rose with age. The likelihood of faculty web site use for instructional purposes also rose after faculty were 30 years old, possibly another result of having achieving tenure. Reduced career pressure may lead to increased communication and creativity. Race was not significantly related to faculty satisfaction with equipment, faculty satisfaction with technology, or faculty email use. Most racial groups in the study reported similar web site usage, although African-American faculty reported the lowest likelihood of web site use for instructional purposes.

I then examined the association between research and teaching characteristics and faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes. While several teaching characteristics variables had significant associations with my four dependent variables, this was the case for only a few research characteristics. Only the number of hours spent per week on thesis advising was significantly associated with at least three dependent variables. This study found a positive relationship between faculty satisfaction with equipment, faculty satisfaction with technology and faculty web site use for instructional purposes.

The most notable finding among the teaching characteristics was that teaching factors which reduced available time for faculty were consistently associated with reduced levels of faculty satisfaction with equipment and faculty satisfaction with technology. The most prominent of these variables included the number of hours per week spent on administrative committees, the number of hours per week spent on advising, and the number of credit classes taught.

The findings within the organizational satisfaction characteristics were somewhat more complex. All of the organizational satisfaction variables used in this study were positively correlated with faculty satisfaction with equipment and faculty satisfaction with technology but negatively correlated with faculty email use. Faculty appreciated information technology as long as it was not overused. This suggests another dimension to the Davis' Technology Acceptance Model. The Technology Acceptance Model posits that an increase in technology use leads to positive perceptions of technology. In my study, excessive use of technology led to diminished levels of faculty satisfaction. Although faculty were generally satisfied with equipment and technology, when time constraints became excessive, faculty satisfaction with equipment and technology declined. Table 5.2 summarizes those relationships.

Table 5.2. Summary of Significant Relationships Between Institutional Control, Institutional Characteristics, Employment Characteristics, Disciplinary Classifications, Demographic Characteristics, Teaching and Research Characteristics, Organizational Satisfaction and Faculty Satisfaction with Equipment and Technology, Faculty Email Use and Faculty Web Site Use for Instructional Purposes.

Independent Variables	Dependent Variables			
	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Site Use for Instructional Purposes
Institutional control Priv. vs. Pub.	**	**	**	***
Enrollment			*	
Number of faculty			*	**
Student/Faculty ratio	***	***		***
Degree of urbanization				
Institutional instructional expenditures		**		

Table 5.2. Summary of Significant Relationships Between Institutional Control, Institutional Characteristics, Employment Characteristics, Disciplinary Classifications, Demographic Characteristics, Teaching and Research Characteristics, Organizational Satisfaction and Faculty Satisfaction with Equipment and Technology, Faculty Email Use and Faculty Web Site Use for Instructional Purposes (continued).

Independent Variables	Dependent Variables			
	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Site Use for Instructional Purposes
Principal activity	***			***
Part-time vs. full-time	***	**	***	***
Part-time is primary job	*			***
Academic rank	***		***	***
Tenure status	***	**	***	***
Union member	**	***	***	*
Highest degree			***	***
Contract type	***	**	***	***
Income	***	*	***	***
Biglan class.	*		***	***
Stark class.	*		*	***
Gender			**	
Age		*		**

Table 5.2. Summary of Significant Relationships Between Institutional Control, Institutional Characteristics, Employment Characteristics, Disciplinary Classifications, Demographic Characteristics, Teaching and Research Characteristics, Organizational Satisfaction and Faculty Satisfaction with Equipment and Technology, Faculty Email Use and Faculty Web Site Use for Instructional Purposes (continued).

Independent Variables	Dependent Variables			
	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Site Use for Instructional Purposes
Race				**
Book chapters	*			
Books				
Exhib/Perform.				***
Journal Articles			*	
Non-ref. Articles	*	*		
Patents/Software				***
Presentations			*	
Thesis Advising	***		***	*
Adm. Comm.	***	*	***	***
Advising hours	***	**	***	***
Credit hours	***	***	***	***
Distance ed.			***	***
Non-cred. class				
Office hours			***	

Table 5.2. Summary of Significant Relationships Between Institutional Control, Institutional Characteristics, Employment Characteristics, Disciplinary Classifications, Demographic Characteristics, Teaching and Research Characteristics, Organizational Satisfaction and Faculty Satisfaction with Equipment and Technology, Faculty Email Use and Faculty Web Site Use for Instructional Purposes (continued).

Independent Variables	Dependent Variables			
	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Site Use for Instructional Purposes
Remedial classes				*
T.A. use			***	***
Undergrad Inst.			**	
Book chapters	*			
Books				
Exhib/Perform.				***
Journal Articles			*	
Non-ref. Articles	*	*		
Patents/Software				***
Presentations			*	
Thesis Advising	***		***	*
Adm. Comm.	***	*	***	***
Advising hours	***	**	***	***

Table 5.2. Summary of Significant Relationships Between Institutional Control, Institutional Characteristics, Employment Characteristics, Disciplinary Classifications, Demographic Characteristics, Teaching and Research Characteristics, Organizational Satisfaction and Faculty Satisfaction with Equipment and Technology, Faculty Email Use and Faculty Web Site Use for Instructional Purposes (continued).

Independent Variables	Dependent Variables			
	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Site Use for Instructional Purposes
Credit hours	***	***	***	***
Distance ed.			***	***
Non-cred. class				
Office hours			***	
Remedial classes				*
T.A. use			***	***
Undergrad Inst.			**	
Female Faculty Treated fairly	***	***	***	
Minority Faculty Treated Fairly	***	***	**	*
Overall Satis.	***	***	***	
Teaching is Rewarded	***	***	**	
* p≤ .05, ** p≤.01, *** p≤ .001				

In Chapter 6, I discuss the results of multiple linear regressions using faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use as the dependent variables. I then discuss the results of binary logistic regressions using faculty web site use for instructional purposes as a dichotomous dependent variable.

CHAPTER 6

REGRESSION MODELS

Regression Models by Dependent Variable

In this chapter, I discuss the multiple linear regressions I conducted on three of my dependent variables: faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. Then I discuss the binary logistic regressions I conducted on faculty web site use for instructional purposes, a dichotomous variable which was my fourth dependent variable. Each set of variables was entered in a block using the “enter method.” There are several methods available for multiple regressions with multiple blocks. These include the “enter method” and the “stepwise method.” Pallant (2005) points out:

> In hierarchical regression (also called sequential), the independent variables are entered into the equation in the order specified by the researcher based on theoretical grounds. Variables or sets of variables are entered in steps (or blocks), with each independent variable being assessed in terms of what it adds to the prediction of the dependent variable, after the previous variables have been controlled for. By contrast, the stepwise method can use either forward selection, backward deletion, or stepwise regression. The disadvantage of a stepwise method is that it relies on selection by computer, rather than selection based on research. (p.141-142).

Since my study is based on prior empirical studies, I chose to use the enter method. Each of my models consisted of related variables using the enter method until the sixth and final model for each dependent variable controlled for the effects of all other independent variables in this study.

I discuss my findings organized first by dependent variable. Next I summarize my findings at the end of each model. At the end of this chapter, I discuss the relationship between information technology satisfaction and use. The first set of multiple regressions used faculty satisfaction with equipment as the dependent variable and is shown in Table 6.1.

I. Faculty Satisfaction with Equipment

I used a multiple linear regression and entered six major blocks of independent variables in the following order: (1) institutional characteristics, (2) employment characteristics, (3) disciplinary characteristics, (4) demographic characteristics, (5) research and teaching characteristics, and (6) organizational satisfaction. The six blocks correspond to the six research subquestions used in the study. As each block was added to the multiple linear regression, a new model was generated.

Table 6.1 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Equipment.

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Institutional Char.												
Priv vs. Pub	.087	***	.071	**	.077	**	.074	**	.070	**	.014	
Undergraduate FT and PT Enrollment	.056		.059		.058		.055		.052		.016	
Number of Faculty at institution	.028		.007		.009		.012		.011		.033	
FTE student/ FTE faculty ratio	-.068	***	-.088	***	-.086	***	-.087	***	-.075	***	-.057	**
Urbanization	.029		.051	*	.051	*	.056	*	.052	*	.030	
Instr. Expenses	-.014		-.002		-.007		-.005		-.001		.006	
Employment Char.												
Prin. Act. Research vs. Teaching			.004		.004		.005		.004		-.010	
Prin. Act. Publ. Servs. vs. Teaching			.009		.009		.009		.013		.002	
Prin. Act. Clin. Servs. vs. Teaching			.047	*	.039		.039		.033		.030	
Prin. Act. Admin. Servs. vs. Teaching			.044	*	.042		.042		.040		.030	
Prin. Act. Sabbatical vs. Teaching			.022		.023		.024		.018		.022	
Prin. Act. Other vs. Teaching			.049	*	.042	*	.044	*	.037		.031	
Employment status												
Part-time vs. Full-time			.342		.345	*	.343	*	.270		.161	

Table 6.1 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Equipment (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Part-time is Primary Job			-.243		-.241		-.242		-.205		-.138	
Rank												
Rank Assoc. Prof. vs. Professor			-.026		-.031		-.031		-.023		-.018	
Rank Assist. Prof. vs. Professor			-.009		-.010		-.010		-.004		-.007	
Rank Instructor vs. Professor			.034		.027		.028		.025		.014	
Rank Lecturer vs. Professor			.022		.024		.023		.022		.022	
Tenure												
Tenure Untenured on Track vs. Ten.			.023		.019		.016		.021		-.002	
Tenure Not on Track vs. Ten.			.028		.018		.018		.021		.007	
Tenure: No tenure in system			-.054	*	-.060	*	-.059	***	-.052	*	-.046	*
Union membership			-.047	*	-.047	*	-.047	*	-.045	*	-.035	
Highest Degree												
Highest Degree None vs. Doctorate			-.018		-.014		-.015		-.019		-.025	
Highest Degree Prof. vs. Doctorate			.017		.014		.014		.010		.011	
Highest Degree MFA, MSW vs. Doctorate			-.032		-.014		-.015		-.015		-.013	

Table 6.1 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Equipment (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Highest Degree MA, MS vs. Doctorate			.025		.029		.028		.028		.010	
Highest Degree BA or BS vs. Doctorate			-.006		.000		.001		-.003		.001	
Highest Degree AA or AS vs. Doctorate			-.007		-.010		-.010		-.007		-.009	
Highest Degree Cert. vs. Doctorate			-.001		-.003		-.005		-.007		-.002	
Contract type												
Contract Type: 11 or 12 month vs. 9			.069	**	.071	***	.072	***	.069	**	.045	*
Contract Type: course basis vs. 9 month			.021		.022		.026		.008		.021	
Income categories												
Income $25 to 49 vs. $1 to 24 (thousand)			.045		.037		.033		.028		.013	
Income $50 to 74 vs. $1 to 24 (thousand)			.097	*	.089	*	.084	*	.080	*	.049	
Income $75 to 99 vs. $1 to 24 (thousand).			.107	***	.103	***	.098	**	.092	**	.062	*
Income $100 to 149 vs. $1 to 24 (thousand).			.105	***	.103	***	.099	***	.090	***	.050	

Table 6.1 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Equipment (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Income $150 to 199 vs. $1 to 24 (thousand).			.016		.014		.012		.010		-.001	
Income $200 and above vs. $1 to 24 (thousand).			.043	*	.042	*	.042	*	.040	*	.035	
Disciplinary categories												
Biglan's Classifications												
Soft/Pure/Non-Life vs. Soft/Pure/Life					.072	*	.067	*	.070	*	.056	
Soft/Applied/Life vs. Soft/Pure/Life					-.001		-.001		.003		-.002	
Soft/Applied/Non-Life vs. Soft/Pure/Life					.063		.066		.080	*	.053	
Hard/Pure/Life vs. Soft/Pure/Life					.030		.031		.027		.007	
Hard/Pure/Non-life vs. Soft/Pure/Life					.037		.037		.028		.014	
Hard/Applied/Life vs. Soft/Pure/Life					.043		.046		.049	*	.034	

Table 6.1 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Equipment (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Hard/Applied/Non-Life vs. Soft/Pure/Life					.054	*	.052	*	.057	*	.048	
Disciplinary categories												
Stark's classifications												
Information vs. Human Client					.006		.005		.012		.008	
Enterprise/Production vs. Human Client					-.061	*	-.062	**	-.057	*	-.042	
Artistic vs. Human Client					-.031		-.031		-.036		-.038	
Demographics												
Gender												
Fem. vs. Male							-.008		-.007		.014	
Age												
Age: 30-49 vs. up to 29							.021		.019		.014	
Age: 50 and above vs. up to 29							.031		.030		.019	
Race												
American Indian vs. white							-.029		-.026		-.030	

Table 6.1 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Equipment (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Asian American vs. white							.005		.007		.025	
Black/African American vs. white							.024		.026		.042	*
Hispanic vs. white							.035		.038		.031	
Research characteristics												
Books									.001		-.005	
Book chapters									.039		.044	*
Exhibitions / Performances									.025		.013	
Journal Articles									.008		.004	
Non-refereed articles									.022		.024	
Patents/ software									-.001		-.001	
Presentations									.003		.003	
Thesis advising									-.023		-.011	
Teaching characteristics												
Admin. Committee hours									-.043		-.039	
Advising hours									-.033		-.009	
Credit classes taught									-.094	***	-.071	**

Table 6.1 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Equipment (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Distance education classes taught									.010		.011	
Non-credit classes taught									-.046	*	-.036	
Office hours									.021		.019	
Remedial classes taught									.036		.035	
Teaching assistant use									.034		.011	
Undergraduate instruction (as percent of overall activities)									.013		.008	
Organizational satisfaction												
Female faculty are treated fairly											.031	
Minority faculty are treated fairly											-.011	
Overall satisfaction											.250	***
Part-time faculty are treated fairly											.061	**
Teaching is rewarded											.140	***
Model summaries	R square		R square		R square		R square		R square		R square	
	.011	***	.066	***	.073	*	.076	n.s.	.091	**	.225	***
*** p≤ .001,** p≤.01,* * p≤05 *												

Faculty Satisfaction With Equipment Models

Models 1, 2, 3, 5, and 6 exhibited changes in R squared values at the .05 level of significance. Model 4 was not significant. Model 6 showed the highest R squared value and it explained 22.5 percent of the variance in the dependent variable (faculty satisfaction with equipment). In the sixth model, organizational satisfaction characteristics were added as a block after controlling for institutional characteristics, employment characteristics, disciplinary characteristics, demographic characteristics, and research and teaching characteristics.

Institutional and Employment Characteristics

Within the institutional characteristics block, only student-faculty ratios had a negative, statistically significant relationship with faculty satisfaction with equipment (beta= -.057).Within the principal activity category, research, public services, clinical services, administrative services, sabbatical leave, and "other" were not statistically significant. Part-time status and "part-time job is primary job" and academic rank were not significant. Within the tenure category, only "no tenure in system" was negatively significant (beta= -.046). Highest degree attained was not significant. Eleven or twelve month contracts were positively related and significant (beta=+.045), but individual course contracts were not significant. Within the income categories, only income in the $75,000 to $99,999 range was significant (beta= +.062) and positively related.

Disciplinary and Demographic Characteristics

None of Biglan's (1973a) classifications or Stark's (1998) disciplinary classifications was statistically significant. Gender and age were not statistically significant. Within race, American Indian, Asian American, and Hispanics were not statistically significant, however, African Americans were statistically positive and significant (beta= +.042).

Research and Teaching Characteristics

The number of book chapters published was positively related and significant (beta= +.044), but the number of books, exhibitions/performances, journal articles, non-refereed articles, patents or software, presentations, and thesis advising were not significant. The only teaching characteristics that was significant was the number of credit courses taught (beta= -.071) which was negatively related. The number of hours spent on administrative committees, advising, the number of distance education classes taught, office hours, remedial classes, the use of a teaching assistant and undergraduate instruction as a percent of overall activities were not significant.

Organizational Satisfaction Characteristics

Overall organizational satisfaction (beta=+.250), the perception that part-time faculty were treated fairly (beta=+.061), and that teaching was rewarded were all significant (beta=+.140) and positively related. A belief that female faculty were treated fairly, and that minority faculty are treated fairly were not statistically significant.

A Summary of the Faculty Satisfaction with Equipment Models

In the previous section, I discussed which variables contributed to variance in the faculty satisfaction with equipment satisfaction and pointed out which variables were not significant. In this section I summarize and discuss only those independent variables which were found to contribute significantly to the variance in the dependent variable.

After controlling for all other variables in this study, ten variables were found to be significant. Student/faculty ratios were negatively related to faculty satisfaction with equipment. When employment characteristics were examined, only teaching in a system that did offer tenure was negatively related to faculty satisfaction with equipment. Faculty who taught on an 11-12 month contract were positively related to faculty satisfaction with equipment. Income levels, particularly $75,000 to $99,999, were positively associated with faculty equipment satisfaction. Demographically, African-American faculty showed a statistically significant, positive association with faculty satisfaction with equipment.

Except for the number of book chapters published, there were no unique contributions to faculty satisfaction with equipment among research characteristics. However, there was a consistently negative association between the number of credit classes taught and faculty satisfaction with equipment.

Organizational satisfaction factors proved to be important predictors of faculty satisfaction with equipment. While a belief that female faculty were treated fairly fell away in the final model, overall satisfaction, a belief that part-time faculty were treated fairly, and a belief that teaching was rewarded were all positively related to faculty satisfaction with equipment.

II. Faculty Satisfaction with Technology

I used a multiple linear regression to examine the relationship between six blocks of independent variables and the faculty satisfaction with technology dependent variable. The six blocks of variables were (1) institutional characteristics, (2) employment characteristics, (3) disciplinary characteristics, (4) demographic characteristics, (5) research and teaching and characteristics (6) and organizational satisfaction. The six blocks of variables corresponded to the first six research questions used in the study. As each block of variables was added to the multiple linear regression, a new model was generated for this dependent variable. Table 6.2 shows the results of this regression.

Table 6.2 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Technology.

