EFFECTS OF INFORMATIONAL TECHNOLOGY ON COMMUNITY COLLEGE FACULTY

by

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TABLE OF CONTENTS

TABLE OF CONTENTS, *continued*

TABLE OF CONTENTS, *continued*

TABLE OF CONTENTS, *continued*

ABSTRACT

During the 2001-02 academic year, I investigated the impact of information technology on community college faculty at a large, multi-campus community college district in the southwest. My purpose of this study was to determine how technological innovation on their campuses was affecting the working conditions of faculty since these conditions ultimately affect the ability of faculty to provide effective instruction for their students. Using a grounded theory and phenomenological approach, I analyzed data collected through interviewing faculty in three community colleges, examining email communication and online documents from four colleges and the college district, and attending two technology conferences for employees in the college district.

While a number of studies have been conducted in recent years on technology's impact on labor, few of these studies have addressed the impact of technology in higher education, with fewer still examining the effects of technology on community college personnel, despite the rapid proliferation of technology on community college campuses. Therefore, drawing on research conducted in business and industry as well as in higher education settings, I sought to ascertain whether technological innovations enskill or deskill faculty (Vallas, 1993), or promote managerial extension of power (Rhoades, 1998), whether each college or the college district rewards or penalizes faculty for their eagerness or reluctance to adopt new technologies (Rogers, 1983), and whether the technologies purchased by community colleges impact faculty working conditions by altering the environments in which the technologies are used (Winner, 1986).

The most salient findings of this study included the offsetting advantages and disadvantages to technology usage which result in detriments and benefits to the work of faculty increasing simultaneously, and the impact on the work environment of the technologies themselves due to their intrinsic characteristics. The conclusions are both striking and powerful enough to warrant further investigation into the ramifications of technology proliferation within the community college sector in order to determine whether the anticipated benefits of technological innovation to community college education do, in fact, outweigh the problems connected to technology.

CHAPTER 1

INTRODUCTION

As the United States has evolved from a production society into an information processing society, personnel in many occupations and fields have experienced the impact of computerization on their work lives. As a result, sociologists and organizational theorists have begun to examine the effects of advanced technology on job security, salaries, working conditions, labor/management relations, and power structures in a variety of sectors, although largely in business and the manufacturing industries (Bijker, 1995; Thomas, 1994; Vallas, 1993; Winner, 1986). It is only very recently that computerization of the service sector has begun to appear in the professional literature, with information technology in educational settings among the latest to be studied. Yet, there is evidence that the use of advanced computer technology is spreading rapidly in certain segments of postsecondary education, most notably in public community colleges (Cintron, Dillon, & Boyd, 2001; Eder, 2001; Levin, 2001b; Rhoades, 1998).

In spite of this proliferation of technology on community college campuses, few studies have examined the ways in which this technology is impacting the work lives of faculty. Both Grubb (1999) and Frye (1994) decry the dearth of empirical studies on the community college sector of higher education. Frye states that the existing literature "reflects confusion" resulting from the "complex interplay of social group interest, traditional values, inertia, and innovation (p. 183), while Grubb complains that most community colleges lack effective institutional research by which to assess their policies,

instructional methods, and technologies. Yet research of this type is sorely needed because technology usage is expanding rapidly in the community college sector of higher education (Levin 2001b; Rhoades 1998), even though the ability of computer technology to enhance or facilitate the work of faculty has not been demonstrated (Eder, 2001). Furthermore, the working conditions of faculty matter a great deal in community colleges, in which "teaching has always been the hallmark" (Cohen & Brawer, 1996, p. 97), because the work life of faculty ultimately impacts the instruction and assistance that faculty provide for students, and thus the overall benefit of community college instruction to society at large. Therefore, since technologies affect the working conditions of all employees who use them on the job, and since technology usage is increasing so rapidly on community college campuses, it is imperative that the effects of technology usage on community college faculty be carefully examined.

Background of the Research Project

During the 2000-01 academic year, in order to address the issue of the impact of information technology on community college faculty, I implemented the first stage of a research project designed to gather and analyze data on community college instructors' perceptions of technology in their work lives. In this first stage, I conducted a preliminary study in which I interviewed employees at a large, urban community college district. The results of that study became the foundation for the larger study described in this paper.

The preliminary study was grounded in three main theoretical frameworks. The first was globalization theory, which states that American higher education in general,

and community colleges in particular, are shifting in mission, curricula, and methodologies toward an increasingly corporate/industrial model. This model is replacing the traditional emphasis on university transfer preparation for students and collegial relationships among college personnel with an emphasis on career training for students and corporate-style relationships among personnel. One of the impacts of this shift is an increase in technological innovation on community college campuses in order to meet the needs of business and industry for a more technologically advanced labor force (Levin, 2001b).

The second theoretical framework of the preliminary study included both the enskilling and deskilling theories of technology's impact on workers (Rhoades, 1998; Vallas, 1993). The enskilling theory predicts that technological innovation will elevate the status and power of workers by eliminating low-level, unskilled jobs while creating a need for technologically skilled employees. This need will force management to recruit, train, promote, and reward higher skilled workers, which will result in a flattened organizational hierarchy as management is forced to rely on the expertise of labor to a greater extent. The deskilling theory, on the other hand, predicts that management will use advanced technology to reduce managerial dependence on labor by routinizing and automating the workplace to the greatest extent possible, resulting in the elimination or marginalization of most of the labor force, and the maximization of profits for the few highly skilled and managerial personnel needed to run the organization (Vallas, 1993). In addition, a variant of the deskilling theory, the managerial extension theory, predicts that technology will simultaneously increase the skill level of employees and decrease

employee discretion and autonomy as managerial control is expanded due to the routinization of work and the marginalization of workers (Rhoades, 1998).

The third theoretical framework of the preliminary study was the diffusion theory, which seeks to explain the mechanisms by which technology spreads (or fails to spread) throughout an organization. This theory predicts that technologies will be adopted by some personnel in an organization faster than by others based on idiosyncratic traits such as tolerance for risk and ambiguity, power and status within the organization, and number and types of social interactions with other employees and managers. Furthermore, managerial policies will result in rewards for the "innovators," who make the organization aware of new technologies, as well as for the "early adopters" and "early majority" who are the first to embrace new technologies that have been purchased by the organization, while resulting in penalties for the "late majority" and "laggards" who resist innovation the longest (Rogers, 1983).

With these theories as the guiding framework, I sought to determine whether changes in the macro-environment, particularly the changes caused by globalizing influences on the country as a whole, were influencing technology adoption in community colleges, whether technologies adopted by the colleges were, in general, deskilling, enskilling, or otherwise affecting the autonomy of faculty, and whether differences in speed of technology adoption among the faculty influenced the impact of institutional technology adoption on individuals. In order to obtain data that would shed light on these questions, I interviewed eight instructors, two administrators, and seven staff members on four of the campuses in the community college district I was studying. I

also attended a technology roundtable discussion at one of the campuses, in which six faculty, one administrator, and one staff member discussed their views on technology usage in their work. Thus, my total sample was twenty-three employees, consisting of twelve faculty, three administrators, and eight staff members, with the latter comprised of librarians, center directors, computer resource professionals, and Training and Development specialists.

My method for obtaining the interview sample was the "snowball" technique in which each interviewee supplied me with names of other potential participants. My first interview was with the president of one of the campuses who recommended other employees at her institution, all of whom recommended others, until I had interviewed seventeen people on four campuses. The interviews lasted approximately one hour each, during which I asked each participant open-ended questions concerning his/her experience with technology on the job, the advantages and disadvantages of technology usage in the community college setting, the availability and quality of technical support on the participant's campus, and whether there were any changes in relationships among the faculty, staff, and administrators that could be attributed to increased technology usage. At the roundtable discussion, which I was permitted to attend as an observer, a facilitator asked the participants how technology affected the teaching-learning process, what principles should be guiding the use of technology in the classroom, and what support was needed in order to increase technology use in the classroom.

I tape-recorded all the interviews and took field notes at the roundtable discussion. After collecting the data, I employed the methods recommended by Miles and

Huberman (1994) to code the discourse from the interview transcriptions and my field notes into categories. Specifically, Miles and Huberman advise developing broad coding categories based on the study's guiding conceptual framework before collecting the data. During the data collection process, these broad categories are revised into narrower categories that reflect, in more detail, the data's relationship to the conceptual framework. Thus, my initial categories included: 1) Evidence of the impact of globalization on technological innovation, 2) Effects of diffusion patterns on individuals, 3) Benefits and detriments of technology for community college constituent groups, and 4) Changes in power relationships between faculty and administration. Subsequently, these were revised into a set of narrower categories that described the concepts arising from the interview and roundtable discussion discourse.

The globalization category was organized into ten subcategories: 1) Internationalization, which includes recruiting foreign students, offering courses in other countries, and incorporating foreign ideas, customs and images into materials and literature; 2) Multiculturalism, which is the fostering of equality and integration of all ethnic groups, genders, and social classes while championing historically oppressed groups; 3) Commodification, which involves tailoring curricula and programs to the needs of business and industry; 4) Homogenization, which is the standardizing of courses, methods, and services to reduce variation; 5) Marketization, which entails seeking and competing for corporate funding; 6) Re-structuring, which is the alteration of work methods, resources, and job descriptions; 7) Labor relations, which involves changes in working conditions; 8) Productivity and efficiency, which refers to

institutional attempts to reduce costs while increasing outputs; 9) Electronic communication and information, which encompasses the usage of technology to reduce labor costs and to standardize production; and 10) State intervention, which refers to the involvement of government in the operations of the college. These subcategories were derived from Levin's (2001b) description of globalization behaviors in community colleges.

The subcategories of diffusion theory included: 1) Innovators, which refers to those employees who bring new technologies to the organization; 2) Early adopters, which refers to the employees who are the first to incorporate a newly purchased technological innovation their work; 3) Early majority, which refers to the employees who begin using a new technology after it has been demonstrated to them by the early adopters; 4) Late majority, which refers to the employees who wait until a technological innovation has been adopted by most of their co-workers before they begin using it themselves; and 5) Laggards, which refers to the employees who resist adopting a technological innovation until its usage becomes compulsory or otherwise unavoidable. These subcategories were derived from Rogers' (1983) taxonomy of diffusion patterns in organizations.

The subcategories of the benefits and detriments of technology for community college constituent groups included: 1) Faculty benefits, 2) Student benefits, 3) Institutional benefits, 4) Faculty problems, 5) Student problems, and 6) Institutional problems. These subcategories were derived directly from data; that is, they indicate the conceptual groupings of ideas that arose from the discourse of the interviewees and of the

roundtable participants. Finally, the subcategories of power relationship changes consisted of Enskilling, Deskilling, and Managerial Extension, which were derived from the research of Vallas (1993) and Rhoades (1998).

The data from this preliminary study yielded considerable evidence of globalization impacting the community college district's decisions and practices. Most of the comments in the interviews and roundtable discussion concerned the restructuring of work conditions (particularly in instructional practices), labor alterations in the colleges as a result of technology adoption, the homogenization of methods and services to reduce variation, an increased institutional emphasis on productivity and efficiency, and the commodification of instruction to fit the needs of business and industry, all of which are predicted by globalization theory (Levin, 2001b).

Diffusion theory was partially supported by the data in this study since nearly all of the participants fit Rogers' (1983) definition of early adopters or early majority users of technology. Furthermore, several of the early adopters among the faculty had moved into high-level staff positions either as computer coordinators or Training and Development specialists, and this was generally perceived as an advancement both in status and prestige by the participants in the study. This type of institutional "reward" mechanism for employees in the vanguard of technology usage is also predicted by the diffusion theory (Rogers, 1983). However, the data also indicated that the early adopters and early majority among the faculty who remained in instructional positions did not receive any reward or compensation for their increased use of technology, which would tend to refute the diffusion theory.

The coding of the interview and roundtable data into the six subcategories of benefits/detriments of technology revealed that 100% of the data sources commented on faculty problems caused by technology as opposed to only 26% that commented on faculty benefits. Thus, all the participants in the study were aware of detriments caused to faculty by the use of information technology, while only about a fourth of the participants could think of benefits that technology produces for faculty. The faculty problems mentioned most often were: 1) Extra work load and corresponding time burden caused by the incorporation of technology into instruction; 2) The lack of adequate compensation for the extra time and effort spent on course preparation; 3) The high "learning curve" required for most faculty to master new technologies; 4) Technical problems such as power failures and equipment malfunctions during class time; 5) Administrative pressure on faculty to increase the instructional usage of technology without any corresponding increase in technical or financial support; and 6) Administrative ignorance of curricular demands and the place of technology within the instructional framework, leading to unsatisfactory purchasing decisions. In contrast, the only faculty benefit referred to by more than one data source was faculty's access to worldwide information and colleagues via the Internet, which was mentioned by two instructors and three staff members.

In addition, 74% of the participants commented on student problems while 78% commented on student benefits, and 65% commented on institutional problems in contrast to 78% that commented on institutional benefits. These data revealed a considerable discrepancy between the perceptions of technology's impact on faculty and the perceptions of its impact on students and the colleges. In contrast to the inordinately

large gap between comments on faculty problems and benefits, the comments concerning technology's effects on students were almost evenly divided between problems and benefits, and the comments on technology's impact on the institution as a whole emphasized benefits more than problems. Therefore, it appeared from these data that community college personnel, insofar as they are represented by the participants in the preliminary study, perceive information technology to be highly beneficial to community colleges at the institutional level, and almost equally advantageous and disadvantageous to students.

Finally, the data yielded evidence that technology was contributing to managerial extension of administrative authority in that faculty were increasing in skill level while decreasing in power and autonomy in their work lives. Although the faculty interviewees were almost unanimous in their willingness to infuse technology into their instructional practices, there were serious discrepancies between the amount of time and effort instructors were investing in technology-infused (hybrid) or distance courses and the compensation or benefits the instructors received in return. Most of the faculty interviewees contended that administrators did not understand how much work was involved in setting up and running computer-based courses, that the college lacked sufficient technical support to assist instructors with technology-infused courses, and that the college had a centralized, top-down decision-making structure in which faculty had little voice in technological purchases or dissemination. Furthermore, it appeared from the data that faculty were motivated to increase technology usage largely by their perception that technology-infused instruction was of benefit to their students, while the

faculty themselves (except for those that advanced into non-instructional staff positions) received few benefits from the usage of technology, and in fact were working longer hours with no corresponding increase in benefits or remuneration.

Importance of Further Research

The preliminary study raised issues of sufficient importance to warrant further research. First, the globalization-influenced behaviors of restructuring, labor alterations, homogenization, productivity and efficiency, and commodification may be resulting in decreased faculty control over curriculum and instructional methodologies since these institutional behaviors are linked to the "managerial culture" which emphasizes market-place competition, centralized control of the organization in order to ensure productivity and efficiency, and continuous growth as a yardstick of success (Levin, 2002). Diminished faculty autonomy was further supported by the contention of many interview participants that administration was pressuring faculty to adopt the technologies purchased by the college, which indicates that decision-making authority over curriculum and instructional methods may be shifting away from faculty and toward the "managerial extension" of administrative power (Rhoades, 1998). While community college faculty have never enjoyed the degree of autonomy that university faculty have traditionally held (Levin, 2001b), the authority of faculty to design and implement curricular and instructional decisions has always been sacrosanct. Therefore, the possibility that this authority is being eroded and that faculty are being marginalized due to the proliferation

determine whether any ramifications of information technology were common among community college faculty, and whether, overall, technology usage had a positive effect on faculty work lives by facilitating the work that faculty do or by empowering them in their relationships with institutional and district administration, or whether technology usage had a largely negative effect on faculty work lives by marginalizing faculty or making their work more difficult.

Methods

To accomplish these objectives, I interviewed sixty-nine instructors at three colleges in the district, attended two technology conferences in the district, and collected email messages and online institutional documents from four colleges and the district as a whole. The data were then analyzed within a grounded theory framework (Conrad, 2001) that incorporated aspects of hermeneutic phenomenology (Barritt, Bleeker, Beekman, and Mulderij, 2001) and the contingency of hypotheses on data (Milam, 2001). The discourse analysis process was conducted according to the principles of Miles and Huberman (1994), utilizing the Nud*st Version 6 (N6 Student) software designed to facilitate qualitative research.

Research Questions

The interview phase of the study was designed to record and analyze the stories of community college faculty whose work lives are changing due to the acquisition and

increased usage of information technology on their campuses. Specifically, the study investigated the following issues:

1) Do individual characteristics of faculty, including discipline, gender, employment status, and the timing of the individual's adoption of technology, affect the impact of technology usage on the individual?

2) What is the extent of faculty input into decisions to purchase technology?

3) Does technology usage tend to change the power and status of faculty, and if so, in what ways?

4) What are the advantages and disadvantages of technology usage experienced by faculty in colleges where technological innovation is widespread?

5) Are the changes that are brought about by technology usage determined by the nature of the technologies themselves, by human choice and the ways in which the technologies are used, or by some combination thereof?

Limitations

The observations and conclusions reached in this study may have limited external validity for the following reasons:

1) The data were derived from the personal opinions of volunteer participants who were not randomly selected.

2) The participants were all employees of one college district in a southwestern city.

3) There is inherent subjectivity in both the phrasing of the questions used to elicit responses from participants and in the interpretation and categorization of the responses (Miles & Huberman, 1994)

Delimitations

Due to time and resource constraints, the study was delimited to faculty at three colleges who were available for interviews during the spring 2002 semester. In addition, documents and email messages were gathered from the websites of the same three colleges, a fourth college, and the college district.

Overview of the Study

Chapter One provides an introduction and contextual background to the research project. In Chapter Two, relevant literature is discussed to establish a theoretical framework for the study. Chapter Three presents the methods of data collection and analysis. Chapter Four explains the results obtained from these methods. In Chapter Five, the results are discussed in light of the research questions and the application of the findings to current theory, and suggestions are made for further investigations. More research is clearly needed to determine the effects of technology on faculty in community colleges where the reallocation of resources toward technological innovation is increasing rapidly, and it is to this end that I expect to contribute insights from this study.

CHAPTER 2

REVIEW OF RELEVANT LITERATURE

Introduction

This chapter is divided into two main sections. The first section discusses factors that have impacted the purchases and usage of information technology in the community college sector of higher education. These factors are grouped into three subsections: 1) governmental policies (at federal and state levels), 2) community college constituent demands, and 3) community college responses to environmental changes. The second section reviews literature on the impact of technology on workers, especially those in professional and public service fields, and explains how these effects apply to community college faculty. The purpose of this chapter is to examine what is currently known about the proliferation of technology in community colleges and the corresponding effects on community college faculty.

Factors Affecting Technology Usage in Community Colleges

Government Policies

Government policy plays an important part in virtually any discussion of community colleges because "public institutions receive most of their support from State appropriations" (Zumeta & Fawcett-Long, 1996, p. 75). State legislatures and the federal government inevitably exert influence on the decisions made by public colleges by virtue of holding the purse strings. In fact, since the early 1960s, control of community colleges has shifted from predominantly local (city and county level) to largely state, and to a

lesser extent federal, which has resulted in "more micromanagement" of college policies by the government (Cohen, 2001, p. 17).

Although governments at both state and federal levels use some direct legislation, such as the Perkins Vocational Act and the Advanced Technological Education Program, to bring community college policies in line with government objectives, the primary method of direct intervention is through monetary allocations either to the colleges themselves or to students. Zumeta (1995) observed that the college budgeting process "is complex... and subject to politicization, especially in stringent times" (p. 91), which renders college policy-making susceptible to manipulation by funding sources.

Since "the level of [governmental] influence is great for many community colleges, and this involvement and influence show no signs of reversing anytime soon" (Lovell, 2001, p. 23), it is important to discern governments' objectives for the community colleges. It has been the contention of many community college and other higher education researchers that, since the latter half of the twentieth century, federal and state government policy changes have acted to shift the focus of community colleges from university-transfer institutions to mainly centers of vocational education (Brint & Karabel, 1989; Dougherty, 1994). This has been accomplished by a mix of direct funding, student aid, the tax code, and actual mandates, all of which reflect the State's intention "to keep a competitive workforce and to keep citizens employable" (Lovell, 2001, p. 31). Community colleges are typically "exhorted" to increase the range and accessibility of their vocational offerings "in state master plans...where community

colleges are clearly told that they are to make workforce preparation a central mission" (Dougherty, 2001, p. 131).

Scholars are divided on the impetus for the government's interest in community college policy. Some, most notably Clark (1960), insist that the government policies of the early to mid-twentieth century sought to preserve the social class structure by shielding universities from masses of unqualified degree aspirants clamoring for more access to higher education. Others, such as Brint and Karabel (1989), contend that state governments have provided more funding for vocational education out of fear that colleges and universities would turn out more graduates than the economy could absorb. Still others, such as Dougherty (1994) argue that state governments have supported vocationalization of community colleges out of a perceived need to increase employment more rapidly than four-year, or even two-year, academic degrees would permit in an effort to relieve state budget crises through expanded tax bases. Similarly, some, such as Cintrón, Dillon, and Boyd (2001), attribute increased state involvement in community colleges to the pressure on government officials to provide increased educational access and job training in economically depressed rural areas. Finally, supporters of the increase in career programs in community colleges maintain that government policy merely reflects the will of the public who desire the opportunity to choose among a variety of programs, including academic, vocational, and non-credit special interest courses (Carnevale, Desrochers, & Rose, 1998; Cohen & Brawer, 1996).

A more recent theory views governmental policies as reflective of macro-changes in the broader environment of world politics and economics. Specifically, federal and

state policies reflect the increasingly global perspective that has been dominating governmental behaviors for the past decade (Levin, 2001b; Twombly & Townsend, 2001). "Globalization" refers to the worldview that all nations and regions are interconnected and mutually responsive. That is, changes in any one area of the world will ultimately impact all others due to international and interregional "consciousness and interdependency" (Levin, 2001c, p. 239). According to Slaughter (1990), in the past 20 years, the national economy has had to contend with the rise of the global economy, the tendency toward global division of labor mirroring that of capitalist countries, a declining rate of return on investments worldwide, and the increasing profitability of high technology at the expense of manual labor. As a result there is more industrial competition, developing countries enjoy an economic advantage in attracting manufacturing jobs, and automation/computerization is continuing to eliminate low-level jobs by the thousands. These effects of globalization directly impact government and business and industry, and indirectly (via governmental and commercial pressure) impact the "fundamental cultural values" of community colleges (Twombly & Townsend, 2001, p. 284).

How does globalization produce such a profound, yet indirect, effect on community colleges? Slaughter (1990) contends that "economic competitiveness is central to all policy makers' agendas" (p. 3). Zumeta (1995) explains that this competitiveness results in a higher education policy that requires public colleges "to increase academic and administrative productivity" (p. 90), and that this may be accomplished by mandating increases in the number and size of classes that faculty must

teach, increasing pressure for faculty and administrators to become entrepreneurial in attracting private funding, or increasing funding for advanced instructional technologies. In other words, state and federal governments use their economic and legislative power over educational institutions to compel them to conform to governmental objectives, which usually involve spending less money or creating more revenue for the state.

According to Levin (2001c), these effects of globalization can already be seen in the changes in governmental policies concerning community colleges. As a result of the increasingly global perspective of government (at both the federal and state levels), in which the world is viewed as an interconnected system of competing markets, state policies have pushed community colleges away from an emphasis on liberal arts and community service and towards an emphasis on labor force development and service to the private sector.

> In the 1990s, public policy applicable to community colleges...directed these institutions to global competitiveness and to a re-fashioning of institutional mission. Governmental policies clearly endeavored to direct community colleges toward economic goals, emphasizing workforce training and state economic competitiveness as outcomes, compelling colleges to improve efficiencies, increase productivity, and to become accountable to government and responsive to business and industry (Levin, 2001c, p. 237).

In short, in its drive to compete successfully in the global economy, the state has put increasing pressure on community colleges to operate more like commercial organizations in order to decrease their required level of state funding, and to expand vocational programs in order to "graduate more workplace-ready students" (Levin, 2001c, p. 242).

Furthermore, this changed community college mission entails increasing usage of advanced information technologies. Rhoades' (1998) study of collective bargaining agreements between faculty and administration in 212 academic institutions indicated that "key legislators were virtually unanimous in their endorsement of the expanded use of technology as a means for delivering educational instruction in higher education" (p. 176). One reason for this is government officials' desire to see stronger ties between the colleges and business/industry (Levin, 2001c). The use of electronic communication technology is increasing at a phenomenal rate in nearly every industry, and consequently employers need training for new and prospective employees in the use of these new types of technology. In fact, many of the earliest distance education programs began in response to the demand of high-technology professionals who needed to stay current in their fields, yet did not have the time to attend on-campus courses (McGill & Johnstone, 1994). As business and industry pressure the government for assistance in remaining competitive in the global economy, the government encourages community colleges to provide the skilled labor that business and industry need (Dougherty, 2001; Levin, 2001b). "While many colleges resist seeing themselves as vocational schools, all are increasingly pressured to produce tangible results in terms of employable graduates" (Deden & Carter, 1996, p. 81).