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Institutional Char.												
Priv. vs. Pub	.074	**	.058	*	.058	*	.060	*	.055	*	-.007	
Undergraduate FT and PT Enrollment	-.020		-.014		-.017		-.021		-.026		-.068	*
Number of Faculty at institution	.089	**	.079	***	.081	*	.083	**	.092	**	.117	***
FTE student/ FTE faculty ratio	-.076	***	-.092	***	-.089	***	-.088	***	-.081	***	-.059	**
Urbanization	.024		.036		.035		.035		.032		.004	
Instr. Expenses	-.042	*	-.028		-.012		-.018		-.012		-.005	
Employment Char.												
Prin. Act. Research vs. Teaching			-.006		-.008		-.006		-.002		-.019	
Prin. Act. Publ. Servs. vs. Teaching			.028		.027		.028		.034		.021	
Prin. Act. Clin. Servs. vs. Teaching			.018		.009		.009		.007		.004	
Prin. Act. Admin. Servs. vs. Teaching			.033		.032		.033		.042		.029	
Prin. Act. Sabbatical vs. Teaching			-.018		-.019		-.018		-.013		-.010	
Prin. Act. Other vs. Teaching			.030		.025		.027		.027		.021	

Table 6.2 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Technology (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Employment Status												
Part-time vs. Full-time			-.006		.151		.150		.111		-.013	
Part-time is Primary Job			.033		-.075		-.074		-.049		.026	
Rank												
Rank Assoc. Prof. vs. Professor			.021		.021		.020		.022		.030	
Rank Assist. Prof. vs. Professor			.029		.032		.034		.035		.035	
Rank Instructor vs. Professor			.021		.017		.024		.024		.013	
Rank Lecturer vs. Professor			.009		.008		.011		.010		.010	
Tenure												
Tenure Untenured on Track vs. Ten.			.014		.016		.022		.022		-.005	
Tenure Not on Track vs. Ten.			.037		.037		.043		.038		.021	
Tenure: No tenure in system			-.018		-.020		-.016		-.017		-.010	
Union membership			-.058	**	-.055	*	-.056	**	-.053	*	-.041	*
Highest Degree												
Highest Degree None vs. Doctorate			-.010		-.009		-.007		-.012		-.019	

Table 6.2 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Technology (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Highest Degree Prof. vs. Doctorate			.011		.009		.010		.003		.003	
Highest Degree MFA, MSW vs. Doctorate			.023		.030		.030		.028		.031	
Highest Degree MA, MS vs. Doctorate			.041		.054	*	.053	*	.050		.026	
Highest Degree BA or BS vs. Doctorate			.001		.007		.012		.009		.013	
Highest Degree AA or AS vs. Doctorate			.012		.008		.008		.008		.007	
Highest Degree Cert. vs. Doctorate			.002		.000		-.003		-.005		.002	
Contract type												
Contract Type: 11 or 12 month vs. 9 month			.033		.036		.037		.035		.006	
Contract Type: course basis vs. 9 month			-.001		-.002		-.002		-.014		.002	

Table 6.2 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Technology (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Income categories												
Income $25 to 49 vs. $1 to 24 (thousand)			.068		.061		.054		.049		.030	
Income $50 to 74 vs. $1 to 24 (thousand)			.120	**	.115	**	.102	*	.097	*	.061	
Income $75 to 99 vs. $1 to 24 (thousand).			.087	**	.087	**	.076	*	.074	*	.038	
Income $100 to 149 vs. $1 to 24 (thousand).			.115	***	.119	***	.110	***	.111	***	.063	*
Income $150 to 199 vs. $1 to 24 (thousand).			.022		.022		.018		.017		.004	
Income $200 and above vs. $1 to 24 (thousand).			.003		.002		.001		.002		-.004	
Disciplinary categories												
Biglan's Classifications												
Soft/Pure/Non-Life vs. Soft/Pure/Life					-.013		-.010		.000		-.015	

Table 6.2 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Technology (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Soft/Applied/Life vs. Soft/Pure/Life					-.003		-.005		-.004		-.009	
Soft/Applied/Non-Life vs. Soft/Pure/Life					.031		.019		.029		-.005	
Hard/Pure/Life vs. Soft/Pure/Life					.051		.050		.048		.022	
Hard/Pure/Non-life vs. Soft/Pure/Life					.017		.019		.016		-.002	
Hard/Applied/Life vs. Soft/Pure/Life					.034		.030		.030		.010	
Hard/Applied/Non-Life vs. Soft/Pure/Life					-.012		-.014		-.007		-.021	
Disciplinary categories												
Stark's classifications												
Information vs. Human Client					-.023		-.027		-.026		-.029	
Enterprise/ Production vs. Human Client					-.056	*	-.053	*	-.052	*	-.033	

Table 6.2 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Technology (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Artistic vs. Human Client					-.014		-.023		-.036		-.041	
Demographics												
Gender												
Fem. vs. Male							.017		.021		.044	*
Age												
Age: 30-49 vs. up to 29							.191	**	.196	**	.186	**
Age: 50 and above vs. up to 29							.224	**	.229	**	.212	***
Race												
American Indian vs. white							-.011		-.009		-.014	
Asian American vs. white							-.010		-.004		.020	
Black/African American vs. white							-.005		-.003		.018	
Hispanic vs. white							.023		.024		.017	

Table 6.2 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Technology (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Research characteristics												
Books									-.022		-.027	
Book chapters									-.005		.002	
Exhibitions / Performances									.040		.025	
Journal Articles									-.014		-.018	
Non-refereed articles									.044	*	.045	*
Patents/ software									-.018		-.016	
Presentations									.013		.014	
Thesis advising									-.018		-.005	
Teaching characteristics												
Admin. Committee hours									-.040		-.034	
Advising hours									-.049	*	-.021	
Credit classes taught									-.041		-.016	
Distance education classes taught									-.018		-.018	
Non-credit classes taught									-.022		-.011	
Office hours									.042		.038	
Remedial classes taught									-.002		-.004	

Table 6.2 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Satisfaction with Technology (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Teaching assistant use									.047		.021	
Undergraduate instruction (as percent of overall activities)									.002		-.003	
Organizational satisfaction												
Female faculty are treated fairly											.019	
Minority faculty are treated fairly											.001	
Overall satisfaction											.323	***
Part-time faculty are treated fairly											.070	***
Teaching is rewarded											.136	***
Model summaries	R square		R square		R square		R square		R square		R square	
	.015	***	.041	***	.047	n.s.	.052	n.s.	.065	*	.251	***

*** p≤ .001,** p≤.01,* * p≤05 *

Faculty Satisfaction with Technology Models

Models 1, 2, 5, and 6 exhibited changes in R squared values at the .05 level of significance. Models 3 and 4 were not significant. In the sixth model, organizational satisfaction characteristics were added as a block after controlling for institutional characteristics, employment characteristics, disciplinary characteristics, demographic characteristics, and research and teaching characteristics. This model explained 25.1 percent of the amount of variation in the dependent variable (faculty satisfaction with technology).

Institutional Characteristics

The number of undergraduate students (beta= -.068), number of faculty (beta= +.117), and student-faculty ratios (beta= -.059) had statistically significant relationships with faculty satisfaction with technology, however, only the number of faculty was positively related. Institutional control, degree of urbanization, and instructional expenditures were not significant.

Employment Characteristics

Principal activity, academic rank, tenure status, and highest degree attained, and contract type were not significant. Union membership (beta = -.041) was negatively related to faculty technology satisfaction, but contract type was not significant. Within income categories, only $100,000 to $149,999 was statistically significant and positively related (beta = +.063).

Disciplinary and Demographic Characteristics

Neither Biglan's (1973a) nor Stark's (1998) disciplinary categories were statistically significant. Female faculty were more satisfied with technology than male faculty (beta= .044) and faculty who were between 30 and 49 years old (beta= .186) and 50 years or older (beta =.212) were more satisfied with technology than faculty who were 29 years old or younger. Race was not statistically significant.

Research and Teaching Characteristics

The number of books published, book chapters, exhibitions/performances, journal articles, patents or software, presentations, thesis advising were not statistically significant. The number of non-refereed articles published was significant and positively related (beta= +.045).The number of hours spent on administrative committees, advising, number of credit classes taught, distance education classes taught, non-credit classes, office hours, remedial classes taught, use of a teaching assistant, and undergraduate instruction as a percent of overall activities were not significant.

Organizational Satisfaction Characteristics

A belief that female faculty were treated fairly, and a belief that minority faculty were treated fairly were not statistically significant. However, overall organizational satisfaction (beta= +.323), a belief that part-time faculty were treated fairly (beta= +.070), and the belief that teaching was rewarded were significant and positively related (beta= +.136).

A Summary of the Technology Satisfaction Models

After controlling for all other factors, the final technology satisfaction model revealed enrollment was negatively related to faculty satisfaction with technology number of faculty at an institution was positively related to faculty satisfaction with technology, and student/faculty ratios were negatively related to faculty satisfaction with technology. Union membership was negatively related to faculty satisfaction with technology. Gender was related to faculty satisfaction with technology with female faculty reporting higher levels of satisfaction with technology than male faculty. Faculty income from $100,000 to $149,999, age 30 to 49, and 50 and above, a belief that part-time faculty are treated fairly, overall satisfaction, and a belief that teaching is rewarded, were all positively related to faculty satisfaction with technology.

III. Faculty Email Use

I used a multiple linear regression to examine the relationships between six blocks of independent variables and the faculty email use dependent variable. The six blocks of variables were: (1) institutional characteristics, (2) employment characteristics, (3) disciplinary characteristics, (4) demographic characteristics, (5) research and teaching characteristics, and (6) organizational satisfaction. As each block of variables was added to the multiple linear regression, a new model was generated for this dependent variable. Table 6.3 shows the results of this regression.

Table 6.3 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Email Use.

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Institutional Char.												
Priv. vs. Pub	-.080	**	-.058	*	-.046		-.039		-.014		-.009	
Undergraduate FT and PT Enrollment	-.018		-.013		-.004		-.001		.008		.012	
Number of Faculty at institution	.022		.033		.031		.038		.035		.033	
FTE student/ FTE faculty ratio	-.012		.022		.011		.003		-.022		-.024	
Urbanization	-.009		-.009		-.005		.005		.015		.018	
Instr. Expenses	.003		-.011		.001		.014		.018		.017	
Employment Char.												
Prin. Act. Research vs. Teaching			-.037		-.036		-.042	*	-.039	*	-.036	
Prin. Act. Publ. Servs. vs. Teaching			.017		.014		.012		.012		.013	
Prin. Act. Clinical Servs. vs. Teaching			-.024		-.018		-.018		-.012		-.011	
Prin. Act. Admin Servs. vs. Teaching			.011		.005		.001		-.050	*	-.048	*
Prin. Act. Sabbatical vs. Teaching			-.076	***	-.073	***	-.076	***	-.048	*	-.048	*
Prin. Act. Other vs. Teaching			-.067	***	-.072	***	-.070	***	-.063	**	-.062	**

Table 6.3 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Email Use (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Employment Status												
Part-time vs. Full-time			-.101		-.149		-.162		-.020		-.011	
Part-time is Primary Job			-.004		.040		.047		-.030		-.034	
Rank												
Rank Assoc. Prof. vs. Professor			.024		.021		.014		.014		.013	
Rank Assist. Prof. vs. Professor			.034		.030		.019		.024		.024	
Rank Instructor vs. Professor			-.024		-.017		-.019		-.015		-.013	
Rank Lecturer vs. Professor			.009		.015		.014		.021		.021	
Tenure												
Tenure Untenured on Track vs. Ten.			.034		.021		.014		.012		.014	
Tenure Not on Track vs. Ten.			.022		.011		.000		.010		.012	
Tenure: No tenure in system			.000		-.009		-.009		-.008		-.008	
Union Membership			.050	*	.044	*	.037		.043	*	.043	*
Highest Degree Held												
Highest Degree None vs. Doctorate			-.024		-.022		-.019		-.017		-.016	
Highest Degree Prof. vs. Doctorate			-.010		-.020		-.019		-.014		-.013	

Table 6.3 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Email Use (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Highest Degree MFA, MSW vs. Doctorate			.016		.019		.016		.011		.011	
Highest Degree MA, MS vs. Doctorate			-.012		-.047		-.056	*	-.041		-.039	
Highest Degree BA or BS vs. Doctorate			.005		-.005		-.009		.005		.005	
Highest Degree AA or AS vs. Doctorate			-.001		.001		.000		.004		.004	
Highest Degree Cert. vs. Doctorate			.019		.021		.022		.017		.017	
Contract Type												
Contract Type: 11 or 12 month vs. 9 month			.016		.010		.011		-.002		.000	
Contract Type: course basis vs. 9 mo.			-.070	*	-.073	*	-.066	*	-.045		-.045	
Income Categories												
Income $25 to 49 vs. $1 to 24 (thousand)			.008		.012		.023		.018		.022	
Income $50 to 74 vs. $1 to 24 (thousand)			.042		.035		.050		.045		.050	
Income $75 to 99 vs. $1 to 24 (thousand).			.043		.025		.039		.037		.041	
Income $100 to 149 vs. $1 to 24 (thousand).			.032		.017		.031		.017		.023	
Income $150 to 199 vs. $1 to 24 (thousand).			.007		.001		.005		-.001		.982	
Income $200 and above vs. $1 to 24 (thousand).			.054	**	.055	**	.055	**	.059	**	.001	

Table 6.3 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Email Use (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Disciplinary Categories												
Biglan's Classifications												
Soft/Pure/Non-Life vs. Soft/Pure/Life					.018		.001		.004		.007	
Soft/Applied/Life vs. Soft/Pure/Life					.020		.023		.010		.010	
Soft/Applied/Non-Life vs. Soft/Pure/Life					-.015		-.013		-.013		-.009	
Hard/Pure/Life vs. Soft/Pure/Life					-.060	*	-.058	*	-.039		-.034	
Hard/Pure/Non-life vs. Soft/Pure/Life					-.111	***	-.102	**	-.067	*	-.064	*
Hard/Applied/Life vs. Soft/Pure/Life					-.017		-.028		-.039		-.038	
Hard/Applied/Non-Life vs. Soft/Pure/Life					.038		.043		.033		.036	
Stark's Classifications						.						
Information vs. Human Client					.096	**	.088	**	.052		.051	
Enterprise/Production vs. Human Client					.085	***	.088	***	.073	***	.072	**
Artistic vs. Human Client					-.016		-.017		-.001		.000	

Table 6.3 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Email Use (continued).												
Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Demographics												
Gender												
Fem. vs. Male							.073	***	.065	**	.061	**
Age												
Age: 30-49 vs. up to 29							-.002		-.025		-.025	
Age: 50 and above vs. up to 29							-.018		-.071		-.068	
Race												
American Indian vs. white							.013		-.007		-.007	
Asian American vs. white							-.008		-.016		-.017	
Black/African American vs. white							.061	**	.044	*	.043	*
Hispanic vs. white							.009		.014		.015	
Research Characteristics												
Books									-.023		-.024	
Book chapters									.010		.009	
Exhibitions / Performances									-.012		-.011	
Journal Articles									.018		.018	
Non-refereed articles									.008		.009	
Patents/ software									.012		.012	
Presentations									.041	*	.042	*
Thesis advising									.075	***	.072	***

Table 6.3 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Email Use (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β		β		β		β		β		β	
Teaching Characteristics												
Admin. Committee hours									.052	*	.052	*
Advising hours									.140	***	.136	***
Credit classes taught									.017		.016	
Distance education classes taught									.216	***	.217	***
Non-credit classes taught									-.013		-.013	
Office hours									.083	***	.084	***
Remedial classes taught									-.030		-.030	
Teaching assistant use									.043		.046	*
Undergraduate instruction (as percent of overall activities)									-.023		-.023	
Organizational Satisfaction												
Female faculty are treated fairly											-.031	
Minority faculty are treated fairly											.021	
Overall satisfaction											-.047	*
Part-time faculty are treated fairly											.000	
Teaching is rewarded											.010	
Model summaries	R square		R square		R square		R square		R square		R square	
	.006	*	.069	***	.086	***	.095	**	.191	***	.193	n.s.
*** p≤ .001,** p≤.01,* * p≤05 *												

Faculty Email Use Models

Models 1, 2, 3, 4, and 5 exhibited changes in R squared values at the .05 level of significance. Model 6 was not significant while model 5 showed the highest R squared value and it explained 19.1 percent of the variation in the dependent variable (faculty email use). In the fifth model, faculty research and teaching characteristics were added as a block after controlling for institutional characteristics, employment characteristics, disciplinary characteristics, demographic characteristics. In the section below, I discuss model 5 because it explained the greatest amount of variance in the dependent variable.

Institutional Characteristics

There was no statistically significant difference between email use by faculty at private baccalaureate-only institutions and their public baccalaureate-only institution counterparts. In addition, the number of undergraduates, the number of faculty at an institution, student-faculty ratios, degree of urbanization and instructional expenditures were not significant.

Employment, Disciplinary, and Demographic Characteristics

In the employment block, principal activity listed as research (beta= -.039), administrative duties (beta= -.050), sabbatical (beta= -.048), and “other” (beta= -.063) were all negatively related to faculty email use. Part-time/full-time status, “part-time job as primary job,” academic rank and tenure status were not significant. Union membership (beta = +.043) was positively related to faculty email use, but highest degree held, and contract type were not significant. For faculty who earned $200,000 or more, income continued to be positively related to faculty email use (beta= +.059). The remaining income categories were not significant.

Within Biglan's (1973a) disciplinary classifications, the Hard/Pure/Non-Life category used email more often than the Soft/Pure/Life reference category (beta= -.067). Within Stark's (1998) classifications, only faculty in the Enterprise/Production category used email more than the Human Client reference group (beta= +.073). Female faculty used email more than male faculty (beta= +.065), but there were no significant differences by age. Within race, African-American faculty continued to use email more often than the white faculty reference group (beta= +.044).

Research and Teaching Characteristics

In the research category, the number of presentations (beta= +.041) and number of hours spent on thesis advising (beta= +.075) were positively related with faculty email use. The number of books published, number of exhibitions/performances, number of journal articles, number of non-refereed articles, and number of patents/software were not significant. The number of hours spent per week on administrative committees (beta= +.052), advising (beta= +.140), number of distance education courses (beta= +.216), office hours (beta= +.083) had a positive relationship with faculty email use. The number of credit classes taught, number of remedial classes taught, use of a teaching assistant, and undergraduate instruction as a percent of overall activities were not significant.

A Summary of Email Use Models

After controlling for all other factors, the final model of faculty email use revealed that administrative services as principal activity, research, sabbatical, and "other" activity were all negatively related to faculty email use. Union membership and faculty income above $200,000 were positively related to faculty email use.

Within Biglan's (1973a) disciplinary categories, faculty classified as Hard/Pure/Non-Life were less likely to use email than faculty classified as belonging to the Soft/Pure/Life group (the reference group). Using Stark's (1998) nomenclature, faculty in the Enterprise/Production group used email more than faculty in the Human Client group. It is understandable that faculty in the Enterprise/Production areas would use email frequently given the importance of rapidly sharing information in business oriented fields.

Female faculty used email more frequently than male faculty thus supporting Gefen and Straub's (1997) social presence theory which posited that women tended to be drawn to technology that included a social component, while men used technology regardless of whether it had a social component. All age groups and races tended to be similarly comfortable in using email although African-American faculty tended to use email more often than the reference group.

The number of presentations and number of hours spent per week on thesis advising were positively associated with email use. It is understandable that faculty who were involved with thesis advising would use email to communicate with their students. It is interesting that faculty presentations result in greater email use--possibly to disseminate research findings. This suggests a possible nexus between the solitary process of scholarly research and a desire to publicize those results.

Although only a few research characteristics were associated with increased email use, several teaching characteristics were associated with email use including the number of hours per week spent on administrative committees, advising, and the number of office hours per week, the number of distance education classes taught. These findings suggest that faculty have embraced technology to communicate with students. It may also have become a time saving mechanism across a broad spectrum of teaching faculty.

Adding the organizational satisfaction block did not alter the independent variables' contribution to the variance in the faculty email use dependent variable. Similarly, there were no statistically significant correlations between faculty email use and faculty satisfaction with equipment or faculty satisfaction with technology.

IV. Faculty Web Site Use for Instructional Purposes

I used a binary logistic regression to examine the relationship between six blocks of independent variables and the faculty web site use for instructional purposes dependent variable. The six blocks of variables were: (1) institutional characteristics, (2) employment characteristics, (3) disciplinary characteristics, (4) demographic characteristics, (5) research and teaching characteristics, and (6) organizational satisfaction. As each block of variables was added to the binary logistic regression, a new model was generated for the faculty web site use for instructional purposes dependent variable. I used the Likelihood Ratio Test and the Omnibus Test of Model Coefficients to determine the goodness of fit for each model. Table 6.4 shows the results of the binary logistic regressions and Table 6.5 shows the pseudo-r squared values and goodness of fit of each model.

Faculty Web Site Use for Instructional Purposes Models

Models 1, 2, 3, 4, and 5 exhibited changes in the pseudo R squared values at the .05 level of significance. Model 5 showed the highest pseudo R squared value using the Nagelkerke R squared value. Model 6 was not statistically significant. In the fifth model, research and teaching characteristics were entered as a block after controlling for institutional characteristics, employment characteristics, disciplinary characteristics, and demographic characteristics. This model was significant at the .05 level and explained 17.8 per cent of the “variation” in faculty web site use for instructional purposes (the dependent variable). In the next section, I discuss the fifth model since it explained the greatest amount of “variance” in the dependent variable.

Institutional Characteristics

Faculty at private baccalaureate-only institution were less likely to use a web site than their public baccalaureate-only institution counterparts (exp (B) =.654), and the number of undergraduate students (exp (B) = 1.001) and number of faculty (exp (B) = 1.002) had a small positive influence on faculty likelihood to use a web site use for instructional purposes. Student-faculty ratios, degree of urbanization, and institutional instructional expenses were not significant.

Table 6.4 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Web Site Use for Instructional Purposes.

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)	
Institutional Char.												
Priv. vs. Pub.	.603	***	.590	***	.626	**	.625	**	.654	**	.639	**
Undergraduate FT and PT Enrollment	1.001	**	1.001	***	1.001	***	1.001	***	1.001	***	1.001	***
Number of Faculty at institution	1.001	**	1.002	***	1.002	***	1.002	***	1.002	***	1.002	***
FTE student/ FTE faculty ratio	.972	***	.986		.983		.987		.984		.984	
Urbanization	1.010		.993		.998		.987		.997		1.000	
Instr. Expenses	1.000		1.000		1.000		1.000		1.000		1.000	
Employment Char.												
Prin. Act. Research vs. Teaching			.120	**	.119	**	.121	**	.190	*	.194	*
Prin. Act. Publ. Servs. vs. Teaching			2.650		2.513		2.762		4.151		4.038	
Prin. Act. Clinical Servs. vs. Teaching			.190	**	.213	**	.233	*	.308	*	.300	*
Prin. Act. Admin. Servs. vs. Teaching			.683	*	.668	*	.681	*	.672	*	.680	
Prin. Act. Sabbatical vs. Teaching			.100	***	.102	***	.100	***	.270	*	.269	*
Prin. Act. Other vs. Teaching			.453	**	.418	***	.406	***	.628		.610	
Employment Status												
Part-time vs. Full-time			.043	***	.037	***	.035	***	.047	***	.045	***
Part-time is Primary Job			1.934	***	2.022	***	2.054	***	1.948	***	1.983	***
Rank												
Rank Assoc. Prof. vs. Professor			.940		.908		.907		.893		.876	
Rank Assist. Prof. vs. Professor			1.090		1.067		1.084		1.065		1.045	
Rank Instructor vs. Professor			.896		.900		.933		.907		.891	
Rank Lecturer vs. Professor			.982		1.076		1.118		1.145		1.125	

Table 6.4 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Web Site Use for Instructional Purposes (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)	
Tenure												
Tenure Untenured on Track vs. Ten.			1.153		1.096		1.130		1.139		1.165	
Tenure Not on Track vs. Ten.			.938		.883		.903		.933		.939	
Tenure: No tenure in system			1.042		.991		.997		.958		.958	
Union membership			.819		.095		.805		.825		.822	
Highest Degree												
Highest Degree None vs. Doctorate			.420		.506		.627		.478		.504	
Highest Degree Prof. vs. Doctorate			.742		.714		.703		.718		.717	
Highest Degree MFA, MSW vs. Doctorate			.690		.887		.907		.923		.913	
Highest Degree MA, MS vs. Doctorate			1.192		1.142		1.156		1.271		1.323	*
Highest Degree BA or BS vs. Doctorate			1.072		1.109		1.181		1.272		1.333	
Highest Degree AA or AS vs. Doctorate			.621		.752		.724		.994		.929	
Highest Degree Cert. vs. Doctorate			.376		.389		.356		.303		.330	
Contract type												
Contract Type: 11 or 12 month vs. 9 month			.885		.905		.905		.898		.908	
Contract Type: course basis vs. 9 month			1.090		1.080		1.051		1.053		1.069	
Income categories												
Income $25 to 49 vs. $1 to 24 (thousand)			1.095		1.073		1.034		1.042		1.036	
Income $50 to 74 vs. $1 to 24 (thousand)			1.305		1.247		1.180		1.136		1.115	
Income $75 to 99 vs. $1 to 24 (thousand).			1.318		1.169		1.098		.998		.993	
Income $100 to 149 vs. $1 to 24 (thousand).			1.759	*	1.562		1.482		1.343		1.343	
Income $150 to 199 vs. $1 to 24 (thousand).			2.545	*	2.149		2.016		1.851		1.825	
Income $200 and above vs. $1 to 24 (thousand).			1.591		1.629		1.500		1.287		1.313	

Table 6.4 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Web Site Use for Instructional Purposes (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)	
Disciplinary categories												
Biglan's Classifications												
Soft/Pure/Non-Life vs. Soft/Pure/Life					1.534	*	1.614	**	1.547	**	1.530	**
Soft/Applied/Life vs. Soft/Pure/Life					1.615		1.483		1.301		1.328	
Soft/Applied/Non-Life vs. Soft/Pure/Life					1.053		.999		.984		1.020	
Hard/Pure/Life vs. Soft/Pure/Life					1.085		1.055		1.017		1.075	
Hard/Pure/Non-life vs. Soft/Pure/Life					.839		.837		.815		.851	
Hard/Applied/Life vs. Soft/Pure/Life					.871		.828		.751		.807	
Hard/Applied/Non-Life vs. Soft/Pure/Life					1.770	*	1.772	*	1.542		1.628	*
Disciplinary categories												
Stark's classifications												
Information vs. Human Client					1.428	*	1.455	**	1.436	*	1.438	*
Enterprise/Production vs. Human Client					1.291		1.332		1.278		1.259	
Artistic vs. Human Client					.737		.698		.731		.743	
Demographics												
Gender												
Fem. vs. Male							1.005		1.007		.982	
Age												
Age: 30-49 vs. up to 29							2.544	**	2.445	*	2.479	*
Age: 50 and above vs. up to 29							2.550	**	2.355	*	2.427	*

Table 6.4 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Web Site Use for Instructional Purposes (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)	
Race												
American Indian vs. white							1.487		1.174		1.134	
Asian American vs. white							.714		.714		.693	
Black/African American vs. white							.587	**	.582	**	.566	**
Hispanic vs. white							1.170		1.240		1.211	
Research characteristics												
Books									1.005		1.005	
Book chapters									.997		.996	
Exhibitions / Performances									.999		.999	
Journal Articles									.998		.998	
Non-refereed articles									1.002		1.003	
Patents/ software									1.113	**	1.107	*
Presentations									1.001		1.001	
Thesis advising									1.018		1.018	
Teaching characteristics												
Admin. Committee hours									1.024	*	1.024	*
Advising hours									1.018		1.018	
Credit classes taught									1.029		1.035	
Distance education classes taught									1.330	**	1.321	**
Non-credit classes taught									.936		.936	
Office hours									.992		.992	
Remedial classes taught									.912		.915	
Teaching assistant use									1.375	***	1.373	***

Table 6.4 Relationships Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction Blocks and Faculty Web Site Use for Instructional Purposes (continued).

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)		Exp (B)	
Undergraduate instruction (as percent of overall activities)									1.000		.999	
Organizational satisfaction												
Female faculty are treated fairly											.992	
Minority faculty are treated fairly											.855	
Overall satisfaction											.944	
Part-time faculty are treated fairly											.961	
Teaching is rewarded											1.171	*

*** p≤ .001,** p≤.01,* * p≤05 *

Table 6.5 Goodness of Fit and Pseudo R Squared Values of the Models that Show the Relationship Between Institutional, Employment, Disciplinary, Demographic, Research and Teaching, and Organizational Satisfaction, and Faculty Web Site Use for Instructional Purposes.

Model number	Nagelkerke R Squared	Omnibus Test of Model Coefficients Sig.	Likelihood Ratio		
			df	LL diff. from previous model	sig.
model 1	.023	***	6	333	***
model 2	.117	***	31	182	***
model 3	.136	***	10	39	***
model 4	.146	**	7	20	**
model 5	.178	***	17	67	***
model 6	.183	n.s.	5	10	n.s.

In the case of model 1, the difference is from the null model
*** p≤ .001,** p≤.01,* * p≤05 *

Employment Characteristics

Faculty whose principal activity was research (exp (B) = .190), clinical services (exp (B) = .308), administrative services (exp (B) = .672) or sabbatical leave groups (exp (B) = .270) were less likely to use a web site than faculty in the teaching reference group. Public services and “other” were not significant. Faculty who taught part-time were less likely to use a web site (exp (B) = .047) than full-time faculty, and part-time faculty whose part-time job was their primary job were almost twice as likely (exp (B) = 1.948) to use a web site than part-time faculty whose part-time job was not their primary job. Academic rank, tenure status, union membership, highest degree attained, contract type, and income were not significant.

Disciplinary Characteristics

Within Biglan’s (1973a) disciplinary classifications, faculty in the Soft/Pure/ Non-Life category (exp (B) = 1.547) were more likely to use a web site than faculty in the Soft/Pure/Life reference group. Within Stark’s (1998) disciplinary classifications, only faculty in the Information group were more likely to use a web site than faculty in the Human Client reference group (exp (B) = 1.436). All other disciplinary groups were not significant.

Demographic Characteristics

Gender was not significant, but faculty who were 30 to 49 years old (exp (B) = 2.445) and 50 or above (exp (B) = 2.355) were more likely to use a web site than faculty who were 29 years old or younger. African-American faculty were less likely to use a web site than white faculty (exp (B) = .582). Asian-American, American Indian, and Hispanic faculty were not statistically significant.

Research and Teaching Characteristics

The number of patents or software developed by faculty was positively related to faculty web site use for instructional purposes (exp (B) = 1.113), but the number of books published, book chapters, exhibitions, performances, journal article, non-reference articles, presentations, and thesis advising were not significant. Within the teaching category, several items were significant including number of hours spent per week on administrative committees (exp (B) = 1.024), number of distance education classes taught (exp (B) = 1.330), and use of teaching assistant (exp (B) = 1.375). Conversely, the number of hours per week spent on advising, number of credit classes taught, number of non-credit classes taught, number of office hours per week, number of remedial classes taught, and undergraduate instruction as a percent of overall activities were not significant.

In the next section, I summarize the regression results by the dependent variables: faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and faculty web site use for instructional purposes.

Regression Results by Dependent Variable

I. Faculty Satisfaction with Equipment

Institutional Characteristics

In the first five multiple regression models, the institutional control variable showed that faculty at private baccalaureate-only institutions were more satisfied with equipment than faculty at public baccalaureate-only institutions, however, this distinction was not significant in the final regression model. The student-faculty ratio variable was negative and significant in every faculty satisfaction with equipment model. Small class sizes apparently was related to greater levels of faculty satisfaction with equipment.

Employment Characteristics

Teaching in an institution that did not offer tenure was significant in all faculty satisfaction with equipment models. Apparently, the absence of any possibility of tenure led to an abiding sense of dissatisfaction among the affected faculty.
Faculty/administrators who held eleven or twelve month contracts were consistently more satisfied with equipment than faculty in every other category. At higher income levels, faculty satisfaction with equipment was higher than it was for lower income faculty in almost every income category beyond $49,999 in five out of six models. Not surprisingly, faculty satisfaction with technology was associated with income levels. However, by the final model, only the $75,000 to $99,999 income category was significant.

Disciplinary, Demographic, and Research and Teaching Characteristics

By the final model, none of the categories in Biglan's (1973a) disciplinary model, nor Stark's (1998) disciplinary model were significant. The only demographic finding was that African-American faculty used email more than white faculty (the reference group). The research characteristics block was entered into the last two models and only one variable, the number of book chapters published, was significant in both models. The teaching characteristics block was also entered in two models. Within the teaching characteristics, only the number of credit classes taught was significant in the final model. The negative relationship suggested that faculty satisfaction with equipment was lowest at the highest workload levels.

Organizational Satisfaction

Within organizational satisfaction factors, overall satisfaction, a belief that part-time faculty were treated fairly, and a belief that teaching was rewarded were all positively related to faculty satisfaction with equipment.

II Faculty Satisfaction With Technology

Institutional Characteristics

Although institutional control was significant in five of six models with faculty at private baccalaureate-only institutions more satisfied with technology than faculty at public baccalaureate-only institutions, by the final regression model, institutional control was not significant. The number of undergraduate students was significant in the final model, while the number of faculty and student-faculty ratios were both significant in every model. This suggests that small classes may enhance positive classroom faculty attitudes. Smaller classes may also reduce faculty workload which may enhance faculty satisfaction with technology. On the other hand, institutional instructional expenditures had no effect on faculty satisfaction with equipment.

Employment Characteristics

Principal activity, part-time status, part-time teaching as primary job, academic rank and tenure status were not significant in any of the faculty satisfaction with technology models. Interestingly, union membership was negatively related to faculty satisfaction with technology in every model. Institutional discontent may have also led to faculty dissatisfaction with technology. When the highest faculty degree attained was the M.A. or M.S. variable, it was significant in two models. However, the highest degree attained variable was not significant in the final model. Likewise, contract type was not significant in any faculty satisfaction with technology model.

Although the number of income categories diminished somewhat in the final faculty satisfaction with technology model, in all faculty satisfaction with technology models prior to the last one, all income ranges from $50,000 to $149,999 were positively related to faculty satisfaction with technology. This suggests that once tenure was achieved, faculty satisfaction with technology was associated with higher income. It should be noted that in the final regression model, only incomes in the $100,000 to $149,999 range were significant.

Disciplinary Classifications and Demographic Characteristics

None of Biglan's (1973a) disciplinary classifications nor Stark's (1998) disciplinary classifications was significant. Gender was significant in the final model with female faculty more satisfied with technology than male faculty, However, in every model of faculty satisfaction with technology, faculty in the 30 to 49 year old group, and the 50 year old or above group were more satisfied with technology than faculty in the 29 year old or younger age group. This suggests that older faculty are becoming comfortable with familiar technology on campus. Race was not significant in any of the faculty satisfaction with technology models.

Research and Teaching Characteristics

The faculty research characteristics block was introduced in the last two faculty satisfaction with technology models, and the "number of non-refereed articles published" variable was introduced in the last two faculty satisfaction with technology models and was positive and significant in both. No teaching characteristic appeared in more than one model of faculty satisfaction with technology and none appeared in the final regression model.

Organizational Satisfaction Characteristics

A belief that teaching was rewarded, a belief that part-time faculty were rewarded fairly, and overall satisfaction were all positively related to faculty satisfaction with technology. This supports further the notion that technology use is linked to teaching and those faculty who felt teaching was rewarded also tended to be satisfied with technology. Furthermore, it is understandable that one aspect of organizational satisfaction was linked to other aspects of organizational satisfaction.

III Faculty Email Use

Institutional Characteristics

None of the institutional characteristics were significant in the final regression model. Apparently, email is a fairly familiar technology (despite the claims of a variety of vendors). Furthermore, given the fairly standard features of most email software, it is unlikely that additional institutional instructional expenditures would have much impact on faculty email use. Indeed, this study tended to confirm that assertion.

Employment Characteristics

In the final model, research, administrative duties, and faculty on sabbatical as principal activity used email less than the teaching faculty reference group. Principal activity, part-time or full time status, part time job as primary job, income, and academic rank were not significant in any faculty email use model. Union membership was positively related to faculty email use in every regression model.

Disciplinary Characteristics

Faculty in Biglan's (1973a) Hard/Pure/Non-Life classification used email more than faculty in the reference group (Soft/Pure/Life) while faculty in Stark's (1998) Enterprise/Production classification used email more often than faculty in the Human Client reference group. With regard to email use, the Enterprise/Production group seemed to a believe in the importance of communicating with students who may also be potential future customers, suppliers, and colleagues.