A second reason for government's endorsement of information technology in college instruction is the perception that technology increases efficiency and thereby reduces operating costs, despite the lack of empirical data to support this supposition (Cintrón, Dillon, & Boyd, 2001). According to Levin (2001b), one effect of globalization

on governments and institutions is the embracing of communication and information processing technologies as a means of reducing labor costs and standardizing production. This is partially a response to the demands of many employers and job seekers who are looking for ways to speed up the process of preparing people for the modern workforce. Many high technology experts believe that the traditional classroom approach to learning is obsolete because it is too time-consuming, whereas computerized instruction can be used to move learners more quickly through large volumes of complex information (Barker, 1994). Consequently, in the interest of more rapid and efficient employee training, both federal and state governments have made increased technology usage one of the "strings" attached to "direct [institutional] support and state student aid" for community colleges (Zumeta & Looney, 1994, p. 96).

Community College Constituent Demands

Increasing dependence on technology-based instruction in community colleges is not solely due to governmental or even to corporate pressure on community colleges to supply the country with a skilled labor force. Community college administrators also realize that they must meet the expectations of "a new generation of students and staff [entering] colleges and universities – one that has grown up with information technology" (Katz, Goldstein, and Dobbin, 2001, p. 6). One result of the virtually instant gratification and unlimited availability of resources that can be obtained through the Internet has been growing consumer demand for "mass customization," or the tailoring of products and services to each individual's requirements. So prevalent is this attitude in our culture

today that it has spread from the business sector even to the non-profit service sector, including student demands on community colleges to provide "individualized or customized instruction," including flexibility of time, location, and pedagogical methods (Ausburn, 2002). Colleges are finding that they must adapt to the needs of a widely diverse student body, including those who are geographically distant from the colleges, and those with physical disabilities that make commuting to college difficult or impossible (Paine, 1996; Roth & Sanders, 1996).

In the marketplace ideology that state and federal governments have been fostering in community colleges, organizations prosper by supplying goods or services to customers. Thus, the customer is always "the boss" of the organization. Therefore, if students are customers of the college, then the students' wishes are the college's commands, and if these wishes include advanced job training via technological delivery methods, "the standards of [the colleges'] service must meet [the students'] expectations" (Katz, Goldstein, & Dobbin, 2001, p. 6). The pressure is building on colleges to expand distance and hybrid course offerings, or risk losing students to institutions with more sophisticated electronic instruction. This is because community colleges, like for-profit businesses, must compete with other institutions for the student enrollment on which the colleges' state funding is largely based (Ausburn, 2002). Both state and federal governments have financially rewarded enrollment growth in community colleges to such an extent that growth is now the preeminent goal of nearly all college administrators (Cohen, 2001). And college administrators are becoming increasingly aware that institutions offering the latest innovations in information technology as a component of

Across the nation, community colleges responded to this pressure by shifting their curricula, methodologies, and overall missions away from the demands of their traditional constituent base - the local community - and toward the needs of business and industry. Ironically, as "local in the 1990s took on a more specific and narrower definition," that of the local business community, community colleges, at the same time, have also become "global institutions, participating in the global flows of culture as conveyors and recipients of these flows" (Levin, 2002, p. 141). The end result is the community college as an institution that today embraces, in large part, both a managerial and business culture in place of the traditional academic one (Levin, 2002).

As mentioned before, one aspect of this mission shift has been the growth of partnerships between community colleges and business and industry, which in turn has led to an increasing emphasis on vocational training, as opposed to university transfer, in community colleges throughout the United States (Grubb, 1999; Levin, 2000; Valadez, 1999). Advanced computer technology is an integral component of the expansion of vocational programs in higher education as it is viewed by community college personnel as either unavoidable or indispensable to present-day workforce education (Levin, 2001b). Consequently, since the mission of the community college has shifted in recent years from student and community betterment to a workforce development model that seeks to serve the global economy, and since this global economy is also a technological economy, community colleges are naturally incorporating technology into their operations and instructional procedures. In particular, distance education technology is

"viewed by managers as a cost effective way to provide instruction and a key component of college strategy to improve productivity" (Levin, 2000, p. 11).

Although there is disagreement among researchers concerning the value of distance education, there is one point on which nearly all agree. To an extent, electronic transmission of course content to distant students is inevitable in our society (The Institute for Future Studies, 1994; Paine, 1996). The decision-makers of community colleges may no longer be faced with the decision whether to invest in distance technology, but rather when, how, and how much. Barker (1994) warns,

> Without a doubt, in the twentieth-first century, the virtual classroom will become as commonplace in higher education as the chalkboard once was... The benefits of virtual classrooms will be so appealing to students, faculty, and society... that [college administrators] who ignore this technology revolution will risk [institutional] extinction (pp. 159, 166).

The impact of information technology on the community college cannot be overstated. Although computer-based instruction has failed to sustain the enthusiasm and optimism of the college faculty and administrators who were in the vanguard of technological innovation, and who anticipated a complete and rapid transformation of the student-instructor-content relationship, information technology has nevertheless altered virtually every aspect of higher education (Katz, Goldstein, & Dobbin, 2001)." The speed, agility, and complexity of net-based information systems are transforming cultural assumptions and expectations about education" (Michelson, 2001, p. 18).

Such upheavals in the mission and public perception of higher education are nothing new. Michelson (2001) traces the metaphoric transformation of higher education from the Renaissance period, in which higher education was perceived as something like

an agricultural field, where students were cultivated upward toward the light, to the nineteenth century industrial model, in which students, faculty, indeed all individuals, were viewed as interconnected parts of a vast machine. This influenced the physical structure of college and university campuses, which in turn "reinforces a message about the relationship of one kind of perception to another" (Michelson, 2001, p. 20). The problem for twenty-first century colleges is that the messages conveyed by the structure and organization of modern-day colleges "conflict with the information anarchy of the Web" (p. 20). In other words, past experience and previous forms, features, and practices of academic institutions are inadequate for today's technology-infused environment, where "the economy, the culture, and even the physical universe no longer play by such rules" (Michelson, 2001, p. 20).

Despite the need for institutions to adapt to this new environment, Michelson (2001) insists that community colleges' headlong rush into the information technology explosion has been accomplished with little or no contemplation of the overall, long-term effects this will have on the institution.

> Momentum, money, and fear – these propel college-level instruction into virtual mode, and hand-wringing about collateral cultural damage and other intangibles is relegated for the time being to op-ed columns in academic trade papers that few active academics have time to read. Pay for your virtual campus first, debate its value and shortcomings later (p. 19).

According to Rhoades (1998), higher education as a whole is currently engaged in a restructuring process that includes "an increased emphasis on efficiency and on generating revenues" (p. 2). Slaughter (1995) explains that institutions engaged in

restructuring make changes in the allocation of resources rather than reducing expenditures across the board. Thus, colleges in the present turbulent political and social environment are likely to be shifting monies from programs and supplies considered expendable towards those considered vital to the survival and growth of the college as a whole. Funds are generally redirected away from "soft disciplines" such as humanities and social sciences toward educational hardware and software "in the hope that advances in communication and computer technologies will increase the institutions' instructional productivity" (Rhoades, 1998, p. 182).

This process occurs to an even greater extent in community colleges than in four-year institutions since community college personnel tend to be pragmatists rather than philosophers and thus focus on "problem solving rather than theory" (Frye, 1994, p. 184). In contrast to the research or theory-based culture of the universities, community colleges evince a "practitioners' culture," that has yielded "to business and corporate cultures, where economic and system values prevailed" (Levin, 2000, p. 19). As community colleges have become more sophisticated and market-oriented, they have embraced advanced information technology more since technology is part of the corporate image (Levin, 2001b). Furthermore, recent technological innovations tend to be embraced enthusiastically because "the concept of new and different as being better has a life of its own in American cultural traditions" (Frye, 1994, p. 212). Americans have embraced technology as the vehicle for creating utopia since this country began.

> The idea that science and technology – harnessed by a nation of dedicated and faithful laborers steeped in the modern work ethic – would direct us to an earthly kingdom of great wealth and leisure continues to serve as a governing social and economic paradigm to the present day" (Rifkin, 1995, p. 46).

The problem with this, as Eder (2001) explains, is that the corporate model conflicts with the traditional academic model. As a result, the adoption of the corporate view by community colleges alters the relationships between the college and its constituents, including faculty, students, and the public. Eder explains that the information technology in use in colleges today was originally created for political and industrial objectives rather than for academic purposes. "The deployment of Internet tools by colleges represents the appropriation of corporate strategies, which were in part designed to reach consumers who are not physically present" (p. 30). In other words, the proliferation of Internet-based courses in the curriculum suggests a physical distancing of students from their instructors, either by acquiescence or design on the part of the college. Many colleges embrace distance and hybrid courses as "learner-centered," which, as discussed above, reflects a "view of education and training as a commodity, students as customers, and business and industry as clients – all reinforcing market ideology" (Levin, 2001a, p. 94).

A number of higher education researchers point out the dangers of academic institutions emulating the corporate model (Rhoades, 1998; Slaughter & Leslie, 1997). Bridges (1994) warns, "One side effect of the market metaphor is that it screens out values that do not have a place in the give-and-take of economic exchange" (p. 62). These values may include those traditionally associated with higher education, such as

questioning and reexamining accepted theories and practices, or studying and preserving artistic and literary forms that have no monetary value in a free-market economy. However, Bridges (1994) also contends that, for good or for ill, the marketplace is the dominant paradigm of today's labor force. Consequently, since community colleges are increasing their ties to the corporate world in order to obtain needed resources, the market metaphor is becoming the dominant paradigm of the colleges as well. And an important aspect of this paradigm is the use of information technology to attract "customers," increase productivity, and remain competitive in a global economy.

Effects of Increased Technology Usage on Employees

There is considerable debate among scholars concerning how this restructuring toward technology affects personnel. According to Vallas (1993), theories of how technology impacts labor include:

1. Deskilling: Management uses technology to reduce managerial dependence on labor, and thus to lower the status and salary levels of employees. Those few workers with the ability to embrace the new technologies rapidly will increase their power and status; however, the majority will be increasingly marginalized.
2. Enskilling: Technology elevates the status and power of labor by eliminating low-level, unskilled jobs, and creating a need for technologically skilled workers. This need forces management to recruit, train, promote, and reward employees, and flattens the employment hierarchy.

In addition, Rhoades (1998) theorizes that a combination of these two outcomes, which he labels "managerial extension," may occur. In this view, technology increases the skill level of the workforce while at the same time reducing the voice of workers in the decisions that affect their work lives. "Workers are more skilled. But they are more controlled by central managers, who by virtue of technology extend their control over workers" (p. 181).

Rhoades' (1998) examination of academic collective bargaining agreements revealed "far more support for deskilling than for enskilling theory...faculty are being professionally 'marginalized'...bypassed by technological developments in the production process" (p. 205). However, Vallas (1993) argues that managers cannot attain "managerial hegemony" unless workers "participate in their own subordination" (p. 28), and that this is most likely to occur in situations where workers are highly specialized and thus isolated from one another. This of course describes college faculty, who are segregated by discipline or program, and often have little contact with colleagues outside their departments.

According to Levin (2000), community colleges are hiring more technicians and fewer full-time faculty, especially in arts and sciences, as they increase their ties to the corporate world.

> This suggests that for the twenty-first century, community colleges will function more on a model compatible with business norms: a fluid organization, with little reverence for academic traditions, little evidence of a dominant professional class of faculty and more evidence of a professional managerial class, and greater reliance upon technology and less upon full-time labor (p. 21).

Grubb (1999) concurs. "Colleges are investing in computers *rather than instructors,* presuming that fancy slide shows and multimedia presentations are more educative than instructors with a better command of teaching practice" (p. 253).

And yet, despite what appears to be a top-down approach to technology acquisition by community colleges, there is no evidence in the current literature that faculty are resisting or protesting these purchases. Although Seidman's (1985) study indicated that few community college instructors were embracing information technology in the workplace, much has changed in the nearly 20 years since Seidman conducted his research. Even Grubb's study (1999), which indicated that technology-infused instruction was "quite rare" in community colleges, may already have become outdated given the speed of change in higher education and in the world in general. The question, then, remains open as to whether the majority of community college faculty today are accepting or rejecting the use of information technology in their work lives.

A number of sociological studies have examined the mechanisms by which technological innovations come to permeate a work environment, and these may provide insight into the patterns of acceptance and rejection of technology among community college faculty. Durrington, Repman, and Valente (2000) list four predictors associated with eagerness or reluctance to adopt a new form of technology: knowledge of the innovation, anxiety associated with its usage, attitude concerning technological innovation in general, and the availability or convenience of the innovation to the individual's worksite. They further maintain that the most important influence on an individual's adoption or rejection of technology is the individual's status or position in

the organizational hierarchy. Valente (1995), on the other hand, argues that "centrality closeness" is more important to innovation adoption than status alone. He explains that "the extent an individual is near other individuals in the network," (p. 52) is the extent to which that individual will both receive and disseminate information about an innovation. Thus, the more centrally located an individual is among communication paths within the organization, the more likely that individual is both to become aware of an innovation and to begin to use it in his/her work.

According to Rogers' (1983) theory of technological diffusion in the workplace, the willingness or reluctance of workers to embrace new technologies varies according to idiosyncratic traits such as tolerance for risk and self-confidence. Rogers defines diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). The impetus for diffusion is usually a state of uncertainty, caused by unexpected change, among some or all of the members of the organization. This leads to increased communication within the organization, as members try to reduce the uncertainty, and ultimately to the adoption or rejection of new ideas or inventions since "a technological innovation embodies information and thus reduces uncertainty" (p. 6). Those members of the organization able to reduce the uncertainty by implementing the innovation more quickly than others gain status and power, often advancing through the organizational hierarchy, or at least increasing their autonomy relative to management.

Rogers (1983) categorizes technological decision-makers as innovators, early adopters, early majority, late majority, and laggards, based on how quickly they embrace

new ideas or inventions. He also describes various reward and penalty mechanizations by which organizations seek to promote the spread of technologies that are desired by the power-wielders. In some cases, these reward/penalty mechanisms are deliberate policies implemented by management. In others, they are inherent in an organizational culture in which the technologically precocious advance naturally via their command of a needed skill or type of information. According to Thomas (1994), "the choice of technology represents an opportunity to affect not only the performance of work but also the status, influence, and self-concept of those promoting change" (p. 6). This is because "different people are situated differently and possess unequal degrees of power as well as unequal levels of awareness" (Winner, 1986, pp. 28-29). Thus, whether planned or not by the organization's management, technological expertise and the ability to embrace innovations quickly tend to correlate strongly with an individual's level of power and respect in the organization.

It must not be presumed, however, at least not without sufficient evidence, that these potential effects of technology on work life and relationships are necessarily planned, implemented, or even apparent to power wielders and seekers. It has been theorized that the creation and use of some forms of technology in a society may alter the environment to such an extent as to shape the attitudes and behaviors of that society's members. Although "technology may not have a mind of its own,...it is often *experienced* by people and organizations as an exogenous force" (Thomas, 1994, p. 8).

Theoretical Framework of the Study

Since the preliminary study that I conducted the year before yielded compelling evidence of globalization behaviors in a large community college district, this subsequent larger study rested on the premise that globalization is influencing the policies and actions of the community college district in which the larger study was conducted. Specifically, it was assumed that globalization is shaping the macro-environment of the college district, resulting in increased governmental pressure (at both federal and state levels) on the district to infuse more technology into the curriculum in order to satisfy the needs of business and industry for a more technologically proficient labor force.

As was the case with the preliminary study, the larger study was also built on a framework of enskilling, deskilling, managerial extension, and diffusion theories. In particular, I was looking for data that would indicate how technology proliferation in the community colleges is impacting the status and discretionary power of faculty, how faculty patterns of technology adoption affect power and status in the institution, and whether there were any institutional reward/punishment mechanisms in place related to faculty willingness or reluctance to incorporate technological innovations into their work. Consequently, I was also seeking information concerning the overall advantages and disadvantages resulting from technology usage in the work lives of faculty, and the extent to which faculty were aware of how technology was altering their working conditions.

There was one additional theory built into the framework of the larger study which had not been included in the preliminary study. During the process of analyzing the data from the preliminary study, I expanded my literature review to include more

sociological studies of technology's impact on labor in an effort to better understand what the data were revealing. One area of research in particular seemed to be relevant to "the technology revolution" that is changing every aspect of education in the United States (Groves & Zemel, 2000), and that is the theory of technological "flexibility" (Winner, 1986). According to this theory, every technological innovation is either flexible or inflexible. Flexible technology can be modified and used in various ways to achieve the ends desired by the users, and while the variations may lead to differing environmental ramifications, these are largely at the discretion of the users. Most of our technological innovations fall into this category. Inflexible technologies, on the other hand, are so inextricably linked to particular sociopolitical environments that "to choose them is to choose unalterably a particular form of political life" (Winner, 1986, p. 29).

Inventions such as the automobile have necessitated a complete restructuring of communities, homes, and lifestyles affecting every facet of society, including the lives of those who never drive or ride in automobiles. Other technologies, such as nuclear energy and weaponry, "are in fact highly compatible with centralized, hierarchical managerial control" since they require extremely rigid safeguarding mechanisms and protocol (Winner, 1986, p. 35). Thus, an inflexible technological innovation may be one that can only be developed in a particular type of environment, or it may be one that alters its environment through its usage over time.

If information technology proves to be inflexible, then its widespread usage in community colleges will result in permanent and profound changes in the structure, practices, and philosophical underpinnings of these institutions. And it appears, from the

technological capabilities. If the latter is true of the technology in use in most community colleges today, then it can be said to meet Winner's (1986) criteria for inflexible technology.

Within this framework, then, this study was designed to produce data that would address the issues of technology's overall effects on faculty working conditions and on the power relationships between faculty and administration, and whether personal characteristics such as gender, field of teaching, employment status, and diffusion patterns affect technology's impact on individuals. In addition, this study examined the effects of technology on the community college environment in order to ascertain whether the technologies purchased by the colleges could be classified as flexible or inflexible, and thus whether these technologies were under the control and discretion of the people employing them, or else producing profound and irreversible changes in the nature and ambience of community college instruction.

Summary

Within the past half-century, in response to both governmental and societal pressures, community colleges have drifted from their historic image as junior colleges providing transfer opportunities to university aspirants towards an image of vocational education institutions providing a trained labor force for business and industry. While the vocationalism of the 1950's to 1970's reflected a production society emphasis, preparing factory workers for more highly skilled manual labor, the vocationalism of the 1980's to present mirrors the shift in the nation's economic base from manufacturing to information

processing (Brint & Karabel, 1989). Specifically, community colleges have responded to the changing needs of business and industry by instituting job training programs in areas such as computer information systems, office management, medical transcription, and paralegal. Thus, not only have community colleges altered their curricula from academic to vocational, but they have also shifted from one type of vocational to another to satisfy the demands of an increasingly managerial economy (Levin, 2002). A major component of this altered emphasis is the increasing reliance on information technology for instructional purposes since the labor market for which students are being prepared is today a highly technological one. Sociological research on the changing labor environment indicates that the growth of technology in the workplace is having a profound impact on employees in virtually every sector of the labor market. Therefore, in can be hypothesized that the increased use of information technology in community colleges is radically altering the work environment of community college faculty.

Consequently, this study is an attempt to discover how technology is impacting faculty, particularly in regards to power and autonomy over their work lives. To accomplish this, the study relies on the theories of deskilling, enskilling, managerial extension, technology diffusion, and technological flexibility to guide the question formation, data collection and analysis. However, as will be explained in Chapter 3, the study also employs a grounded theory methodology in which the researcher must remain open to the possibility that other theories, perspectives, or conclusions may be revealed by the data.

CHAPTER 3

METHODS

Guiding Theoretical Framework

Choosing a method for research is more complex and demanding than merely picking a procedure for obtaining data. This is especially applicable to qualitative research in which the variables are often amorphous and procedures are governed by conflicting paradigms (LeCompte & Preissle, 2001; Milam, 2001). LeCompte and Preissle encourage every sociological researcher to examine the four theoretical frameworks that have tended to dominate qualitative research for several decades: functionalism, conflict theory, exchange theory, and interactionism (also known as postmodernism), and to note which of these frameworks the researcher finds most and least attractive at a purely subjective level. This will help researchers to become more aware of the idiosyncratic attitudes, interests, and philosophies that will inevitably affect how they ask questions and interpret data.

Milam (2001) lists five approaches a researcher may choose to take regarding the conflicting theoretical frameworks that prevail in qualitative research. These approaches include: 1) supremacy (the choice of one framework as right or best); 2) synthesis (the combination of the strengths of each framework while excluding the weaknesses); 3) dialectical (the use of more than one framework in a single study); 4) contingency (the adoption of a framework based on the peculiarities of the study); and 5) "theoretical and methodological anarchy" (p. 76) in which the researcher eschews any pre-analysis theory, framework, or assumptions. He concludes with the assertion that "scholars must believe

in their own assumptions, yet be open and willing to learn about alternative approaches" (p. 97).

With the above exhortations in mind, I conducted this study in a mainly inductive and contingent (Milam, 2001) approach with the aim of "discovering...what the hypotheses are" (Wolcott, 2001, p. 158) that would best describe and be supported by the data. I tried to temper my innate, temperament-driven affinity for traditionally structured procedures and the search for objective truth with the awareness that "knowledge is always constructed relative to a framework" which is derived from the researcher's and the study participants' "cultural code, and...personal biography" (Eisner, 2001, p. 6). While I cannot bend so far as to embrace the postmodern view in its purist form, that is, that reality exists only in the mind of the beholder (Gergen, 2001), I did attempt to incorporate a more interpretive viewpoint into my methodology. Following Milam's (2001) recommendations, I sought patterns rather than answers in my data, and strove to remain conscious that human discourse and behavior are bound up in individuals' "social construction of reality" (p. 86), and are too complex to be completely quantified or categorized.

To do this, I drew heavily from grounded theory as described by Conrad (2001), and hermeneutic phenomenology as defined by Barritt, Bleeker, Beekman, and Mulderij (2001). In the former, grounded theory is described as the development of theory via "the constant comparative method" (Conrad, p.256), which utilizes the following steps: 1) Data are divided into all possible classifications by continuously comparing the data with one another; 2) The classifications are then grouped or stratified to form theoretical

concepts; 3) The concepts are gradually refined into theory; 4) When the theory seems fully developed to the researcher, it is recorded "in a discussion format or as a set of propositions" (Conrad, 2001 p. 257). Conrad further explains that grounded theory has been used chiefly in educational research to theorize about change in academic institutions and, while it frequently combines qualitative and quantitative data, it emphasizes the former. Therefore, since my research deals with change in community college working conditions and relies on primarily qualitative data, grounded theory seems an appropriate choice of methodology.

According to Barritt et al. (2001), "phenomenology means the study of experiences" (p. 217). It is an interpretive paradigm in which human experience is viewed as a text that the researcher must examine.

> To comprehend a text or experience, interpreters must place themselves in a position similar to the author's. This then is the counsel of the hermeneutic phenomenologist. Place yourself in the context you wish to understand. (Barrit et al., 2001 p. 219).

Phenomenological research is heavily dependent on language. "This is not to say that language is the perfect tool; but it is often the only tool" (Barritt, et al., 2001, p. 222). Thus, the first step in this type of research is to describe what is observed. Although "there is no guarantee that a description will be generalizable...in most cases there are very likely to be similarities in the reactions of different people to similar circumstances" (Barritt et al., p. 221). The second step is to attempt to arrive at shared interpretations of these observations via "the language of this everyday world" (Barritt et al., p. 223). This is done by asking questions such as "What is this story about? Where did it begin? What are the significant parts and what the insignificant?" (Barritt et al., p. 220). Conclusions

the participants' experiences and the meanings they assign to those experiences. While a certain measure of objectivity may be sacrificed in this type of research relationship, the interpretation of human experiences and meanings, which is the objective of sociological research, "can only be achieved through participation with the individuals involved" (Burgess, p. 78). Seidman explains that the way in which "faculty understand and make meaning of their work affects the way they carry out that work" (p. 5). Therefore, the word choices and narratives that emerge during participant interviewing can reveal important aspects of faculty experiences and interpretations of events.