Demographic Characteristics

Gender was significant in all regression models of faculty email use, which provided considerable evidence that female faculty used email more than male faculty. Furthermore, in every faculty email use model, faculty who were between 30 and 49 years old, and 50 years old or above used email more than faculty who were 29 years old or younger. This may be because younger faculty are preoccupied with achieving tenure and this may limit the time available for interacting with students. The race variable indicated that African-American faculty used email more often than faculty in the reference group (white faculty).

Research And Teaching Characteristics

The number of exhibitions or presentations, and the number of hours spent per week on thesis advising were positively associated with faculty email use. The number of hours spend per week on administrative committees, the number of hours spent per week on advising, the number of distance education courses taught, and the number of hours spent per week on office hours were all positively associated with faculty email use.

Organizational Satisfaction Characteristics

In the final regression model for faculty email use, only one variable: overall satisfaction, was positively associated with the dependent variable. Faculty who were generally satisfied with their institutions also tended to use email more than faculty who were less satisfied with their institutions.

IV Faculty Web Site Use for Instructional Purposes

Institutional Characteristics

In every model of faculty web site use for instructional purposes, faculty at private baccalaureate-only institutions were less likely to use a web site than faculty at public baccalaureate-only institutions. The number of undergraduate students enrolled and the number of faculty had a slight positive influence on the likelihood of faculty web site use for instructional purposes.

Employment Characteristics

Those faculty whose principal activity was listed as research, clinical services, or sabbatical leave were consistently less likely to use a web site than the reference group (teaching faculty) in every model of faculty web site use for instructional purposes. This suggests that many faculty perceive of academic web sites as pedagogical tools.

Part-time faculty were less likely to use a web site than full-time faculty, and part-time faculty whose part-time job was their primary job were more likely to use a web site than part-time faculty whose part-time job was not their primary job. Academic rank, tenure status and union membership and highest degree attained were not significant in any of the faculty web site use for instructional purposes models. Because many faculty tend to see web sites as pedagogical tools, it is understandable that faculty who teach with a reduced research load may be more likely to use a web site than faculty whose teaching load was reduced in favor of an increased research load. Contract type was not significant in any of the models, and the influence of income disappeared quickly after the first model of faculty web site use for instructional purposes.

Disciplinary Characteristics

Within Biglan's (1973a) disciplinary classifications, faculty in the Soft/Pure/Non-Life category and faculty in the Hard/Applied/Non-Life category were significant in almost every faculty web site use for instructional purposes model, including the final regression model. Both categories were more likely to use a web site than faculty in the Soft/Pure/Life reference group. This suggests that non-biological theoretical scientists and non-biological applied scientists were more comfortable using new pedagogical technology tools than their nonscientific colleagues.

In Stark's (1998) disciplinary classification, faculty in the Information group were more likely to use a web site than faculty in the Human Client reference group. This suggests that faculty who were in a computer science or information systems field were more comfortable with a relatively new technology than faculty in other fields.

Demographic Characteristics

Gender was not significant in any of the faculty web site use for instructional purposes models, but faculty who were between 30 and 49 years old, and faculty who were 50 years old or above were more likely to use a web site than faculty who were younger than 30 in every faculty web site use for instructional purposes model. This suggests that once faculty have achieved tenure, they may feel more comfortable in using pedagogical tools. African-American faculty were less likely to use a web site than the white faculty reference group, but other racial groups were not statistically significant.

Research and Teaching Characteristics

Within research characteristics, only the number of patents or software developed was positively related to faculty web site use for instructional purposes. Faculty web site use for instructional purposes was not associated with any other research characteristic variable. Generally speaking, academic research activities tend to be theoretical in nature, while the development of patents and software suggest a more applied type of activity. Since web site use for instructional purposes is still a relatively new applied skill, entrepreneurially oriented faculty may be more open to using web sites for instructional purposes than their more theoretically oriented colleagues.

Within teaching characteristics, there were three variables that were positively associated with faculty web site use for instructional purposes: number of hours spent per week on administrative committees, the number of distance education courses taught, and the use of a teaching assistant. In the current technological environment, it is necessary for most faculty who teach distance education courses to use a web site to conduct electronic discussions and to post assignments and grades. Similarly, undergraduate faculty typically have teaching assistants when they are assigned to teach large classes. Web sites are becoming increasingly important tools for providing information for large groups of students. The association between the number of hours spent per week on administrative committees and faculty web site use for instructional purposes is less clear. One possibility is that in order to compensate for time spent on administrative committees, faculty may rely on web sites for instructional purposes to provide instructional materials. For example, a professor may choose to upload tests and lectures provided by a textbook publisher to a course web site rather than develop his or her own materials.

Organizational Satisfaction Characteristics

In the sixth model, the organizational satisfaction block was not significant.

In the next section I summarize and discuss the findings of this chapter. Table 6.6 shows a summary of the outcomes. A significant, positive association is represented by a plus sign, while a significant negative association is represented by a minus sign.

Table 6.6 A Summary of Variable Relationships Within the Final Models.

Independent Variables	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Use for Instructional Purposes
Institutional characteristics				
Private Bacc. vs. Public Bacc.				–
FT and PT enrollment (undergraduates)		–		+
Number of Faculty		+		+
FTE student / FTE Faculty ratio	–	–		
Urbanization				
Instructional Expenditures				
Employment characteristics				
Prin. Act. Research vs. Teaching			–	–
Prin. Act. Publ. Servs. vs. Teaching				
Prin. Act. Clinical Servs. vs. Teaching				–
Prin. Act. Admin. Servs. vs. Teaching			–	–
Prin. Act. Sabbatical vs. Teaching			–	–
Prin. Act. Other vs. Teaching			–	
Employment Status				
Part-time vs. Full-Time				–
Part-time is Primary Job				+
Rank				
Rank Inst. has no rank system				
Rank Assoc. Prof. vs. Professor				

Table 6.6 A Summary of Variable Relationships Within the Final Models (continued).				
Independent Variables	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Use for Instructional Purposes
Rank Assist. Prof. vs. Professor				
Rank Instructor vs. Professor				
Rank Lecturer vs. Professor				
Rank Other vs. Professor				
Tenure Status				
Tenure: Untenured on Track vs. Tenured				
Tenure: Not on Track vs. Tenured				
Tenure: No tenure in system	–			
Union Membership		–	+	
Highest Degree Attained				
Highest Degree None vs. Doct.				
Highest Degree Prof. vs. Doct.				
Highest Degree MFA, MSW vs. Doct.				
Highest Degree MA, MS vs. Doct.				
Highest Degree BA or BS vs. Doct.				
Highest Degree AA or AS vs. Doct.				
Highest Degree Cert. vs. Doct.				

Table 6.6 A Summary of Variable Relationships Within the Final Models (continued).

Independent Variables	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Use for Instructional Purposes
Contract Type				
Contract Type: 11 or 12 month vs. 9	+			
Contract Type: course basis vs. 9 month				
Contract Type: course basis vs. 9 month				
Income Categories				
Income $25 to 49 vs. $1 to 24 (thousand).				
Income $50 to 74 vs. $1 to 24 (thousand).				
Income $75 to 99 vs. $1 to 24 (thousand).	+			
Income $100 to 149 vs. $1 to 24 (thousand).		+		
Income $150 to 199 vs. $1 to 24 (thousand).				
Income $200 and above vs. $1 to 24 (thousand).			+	
Disciplinary characteristics				
Biglan's Classifications				

Table 6.6 A Summary of Variable Relationships Within the Final Models (continued).

Independent Variables	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Use for Instructional Purposes
Soft/Pure/Non-Life vs. Soft/Pure/Life				+
Soft/Applied/Life vs. Soft/Pure/Life				
Soft/Applied/Non-Life vs. Soft/Pure/Life				
Hard/Pure/Life vs. Soft/Pure/Life				
Hard/Pure/Non/Life vs. Soft/Pure1Life			–	
Hard/Applied/Life vs. Soft/Pure/Life				
Hard/Applied/Non-Life vs. Soft/Pure/Life				
Stark's Classifications				
Information vs. Human Client				+

Table 6.6 A Summary of Variable Relationships Within the Final Models (continued).

Independent Variables	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Use for Instructional Purposes
Enterprise/Production vs. Human Client			+	
Artistic vs. Human Client				
Demographic characteristics				
Gender (female vs. male)		+	+	
Age				
Age: 30-49 vs. up to 29		+		+
Age: 50 and above vs. up to 29		+		+
Race				
American Indian vs. white				
Asian American vs. white				
Black/African American vs. white	+		+	—
Hispanic vs. white				

Table 6.6 A Summary of Variable Relationships Within the Final Models (continued).

Independent Variables	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Use for Instructional Purposes
Research characteristics				
Books published				
Book chapters published	+			
Exhibitions /Performances				
Journal Articles				
Non-refereed articles		+		
Patents software				+
Presentations			+	
Thesis advising			+	
Teaching characteristics				
Admin. Committee hours			+	+
Advising hours			+	
Credit classes taught	–			
Distance education classes taught			+	+
Non-credit classes taught				
Office hours			+	
Remedial classes taught				
Teaching assistant use				+

Table 6.6 A Summary of Variable Relationships Within the Final Models (continued).				
Independent Variables	Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Use for Instructional Purposes
Undergraduate instruction (as percent of overall activities)				
Organizational satisfaction characteristics				
Female faculty are treated fairly				
Minority faculty are treated fairly				
Overall satisfaction	+	+		
Part-time faculty are treated fairly	+	+		
Teaching is rewarded	+	+		

Summary of All the Regression Models by Independent Variable

In the next section, I summarize the final results of all the regressions. The discussion will proceed by independent variable across each of the four dependent variables. I selected only those models which had the greatest R Squared Change, or in the case of binary logistic regressions, the greatest Pseudo R Squared values, and were significant at the .05 level.

Institutional Characteristics

After controlling for all other variables in this study, institutional control was related only to faculty web site use for instructional purposes, with faculty at public baccalaureate-only institutions more likely to use web sites for instructional purposes than faculty at private baccalaureate-only institutions. Total undergraduate enrollment was negatively related to faculty satisfaction with technology, but there was a positive association with faculty web site use for instructional purposes, and the number of faculty at the institution was positively related to faculty satisfaction with technology and faculty web site use for instructional purposes. The student-faculty ratio was negatively related to faculty satisfaction with equipment and faculty satisfaction with technology.

Employment Characteristics

In the final regression models, faculty whose principal activity was research or who were on sabbatical were less likely to use email or a web site than the reference group, while faculty in a clinical services category were less likely to use a web site than the reference group (faculty whose principal activity was teaching). However, faculty whose principal activity was listed as administrative service used email less than faculty whose principal activity was listed as teaching (the reference group). However, faculty who were on sabbatical leaves used email less than the reference group and also were less likely to use web sites for instructional purposes than the reference group. Part-time faculty were less likely to use a web site than full-time faculty, however, among those part-time faculty who indicated that their part-time job was their primary job, web site use for instructional purposes was higher than for part-time faculty for whom their part-time job was not their primary job.

After controlling for all other independent variables, academic rank was not statistically related to any of the four dependent variables. In the final regression models, only faculty who taught in institutions that did not offer tenure were found to be less satisfied with equipment than faculty who had tenure (the reference group). Union membership was negatively related to faculty satisfaction with technology, but positively related to email use. Only faculty who held an eleven or twelve month appointments were statistically more likely to be satisfied with equipment than faculty who held a nine month appointment.

Faculty who earned between $75,000 and $99,999 were more likely to be satisfied with equipment than faculty who earned $24,999 or less (the reference group). By contrast, faculty who earned between $100,000 and $149,999 were more likely to be satisfied with technology than the reference group. Faculty who earned $200,000 or more used email more than the reference group.

Disciplinary Characteristics

Using Biglan's (1973a) classifications, faculty in the Soft /Pure /Non-Life group were more likely to use a web site than faculty in the Soft /Pure/Life reference group. Faculty in the Hard /Pure /Non-Life group used email less than the reference group. When Stark's (1998) classifications were used, faculty in the Information Service classification were more likely to use a web site than the Human Client reference group while faculty in the Enterprise/Production classification were more likely to use email than the reference group.

Demographic Characteristics

Female faculty were more likely to be satisfied with technology and to use email than male faculty, and faculty who were between 30 and 49 years old, and 50 years old or above, were more satisfied with technology and more likely to use a website than faculty who were 29 or younger (the reference group). The final regression models showed that African-American faculty were more satisfied with equipment and used email more, but less likely to use a website than white faculty (the reference group).

Research and Teaching Characteristics

The final regression models exhibited a positive association between the number of book chapters published in a career and faculty satisfaction with equipment. There were also positive relationships between the number of non-refereed articles published and faculty satisfaction with technology. The number of patents or software developed was positively related to the likelihood of faculty web site use for instructional purposes. The number of hours spent per week on thesis advising was also positively related to faculty email use.

The final regression models also showed that the number of hours spent per week on administrative committees was positively related to email use and the likelihood of faculty web site use for instructional purposes. The number of hours per week spent on general advising was positively related to faculty email use. On the other hand, there was a negative relationship between the number of credit classes taught per term and faculty satisfaction with equipment. The number of distance education classes taught was positively associated with faculty email use and the likelihood of faculty web site use for instructional purposes. The number of hours spent per week on office hours was positively related to faculty email use. The use of a teaching assistant was positively associated with faculty web site use for instructional purposes.

Organizational Satisfaction Characteristics

After controlling for all other variables, the last set of significant regression models showed a positive relationship between overall satisfaction and faculty satisfaction with equipment and faculty satisfaction with technology. In other categories, a belief that part-time faculty were treated fairly was positively related with faculty satisfaction with equipment and faculty satisfaction technology while a belief that teaching was rewarded was positively related with faculty satisfaction with equipment and faculty satisfaction with technology.

The Relationship Between Information Technology Satisfaction and Use

In the next section I discuss my findings on the relationship between information technology satisfaction and information technology use. The results are shown in Table 6.7.

Table 6.7. Relationship Between Faculty Information Technology Satisfaction and Faculty Use of Information Technology

	Faculty Email Use	Significance	Faculty Web Site Use for Instructional Purposes	Significance
Faculty Satisfaction with Equipment	-.014		.045	**
Faculty Satisfaction with Technology	-.018		.064	*
Pearson’s r test of correlation was used				
* p<.05, ** p<.01, *** p<.001				

A Pearson’s correlation revealed a small, yet significant positive association between faculty satisfaction with equipment and faculty web site use for instructional purposes (beta=.045). There was also a small, yet significant positive association between faculty satisfaction with technology and faculty web site use for instructional purposes (beta=.064). There were no significant associations between faculty satisfaction with equipment and faculty email use, nor between faculty satisfaction with technology and faculty email use. This suggests that faculty satisfaction with equipment and technology may embolden faculty to try additional technologies such as web sites for instructional purposes, but faculty may use email regardless of whether they are satisfied with equipment or technology. It may be that email is regarded as a familiar and comfortable technology while web site development is still a relatively unfamiliar new skill for many faculty. A limitation of this test is that correlations reveal the association between variables, but do not reveal causation.

In Chapter 7, I discuss the theoretical and practical implications of these findings, limitations of this study and suggestions for future research.

CHAPTER 7

DISCUSSION AND RESULTS

In this chapter I provide a concise summary of this study, then I briefly discuss the purpose of this study, the research design, findings for my study in order of research question, conceptual implications, practical implications, practical recommendations, limitations of this study, and suggestions for future research.

Concise Study Summary

This study endeavored to answer the research question: "What are the relationships between organizational factors and faculty satisfaction with information technology and use." The focus of this investigation was on baccalaureate-only institutions within the United States using the National Center for Educational Statistics, National Study of Postsecondary Faculty dataset (NSOPF:04). While many factors were associated with faculty information technology satisfaction and use at baccalaureate-only institutions, the most salient were institutional characteristics, employment characteristics, demographic characteristics, research and teaching characteristics, and organizational satisfaction characteristics. Disciplinary characteristics tended not to follow any consistent patterns in the final models.

Within those domains, the most prominent findings were that even though faculty use of information technology on campus is linked to teaching, higher levels of institutional instructional expenditures were not associated with concomitant higher levels of faculty information technology satisfaction or faculty information technology use. The study confirmed that faculty whose principal activity was teaching tended to be tied more closely to information technology than non-teaching faculty.

Faculty demographic characteristics including gender, age, and race, were all significantly related to faculty satisfaction and use of information technology on campus. Female faculty reported higher levels of technology satisfaction and email use than male faculty which suggests a comfortable acceptance of information technology. Nevertheless, outside research still reports dropping levels of female enrollment in information technology related fields. An examination of research and teaching activities suggest that when demands on faculty time became excessive, faculty information technology satisfaction dropped.

Finally, the strongest predictors of faculty information technology satisfaction at baccalaureate-only institutions were organizational satisfaction factors that revealed a belief that an institution was supportive and it interacted fairly with its faculty. This phenomenon appears to suggest an intrinsic type of faculty motivation. However, this study also found that extrinsic motivation was related to faculty information technology satisfaction. A belief that an institution rewarded teaching was also related to faculty information technology satisfaction.

In the next section I discuss the purpose of the study, followed by a more detailed discussion of the study outcomes.

Purpose

The purpose of this study was to determine which organizational factors were related to information technology satisfaction and use by faculty in higher education. The study was limited to faculty at baccalaureate-only institutions in order to facilitate institutional comparisons. Information technology satisfaction and use were chosen for examination because substantial resources are allocated to information technology in higher education and information technology is in the vanguard of the advancement of knowledge in a myriad of disciplines. If faculty are dissatisfied with that technology or avoid using it, resources are wasted and critical educational opportunities are lost. This study investigated which characteristics were associated with information technology satisfaction and use.

Data Sampling and Methodology

My study used data collected by the National Center for Educational Statistics (NCES) from accredited colleges and universities throughout the United States. My investigation focused on postsecondary faculty at institutions which granted baccalaureate degrees, but not graduate degrees. The data were extracted from the NSOPF:04 dataset. In the next section I discuss the key findings of my study as revealed by the eight research questions that guided my investigation.

Study Findings

Research Questions

1) What are the relationships between institutional characteristics and faculty satisfaction with information technology and faculty use of information technology?

This study focused on private baccalaureate-only institutions and public baccalaureate-only institutions. This decision was made in order to make comparisons among institutions more equivalent than if the study had included graduate, baccalaureate and associate degree granting institutions. The similarities in degrees granted also led to similarities in faculty satisfaction with information technology and faculty use of information technology. After controlling for all other variables in the study, only one institutional type characteristic was found to be statistically significant--faculty at public baccalaureate-only institutions were more likely to use web sites for instructional purposes than faculty at private baccalaureate-only institutions. A possible explanation for this phenomenon is that public baccalaureate-only institutions are more likely to include a technological orientation than small liberal arts colleges which would be oriented more towards the humanities. As such, it is not surprising that faculty in public baccalaureate-only institutions would tend to be more comfortable with taking advantage of technology for pedagogical expression than private baccalaureate-only institutions.

2) What are the relationships between employment characteristics and faculty satisfaction with information technology and faculty use of information technology?

The second research question examined whether faculty satisfaction with information technology and its use was influenced by faculty employment characteristics. Faculty whose principal activity was research, administrative duties, on sabbatical or who has "other" principal activities, tended to be less engaged in pedagogy and this appeared as a decrease in email use with students and a decrease in the likelihood of web site use for instructional purposes. This outcome was expected and was supported in this study.

The findings on part-time faculty add insights to the ongoing debate about the role of adjuncts in the academy. Although part-time faculty can provide an institution financial relief in the form of reduced salaries and benefits, there have been doubts concerning their institutional dedication and academic commitment since many adjuncts also hold full-time non-academic positions. Descriptive statistics showed that, as a group, part-time faculty members are more satisfied with equipment and technology than their full-time counterparts. However, paradoxically, their part-time status provides them with less time to participate fully in all aspects of the academy than full-time faculty since part-time faculty typically need to hold multiple jobs. In my study, this phenomenon manifested itself as diminished web site use for instructional purposes among part-time faculty compared to full-time faculty. Within the part-time faculty, those faculty for whom their part-time teaching job was their primary job used web sites for instructional purposes more than part-time faculty who had other outside employment. Thus, it appears that part-time faculty have a healthy attitude but cannot overcome the constraints of less available time brought about by the nature of their appointments.

Faculty who belonged to a union and faculty who taught at institutions that offered no possibility of tenure, tended to be less satisfied with equipment than their non-union and tenure track counterparts. Faculty union members also tended to communicate more with their students using email. Perhaps this increased use of information technology in the form of email also causes these faculty members to be more sensitive to problems with equipment and technology.

A faculty member's highest faculty degree did not appear to affect either information technology satisfaction or use, however, faculty who held contracts that suggested administrative duties were most satisfied with equipment. Income is often seen as a dividing mechanism in organizational research. In this study, differences appeared by income groups, but the progression was not linear. The greatest difference in satisfaction occurred between the lowest salary group and all other salary groups. Thus, it appears that faculty who are just beginning their careers, and temporary faculty may be under the greatest time pressures which results in diminished satisfaction levels.

3) What are the relationships between disciplinary affiliations and faculty satisfaction with information technology and faculty use of information technology?

While there are many disciplinary classification models, I chose the Biglan model and the Stark model because they were so completely different from each other while many extant models are permutations of these models. I had expected to observe a clear pattern of information technology satisfaction and use along consistent disciplinary lines, such as a consistent pattern for the hard sciences, soft sciences, and so forth. In Stark's (1998) model I had hoped to observe consistent paths along broad academic areas but that did not occur. Although there were several significant relationships no consistent, extended patterns along disciplinary lines appeared in either model.

> 4) What are the relationships between demographic characteristics and faculty satisfaction with information technology and faculty use of information technology?

As predicted by Gefen and Straub (1997) and Gattiker and Hlavka (1992), female faculty used email more often than male faculty and were more satisfied with technology than male faculty. A surprising demographic finding was that faculty over the age of 30 were more satisfied with technology than faculty under the age of 30 and were more likely to try a web site. This runs counter to common stereotypes about age and technology. However, it may instead suggest that young, untenured faculty may be under considerable time constraints which in turn may suppress an underlying interest in technology. African-American faculty were more satisfied with equipment and used email more often than white faculty (the reference group) but were less likely to use a web site.

> 5) What are the relationships between research and teaching characteristics and faculty satisfaction with information technology and faculty use of information technology?

I had expected teaching variables to have a greater influence on information technology satisfaction and use than research variables and this expectation was supported by my study. While a few research variables influenced the information technology satisfaction and use dependent variables, most research variables were not statistically significant. In the case of the number of book chapters published, non-refereed articles published, patents granted or software developed, it is evident that faculty who teach in a technological area or are entrepreneurially oriented tend to favor technology.

Teaching characteristics, on the other hand, were more likely to exhibit consistent patterns of influence on the information technology dependent variables. Interestingly, the relationships between teaching characteristics variables and the information technology dependent variables are supported from both sides with expected positive and negative associations. For example, a behavior that increased faculty familiarity with technology such as the number of distance education classes taught was positively related to faculty satisfaction with information technology and use, while factors that impinged further on faculty time such as the number of credit classes taught per term revealed negative relationships with faculty satisfaction with information technology and use. Factors that increased faculty time availability such as the use of a teaching assistant, showed a positive association with the information technology use constructs.

6) What are the relationships between organizational satisfaction characteristics and faculty satisfaction with information technology and faculty use of information technology?

Organizational satisfaction variables including: overall satisfaction, a belief that part-time faculty are treated fairly, and a belief that teaching was rewarded were all positive predictors of faculty satisfaction with equipment and faculty satisfaction with technology. However, at excessive levels, faculty email use had a negative relationship with overall faculty satisfaction.

7) What are the relationships between faculty use of information technology and faculty satisfaction with information technology and faculty use of information technology?

8) What are the relationships between faculty satisfaction with information technology and faculty use of information technology?

My study revealed a positive relationship between faculty satisfaction with equipment and faculty web site use for instructional purposes, as well as a positive relationship between faculty satisfaction with technology and faculty web site use for instructional purposes. However, there were no statistically significant relationships detected between faculty satisfaction with equipment and faculty email use, or between faculty satisfaction with technology and faculty email use. This finding suggests that the connection between information technology satisfaction and use is not a simple one. Most faculty on most college campuses are comfortable with using email and find it easy to use. They also find email to be a useful conduit for sending and receiving information asynchronously. These conditions satisfy Davis' (1989) requirements for technology use and lend further support to his Technology Acceptance Model. However, faculty web site use for instructional purposes requires a more sophisticated skill set than email use. In order to develop a web site, faculty typically need to learn HTML, XML, FTP, Adobe Acrobat, and Flash. For more enhanced web sites for instructional purposes, one must learn JavaScript or Java, SQL Server, ASP, or Blackboard. The commitment is deeper and requires a greater tolerance for risk. While both faculty email use and faculty web site use for instructional purposes are both indicators of information technology use, they are subtly different indicators. Faculty email use measures faculty use of a stable, familiar, low risk technology. Faculty web site use for instructional purposes, on the other hand, measures faculty willingness to use a technology that is less familiar to most faculty. It also requires more learning and risk.

In my previous chapter, I used a correlation test to measure the association between faculty satisfaction with technology and faculty web site use for instructional purposes, as well as the association between faculty satisfaction with equipment and faculty web site use for instructional purposes. I also discussed how correlations reveal associations between variables but not direction. However, I believe that there is symbiotic feedback loop between these constructs. Faculty satisfaction with information technology is linked with the use of unfamiliar and riskier information technology, and, for those faculty, increased use of unfamiliar and riskier information technology links back to information technology satisfaction.

Revised Conceptual Framework

In deciding which variables to include in a revised conceptual framework, I applied the following requirement: in order to be included in the revised conceptual framework, a variable had to be significant across multiple dependent variables and in the final significant multiple regression models.

Institutional Characteristics

Total undergraduate enrollment was associated with faculty satisfaction with technology as well as faculty web site use for instructional purposes. Reduced student/faculty ratios are associated with increased faculty time which provides faculty with more time. Faculty satisfaction with equipment and technology understandably rises with lessened work loads.

Employment Characteristics

In the final regression models, faculty whose principal activity during the study period was research or who were on a sabbatical leave were less likely to use email or web sites for instructional purposes than faculty who listed their principal activity as teaching. This strengthens the faculty perception of technology as a pedagogical tool. Another employment characteristic, union membership, was also associated with faculty satisfaction with technology and faculty email use. It is uncertain whether union membership led to a decrease in faculty satisfaction with technology as well an increase in faculty email use or whether union membership was actually a reflection of institutional climate. Similarly, there were several positive associations between faculty income and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. Faculty income tended to be related to faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use.

Disciplinary Characteristics

Although there were several individual variable relationships with individual dependent variables, there were no consistently strong relationships that spanned multiple dependent variables in multiple models in either the Biglan or Stark models. Perhaps collapsing Biglan's (1973a) categories into just Hard/Soft categories would yield better results.

Demographic Characteristics

This study confirmed Gefen and Straub's (1997) assertion that female faculty used email more often than male faculty and also showed that female faculty were more satisfied with technology than male faculty. It also suggested that older faculty were satisfied with technology and were more willing to use web sites for instructional purposes than faculty under 30 (although faculty who are used web sites for instructional purposes were still in the minority). Race was a useful variable for highlighting the digital divide that still persists with new technology.

Research and Teaching Characteristics

The two variables in this areas which spanned more than one dependent variable were the number of hours spent per week on administrative committees and the number of distance education courses taught. In the final regression models, the number of hours per week spent on administrative committees was positively associated with faculty email use and faculty web site use for instructional purposes since many faculty seem to perceive of committee work as a time constraint. When time is limited, faculty email use and faculty web site use for instructional purposes may be employed to save time.

Faculty who teach distance education courses were expected to be closest to equipment and technology and to use e-mail and web sites for instructional purposes the most. Indeed, by its nature, distance education courses necessitate the use of electronic communication via e-mail and the Internet. With information technology, familiarity breeds confidence, which in turn may create a perception of usefulness as well as ease of use.

Organizational Satisfaction Characteristics

Overall job satisfaction, a belief that part-time faculty were treated fairly, and a belief that teaching was rewarded, were related to multiple dependent variables in this study. Overall job satisfaction is understandably (but not automatically) related to faculty satisfaction with equipment and faculty satisfaction with technology, since faculty satisfaction with equipment and faculty satisfaction with technology may be seen as essential components of overall job satisfaction. In addition, this study indicates that information technology satisfaction is related to information technology use.

It is understandable that part-time faculty satisfaction would have a considerable influence on the satisfaction of faculty at an institution given the growing number of part time faculty in academe.

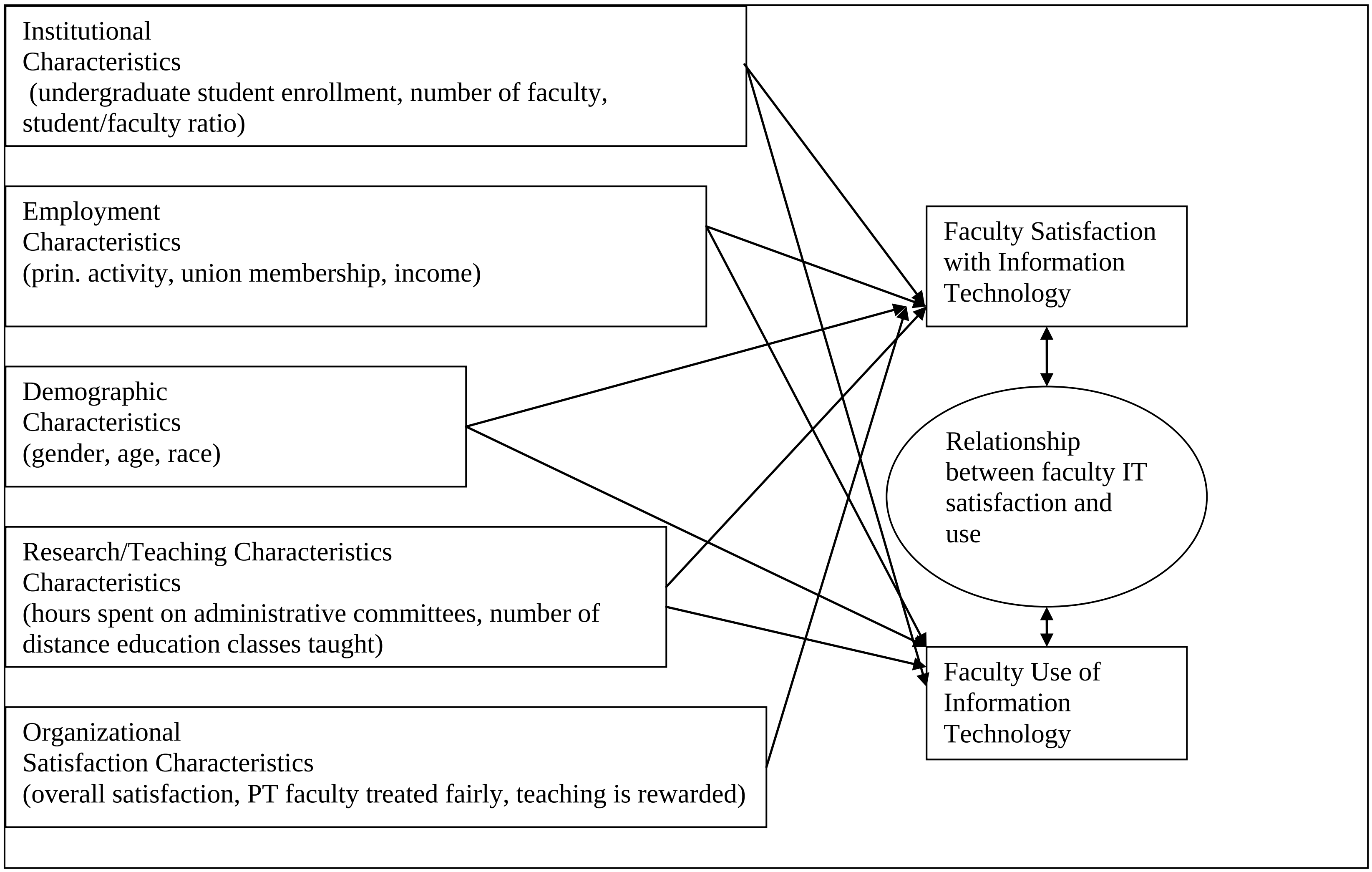
A belief that teaching is rewarded lends additional support to the proposition that information technology is perceived of as a necessary tool of modern pedagogy. This represents an alternative to the paradigm which previously posited that institutions acquired technology for the purpose of furthering research. This study suggests that there were no significant disciplinary differences among faculty in the use of one form of information technology (email), although there were differences in faculty web site use for instructional purposes. Furthermore, an increasing number of faculty are willing to experiment using web sites as instructional tools.

Information Technology Use and Information Technology Satisfaction

The final research questions in this study examined whether faculty satisfaction with information technology (as measured by faculty satisfaction with equipment and faculty satisfaction with technology) was associated with faculty use of information technology (as measured by faculty email use and faculty website use). The findings suggest a partial relationship. There is an association between faculty satisfaction with equipment and faculty satisfaction with technology and faculty website use but no association between faculty satisfaction with equipment or faculty satisfaction with technology, and faculty email use. This suggests that faculty may have become quite comfortable with an older form of information technology (email) and simply expect to have it available. Email is a mature technology that is both useful and easy to use. On the other hand, web site use for instructional purposes represents a comparatively new form of technology which demands a greater learning curve. Consequently, this technology is more likely to be embraced by early adopters before widespread innovation diffusion takes place. For the pathfinders, satisfaction can be critical to continued exploration and adoption.

Given the results of the study, I have revised the conceptual framework first envisaged at the beginning of the study. The original conceptual framework was shown in figure 3.1 and it included institutional characteristics, employment characteristics, disciplinary characteristics, demographic characteristics, research and teaching characteristics, and organizsational satisfaction characteristics. The revised conceptual is shown in figure 7.1 and includes institutional characteristics, employment characteristics, demographic characteristics, research and teaching characteristics, and organizational characteristics, but not disciplinary characteristics.

Figure 7.1 Revised Conceptual Framework



Conceptual Implications

This study confirms some earlier research findings and challenges others. Many investigations in this area relied on small sample sizes using student subjects. This study used a fairly large sample--2443, respondents, thus allowing for more generalizability of the results. It also used faculty respondents which had several benefits. First, this study included an adult population which had considerable working experience, thus making possible more thoughtful responses across many disciplinary areas. Second, by using faculty, the age demographic was broadened considerably. Unlike many student based studies which capture only a narrow age range, this study was able to capture a broad spectrum which included subjects across several decades while including a considerable number of respondents in each age group. Finally, the inclusion of faculty from many different private and public institutions helped strengthen the external validity of the findings to other baccalaureate-only institutions.

This study supported one of Anderson's (1981) research issues which addressed two possible reasons for low information technology use. According to Anderson (1981), administrators felt that faculty avoided information technology because of a lack of training. Faculty, on the other hand, believed it was because of a lack of time. This study provided several points of evidence that supported the lack of time explanation. In many instances, activities which resulted in increased demands on faculty time were associated with decreases in both information technology satisfaction and use. There was also support for some areas suggested by Tang and Chamberlain's (1997) research that stated that new faculty were deeply immersed in research and publications while tenured faculty tended to become more teaching oriented.

I suggest that while the pressure to publish is most intense prior to tenure, most faculty continue to publish after the granting of tenure. My research did tend to support the finding that after the attainment of tenure, faculty seem to be more open to using information technology. This conflicts with Anderson's (1981) assertion that senior faculty avoided computers. This study also questions Adams (2002) and Rakes and Casey (2002) who asserted that most faculty were dissatisfied with information technology. In my study, the levels of faculty satisfaction with information technology were fairly high. There was also little to support Brzycki and Dudt's (2005) assertion that faculty felt devalued by information technology.

Many studies have suggested that user attitudes toward information technology affect learning about information technology (Francis & Evans, 1995; Freedman & Liu, 1996; Mitra & Steffernsmeier, 2000; Houtz & Gupta, 2001). Liu, Maddux, and Johnson (2004) also observed that computer satisfaction led to additional learning. At least with regard to information technology satisfaction, there was evidence in my study to suggest that faculty exhibited a positive attitude toward computers. This satisfaction may reinforce further the advance of technological learning and proficiency.