Site Selection

From February through March of 2002, I interviewed faculty at three of the colleges in the system where I teach, which is a large, urban, multi-campus community college district in the southwestern United States. While the use of my own work environment as the research site may raise the issue of researcher bias, it is important to remain aware that a certain level of subjectivity is inherent in all sociological research because "observing the world without being there isn't possible. We must necessarily look through our own pre-judgments at what happens" (Barritt, et al., 2001, p. 223). The task of the qualitative researcher is to minimize subjective distortions in the observation and interpretation of data by identifying or "bracketing" the biases that influence the researcher's perceptions (Barritt, et al., 2001), and this I strove to do while collecting and analyzing the data, and drawing conclusions.

Although the district is in a major metropolis, it encompasses such a large geographical area that the colleges are dispersed among suburban and quasi-rural areas as well as urban. The three colleges at which I conducted the interviews were selected on the basis of the demographics of the surrounding area. The first college, hereafter referred to as Inner-city Community College (ICC), serves a demographically mixed community that includes the urban areas with the most deeply entrenched poverty, a small Native American tribal community adjoining the city, small farms and orchards that have not yet yielded to urbanization, and one of the newest and most affluent housing developments in the city. The second college, hereafter referred to as Suburban Community College (SCC), is in the city's largest suburb, which is predominantly middle-income and includes a sizable proportion of older, retired residents. The third college, hereafter referred to as Transitional Community College (TCC), is in an outlying area beyond the largest suburb that is in the process of shifting from a mainly rural/agricultural to a suburban/commuter environment.

The purpose of this selection was to interview personnel from colleges that serve populations with differing experiences and expectations of computer technology since community colleges tend to reflect the culture and characteristics of their surrounding communities much more than of their larger environments (Breneman & Nelson, 1981; Fairchilds, 2001; Kempner, 1990). Thus, it could be predicted that the level of technological development on each campus would, to a certain extent, reflect its area's economic level and corresponding likelihood of personal computer usage among the area residents. Also, according to Burgess (1984), locations chosen for sociological field

research should encompass varying levels of complexity, and these three sites varied considerably in age of institution, size of faculty, and size and demographics of student body (Table 1).

In addition to the three interview sites, the college at which I teach, which is separate from the interview sites and which serves a largely low-income inner-city area, became the source of a collection of email communications concerning faculty views of technology. This occurred in March of 2002 when the Dean of Instruction (who was not aware of my research at the time) sent an email message to all full-time faculty in the college soliciting their opinions of technology usage in instruction. Upon receipt of the email message, I contacted the Dean of Instruction, explained my research, and received access as well as permission to include in my data set copies of all resulting email responses from the faculty (Table 2).

Confidentiality

To protect the confidentiality of all information sources, as part of my agreement with the colleges so that I could gain site access, I refer to the community college district, the colleges, and the participants by pseudonyms throughout this paper. The college district will hereafter be known as the District. The interview sites, as mentioned before, will be known as Inner-city Community College (ICC), Suburban Community College (SCC), and Transitional Community College (TCC), and the college at which email communications were collected will be known as City Community College (CCC).

Participants will be referred to by brief descriptors, such as Art Instructor, that do not include identifying information.

Participant Selection

In order to comply with the human subjects research regulations of the University of Arizona, I began the process of finding research participants by sending email messages to the presidents' offices of the three colleges and requested written permission to conduct site interviews. At all three colleges, the president's office responded with written permission (via email) to conduct the interviews, and also assigned an administrator to act as my liaison with the faculty and assist me with setting up the interviews. I then requested of each of the liaisons the names of department chairs whom I could contact for interviews. I explained to the liaisons that I intended to interview faculty in as wide a variety of disciplines as possible, including those in vocational as well as academic departments, and that I planned to use the snowball technique, asking each interviewee, beginning with the department chairs, for recommendations of other faculty to be interviewed.

Although the snowball technique results in a non-probability sample (Smith & Glass, 1987), it has value and validity when used with a population that has not yet been fully identified (Eckhardt & Ermann, 1977). In participant interviewing, "We do not seek a [representative] sample of a population. We seek sworn testimony from as much of a particular population as we can reach" (Feldman 1981, p. 33). Furthermore,

> The ethnographer, like other social scientists, is concerned with the issue of 'representativeness' but approaches that problem differently, by seeking to locate the particular case under study among other cases. The question, as Margaret Mead once noted, is not 'Is this case representative?' but rather 'What is this case representative of?'(Wolcott, 2001, p. 166).

I employed the snowball technique in this study for the purpose of obtaining interviews with resisters as well as users of technology. The preliminary study that I conducted at a smaller community college district during the 2000-01 academic year indicated that, in colleges or districts where technology is highly valued by the decision-makers, non-technology users among the faculty may be reticent to express their views openly as they tend to fear reprisals from the administration or loss of respect from colleagues. I believed that the snowball technique, therefore, had the potential to provide a collection of interviews with faculty from a wide cross-section of disciplines and with varying levels of experience with technology, including some who might otherwise have been unwilling to participate, since the sample procedure was based on the network of collegial relationships that already existed on each campus.

The reality, however, was somewhat disappointing in this respect. Although I requested of each participant the names of colleagues who both did and did not use technology in their work, I was able to obtain interviews with only five instructors (out of $n = 69$) who do not use technology in the classroom. I found that, as in my preliminary study, non-technology users were extremely reluctant to discuss their views of technology. Despite assurances that I wanted their viewpoints and that they would not be identified by name or college, the responses of non-technology users were generally, "That's not my area of expertise," and "I'm not the one you should talk to about that."

My initial goal was to conduct 10-12 interviews per campus. However, on two of the three campuses (Inner-city Community College and Suburban Community College), the liaison provided me with a list of department chairs willing to be interviewed that exceeded my target number of total interviews for the college. Since I did not want to snub any of the chairs who expressed interest in being interviewed, yet neither did I want to confine my study to department chairs alone but rather intended to include other faculty as well, the number of interviews eventually far surpassed my goal on those two campuses and slightly surpassed it at Transitional Community College (Table 3 for sample size and other data).

The decision of whether to include part-time as well as full-time faculty in my sample presented a problem. On the one hand, part-timers make up about 60% of all community college faculty nationwide, and teach more than a third of the credit hours offered each year (Roueche, Roueche, & Milliron, 1995). Furthermore, at the college district where I conducted my research, the percentage is even higher, with part-time instructors comprising 74% of total faculty, according to the District website (2001). Thus, I was concerned that excluding them from my sample might result in a distorted view of the impact of technology on the work of faculty since a significant faculty cohort would not be represented in the study. On the other hand, part-time faculty generally lack offices, work phones, and predictable work schedules (Rouech, Roueche, & Milliron), which would make the task of arranging interviews difficult. My solution was to attempt to interview any adjunct faculty who were referred to me by other participants in the study. At Inner-city Community College I was able to contact and interview only one of

the three adjunct instructors I was referred to, while at Suburban Community College there were no referrals to adjuncts. At Transitional Community College, my first contact was with an adjunct instructor who had heard about my study from the liaison and was eager to participate. This person then referred me to twelve other part-time faculty, of whom I was able to interview five (Table 4).

Thus, the result of my participant selection procedure was a collection of 69 interviews at three colleges with male and female faculty, including department chairs, adjuncts, and full-time instructors, from every teaching field available at those institutions. While this appears to comprise a large enough and diverse enough sample to achieve a high degree of generalizability of results, there is an important limitation to the interviewees' representativeness of community college faculty in general. It must be noted that the snowball technique, combined with the refusal of most non-technology users to participate in the study, resulted in an inherent selectivity bias toward high-end users of technology among the faculty. This bias was especially pronounced at Suburban Community College, where seventy faculty were contacted but only thirty-three (47%) agreed to be interviewed. In contrast, at Inner-city Community College thirty-two faculty were contacted with twenty-one (66%) agreeing to be interviewed, and at Transitional Community College twenty-two faculty were contacted with fifteen (68%) agreeing to be interviewed. Overall, 56% of the contacts participated in the interview. As will be discussed further in Chapters 4 and 5, nearly all of these participants expressed willingness to use technology in their work, while the non-participants who returned phone calls or email messages generally cited lack of time or lack of interest in the topic

as their reason for declining to be interviewed. Since these non-participants comprised nearly half of the faculty who were invited to participate, there is a strong indication that the participants in this study are representative only of early adopter and early majority (Rogers, 1983) users of technology among community college faculty.

Interview Procedure

Every interviewee was asked to sign a consent form (see Appendix A for a copy), and informed of the nature and purpose of the study, that their participation was voluntary, and that their anonymity would be protected. In addition, I gave each participant the option of a face-to-face or phone interview. Out of a total of 69 participants, 15 chose a face-to-face interview, 52 chose a phone interview, and two requested that I email them the questions, to which I consented. All the interviews were tape-recorded with the full knowledge and consent of the interviewees. (In the case of phone interviews, the participants were informed that a recording device was attached to the phone). The interview recordings were supplemented by field notes. The length of the interviews ranged from 15-60 minutes, with most lasting approximately 30 minutes.

LeCompte and Preissle (2001) point out that personal and cultural characteristics shape the questions we ask in interviews, and that we must be aware of biases in the interview setting. However, they also maintain that "curiosity about ordinary phenomena or personal experience" (p. 43) is a legitimate foundation for formulating interview questions. Following the examples of Seidman (1985) and Amey and Twombly (1992), I encouraged participants to discuss their thoughts and relate narratives concerning the use

of computer technology in their work lives. I asked them to tell me the "story" of technology in their work (Bijker, 1995), using the eight questions in Appendix B as a starting point for each interview. Although I used these eight questions as a guide during the interview sessions, I also attempted to draw out, clarify, or redirect participants' responses in various fashions since "in order to achieve data which are comparable in key ways, far from giving everyone standardized questions in a standardized form, [the researcher] may well need to ask different questions of...different interviewees" (Mason, 1996, p. 41). As Mason advises, I continually re-evaluated my prompts and questions during each interview to obtain the information relevant to my research topic.

Triangulation of Data

I triangulated my data in several ways. First, I examined on-line documents concerning technology from the District Office (DO) that serves as the administrative center for all the community colleges within the District, and also from the four colleges at which I obtained faculty input (Table 5 for a description of the documents). Second, I attended two workshops on technology given at two different colleges in the District, one during the spring semester of 2002 at a college not otherwise included in my data set (Table 6), and the other at City Community College in the fall of 2002 (Table 7). Both workshops were offered free and on a voluntary basis to all employees of the District, and both concerned the general use of various forms of technology in instruction or information processing and record keeping. Since tape-recording was not feasible in either of the workshop settings, I used field notes for data collection.

Finally, I employed "space triangulation" (data collected at more than one site), "person triangulation" (data collected from multiple participants), and "interactive analysis" (studying members of groups who interact with one another regularly) which, according to Denzin (2001), are all methods of triangulating data. In particular, space triangulation involving heterogeneous sites yields findings that are "more robust" and generalizable than single site studies (Schofield, 2001, p. 336). In fact, "a key variable [often] comes clear only during cross-site analysis" (Huberman & Miles, 2001, p. 563). Denzin further points out that data triangulation alone "seldom yields a single, coherent, consistent picture of the situation being studied" (p. 320), and recommends combining it with "investigator triangulation" (more than one researcher collecting and analyzing data) and/or "theory triangulation" (data analyzed from more than one theoretical perspective). Since the former was not practical for my dissertation research, I applied the latter via the use of grounded theory which Denzin views as a type of theoretical triangulation.

Data Analysis

Relying upon the strategies of Miles and Huberman (1994), and employing the software program Nud*ist Version 6 (N6) by QSR International Pty Ltd. (2002), I searched the interview transcripts, email messages from City Community College, the documents, and my field notes from the two workshops for pertinent words and phrases which could be coded into categories. Miles and Huberman (1994) describe the steps of interview analysis as: 1) asking questions regarding who or what was observed and what major themes seem to be emerging from the interview data; 2) selecting data to be

included and discarding data that do not appear relevant; 3) coding interview texts according to patterns and themes that emerge; 4) reorganizing codes based on their relationships to one another and to participants; and 5) drawing conclusions from the patterns and themes. In all of these steps, I employed the N6 software program as a vehicle for storing, examining, and categorizing the data in my interview transcripts, email messages, documents, and field notes.

N6 software facilitates the process of qualitative data analysis by enabling the researcher to scroll through textual material online, attaching codes (called "nodes") to segments of text. "In N6, when you code, you record a *reference* to a segment of text at the node you create or choose for that idea or theme" (QSR N6, Student Mini Manual 1, 2002, p. 19). The nodes may be individual categories (called "free nodes") or clusters of concepts (called "tree nodes"). For example, I initially categorized my data into a variety of nodes, including the free nodes: Reluctance to Participate, Plagiarism, Students' Prior Computer Knowledge, and Required Usage of Technology, as well as the individual characteristics of the interviewees, such as gender, the discipline in which they teach, the college at which they work, and their position (such as Department Chair, Adjunct, and so forth).