My study also supported Gefen and Straub's (1997) assertion that female users were more likely to use those aspects of information technology that contained elements of a "social presence." Specifically, Gefen and Straub (1997) studied email use by gender, and my study found evidence to support their theory. While there were no significant differences in faculty satisfaction with equipment or faculty web site use for instructional purposes by gender, there were significant differences in faculty satisfaction with technology and faculty email use.

The Technology Acceptance Model offered by Davis (1989) examined factors that led to the adoption of information technology. Karahanna, Straub, and Chervany (1999) noted that the Technology Assistance Model studied the adoption of technology and suggested two different ways of studying information technology usage. In the first approach, the individuals making the adoption decision were called “adopters” and the dependent variable was adoption. After adoption, a second perspective should be applied whereby the individuals become “users” and the dependent variable becomes information technology use. This study contributes to those theories by extending the meaning of the dependent variable “technology acceptance” from meaning a one-time acceptance resulting in adoption, to continuous acceptance as measured by satisfaction and use.

Practical Implications

As Venkatesh and Davis (2000) pointed out, information technology is a high priority both inside and outside the academy. However, simply purchasing equipment does not assure either faculty use or satisfaction with the technology. Davis (1989) pointed out that two major factors in information technology acceptance were ease of use and perceived usefulness of the technology. This study suggests that satisfaction is also a key element. Furthermore, as Downes (1993) pointed out, computer anxiety can lead to decreased use. Liu, Maddux, and Johnson (2004) noted that increased exposure leads to greater satisfaction and as satisfaction increased, learning increased.

This study showed that faculty were generally satisfied with information technology, and while web use was still fairly low, it had increased considerably from a previous study conducted by Grunwald (2004). The general trend seems to be that as faculty become more accustomed to using technology, their satisfaction levels also grow. This phenomenon occurred in older faculty groups and in both genders.

A key finding of this study was that although faculty tended to be satisfied with information technology, when institutional activities increased time demands on faculty, their satisfaction with information technology decreased. Thus, as a policy implication, it is important to maintain a reasonable balance in faculty responsibilities--particularly when faculty are evaluated for tenure and promotions.

Not surprisingly, several aspects of organizational satisfaction were linked with information technology satisfaction. As Herzberg (1964) asserted in his seminal work on motivation and organizational hygiene, when critical, overarching elements in an organizational environment are satisfied, the intrinsic desire of individuals to explore, learn and be productive tends to flourish.

Practical Recommendations

Organizational theorists have long debated whether individuals are happier in large or small organizations. This study suggests that the question may be somewhat complex. When student enrollment at baccalaureate-only institutions rose, faculty were less satisfied with information technology, but when the number of faculty was increased (thereby lowering student/faculty ratios), faculty reported greater satisfaction with information technology and were more likely to use a web site for instructional purposes. Consequently, institutional size in and of itself does not determine information technology satisfaction or use, rather, the degree of decentralization, department size and class size may be more important than the overall size of an institution. Thus, a large institution with small programs and small class sizes may experience higher faculty satisfaction with information technology and faculty use of information technology than a small institution with large programs and large classes.

An optimal approach may be to decentralize large institutions while retaining low student/faculty ratios. Thus, the resources of a large institution such as the presence of a large library and multiple research centers may provide rich resources that may not be available in smaller institutions.

This study also suggests that individuals whose principal activity was teaching used information technology more than faculty in virtually any other principal activity category. It may be incumbent upon top administrators to recognize the changing role of faculty with regard to information technology. There appears to have been a philosophical shift in faculty perceptions of information technology. Faculty whose principal activity is teaching are beginning to realize that information technology is becoming an indispensible pedagogical tool. Furthermore, as incoming students are increasingly technologically adept, faculty who disregard major trends in technology will be at a distinct disadvantage with regard to enrollment and student evaluations.

Every reasonable accommodation should be made for faculty to train and re-train in safe environments such as seminars taught by outside professionals and limited to faculty. Seminars that include students or supervisory employees tend to do poorly since many faculty are reluctant to reveal any technological shortcomings to their students or to administrators who control employment reviews and raises. If an institution can afford it, travel to off-campus locations should be advocated since this strategy tends to eliminate both problems.

Although this study did not reveal consistent patterns of information technology satisfaction or use by discipline, a study that collapsed the categories into just hard and soft disciplines may be beneficial. I would like to make a counterintuitive recommendation at this point. Even though hard sciences tend to request substantial funding for information technology, the soft disciplines should be allocated more institutional funding. Soft disciplines need more institutional support than hard disciplines in order to foster faculty use of information technology in the form of numerous training opportunities and startup hardware and software. Furthermore, faculty in the hard sciences tend to be quite adept at navigating and obtaining resources from corporations and government sources.

Prior studies have predicted that women use email more than men (Gefen & Straub, 1997), this study confirmed that observation in female faculty at baccalaureate-only institutions. What was surprising was that female faculty were more satisfied with information technology than male faculty. Given the precipitous drop in female enrollment in all information technology related fields -- and the concomitant sharp drop in new female faculty in information technology, this challenges the notion that women dislike or fear information technology.

In Ajzen and Fishbein's (1980) research, social norm tended to be a positive factor in influencing behavior, however, social norm may also be a negative factor if young girls are ostracized by their classmates in computer classes in elementary and secondary schools. Research in this area may help to reverse the alarming drop in information technology enrollment caused primarily by young women leaving the field.

Although African American faculty were satisfied with information technology on campus, they were less likely to use a website for instructional purposes than white faculty. This may reflect a continuing digital divide along racial lines. A possible way to address this imbalance would be for colleges and universities to adopt an inner city or rural low income school and share information technology resources. Furthermore, professors may provide training and career insights that may not be available at the primary or secondary school level. In addition to addressing the technology resource imbalance, such programs could provide potential recruiting advantages, and elevated service profiles within the community.

This study also suggests that faculty at baccalaureate-only institutions who were active--whether in research or teaching, tend also to be active users of information technology on campus. Currently, on many campuses, faculty are rewarded for conducting research or engaging in innovative pedagogical activities, however, few institutions reward the digital enhancement of those instructional activities or the electronic dissemination of the research results. The impact that research has is influenced by how quickly and widely the results of the research can be released. As Hynes and Stretcher (2005) pointed out, many institutions disregard electronic journals even when they are peer-reviewed. Ironically, electronic journals may actually require more work from editors (and writers) since electronic journals typically require much faster turnaround times from the editor, reviewers and authors than with traditional paper publications. As a result, the work load for all parties involved is increased. Perhaps a recognition of this new phenomena may lead to increased release time for faculty authors as well as editors and reviewers who engage in electronic publications.

While the study confirmed an expected positive association between overall organizational satisfaction and faculty satisfaction with equipment and information technology, a surprising finding was that, as a group, faculty at baccalaureate-only institutions who felt adjuncts at their campus were treated fairly also expressed high levels of satisfaction in other areas (such as equipment satisfaction and information technology satisfaction). This suggests that even though part-time faculty are not always fully embraced by all faculty on campus and sometimes are seen as competing with full-time faculty for campus resources, in general, faculty in this study were concerned about the well-being of their part-time colleagues. This finding suggests a reluctant harmony may exist among part-time and full-time faculty. Given the likelihood of extended periods of financial constraints on most campuses, part-time faculty will continue to comprise a substantial part of the academic landscape. Consequently, it may be beneficial to expand departmental teaching and equipment budgets to include part-time faculty and to provide funding to attend technology seminars and conferences.

Limitations of the Study

This study focused on private and public baccalaureate granting institutions in the United States. Studies of faculty at graduate oriented or professional institutions may generate different outcomes. Similarly, faculty in other nations may exhibit considerably different outcomes given the differences in curricula, technology availability, funding sources, culture, and governance. Perhaps an even greater limitation of this study is its reliance on self-reporting. While this is less of a problem when measuring constructs such as satisfaction levels, it may not necessarily be an accurate reflection of the use construct.

Because most individuals do not measure how much time they spend on a computer, a self report may not always be accurate.

Since the extant literature shows that computer anxiety has a substantial impact on satisfaction with technology, this construct could have enriched the findings in this study. There were no variables to detect how much experience a faculty member had in using a particular technology. Similarly, there was no mention of the extent of training that was available for faculty.

Suggestions for Future Research

Possible areas for future research could include a comparison of student, faculty, and staff levels of information technology satisfaction and use within each institution. A qualitative follow up study could yield a substantial richness of information that is not available in most qualitative research. While a quantitative study is able to report on the mean levels of satisfaction and use, a qualitative follow-up study may be able to determine why individuals were satisfied or dissatisfied, and what their experiences were with information technology. Furthermore, since computer anxiety is an important factor in technology use and satisfaction, I believe that future studies should include this element. An additional possibility is the inclusion of separate variables for hardware, software and networks. It is possible to be dissatisfied with an institution’s network system (particularly since this typically determines access to the Internet) yet be highly satisfied with an institution’s software or hardware.

APPENDICES

APPENDIX A

Appendix A1. Code and Name for Each Discipline. Source:NSOPF:04 Faculty Instrument Facsimile
0101 = Agriculture and related sciences
0102 = Natural resources and conservation
0201 = Architecture and related services
0301 = Area/ethnic/cultural/gender studies
0401 = Art history, criticism & conservation
0402 = Design & applied arts
0403 = Drama/theatre arts and stagecraft
0404 = Fine and studio art
0405 = Music, general
0406 = Music history, literature, and theory
0407 = Visual and performing arts, other
0408 = Commercial and advertising art
0409 = Dance
0410 = Film/video and photographic arts
0501 = Biochem/biophysics/molecular biology
0502 = Botany/plant biology
0503 = Genetics
0504 = Microbiological sciences & immunology
0505 = Physiology, pathology & related sciences
0506 = Zoology/animal biology
0507 = Biological & biomedical sciences, other
0601 = Accounting and related services
0602 = Business admin/management operations
0603 = Business operations support/assistance
0604 = Finance/financial management services
0605 = Human resources management and svcs
0606 = Marketing
0607 = Business/mgt/marketing/related, other
0608 = Management information systems/services
0701 = Communication/journalism/related pgms
0702 = Communication technologies/technicians and support services
0801 = Computer/info tech administration/mgmt
0802 = Computer programming

Appendix A1. Code and Name for Each Discipline. Source:NSOPF:04 Faculty Instrument Facsimile (continued).
0803 = Computer science 0804 = Computer software and media applications 0805 = Computer systems analysis 0806 = Computer systems networking/telecomm 0807 = Data entry/microcomputer applications 0808 = Data processing 0809 = Information science/studies 0810 = Computer/info 0901 = Construction trades 1001 = Curriculum and instruction 1002 = Educational administration/supervision 1003 = Educational/instructional media design 1004 = Special education and teaching 1005 = Student counseling/personnel services 1006 = Education, other 1007 = Early childhood education and teaching 1008 = Elementary education and teaching 1009 = Secondary education and teaching 1010 = Adult and continuing education/teaching 1011 = Teacher ed: specific levels, other 1012 = Teacher ed: specific subject areas 1013 = Bilingual & multicultural education 1014 = Ed assessment 1015 = Higher education 1101 = Biomedical/medical engineering 1102 = Chemical engineering 1103 = Civil engineering 1104 = Computer engineering 1105 = Electrical/electronics/comms engineering 1106 = Engineering technologies/technicians 1107 = Environmental/environmental health eng 1108 = Mechanical engineering 1109 = Engineering, other 1201 = English language and literature/letters 1301 = Family/consumer sciences, human sciences 1401 = Foreign languages/literature/linguistics 1501 = Alternative/complementary medicine/sys 1502 = Chiropractic 1503 = Clinical/medical lab science/allied 1504 = Dental support services/allied 1505 = Dentistry

Appendix A1. Code and name for each discipline. Source:NSOPF:04 Faculty Instrument Facsimile (continued).
1506 = Health & medical administrative services
1507 = Allied health and medical assisting services
1508 = Allied health diagnostic, intervention, treatment professions
1509 = Medicine, including psychiatry
1510 = Mental/social health services and allied
1511 = Nursing
1512 = Optometry
1513 = Osteopathic medicine/osteopathy
1514 = Pharmacy/pharmaceutical sciences/admin
1515 = Podiatric medicine/podiatry
1516 = Public health
1517 = Rehabilitation & therapeutic professions
1518 = Veterinary medicine
1519 = Health /related clinical services, other
1601 = Law
1602 = Legal support services
1603 = Legal professions and studies, other
1701 = Library science
1801 = Mathematics
1802 = Statistics
1901 = Mechanical/repair technologies/techs
2001 = Multi/interdisciplinary studies
2101 = Parks, recreation and leisure studies
2102 = Health and physical education/fitness
2201 = Precision production
2301 = Culinary arts and related services
2302 = Personal and culinary services
2401 = Philosophy
2402 = Religion/religious studies
2403 = Theology and religious vocations
2501 = Astronomy & astrophysics
2502 = Atmospheric sciences and meteorology
2503 = Chemistry
2504 = Geological & earth sciences/geosciences

Appendix A1. Code and name for each discipline. Source:NSOPF:04 Faculty Instrument Facsimile (continued).
2505 = Physics 2506 = Physical sciences, other 2601 = Behavioral psychology 2601 = Behavioral psychology 2602 = Clinical psychology 2603 = Education/school psychology 2604 = Psychology, other 2701 = Public administration 2702 = Social work 2703 = Public administration & social svcs other 2801 = Science technologies/technicians 2901 = Corrections 2902 = Criminal justice 2903 = Fire protection 2904 = Police science 2905 = Security and protective services, other 3001 = Anthropology (except psychology) 3002 = Archeology 3003 = Criminology 3 3004 = Demography & population studies 3005 = Economics 3006 = Geography & cartography 3007 = History 3008 = International relations & affairs 3009 = Political science and government 3010 = Sociology 3011 = Urban studies/affairs 3012 = Social sciences, other 3101 =Transportation & materials moving 3201 =Other

Appendix A2. Faculty Frequency Distribution by Discipline.		
Discipline	**Frequency**	**Percent**
Agriculture / natural resources	18	.6
Architecture	8	.3
Area / ethnic / cultural / gender studies	21	.7
Arts / visual and performing	329	11.3
Biological and biomedical sciences	127	4.4
Business / management / marketing/ related	222	7.6
Communication/ journalism	78	2.7
Computer/ information sciences	100	3.4
Construction trades	0	0
Education	295	10.2
Engineering	30	1.0
English language, literature	250	8.6
Family/consumer sciences	9	.3
Foreign languages/linguistics	155	5.3
Health professions/clinical sciences	103	3.5
Legal professions and studies	34	1.2
Library science	25	.9
Mathematics or statistics	127	4.4
Mechanical/repair technologies	0	0
Multi/interdisciplinary studies	25	.9
Parks/ recreation studies	87	3.0
Precision production	0	0
Personal and culinary services	3	.1
Philosophy/ religion and theology	173	6.0
Physical sciences	161	5.5
Psychology	150	5.2
Public administration/ social services	25	.9
Science technologies	4	.1
Security/ protective services	25	.9
Social sciences (except psychology) and history	309	10.6
Transportation and materials moving	3	.1
Other	7	.2
Totals	2903	99.9%

(Total percent does not equal 100% because of rounding).

APPENDIX B

Appendix B1. Institutional Control Characteristics in NSOPF:04 Dataset and Study Sample.						
Institutional Control	NSOPF:04 Sample N=26108			Study Sample (Bacc. Only) N=2443		
	Freq.	Percent	Cum. Percent	Freq.	Percent	Cum. Percent
Public	17116	65.6	65.6	386	15.8	15.8
Private	8992	34.4	100.0	2057	84.2	100.0
Total	26108	100.0		2443	100.0	

Appendix B2. Institutional Characteristics in the Overall NSOPF:04 Sample Contrasted with Institutional Characteristics in the Study Sample.				
Institutional characteristic	Institutions in overall NSOPF:04 sample N=972		Institutions in study sample N=140	
	Mean	SD	Mean	SD
Undergraduate enrollment	10479.48	9354.84	2288.86	2921.20
Number of faculty at institution	1183.47	1297.97	219.33	207.93
Student to faculty ratio	14.10	7.16	13.97	5.18
Degree of urbanization (institutional location)	2.55	2.16	3.83	1.84
Institutional instr. expenses (in thousands of dollars)	104843.15	151569.93	129026.46	174163.10

Appendix B3. Institutional Characteristics in the Overall NSOPF:04 Sample Public Institutions Contrasted with Institutional Characteristics at Overall NSOPF:04 Sample Private Institutions.				
Institutional characteristic	Overall NSOPF:04 sample public institutions N=610		Overall NSOPF:04 sample private institutions N=362	
	Mean	SD	Mean	SD
Undergraduate enrollment	13838.87	9471.46	4084.97	4578.75
Number of faculty at institution	1339.82	1317.84	885.87	1204.50
Student to faculty ratio	15.45	7.09	11.53	6.56
Degree of urbanization (institutional location)	2.62	2.20	2.41	2.08
Institutional Instr. Expenses (in thousands of dollars)	104011.71	131556.58	106425.77	183734.58

Appendix B4. Institutional Characteristics of the Study Sample Public Institutions Contrasted with Institutional Characteristics of the Study Sample Private Institutions.				
Institutional characteristic	Public institutions in study sample N=21		Private institutions in study sample N=119	
	Mean	SD	Mean	SD
Undergraduate enrollment	5905.04	5927.75	1610.27	799.93
Number of faculty at institution	416.43	396.59	183.24	115.05
Student to faculty ratio	16.24	3.73	13.55	5.30
Degree of urbanization (institutional location)	4.41	2.17	3.72	1.76
Institutional instr. expenses (in thousands of dollars)	140613.79	179555.82	126852.07	173090.75

Appendix B5. Faculty Employment Characteristics in the Overall NSOPF:04 Sample Contrasted with Faculty Employment Characteristics in the Study Sample.						
	NSOPF:04 sample			Study Sample Bacc. Only		
Employment Characteristics	Freq.	Percent	Cum. Percent	Freq.	Percent	Cum. Percent
Principal activity						
Teaching	18713	71.7	71.7	2095	85.8	85.8
Research	2472	9.5	81.1	15	.6	86.4
Public Services	258	1.0	82.1	7	.3	86.7
Clinical Services	1267	4.9	87.0	24	1.0	87.6
Administrative Service	2074	7.9	94.9	194	7.9	95.6
Sabbatical	379	1.5	96.4	26	1.1	96.6
Other	945	3.6	100.0	82	3.4	100.0
Total	26108	100.0		2443	100.0	
Full-Time vs. Part-Time Status						
Full-time	17752	68.0	68.0	1783	73.0	73.0
Part-time	8356	32.0	100.0	660	27.0	100.0
Total	26108	100.0		2443	100.0	
Is Part-Time Job Primary Job						
Part-time not primary job	5578	66.8	66.8	466	70.6	70.6
Part-time is primary job	2778	33.2	100.0	194	29.4	100.0
Total	8356	100.0		660	100.0	

Appendix B5. Faculty Employment Characteristics in the Overall NSOPF:04 Sample Contrasted with Faculty Employment Characteristics in the Study Sample (continued).