During the initial coding and the subsequent re-coding process, I eliminated some nodes, including Reluctance to Participate and Plagiarism, because too few respondents mentioned those ideas to draw any generalizable or significant conclusions. I also added new nodes as more trends and common perceptions emerged from data. One example is the free node, Inflexible Technology, which I added about halfway through the initial

coding as it became an increasingly salient concept in the data. In addition, I grouped some of the free nodes into tree nodes based on the relationships among them that emerged throughout the coding process. For example, I combined all the personal characteristics of the interviewees into one tree node (labeled Characteristics of Respondents). As I continued to read through the texts, I added tree nodes whenever it became apparent that a particular idea or concept was both prevalent and complex enough to be divided into subcategories (called "children" in N6). An example is the tree node, Desired Usage, which I added to code every expression of a respondent's predilection for a particular level of personal technology operation. This node had the children: 1) Want More Technology, 2) Want Less Technology, 3) Satisfied with Current Usage, and 4) Want Different Usage of Technology. (Table 8 and 9 for a list of the nodes into which the data were ultimately categorized.)

After I finished coding and recoding all the data, I used a feature of the N6 program known as "browsing the nodes" to re-examine my categories.

> Qualitative coding is almost always an ongoing process. The researcher wishes to think about a category and move back to rethink it in context, revisiting the document, or widening the coded passage. Or early 'broad brush' coding needs to be reviewed as understanding of the nuances of meaning develop, showing new dimensions, or finer subcategories (QSR N6, Student Mini Manual, 2002, p. 23).

I then used the Node Manager tools to cross-reference nodes such as Required Usage + TCC, Want More Technology + Male Respondents, or Hybrid Courses + Math Faculty. This enabled me to compare the intersections of categories to examine whether certain trends or concepts were more prevalent at one college than another, with one gender

more than the other, or among members of certain disciplines more than others. N6 also provided me with tools to make memos and reports of my codes and cross-references, which I was then able to examine for my ultimate collection of patterns and commonalities that coalesced into my conclusions.

Summary

This chapter, then, is a description of a qualitative study based on participant interviewing in a community college district setting. The data included faculty interviews, institutional documents, a collection of email messages from faculty at one college to their Dean of Instruction, and my field notes from two conferences. I analyzed my data according to the principles and procedures of grounded theory and hermeneutic phenomenology, and with the assistance of the N6 software program, to arrive at the conclusions which will be explained in Chapter 4.

CHAPTER 4

DATA ANALYSIS

Introduction

In this chapter, I describe the concepts that emerged from the data sources via the discourse coding process described in Chapter 3. Since I used a grounded theory approach to guide both the data collection and data analysis process, some of the concepts that arose from the data do not answer specific research questions, but rather reflect issues of importance to the interviewees, conference speakers, or creators of documents. On the other hand, many of the concepts that arose during the interview process do address the specific issues for which I was seeking answers since they were responses to questions related to those issues. Therefore, I have categorized the concepts presented in this chapter on the basis of whether or not they relate to my research questions. Those concepts that address my research questions are labeled "Research Issues," and those that do not are labeled "Free Thoughts."

Overview

This chapter is divided into four main sections, some of which are subdivided further. The sections are: 1) Description of Data Sources, which includes the characteristics of the interviewees, email communication, institutional documents, and conferences from which the data were collected; 2) Discourse Coding Categories, in which I explain how the data were subdivided into common themes for analysis; 3) Research Issues, in which the data that pertain to specific research questions are

discussed; and 4) Free Thoughts, in which the themes that did not arise in response to interview questions are examined. The purpose of these categories is to show the characteristics of the data sources which were ultimately used in this study, to explain how the data were analyzed, and to describe the concepts that emerged from the data through the analysis process.

Description of Data Sources

At the completion of the data collection phase of the study, I had interviewed sixty-nine community college faculty members at three institutions. (Table 3 for breakdown by institution, program, gender, and employment status.) In addition, I collected twelve email messages to the Dean of Instruction at City Community College (Table 2), attended two technology conferences at two separate colleges, (Table 6 and 7) and collected five online documents that consisted of the websites of the three interview sites, the email collection site, and the community college district (Table 5). Thus, my total number of data sources was eighty-eight.

Interviews

Site Characteristics

Inner-city Community College (ICC) was the first campus to respond to my request for interviews. The faculty were interested in my research and a considerable proportion were agreeable to participating. While this small college did not provide my

largest sample size, they did provide the largest percentage of total full-time faculty participating in the study.

Suburban Community College (SCC) is the largest college in the District. A much larger percentage of faculty at this college indicated that they did not have time to participate in the study. Those who did participate frequently set time limits of no more than thirty minutes for the interview because of other commitments. The sheer size of the campus resulted in long distances between faculty offices in the various departments, which limited the number of face-to-face interviews I could schedule each day. Thus, it was fortunate that most of the interviewees requested phone interviews.

At Transitional Community College (TCC), all the participants requested phone interviews except one who asked me to email her the questions. In addition, TCC had the lowest percentage of "no contacts" (referrals who either refused to participate or never responded to my requests for interviews) of the three colleges, with eighteen percent of the twenty-two referrals not participating, compared to thirty-one percent of thirty-two referrals at Inner-city Community College and fifty-four percent if seventy-one referrals at Suburban Community College.

Characteristics of Participants

At Inner-city Community College, I interviewed twenty full-time faculty members, four of whom were department chairs, which constituted thirty-eight percent of the full-time faculty at that college at the time of the study. I also interviewed one part-time instructor out of 131 adjunct instructors at ICC that semester. At Suburban

Community College (SCC), I interviewed thirty-three full-time faculty members, twelve of whom were department chairs, yielding twelve percent of the total faculty population. At this campus, I was not able to interview any of the 833 instructors teaching there part-time. At Transitional Community College (TCC), I interviewed ten full-time faculty (12 %) and five of the 320 part-time instructors (2%) employed at that time. There were no department chairs among this sample because, unlike the other colleges, the liaison official did not send me a list of department chairs as requested. Rather, she disseminated my request for interviews through informal channels (such as mentioning it at meetings), which resulted in the first faculty contact being an adjunct instructor who subsequently referred me to four other adjuncts.

Faculty Teaching Areas

I grouped the participants' teaching fields into the same eleven categories used by most of the colleges in the district to label departments: 1) Business/Computer Information Systems, 2) Communication/Fine Arts/Theater, 3) Counseling[i], 4) Education, 5) Languages/Humanities, 6) Justice Studies, 7) Library[ii], 8) Science/Math, 9) Social/Behavioral Sciences, 10) Vocational/Technical, and 11) Wellness/Health/ Physical Education. As can be seen in Table 3, I was able to obtain a range of two to thirteen interviewees per program, with every program represented. The two largest samples came from Languages/Humanities and Science/Math, with thirteen and twelve respectively, and the two smallest from Justice Studies and Wellness/Health/Physical Education, with two each. Six of the programs were represented by all three colleges.

However, Justice Studies, Vocational/Technical, and Wellness/Health/Physical Education were represented only at Suburban Community College. Social/Behavioral Sciences was represented at Suburban Community College and Transitional Community College, but not Inner-city Community College. Education was represented only at SCC and in the adjunct population at TCC.

Email Messages

This category of data refers to a collection of twelve email messages[iii] sent by faculty at City Community College (CCC) to the Dean of Instruction in response to her campus-wide memo requesting employee feedback on the purchase and use of information technology at CCC. The respondents included four instructors in Languages/Humanities, two in Communications/Fine Arts/Theater, two in Wellness/Health/Physical Education, one in Business/Computer Information Systems, one in Justice Studies, one in Science/ Math, and one in Library (Table 2 for list of comments).

Documents

All the documents in my data set were contained in the college district's and the individual colleges' websites (Table 5). I obtained these documents by conducting word searches through the websites for references to "technology" or "computers." The resulting document from the district's website contained mainly promotional pages designed to encourage prospective students to enroll in any of the colleges in the district.

The document I obtained from the City Community College website contained the minutes of several meetings of the CCC Technology Committee. The document from the Inner-city Community College website contains the college's Vision Statement and Mission Statement as well as the web pages of the ICC Technology Committee and Campus Technology Plan. The document produced by the Suburban Community College website contains a description of the college for prospective students, and the homepages of the college's distance learning division as well as its "portal" (an intra-campus communication system of faculty web pages, and student and faculty email addresses).

Conferences

In this category are my field notes from the two conferences I attended that dealt with information technology issues. The first was the District-wide Technology Conference held at the beginning of the spring semester, 2002, at a community college in the geographical center of the capital city, about midway between City Community College and Inner-city Community College. The topic was information technology in the classroom, and the conference included breakout sessions during which specific types of technology were either showcased or discussed, and a panel discussion with representatives from the ten colleges in the district that addressed the benefits and drawbacks of technology usage on their campuses.

The second conference was held at City Community College at the beginning of the fall semester, 2002, and was limited to employees of that college. The purpose was to provide a forum in which users of information technology in the classroom could discuss

their experiences with colleagues. There were separate sessions for each of the types of technology, such as testing/grading software, distance education, and hybrid classrooms. Each session consisted of a short presentation by each speaker explaining his/her usage of the technology, followed by a question/answer period with the attendees.

Discourse Coding

My coding of the data via the N6 software resulted in three free nodes and ten tree nodes. That is, I was able to categorize all the topics mentioned in the data set into three discrete groupings and ten clusters of groupings. This was the culmination of a process of re-categorizing and regrouping data as different patterns emerged during the coding process. My initial coding was largely exploratory. In other words, I was discovering and labeling the topics discussed by participants or contained in the documents rather than searching for specific information. During the recoding phase, I attempted to determine how my research questions had been addressed in the data. At the same time, I consolidated some codes and eliminated others in order to describe, with accuracy, the interviewees' perceptions and the documents' wording. I then re-examined the codes a final time for conclusions that could be drawn from the codes themselves, their relationships to one another, and the characteristics of the locations in which they appeared. The conclusions are discussed in Chapter 5.

N6 Software Coding

My final set of codes included three free nodes: Students' Prior Knowledge, Faculty Required Usage, and Inflexible Technology, and nine tree nodes: 1) Advantages of Technology, 2) Disadvantages of Technology, 3) Desired Usage of Technology, 4) Types of Usage, 5) Overall Effect of Technology, 6) Speed of Adoption, 7) Purpose of Technology, 8) Purchasing and Disseminating Technology, and 9) Characteristics of Respondents. The free nodes represent categories of discourse that I chose not to subdivide into smaller units, either because their importance lay in their meaning as a whole, or because the number of instances of that particular idea was too small to support any further divisions. The tree nodes, on the other hand, were more complex categories that derived much of their significance from their component parts.

Several times throughout the coding process, I discovered that two or more free nodes were actually components of a larger idea. At that point, I merged the free nodes into one new category, or grafted them on to an existing tree node. For example, a number of respondents mentioned that administrators' relationships with faculty seemed to be largely unaffected by the growth of email communication. During my first two codings, this observation stood alone as a free node since it did not seem to be related to any other idea in my coding schema. However, as the comment surfaced again and again in various places, I began to see that it belonged to an overall concept of the impact of email on relationships, a tree node that also included changes in faculty-student and faculty-faculty relationships due to email communication.

Revised Coding

After completing the coding process via the N6 software, I re-examined my codes for less obvious relationships and finer nuances than were apparent initially, and found it more useful to categorize the various concepts in a dichotomy between those that addressed the research questions that form the basis of this study, and those that either surfaced spontaneously as the respondents told their stories or were embedded in the other data sources, and which were not responses to the research questions. The former I have labeled Research Issues and the latter Free Thoughts. As it turned out, however, the N6 characterization and the revised characterization are nearly parallel, since two of the three free nodes ended up containing Free Thoughts, and all of the tree nodes except Purpose of Technology contained Research Issues.

Throughout the descriptions of coded data that follow, percentages are designated as either "of participants" or "of data sources." The former indicates that the percentage is derived from the number of interviewees that made the particular comment (out of n = 69), while the latter indicates that the percentage is based on the number of instances of the comment in all data sources, including interviews, email messages, documents, and conference notes (n = 88).

Research Issues

The responses to the interview questions, as well as data gleaned from the email messages, documents, and conferences, were eventually organized into eight general categories related to the research questions (Table 8). These categories, which include:

1) Faculty Characteristics, 2) Pressure to Use Technology, 3) Purchase and Dissemination of Technology, 4) Desired Usage of Technology, 5) Inflexibility of Technology, 6) Advantages of Technology, 7) Disadvantages of Technology, and 8) Overall Effect of Technology, are discussed in this section.

Faculty Characteristics

The first of my research questions was whether idiosyncratic traits, such as gender, teaching field, employment status, or timing of innovation adoption, influence how technology usage affects an individual. However, I was not able to obtain a large enough sample of interviewees from each teaching field, or of adjunct faculty or department chairs, to draw meaningful conclusions about those characteristics. Therefore, each response and concept was analyzed for its distribution between male and female participants, and among "early adopters" of technology (Rogers, 1983), since these groups were represented by sufficient numbers of interviews to yield comparative data.

The analysis of gender variation in the concepts that were coded into separate categories revealed no differences between male and female responses. Rather, the percentages of each gender contributing to a conceptual category reflected the proportion of women and men among the interviewees (fifty-seven and forty-three percent respectively). Furthermore, this lack of differentiation held constant among all the categories in both the Research Issues and Free Thoughts divisions.

The last of the idiosyncratic subcategories - speed of innovation adoption – also revealed no differences from the interview samples as a whole. In hindsight, I would

perhaps have obtained more conclusive data on speed of adoption if I had asked the interviewees about their willingness or reticence to embrace new technologies directly. However, at the time that I was conducting the interviews, I did not want to risk biasing or influencing the participants' responses with potentially leading questions such as, "Do you consider yourself an early adopter or resister of technology?" Thus, I did not incorporate this type of query into my interview questions. Nevertheless, many interviewees volunteered information about themselves that indicated their speed of innovation adoption, and consequently, I created the tree node, Speed of Adoption, to contain the two subcategories: Early Adopter and Resister. I had initially intended to add further categories from Rogers' (1983) taxonomy to this tree node; however, I found that respondents who did not fit into one of these two categories made no comments at all about how soon they adopted new technologies. Thus, I was able to compare only early adopters and resisters.

The self-disclosed early adopters outnumbered resisters in my study more than five to one. Twenty-two participants (thirty-two percent of all interviewees) indicated that they were among the first at their college to embrace new technologies that became available, while only four interviewees admitted to resisting the use of technology. In addition, the concept of "technology resister" was mentioned by two interviewees in reference to other faculty that they were acquainted with, and one document, the City Community College Technology Committee minutes, made reference to faculty resistance to technology in its list of hindrances to technological innovation on the campus, where it mentioned, "[Some] faculty refuse to participate."

In comparing the responses of the early adopters to those of the other forty-seven interviewees, no patterns or differences emerged. Their discourse exhibited no observable variation in substance or proportion from the other participants. Excluding the four self-disclosed resisters, forty-three participants did not indicate one way or another how quickly they embrace technological innovations that become available at their colleges. Thus, it is not clear whether the early adopters represent the majority of faculty on their campuses, or whether they were merely the most eager to discuss technology usage as participants in the study. Similarly, it is not clear whether the four resisters represent a minority voice among the faculty, or whether a larger number of resisters exist unobserved, reluctant to express their opinions of technology openly. The contacts that I had with referrals in all three colleges lead me to suspect that, while there are more technology resisters on college campuses than this study gives evidence for, the majority of college faculty are at least open to experimenting with the new technologies, with a large percentage embracing them enthusiastically. Consequently, it seems probable that the acknowledged early adopters are representative of the interview sample as a whole.

Pressure to Use Technology

This concept, which refers to the perception that faculty are required or pressured by their administration to use information technology in their work, was mentioned by twelve of the interview participants (seventeen percent). The respondents in this category did not all express the same reaction to their perceptions of administrative pressure. Five indicated that they were resentful at being pressured to increase their technology usage,

two mentioned only that they had heard of other faculty being pressured to comply, and four perceived themselves to be under pressure to increase usage, yet did not particularly mind that this was so, but rather considered it proper for administrators to do so. In addition, there were two department chairs who mentioned their own efforts to compel faculty in their departments to increase usage of technology.

Purchase and Dissemination of Technology

In the Purchase and Dissemination of Technology category are comments that arose in response to my fifth and sixth interview questions regarding the participant's view of his/her college's system of technology acquisition and distribution. The first two subcategories, Faculty Input Respected and Faculty Input Ignored, contain responses to the fifth question ("Do you feel that you have any input into decisions about purchasing technology on your campus?"). The rest of the comments in this section were responses to the sixth question ("Would you change anything about either the purchase or use of technology on your campus if you could?"), and are divided into the subcategories: 1) Misdistribution of Technology, 2) Information Loop, 3) Untimely Purchases, and 4) Good Dissemination.

Faculty Input Respected

Most of the responses to my fifth interview question were positive, in that participants generally perceived that their views on technology purchases were respected by the administration. There were forty-six interviewees in this category (sixty-seven

percent), as well as two documents: the City Community College Technology Committee document and the Inner-city Community College document. The former document announced that the Technology Committee's membership selection process had been changed to ensure that all employee groups, including faculty and staff, would be represented and thus to have a channel for voicing opinions regarding technology acquisitions on the campus. The latter document stated that the college's technology plan had been "created with input from a variety of sources ranging from the areas of instructional, student, and campus services to students, faculty, staff, and administration." All the interviewees in this category generally assured me that they had avenues for expressing their opinions to the technological decision-makers on their campus, and that they were convinced that their input was noted and attended to.

Faculty Input Ignored

There were less than half as many interviewees who indicated that their input on technological decisions was unwelcome as there were that indicated that it was respected. A total of twenty respondents (twenty-nine percent) informed me that their opinions on technological decisions were ignored by the administration. There were no documents or conferences in this subcategory. Most of the comments in this category reflected a baffled uncertainty about the process of technology acquisition on their college. Several spoke of having to accept whatever brand of computer was purchased for their office although they may have preferred a different brand. Others expressed astonishment at arriving at their offices to find that the computer had been replaced with a new one without their

having been consulted. And a few stated that they expressed their opinions through the proper channel on their campus, yet no one ever seemed to listen.

Misdistribution of Technology

This subcategory contains comments decrying the distribution of new technological purchases by a college to certain employees and not to others. Twenty-four interviewees (thirty-five percent) expressed their dissatisfaction with the distribution system on their campus. In addition, three of the email messages to the City Community College Dean of Instruction, as well as the CCC Technology Committee minutes, referred to this problem. One example of the comments coded as Misdistribution of Technology came from an instructor at CCC who complained in her email message that support staff, such as secretaries and administrative assistants, are given computers that are inferior to those given to faculty and administrators, when in fact "the assistants and secretaries, who are the backbone of many departments, should be included in the technology advancement." Another CCC instructor argued in his email message that newly hired faculty receive state-of-the art computers, while "the process to request replacement computers for the mature faculty becomes very competitive and difficult." Some of the interviewees in this category argued that new technology should be distributed equally to everyone on campus, while others contended that distribution should be based on need, with faculty in the more technology-dependent fields, such as Business/Computer Information Systems and Vocational/Technical, receiving state-of-the-art purchases before faculty in fields such as Languages/Humanities and

Social/Behavioral Sciences. Despite these differences, all respondents in this category agreed that new technology purchases were not being allocated in the most equitable or efficient manner.

Information Loop

The concept labeled "information loop" refers to the perception that information about technological purchases on campus is available only to those who are "in the loop," that is, faculty who are either on committees that deal with technology decisions or, if not, have regular contact and good relationships with other faculty or administrators that are. A total of twenty-six interviewees (38%) held this perception, and one City Community College email message made reference to this issue. Some complained of never receiving information about technological innovation on their campuses, while others contended, "Changes are made, and then you're told that they have been made." However, several of the respondents in this category admitted that their lack of information was due to their disinclination to seek it. When asked how she would find out about technological purchases on her campus, one department chair replied, "I wouldn't know because I'm not particularly interested." And another instructor responded to this question, "You know what; I have no clue. As long as I have a computer that works, I kind of stay out of everything else." The majority of respondents in this category, however, attributed their ability to acquire rapid information on technological decisions on their campuses to their positions on the "right" committees or their relationships with the "right" people. As one interviewee put it, "The average faculty member... would have

to be on the right committee" in order to find out about technological purchases outside his/her own department.

Untimely Purchases

The last subcategory of Technology Purchases and Dissemination, "Untimely Purchases," contains comments indicating that technology innovation does not happen rapidly enough on the respondent's campus. A total of nine interviewees (thirteen percent), but no email messages, documents, or conferences, mentioned this problem. Some instructors complained of submitting requisitions for technology upgrades several years in a row and receiving nothing during that time. And one instructor stated, "It's slow...so that frustrates me and other people who want to just move forward" with technological purchases.

Desired Usage

The comments in the Desired Usage category were mainly responses to my seventh interview question, "Would you like to use technology more than you do now, less than you do now, or about as much as you do now?" However, some of the comments were found in other data sources. Regardless of source, these comments reflect the desire of faculty for more, less, or different usage of technology on the job.

Less or Different Usage

Only three participants indicated that they wanted to decrease their technology usage. Two stated that, although they had formerly enjoyed technology usage, they had become "burned out" by the effort of incorporating technology into their courses for several years. The third stated flatly that he wanted less technology in his work. In addition to those who chose "more usage," less usage," or "satisfied with current usage" as their response, two interviewees informed me that they could not choose any of the three responses I offered them, but instead would choose a different type of usage if that were possible. One explained that the building in which he teaches lacks the infrastructure for the types of technology that he would prefer to use, and the other admitted that she would use technology more efficiently if she could.

Inflexible Technology

The comments in the "Inflexible Technology" category did not arise in direct response to any questions, yet they are supportive of the theory of "inflexible technology" which forms part of the theoretical background of this study. As explained in Chapter 2, Winner (1986) posited that some forms of technology alter the environment, or require adaptations from users, to such an extent that, once adopted, continued usage of the technology becomes unavoidable and the people living in that environment must continually modify their own behaviors and lifestyles to accommodate the demands of the technology.

There were fifty-three data sources (sixty percent of all sources) that referred to computers in educational settings as, in some way, either demanding of accommodation or necessitating their own usage. One of these was the City Community College Technology Committee document, and the other fifty-two sources were interviews, for a total of seventy-five percent of the interviewees. Nearly half the respondents in this category made comments such as, "I have to use a computer," or "I can't not use it." The same number of respondents (twenty-three) indicated that they conform in some way to the demands of the technology. Several used phrases such as: "Computers put you on a treadmill," or "The computer dictates your workload." Many commented that turning on the computer was their first activity at work in the morning, and that an increasing amount of their workload involved online tasks.

Twelve of the Inflexible Technology comments expressed the idea that information technology is changing people. One instructor who offered this view forcefully told me that students who have used computer technology all their lives have "brains [that] are hard-wired differently than ours" in that they "filter" information differently than people who did not grow up with computers. Other commenters in this category pointed out that email communication is changing the way we express ourselves, respond to others, and form relationships. Some indicated that the youth who have grown up with computers have weaker social skills, while others theorized that communication overall was becoming more superficial and less personal.

Six of the comments in this category related to the blurring of work boundaries due to the usage of technology. These respondents mentioned sending work from their

office computer to their home computer to continue working on projects or paperwork at home, or feeling that they are constantly on call and must check their email every hour or so to avoid missing important messages. While most attributed the pressure to the demands of students who expect immediate replies to email messages, some indicated that administrators no longer respect faculty's posted office hours or personal time. Finally, seven of the messages in this category reflected the view that information technology is inevitable in our society. It is no longer possible to choose non-usage; the only choices to be made now are the types of technology and the types of usage.

In summary, then, the category Inflexible Technology contains bits of discourse that hint at an inherent power in computer technology that is actually exerted over the users of the technology. While this is not, of course, to suggest that the technology has any anthropomorphic will of its own, or that the creators of the technology had any deliberate hegemonic agenda which they built into the technology, it does suggest that the information technology in use in community colleges may, by its very nature, be restructuring its own environment in such a way as to make human adaptation to the technology, as well as continued use of the technology, compulsory.