	NSOPF:04 Sample			Study Sample Bacc. only		
Employment Characteristics	Freq.	Percent	Cum. Percent	Freq.	Percent	Cum. Percent
Academic rank						
Institution has no ranks	638	2.4	2.4	14	.6	.6
Professor	5223	20.0	22.4	488	20.0	20.6
Associate Professor	4212	16.1	38.6	504	20.6	41.2
Assistant Professor	4617	17.7	56.3	573	23.5	64.6
Instructor	5052	19.4	75.6	342	14.0	78.6
Lecturer	1226	4.7	80.3	62	2.5	81.2
Other	5140	19.7	100.0	460	18.8	100.0
Total	26108	100.0		2443	100.0	
Tenure status						
Tenured	8423	32.3	32.3	793	32.5	32.5
Untenured, on track	3860	14.8	47.0	452	18.5	51.0
Not on track	11432	43.8	90.8	968	39.6	90.6
No tenure system	2393	9.2	100.0	230	9.4	100.0
Total	26108	100.0		2443	100.0	
Union membership						
Not union member	20880	80.0	80.0	2142	87.7	87.7
Union member	5228	20.0	100.0	301	12.3	100.0
Total	26108	100.0		2443	100.0	

Appendix B5. Faculty Employment Characteristics in the Overall NSOPF:04 Sample Contrasted with Faculty Employment Characteristics in the Study Sample (continued).						
	NSOPF:04 Sample			Study Sample Bacc. only		
Employment Characteristics	Freq.	Percent	Cum. Percent	Freq.	Percent	Cum. Percent
Highest degree attained						
None	246	.9	.9	9	.4	.4
Doctorate (Ph.D.)	12184	46.7	47.6	1315	53.8	54.2
Professional	2009	7.7	55.3	82	3.4	57.6
MFA, MSW	1186	4.5	59.8	146	6.0	63.5
MA, MS	8089	31.0	90.8	783	32.1	95.6
BA, BS	1870	7.2	98.0	100	4.1	99.7
AA, AS	385	1.5	99.5	4	.2	99.8
Certificate	139	.5	100.0	4	.2	100.0
Total	26108	100.0		2443	100.0	
Contract type						
9-10 month	11485	44.0	44.0	1240	50.8	50.8
11-12 month	7881	30.2	74.2	666	27.3	78.0
Course basis	6742	25.8	100.0	537	22.0	100.0
Total	26108	100.0		2443	100.0	
Income						
0 to $24,999	2789	10.7	10.7	228	9.3	9.3
$25,000 to 49,999	6251	23.9	34.6	848	34.7	44.0
$50,000 to 74,999	8023	30.7	65.4	858	35.1	79.2
$75,000 to 99,999	4352	16.7	82.0	314	12.9	92.0
$100,000 to 149,999	3142	12.0	94.1	161	6.6	98.6
$150,000 to 199,999	991	3.8	97.9	28	1.1	99.8
$200,000 to 299,999	291	1.9	99.7	6	.2	100.0
$300,000 and above	69	.3	100.0	0	0	100.0
Total	26108	100.0		2443	100.0	

Appendix B6. Faculty Disciplinary Characteristics Using the Biglan Model in the Overall NSOPF:04 Sample Contrasted with Faculty Disciplinary Characteristics Using the Stark Model in the Study Sample.						
	NSOPF:04 sample N=26108			Study Sample Bacc. Only N=2443		
Disciplinary classification	Freq	Percent	Cum. Percent	Freq	Percent	Cum. Percent
Biglan model						
Soft Pure Life	2800	10.7	18.9	434	17.8	17.8
Soft Pure Non Life	1917	7.3	31.9	435	17.8	35.6
Soft Applied Life	120	.5	32.7	12	.5	36.1
Soft Applied Non Life	3986	15.3	59.6	914	37.4	73.5
Hard Pure Life	1327	5.1	68.5	120	4.9	78.4
Hard Pure Non Life	1331	5.1	77.5	271	11.1	89.5
Hard Applied Life	1960	7.5	90.8	105	4.3	93.8

Appendix B6. Faculty Disciplinary Characteristics Using the Biglan Model in the Overall NSOPF:04 Sample Contrasted with Faculty Disciplinary Characteristics Using the Stark Model in the Study Sample (continued).						
Hard Applied Non-Life	544	2.1	94.4	145	5.9	99.7
Other NCES	822	3.1	100.0	7	.3	100.0
Missing	11301	43.3		0	0	100.0
Total	26108	100.0		2443	100.0	
Stark model						
Human Client	4894	18.7	18.7	683	28.0	28.0
Information	4998	19.1	37.8	900	36.8	64.8
Enterprise Production	1894	7.3	45.1	239	9.8	74.6
Artistic	2851	10.9	56.0	614	25.1	99.7
Other NCES	170	.7	56.7	7	.3	100.0
Missing	11301	43.3	100.0	0	0	100.0
Total	26108	100.0		2443	100.0	

Appendix B7. Faculty Demographic Characteristics in the Overall NSOPF:04 Sample Contrasted with Faculty Demographic Characteristics in the Study Sample.						
Demographic characteristics	**NSOPF:04 sample N=26108**			**Study Sample Bacc. Only N=2443**		
	Freq.	**Percent**	**Cum. Percent**	**Freq.**	**Percent**	**Cum. Percent**
Gender						
Male	14599	55.9	55.9	1332	54.5	54.5
Female	11509	44.1	100.0	1111	45.5	100.0
Total	26108	100.0		2443	100.0	
Race						
Am. Indian and unclass.	338	1.3	1.3	55	2.3	2.3
Asian American	1653	6.3	7.6	102	4.1	6.4
Black / African American	2061	7.9	15.5	161	6.6	13.0
Hispanic	1665	6.4	21.9	81	3.3	16.3
White	20391	78.1	100.0	2044	83.7	100.0
Total	26108	100.0		2443	100.0	
Age						
Under 30 years old	739	2.8	2.8	53	2.2	2.2
30-49 years old	12251	46.9	49.8	1162	47.6	49.7
50 and above	13118	50.2	100.0	1228	50.3	100.0
Total	26108	100.0		2443	100.0	

Appendix B8. Faculty Research and Teaching Characteristics in the Overall NSOPF:04 Sample Contrasted with Faculty Research and Teaching Characteristics in the Study Sample.				
Research and teaching characteristics	Faculty in overall NSOPF:04 N=26108		Faculty in study sample N=2443	
	Mean	SD	Mean	SD
Research				
Number of book chapters published in a career	3.21	8.97	2.69	8.47
Number of books published	2.38	8.14	1.81	7.24
Number of exhibitions or performances in a career	10.89	58.24	13.17	63.83
Number of journal articles published in a career	11.31	26.11	4.71	12.01
Number of non-refereed articles published in a career	7.19	21.25	5.95	19.23
Number of patents or software developed in a career	.28	1.43	.15	1.14
Number of presentations in a career	28.28	56.19	17.54	35.07
Number of hours spent on thesis advising per week	.71	1.96	.55	1.86
Teaching				
Number of hours spent on administrative committees per week	2.94	5.32	3.16	5.12
Number of hours spent on advising per week	1.90	4.22	1.94	3.44
Number of credit classes taught (per term)	2.22	2.03	2.77	1.77
Number of distance education classes taught	.13	.60	.12	.62
Number of non-credit classes taught	.24	1.20	.13	.86
Number of hours per week spent on office hours	5.10	7.40	6.27	7.15
Number of remedial classes taught	.18	.82	.11	.53
Undergraduate instruction as a percentage of overall duties	54.17	38.61	69.63	28.39

Appendix B9. Faculty Organizational Satisfaction Characteristics in the Overall NSOPF:04 Sample Contrasted with Faculty Organizational Satisfaction Characteristics in the Study Sample.				
Organizational satisfaction variables	Faculty in NSOPF:04 sample N=26108		Faculty in study sample N=2443	
	Mean	SD	Mean	SD
Female faculty are treated fairly	3.39	.76	3.42	.77
Minority faculty are treated fairly	3.44	.72	3.48	.70
Overall satisfaction	3.33	.74	3.33	.74
Part-time faculty are treated fairly	2.84	.94	2.88	.93
Teaching is rewarded	3.02	.86	3.16	.83

Appendix B10. Faculty Satisfaction with Equipment, Faculty Satisfaction with Technology, Faculty Email Use, and Faculty Web Site Use for Instructional Purposes in the NSOPF:04 Sample and in the Study Sample.				
Dependent variables	Faculty in NSOPF:04 sample N=26108		Faculty in study sample N=2443	
	Mean	SD	Mean	SD
Faculty satisfaction with equipment	3.12	.85	3.07	.85
Faculty satisfaction with technology	3.30	.79	3.27	.82
Faculty email use	2.41	3.40	2.64	3.32
Faculty web site use for instr. purposes	Yes=42.5%	No=57.5%	Yes=46.6%	No=53.4%

APPENDIX C

Appendix C1. Institutional Characteristics			
Degree granting	Total	Public	Private (not for profit)
NSOPF:04 Sample Data			
Total	3,380	1,700	1,680
Doctoral	300	190	110
Master's	590	270	320
Bachelor's	570	90	480
Associate's	1,180	1,030	150
Other/Unknown	730	110	620
Study Sample	140	21	119

Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Fall 2000.

Appendix C2. Institutional Characteristic Variables and Statistical Test Used.	
Independent variable	**Statistical test**
Institutional control	Independent sample t-test
Undergraduate enrollment	Pearson's r correlation
Number of faculty	Pearson's r correlation
Student/faculty ratio	Pearson's r correlation
Degree of urbanization	Pearson's r correlation
Institutional instructional expenditures (in thousands of dollars)	Pearson's r correlation

Appendix C3. Employment Characteristics and Test Conducted.	
Independent variable	**Statistical test**
Principal activity	One Way ANOVA, Games-Howell Post-Hoc Test
Full-time versus Part-Time	Independent sample t-test
Part-time is not primary job vs. part-time is primary job	Independent sample t-test
Academic rank	One Way ANOVA, Games-Howell Post-Hoc Test
Tenure status	One Way ANOVA, Games-Howell Post-Hoc Test
Union membership	Independent sample t-test
Highest degree attained	One Way ANOVA, Games-Howell Post-Hoc Test
Employment contract	One Way ANOVA, Games-Howell Post-Hoc Test
Faculty income	One Way ANOVA, Games-Howell Post-Hoc Test

Appendix C4. Disciplines Recoded from NSOPF:04 to Biglan's (1973a) Classifications.		
NSOPF :04 code	NSOPF:04 category	Recoded to Biglan's (1973a) category
1	Agriculture / natural resources	Hard/Applied/Life
2	Architecture	Soft/Applied/Non-Life
3	Area / ethnic / cultural / gender studies	Soft/Pure/Life
4	Arts / visual and performing	Soft/Pure/Life
5	Biological and biomedical sciences	Hard/Pure/Life
6	Business / management / marketing/ related	Soft/Applied/Non-Life
7	Communication/ journalism	Soft/Pure/Non-Life
8	Computer/ information sciences	Hard/Applied/Non-Life
9	Construction trades	Hard/Applied/Non-Life
10	Education	Soft/Applied/Non-Life
11	Engineering	Hard/Applied/Non-Life
12	English language, literature	Soft/Pure/Non-Life
13	Family/consumer sciences	Soft/Applied/Life
14	Foreign languages/linguistics	Soft/Pure/Non-Life
15	Health professions/clinical sciences	Hard/Applied/Life
16	Legal professions and studies	Soft/Applied/Non-Life
17	Library science	Soft/Applied/Non-Life
18	Mathematics or statistics	Hard/Pure/Non-Life
19	Mechanical/repair technologies	Hard/Applied/Non-Life
20	Multi/interdisciplinary studies	Soft/Applied/Non-Life
21	Parks/ recreation studies	Soft/Applied/Non-Life
22	Precision production	Hard/Applied/Non-Life
23	Personal and culinary services	Soft/Applied/Life
24	Philosophy/ religion and theology	Soft/Applied/Non-Life
25	Physical sciences	Hard/Pure/Non-Life
26	Psychology	Soft/Applied/Non-Life
27	Public administration/ social services	Soft/Applied/Non-Life
28	Science technologies	Hard/Applied/Non-Life
29	Security/ protective services	Hard/Applied/Non-Life
30	Social sciences (except psychology) and history	Soft/Pure/Life
31	Transportation and materials moving	Hard/Applied/Non-Life
32	Other	Other

Appendix C5. NSOPF:04 Disciplines Recoded Using Stark's (1998) Classifications		
SOPF:04 code	NSOPF:04 category	Recoded to Stark's Category
1	Agriculture/natural resources/related	Enterprise
2	Architecture and related services	Enterprise
3	Area/ethnic/cultural/gender studies	Artistic
4	Arts--visual and performing	Artistic
5	Biological and biomedical sciences	Information
6	Business/management/market/related	Enterprise
7	Communication/journalism/comm. tech	Information
8	Computer/info sciences/support tech	Information
9	Construction trades	Enterprise
10	Education	Information
11	Engineering technologies/technicians	Enterprise
12	English language and literature/letters	Artistic
13	Family/consumer sciences, human sciences	Human Client
14	Foreign languages/literature/linguistics	Artistic
15	Health professions/clinical sciences	Human Client
16	Legal professions and studies	Information
17	Library science	Information
18	Mathematics and statistics	Information
19	Mechanical/repair technologies/techs	Enterprise
20	Multi/interdisciplinary studies	Information
21	Parks/recreation/leisure/fitness studies	Human Client
22	Precision production	Enterprise
23	Personal and culinary services	Human Client
24	Philosophy, religion & theology	Human Client
25	Physical sciences	Information
26	Psychology	Human Client
27	Public administration/social services	Human Client
28	Science technologies/technicians	Enterprise
29	Security & protective services	Human Client
30	Social sciences (except psych) and history	Human Client
31	Transportation & materials moving	Enterprise
32	Other	Other

Appendix C6. A List of Tests Conducted to Determine Association Between Disciplinary Models and the Four Dependent Variables.	
Model name	**Statistical test**
Biglan’s (1973a) model	One Way ANOVA, Games-Howell Post-Hoc Test
Stark’s (1998) model	One Way ANOVA, Games-Howell Post-Hoc Test

Appendix C7. A List of Tests Conducted to Determine the Associations Between the Faculty Satisfaction with Equipment, Faculty Satisfaction with Technology, Faculty Email Use, and Faculty Web Site Use for Instructional Purposes and the Demographic Characteristics Independent Variables.	
Independent variable	**Statistical test**
Gender	Independent sample t-test
Age	One Way ANOVA, Games-Howell Post-Hoc Test
Race	One way NOVA, Games-Howell Post-Hoc Test

Appendix C8. A List of Tests Conducted to Determine the Associations Between the Faculty Satisfaction with Equipment, Faculty Satisfaction with Technology, Faculty Email Use, and Faculty Web Site Use for Instructional Purposes and Faculty Research Characteristics.	
Independent variable	**Statistical test**
Book chapters published	Pearson’s r correlation
Books published	Pearson’s r correlation
Exhibitions and performances	Pearson’s r correlation
Journal articles	Pearson’s r correlation
Non-refereed articles	Pearson’s r correlation
Patents/software	Pearson’s r correlation
Presentation	Pearson’s r correlation
Thesis advising	Pearson’s r correlation

Appendix C9. A List of Tests Conducted to Determine the Associations Between the Faculty Satisfaction with Equipment, Faculty Satisfaction with Technology, Faculty Email Use, and Faculty Web Site Use for Instructional Purposes and Teaching Characteristics.

Independent variable	Statistical test
Administrative committee hours	Pearson's r correlation
Advising hours	Pearson's r correlation
Credit classes	Pearson's r correlation
Distance education classes	Pearson's r correlation
Non-credit classes	Pearson's r correlation
Office hours	Pearson's r correlation
Remedial classes	Pearson's r correlation
Teaching assistant use	Pearson's r correlation
Undergraduate instruction (as percent of total duties)	Pearson's r correlation

Appendix C10. A List of Tests Conducted to Determine the Associations Between the Faculty Satisfaction with Equipment, Faculty Satisfaction with Technology, Faculty Email Use, and Faculty Web Site Use for Instructional Purposes and Organizational Satisfaction.

Independent variable	Statistical test
Female faculty are treated fairly	Pearson's r correlation
Minority faculty are treated fairly	Pearson's r correlation
Overall satisfaction	Pearson's r correlation
Part-time faculty are treated fairly	Pearson's r correlation
Teaching is rewarded	Pearson's r correlation

Appendix C11. A List of Tests Conducted to Determine the Associations Between the Faculty Satisfaction with Equipment, Faculty Satisfaction with Technology and Faculty Email Use, and Faculty Web Site Use for Instructional Purposes.	
Variable	**Statistical test**
Faculty satisfaction with equipment	Pearson's r correlation
Faculty satisfaction with technology	Pearson's r correlation
Faculty use of email	Pearson's r correlation
Faculty web site use for instructional purposes	Pearson's r correlation

Appendix C12. A Listing of Models and Characteristics Blocks Used.	
Model 1	Institutional characteristics block
Model 2	Employment characteristics block added
Model 3	Disciplinary characteristics block added
Model 4	Demographic characteristics added
Model 5	Research and Teaching characteristics block added
Model 6	Organizational satisfaction characteristics block added

APPENDIX D

Appendix D1. Relationship Between Institutional Control and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.					
Independent Variable		Dependent Variables			
Institutional Control		Faculty Satisfaction with Equipment	Faculty Satisfaction with Technology	Faculty Email Use	Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)	Mean (SD)	Mean (SD)	%
Public	386	2.96 (.91)	3.16 (.84)	3.22 (4.17)	54.4
Private	2057	3.09 (.84)	3.29 (.82)	2.53 (3.12)	45.2
Overall	2443	3.07** (.85)	3.27** (.82)	2.64** (3.32)	47.0***
A t-test was conducted to detect the mean differences in faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use by institutional control. A Chi Square test was conducted for faculty web site use for instructional purposes. N= 2443. * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$					

Appendix D2. Relationship Between Enrollment, Number of Faculty, Student/Faculty Ratio, Degree of Urbanization, and Institutional Instructional Expenditures and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.

Independent Variable	Dependent Variables							
Institutional Characteristics	Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes	
Enrollment	.01		-.01		.04	*	.01	
Number of faculty	.02		.03		.04	*	.06	**
Student/faculty ratio	-.07	***	-.08	***	.00		-.07	***
Degree of urbanization	-.01		-.01		.00		.01	
Institutional instructional expenditures	-.01		-.04	**	.01		.03	

Pearson's r test of correlations was used to detect the association between institutional characteristics and faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and web site use for instructional purposes..

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

N=2443

Appendix D3. Relationship Between Principal Activity and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.									
Independent Variable		Dependent Variables							
Principal Activity		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes	
	N	Mean (SD)		Mean (SD)		Mean (SD)		%	
Teaching	2095	3.04 (.86)	a b	3.25 (.83)		2.68 (3.24)	a b	48.4	
Research	15	3.13 (.74)		3.33 (.72)		1.53 (1.46)	c	20.0	
Public Service	7	3.28 (.76)		3.71 (.49)		4.14 (4.92)		71.4	
Clinical Service	24	3.50 (.59)	a	3.46 (.78)		1.79 (3.24)		16.7	
Administrative	194	3.21 (.78)		3.37 (.79)		3.13 (4.42)	c d e	43.8	
On Sabbatical	26	3.27 (.83)		3.15 (.88)		.65 (1.55)	a d	11.5	

Appendix D3. Relationship Between Principal Activity and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes (continued).								
Independent Variable		Dependent Variables						
		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
Other	82	3.30 (.76)	b	3.43 (.69)		1.46 (2.31)	b e	30.5
Overall	2443	2.66 (.85)	***	3.27 (.82)		2.64 (3.32)		47.0***

An ANOVA and the Games-Howell Post Hoc test were used to detect to detect the relationships between principal activity and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. A Chi Square test was conducted for faculty web site use for instructional purposes. Lower case letters indicate a significant Post Hoc relationship pair.
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Appendix D4. Relationship Between Full-Time and Part-Time Status and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.

Independent Variable		Dependent Variables						
Part-time versus full-time faculty		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Part-time	660	3.22 (.83)		3.35 (.80)		1.62 (2.28)		31.2
Full-time	1783	3.02 (.85)		3.24 (.83)		3.02 (3.56)		52.3
Overall	2443	3.07 (.85)	***	3.27 (.82)	**	2.64 (3.32)	***	47.0***

A t-test was conducted to detect the mean differences in faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use by part-time vs. full-time status. A Chi Square test was conducted for faculty web site use for instructional purposes. * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Appendix D5. Relationship Between Part-Time Position Is Primary Job and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.									
Independent Variable		Dependent Variables							
Part-time job as primary job		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Part-time is not primary job	466	3.27 (.79)		3.36 (.80)		1.61 (2.44)		27.7
Part-time is primary job	194	3.10 (.90)		3.31 (.79)		1.65 (1.85)		39.7
Overall	660	3.22 (.83)	*	3.35 (.80)		1.62 (2.28)		31.2**

A t-test was conducted to detect the mean differences in faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use by primary part-time job. A Chi Square test was conducted for faculty web site use for instructional purposes. * $p \le .05$; ** $p \le .01$; *** $p \le .001$

Appendix D6. Relationship Between Academic Rank and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.

Independent Variable		Dependent Variables						
Rank		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Institution has no ranks	14	3.21 (.80)		3.43 (.65)		1.29 (.94)	a b c	7.1
Professor	488	3.07 (.86)		3.23 (.82)		2.86 (3.52)	a d e	54.1
Associate Professor	504	2.95 (.84)	a b	3.24 (.82)		3.04 (3.48)	b f g	50.2
Assistant Professor	573	2.99 (.87)	c	3.26 (.87)		3.17 (3.56)	c h i	54.8
Instructor	342	3.1 (.86)	a	3.31 (.81)		1.93 (2.51)	d f h	37.1

Appendix D6. Relationship Between Academic Rank and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes (continued).

Independent Variable		Dependent Variables						
Rank		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
Lecturer	62	3.17 (.80)		3.29 (.88)		2.47 (3.71)		43.5
Other	460	3.21 (.81)	b c	3.30 (.77)		1.93 (2.91)	e g i	33.3
Overall	2443	3.07 (.85)	***	3.27 (.82)		2.64 (3.32)	***	47.0***

An ANOVA and the Games-Howell Post Hoc test were used to detect the relationships between rank and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. A Chi Square test was conducted for faculty web site use for instructional purposes. Lower case letters indicate a significant Post Hoc relationship pair. * p≤ .05 **; p ≤ .01 ***; p ≤ .001

Appendix D7. Relationship Between Tenure Status and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.								
Independent Variable		Dependent Variables						
Tenure Status		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Tenured	793	3.02 (.86)	a	3.23 (.82)	a	2.95 (3.31)	a	53.0
On tenure track	452	3.01 (.84)	b	3.25 (.87)		3.73 (3.73)	b c	56.0
Not on tenure track	968	3.19 (.84)	a b c	3.34 (.80)	a b	2.14 (3.03)	a b	37.7
No tenure system	230	2.88 (.83)	c	3.18 (.80)	b	2.42 (3.36)	c	43.9
Overall	2433	3.07 (.85)	***	3.27 (.82)	**	2.64 (3.32)	***	47.0***

An ANOVA and the Games-Howell Post Hoc test were used to detect to detect the relationships between tenure status and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. A Chi Square test was conducted for faculty web site use for instructional purposes. Lower case letters indicate a significant Post Hoc relationship pair.
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Appendix D8. Relationship Between Union Membership and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.

Independent Variable		Dependent Variables						
Union Membership		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Not a union member	2142	3.10 (.83)		3.29 (.81)		2.52 (3.15)		45.8
Union member	301	2.91 (.94)		3.12 (.89		3.52 (4.24)		52.2
Overall	2443	3.07 (.85)	**	3.27 (.82)	***	2.64 (3.32)	***	47.0*

A t-test was conducted to detect the mean differences in faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use by union membership. A Chi Square test was conducted for faculty web site use for instructional purposes.
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Appendix D9. Relationship Between Highest Degree Attainment and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.								
Independent Variable		Dependent Variables						
Highest Degree		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
No degree	9	3.00 (1.00)		3.22 (.83)		0.89 (1.62)		22.2
Doctoral degree	1315	3.03 (.86)		3.23 (.84)		2.94 (3.35)	a	51.3
Professional degree (MD, DDS, LL.B)	82	3.28 (.80)		3.39 (.80)		2.11 (2.74)		34.1
Master of Fine Arts, or Master of Social Work	146	2.91 (.98)		3.29 (.79)		2.68 (3.90)		34.9
Other master's degree	783	3.14 (.79)		3.32 (.79)		2.24 (3.08)	a	44.1

Appendix D9. Relationship Between Highest Degree Attainment and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes (continued).									
Independent Variable		Dependent Variables							
Highest Degree		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes	
Bachelor's degree	100	3.12 (.88)		3.26 (.86)		2.10 (4.04)		37.0	
Associate's degree	4	3.00 (.82)		3.50 (.58)		1.75 (.96)		25.0	
Certificate only	4	3.00 (1.41)		3.25 (.96)		4.25 (4.03)		25.0	
Overall	2443	3.07 (.85)		3.27 (.82)		2.64 (3.32)	***	47.0***	
An ANOVA and the Games-Howell Post Hoc test were used to detect to detect the relationships between highest degree attainment and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. A Chi Square test was conducted for faculty web site use for instructional purposes. Lower case letters indicate a significant Post Hoc relationship pair. * $p \leq .05$;** $p \leq .01$; *** $p \leq .001$									

Appendix D10. Relationship Between Contract Type and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.

Independent Variable		Dependent Variables						
Contract type		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
9-10 months	1240	2.97 (.86)	a b	3.22 (.83)	a b	2.93 (3.40)	a	52.5
11-12 months	666	3.15 (.83)	a	3.33 (.81)	a	2.98 (3.78)	b	46.7
Individual course basis	537	3.21 (.84)	b	3.33 (.81)	b	1.56 (2.05)	a b	33.0
Overall	2443	3.07 (.85)	***	3.27 (.82)	**	2.64 (3.32)	***	47.0***

An ANOVA and the Games-Howell Post Hoc test were used to detect to detect the relationships between contract type and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. A Chi Square test was conducted for faculty web site use for instructional purposes. Lower case letters indicate a significant Post Hoc relationship pair.
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Appendix D11. Relationship Between Faculty Income and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.								
Independent Variable		Dependent Variables						
		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Income Categories								
$1 - 24,999	228	3.05 (.93)	a b	3.20 (.87)	a b	1.62 (1.95)	a b c d	32.0
$25,000 - 49,999	848	3.00 (.87)	c d e	3.23 (.85)		2.59 (3.38)	a	44.9
$50,000 - 74,999	858	3.06 (.83)	f g	3.29 (.81)	c	2.86 (3.23)	b	50.1
$75,000 - 99,999	314	3.19 (.79)	c	3.29 (.81)	d	2.85 (3.53)	c	48.7
$100,000 - 149,999	161	3.33 (.77)	a d f	3.50 (.60)	a b c d	2.70 (4.08)	d	51.6
$150,000 - 199,999	28	3.07 (.94)		3.29 (.76)		2.50 (2.87)		60.7
$200,000 or above	6	3.83 (.41)	b f g	3.17 (1.30)		5.17 (7.44)		33.3
Overall	2443	3.07 (.85)	***	3.27 (.82)	*	2.64 (3.32)	***	47.0***

An ANOVA and the Games-Howell Post Hoc test were used to detect to detect the relationships between faculty income and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. A Chi Square test was conducted for faculty web site use for instructional purposes. Lower case letters indicate a significant Post Hoc relationship pair.
* $p \le .05$; ** $p \le .01$; *** $p \le .001$

Appendix D12. Relationship Between Biglan's Disciplinary Classifications and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.								
Independent Variable		Dependent Variables						
Biglan's Categories		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Soft/Pure/Life	434	2.93 (.91)	a	3.25 (.82)		2.55 (3.02)	a	39.4
Soft/Pure/ Non -Life	435	3.07 (.86)		3.20 (.86)		2.74 (2.34)	b	48.7
Soft/Applied/Life	12	2.92 (.90)	a	3.17 (.72)		3.17 (3.69)		50.0
Soft/Applied/ Non-life	914	3.13 (.83)		3.31 (.82)		2.66 (3.47)	c	44.4
Hard/Pure/Life	120	3.05 (.81)		3.38 (.74)		2.48 (2.98)	d	55.8
Hard/Pure/ Non- life	271	3.06 (.87)		3.24 (.85)		2.20 (2.63)	e	55.8
Hard/Applied/Life	105	3.14 (.81)		3.40 (.80)		2.39 (2.68)	f	41.0
Hard/Applied/ Non- life	145	3.14 (.77)		3.18 (.78)		3.75 (4.81)	e g	64.1
Other (NCES classification)	7	3.29 (.49)		3.43 (.53)		0.71 (.48)	a b c d f g	28.6
Overall	2443	3.07 (.85)	*	3.27 (.82)		2.64 (3.32)	***	47.0***
An ANOVA and the Games-Howell Post Hoc test were used to detect to detect the relationships between Biglan's disciplinary affiliation and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. A Chi Square test was conducted for faculty web site use for Instr. purposes. Lower case letters indicate a significant Post Hoc relationship pair. * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$								

Appendix D13. Relationship Between Stark's (1998) Disciplinary Classifications and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.								
Independent Variable		Dependent Variables						
Stark Classifications		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Human/Client	683	3.10 (.86)		3.31 (.81)		2.45 (2.94)	a	42.5
Information	900	3.13 (.83)	a	3.30 (.82)		2.72 (3.40)	b	52.3
Enterprise/Production	239	3.00 (.86)		3.20 (.82)		3.20 (4.51)	c	49.0
Artistic	614	2.99 (.88)	a	3.21 (.84)		2.55 (3.03)	d	42.2
Other NCES	7	3.29 (.49)		3.43 (.53)		0.71 (.49)	a b c d	28.6
Overall	2443	3.07 (.85)	*	3.27 (.82)		2.64 (3.32)	*	47.0***

An ANOVA and the Games-Howell Post Hoc test were used to detect to detect the relationships between Stark's disciplinary affiliations and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. Total N=2903. A Chi Square test was conducted for faculty web site use for instructional purposes. Lower case letters indicate a significant Post Hoc relationship pair.
* p≤ .05: ** p ≤ .01; *** p ≤ .001

Appendix D14. Relationship Between Gender and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.

Independent Variable		Dependent Variables						
Gender		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Female faculty	1111	3.06 (.87)		3.28 (.83)		2.86 (3.57)		46.0
Male faculty	1332	3.09 (.84)		3.26 (.82)		2.46 (3.08)		47.1
Overall	2443	3.07 (.85)		3.27 (.82)		2.64 (3.32)	**	47.0

A t-test was conducted to detect the mean differences in faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use by gender. A Chi Square test was conducted for faculty web site use for instructional purposes.
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Appendix D15. Relationship Between Faculty Age and Faculty Satisfaction with Equipment and Technology and Email and Faulty Web Site Use.								
Independent Variable		Dependent Variables						
Age Categories		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes
	N	Mean (SD)		Mean (SD)		Mean (SD)		%
Up to 29 years old	53	3.08 (.96)		2.96 (.88)	a b	2.13 (3.44)		22.6
30-49 years old	1162	3.05 (.84)		3.26 (.84)	a	2.67 (3.20)		46.5
50 and above	1228	3.10 (.85)		3.30 (.80)	b	2.64 (3.43)		47.8
Overall	2443	3.07 (.85)		3.27 (.82)	*	2.64 (3.32)		47.0**
An ANOVA and the Games-Howell Post Hoc test were used to detect to detect the relationships between age and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. Total N=. A Chi Square test was conducted for faculty web site use for instructional purposes. Lower case letters indicate a significant Post Hoc relationship pair. * p ≤ .05; ** p ≤ .01; *** p ≤ .001								

Appendix D16. Relationship Between Faculty Race and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instr. Purposes.									
Independent Variable		Dependent Variables							
Race		Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes	
	N	Mean (SD)		Mean (SD)		Mean (SD)		%	
American Indian and unclassified	55	2.84 (.88)		3.07 (.81)		3.22 (4.29)		50.9	
Asian American	102	3.07 (.85)		3.22 (.79)		2.56 (2.36)		44.1	
Black	161	3.14 (.83)		3.22 (.89)		3.31 (4.70)		31.7	
Hispanic	81	3.25 (.83)		3.38 (.80)		2.65 (3.20)		51.9	
White	2044	3.07 (.85)		3.28 (.82)		2.58 (3.20)		47.6	
Overall	2443	3.07 (.85)		3.27 (.82)		2.64 (3.32)		47.0**	

An ANOVA and the Games-Howell Post Hoc test were used to detect to detect the relationships between race and faculty satisfaction with equipment, faculty satisfaction with technology, and faculty email use. A Chi Square test was conducted for faculty web site use for instructional purposes. Lower case letters indicate a significant Post Hoc relationship pair.
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Appendix D17. Relationship Between Research Characteristics and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.								
Independent Variable	Dependent Variables							
Research Characteristics	Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes	
Book Chapters	.05	*	-.01		.02		.02	
Books	.03		.01		.00		.03	
Exhibitions and Performances	-.00		.03		-.03		-.07	***
Journal Articles	.02		-.02		.04	*	.02	
Non-refereed Articles	.05	*	.04	*	.02		.03	
Patents/Software	.02		-.01		.02		.07	***
Presentations	.04		.04		.05	*	.02	
Thesis Advising	-.09	***	-.03		.13	***	.05	*

Pearson's r test of correlations was used to detect the association between research characteristics and faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and web site use for instructional purposes. Total N= 2443
* p ≤ .05; ** p ≤ .01; *** p ≤ .001

Appendix D18. Relationship Between Teaching Characteristics and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.

Independent Variable	Dependent Variables							
Teaching Characteristics	Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes	
Administrative Committee Hours	-.06	**	-.05	*	.16	***	.10	***
Advising Hours	-.07	***	-.06	**	.22	***	.08	***
Credit Classes	-.16	***	-.09	***	.16	***	.15	***
Distance Education Classes	-.01		-.03		.25	***	.08	***
Non-Credit Classes	-.04		-.02		.03		-.02	
Office Hours	-.02		-.02		.15	***	.03	
Remedial Classes	.02		-.01		-.02		-.03	*
Teaching Assistant Use	-.04		.01		.10	***	.17	***
Undergraduate Instruction (as percent of overall duties)	-.04		-.03		-.06	**	-.01	

Pearson’s r test of correlations was used to detect the association between teaching characteristics and faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and web site use for instructional purposes. Total N=2443

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Appendix D19. Relationship Between Organizational Satisfaction and Faculty Satisfaction with Equipment and Technology and Email and Faculty Web Site Use for Instructional Purposes.								
Independent Variable	Dependent Variables							
Organizational Satisfaction	Faculty Satisfaction with Equipment		Faculty Satisfaction with Technology		Faculty Email Use		Faculty Web Site Use for Instr. Purposes	
Female faculty treated fairly	.20	***	.21	***	-.09	***	-.04	
Minority faculty treated fairly	.16	***	.18	***	-.06	**	-.05	*
Overall Satisfaction	.38	***	.44	***	-.09	***	-.03	
Part time faculty treated fairly	.25	***	.26	***	-.08	***	-.06	**
Teaching is Rewarded	.32	***	.34	***	-.05	**	.01	

Pearson's r test of correlations was used to detect the association between teaching characteristics and faculty satisfaction with equipment, faculty satisfaction with technology, faculty email use, and web site use for instructional purposes. Total N=2443.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

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