Advantages and Disadvantages of Technology

I asked the interviewees to describe for me both the advantages and disadvantages of technology usage in the community college as they perceived it. Based on my experiences during the preliminary study the year before, I believed that this question, perhaps more than any other, had the potential to elicit the type of information I was

looking for from my participants, that is, a deeper level of insight than the literature has currently yielded into what the results of technology proliferation in community colleges has been. Consequently, I did not try to direct the interviewees' responses into any particular theoretical categories after asking the initial question, but rather, via comments such as, "That's interesting," "I hadn't heard that before," and "Yes, a lot of other people have mentioned that," encouraged them to talk at length about what they liked and did not like about their experiences with computers at work. And this, in fact, was the question to which participants seemed to give the most thought and the lengthiest answers[iv]. The result was eighteen types of advantages and twenty types of disadvantages, a few of which I broke down further into their own subdivisions because the responses clearly fell into subcategories of the overall concept.

Four of the advantages of technology - communication, efficiency, improved instruction, and availability of information - were mentioned by the majority of my participants. For this reason, I consider them to be the "major" advantages of technology usage in the view of the faculty in my study. The rest of the advantages discussed below were mentioned by fewer than half of the interviewees, yet each contributes to the overall picture of technology's impact on college faculty. Although they may be considered "minor" advantages in that they were reported by a minority of respondents, they were nonetheless of importance to the faculty who brought them up during the interviews, and may prove to have greater importance to faculty nationwide, should expanded studies be conducted.

Major Advantages

Communication

The largest number of respondents, sixty-two (90%), spoke of communication among co-workers and between faculty and students as one of the chief advantages of information technology. In addition, both conferences and one document made references to communication as a benefit of information technology. The largest percentage of comments about technological communication addressed speed and simplicity of message transmission. Typical comments included, "It's easier to keep in touch with students," I can communicate faster," and "I can send a message to many people at once."

Although most of the comments in this category concerned the ease and speed of communication, many also claimed that email communication was qualitatively superior to telephone communication. One instructor mentioned that email communication was less of a barrier than face-to-face communication for students with weak conversational skills, and another instructor explained his own preference for technological communication, stating that email allowed him to give more time and thought to messages before he sent them. In addition, several participants stated that students would email them questions or comments that the students would not raise in class because of timidity or insecurity.

In addition, several respondents referred to the ability to communicate with colleagues worldwide and to be connected with colleges and universities throughout the country. Even the few participants who identified themselves as resisters of technology admitted, albeit grudgingly, that information technology facilitates communication

among people, especially over distance. Nearly all the faculty who made comments in this category extolled the speed of email communication, the relative ease of typing a quick message and sending it as opposed to trying to contact someone by phone or leaving a voice mail message, and especially the ability to send a message to many people at once. In addition to the interviews, the Suburban Community College website informs current and prospective students that their "portal" system of faculty web pages and email addresses is "an easy way for students and instructors to communicate." And speakers at both technology conferences mentioned communication as an advantage of technology.

There was some overlap between the Communication category and the Inflexible Technology category in that many of the comments concerned young college students' dependence on email as a primary form of communication. Many of the respondents observed that the students now entering college directly from high school are far more likely to send an email message than make a phone call or a face-to-face appointment. Thus, the technology appears to be altering the communication patterns of our larger culture, and particularly of recent high school graduates.

Efficiency

The second largest category of comments on the advantages of information technology dealt with its promotion of increased efficiency in work tasks. Eighty-four percent of the respondents stated that technology increases their efficiency on the job. Efficiency was also mentioned at one conference, but in no documents. Most of the

technology improves instruction by engaging the student in the learning process, or shifting the focus from instructor to student. Several respondents commented that information technology helps to improve students' ability to think analytically, to evaluate information, and to visualize abstract concepts. Increased student interest in course content and instruction was also mentioned as a benefit of technology in the classroom. Computer technology was also credited with enabling instructors to hold students accountable for assignments, due dates, and content without accepting excuses for lack thereof since all the course information, handouts, and requirements are posted on the course website. A number of participants stated that they no longer give handouts in class, but instead require students to get all class information and assignments from the course website, and that doing so placed the onus of responsibility on the students.

In addition, twenty-five of the commenters on improved instruction stressed that technology usage improved their content delivery or, in other words, made them more effective instructors. Some spoke glowingly of using streaming video, graphing calculators, PowerPoint presentations, the Internet, and computer graphics to enhance their classroom instruction. They described their technology-enhanced teaching as "more interesting," "more student-centered," "not so boring," "no longer tradition lecture-based," and "more participative." They explained how in-class technology could be combined with group work to give students maximum, hands-on experience with the content.

Participants also discussed the handouts, visuals, and other materials they create for their classes via computer technology, indicating that those materials developed via

computer programs were far superior to those made "by hand." In fact, many of the faculty who discussed their development of teaching materials maintained that technology did more than just improve quality; it actually made certain types of materials possible that would not have been possible previously. This included animated online graphics, PowerPoint visuals, and even online photos of, and real-time contact with, remote people, places, and objects around the world. For example, one instructor described how she downloads the lyrics to songs that illustrate key concepts in class, and how she obtained copies of newspaper reports of the 1973 Alabama church bombings to provide her students with historical context for class discussions on racism. She concluded that technology "enhances material in ways I might not have been able to before."

Finally, two documents and both conferences supported the contention that information technology improves instruction. The former were the Inner-city Community College and Transitional Community College websites. The ICC website lists a campus-wide Technology Committee which exists in part "to provide a positive and supportive environment that maximizes learning through technology." The TCC website defines its technology committee's purpose in similar language: "It is the responsibility of Instructional Technology and the Teaching and Learning Center to provide up-to-date faculty development and technological resources to make instruction more meaningful to the students at [TCC]." A speaker at the District-wide Technology Conference contended that information technology enables instructors to "recognize uncommitted students faster online than sitting in the back of the room," and thus to give speedier assistance to

those students who are most at risk of failing or withdrawing from college. And a faculty facilitator at the City Community College Conference announced that his students, who viewed online animal dissection simulations, achieved ten percent higher scores on a nationally standardized science exam than students taught in the traditional manner (in which students dissect animals in class).

Availability of Information

The fourth largest Advantages of Technology category, which was mentioned by fifty-eight percent of the participants, refers to the amount of information available to both faculty and students online. In addition, two documents - the websites of the district and of City Community College - as well as the CCC Conference, made mention of the availability of information as a benefit of technology. Although some in this category made only general references to information technology as opening up "a whole new access to information quickly," others cited specific types of sources and information that had become available via computer technology, such as history collections, government documents, and other kinds of "worldwide information."

Summary of Major Advantages

It can thus be seen that a sizable majority of faculty believe that information technology has a positive impact on community college faculty in four ways. First, it facilitates and improves communication among faculty, students, and administrators. Second, it improves efficiency in routine work such as materials preparation, grading,

and record-keeping. Third, it improves classroom instruction by increasing student participation, enhancing instructor effectiveness, and enabling the creation of superior course materials. And fourth, it makes information available to faculty and students which, in many cases, would not otherwise be available or else would be much more difficult to obtain. It was largely for these four reasons that most of my participants had either already incorporated technology into their courses or else were attempting to do so. However, a number of other reasons were cited by respondents for their embrace of information technology and, while none was mentioned by a majority of interviewees, all except those in the Miscellaneous category below were mentioned by significant numbers of participants.

Minor Advantages

Improvements in Technology

Forty-one percent of the interviewees asserted that computer technology is continuously improving and expanding in capabilities, and that this is an advantage of using technology in community colleges. In addition, two documents – the City Community College Technology Committee minutes and Transitional Community College website, along with the District-wide Technology Conference - included references to improved technology as an advantage to its usage. Comments from all these sources included:

- The new wireless technology enables campuses with older buildings that lack the infrastructure for technology to equip their classrooms with computers;

- Laptop computers are becoming inexpensive enough for many colleges to provide them for faculty and student use;
- Computer peripherals such as digital cameras, scanners, and audio/video hookups are becoming more sophisticated and easier to obtain;
- Teaching software is now far superior to earlier versions, both in its presentation of content and in the ability of students to interact with it;
- Both hardware and software have become much more "user friendly;" and
- There is increasingly less need for printed copies of materials.

Many respondents in this category used expressions such as "phenomenal," and "I couldn't live without it," to describe the improvements they had observed in the technology at their colleges. In short, the overall message of this category is that technology will continue to improve, and in so doing will solve any problems now associated with its usage.

Facilitation of Writing/Editing

Thirty-two percent of the interviewees described computer technology as helpful to the process of writing and editing academic papers. There were no documents in this category; however, the District-wide Technology Conference was represented. Typical comments included: "You can compose at the keyboard and then change everything around," "I can make changes and then save my work," and "I require my students to use word-processing on all assignments because it's so much easier for them to correct their errors." The comments were about evenly divided between those referring to students'

writing and those referring to faculty writing, with many respondents mentioning both. One instructor commented that writing "is a lot easier. [Students] don't realize it because they never did it on typewriters." And a speaker at the District-wide Technology Conference observed that developmental students[v] write much longer papers online than by traditional methods.

Enjoyment of Usage

In this category are all interviewees who indicated that they or their students simply like to use computer technology, and for them, this is one of the advantages of making it available. A total of eighteen interviewees (twenty-six percent) remarked on how much they or their students enjoy technology usage, and a speaker at the District-wide Technology Conference also contributed to this category. Typical comments included: "I really enjoy using technology in my classes," "I just love it," "It's fun, it's creative," and "It's the best thing since sliced bread!" Most of the respondents in this category were referring to their own personal enjoyment of technology usage; however, two sources - an interviewee and a presenter at the District-wide Technology Conference - indicated that students enjoy using technology. Overall, then, this category suggests that a sizable number of faculty are incorporating technology into instruction, at least in part, because they "like to play with it."

Flexibility

The fourth most commonly mentioned minor advantage of information technology was its "flexibility." By this, commenters meant that technology (particularly distance learning technology) enables students to participate in higher education from anywhere, at anytime. A total of sixteen interviewees (twenty-three percent) spoke of the benefits of distance learning for students who need flexibility in their course scheduling. In addition, a speaker at the District-wide Technology Conference, and the City Community College and Suburban Community College documents, made reference to flexibility as an advantage for students of the distance education. Typical of the comments in this category was the remark of an interviewee that "you can meet people where they are as opposed to requiring that they come to you" with the aid of distance technology. Perhaps the most persuasive comment in this category was made by an English instructor who estimated that about half the students taking her distance English course would "otherwise would not have been able to take the class... either because of their work schedules or their family schedules..." Thus, this category reflects the perception that distance technology opens up higher education to non-traditional students who would not otherwise be able to participate by providing increased flexibility in the times and places that courses are conducted.

Professional Development

Seven interview participants (ten percent) mentioned professional development as an advantage of information technology for community college faculty. In addition, the

Transitional Community College document included a reference to professional development via the usage of information technology. Examples of comments in this category include: "It's good for us to continue to learn and to grow," and "It does force you to keep up with your field and what you are doing," According to the TCC document, "It is the responsibility of Instructional Technology and the Teaching and Learning Center to provide up-to-date faculty development" by means of increased access to, and technical support for, advanced information technology.

Student Access to Computers

There were also seven participants (ten percent) in this category, which contains comments to the effect that students generally have computers available to them outside of the college. There was no mention of students' access to computers in the documents or conferences. The interviewees in this category assured me that students in general are not hampered by a lack of access to computer technology.

Paper Trail/Record Keeping

This category includes comments on information technology's facilitation of the maintenance of records concerning communication, student achievement, and transactions. There were eight interviewees (sixteen percent), no documents, and no conferences in this category. Two respondents in this category related anecdotes concerning misunderstandings or false accusations that were cleared up as a result of a "paper trail" of email communications and online documents that one individual in the

situation had saved. As one instructor from Inner-city Community College put it, "I have a record of every document I ever created."

Miscellaneous

In this category are the advantages of technology that were mentioned by fewer than ten percent of the study's participants. These advantages include

- the cost effectiveness of information technology,
- helpful technical support made available to faculty by their institutions, and
- the flattening of the institutional employment hierarchy as a result of technological innovation.

Each of these was discussed by three interviewees. In addition, two interviewees who were pursuing advanced academic degrees at the time of the study commented on the ease of data analysis via computer technology. Although none of these concepts occurred in sufficient numbers to draw any conclusive generalizations, they are mentioned here because they provide insights on the perceptions of some of the faculty in this study, and may be shared by larger percentages of faculty than this study represents. Furthermore, they present an illuminating contrast with some of the Disadvantages of Technology discussed below. (For example, the difference in the number of sources declaring information technology "cost effective" and the number of sources indicating that information technology is excessively costly, as is portrayed in the Disadvantages of Technology section, will be discussed further in Chapter 5.)

Disadvantages of Technology

As was the case with the advantages of technology, I found that disadvantages of technology could be divided into "major" and "minor" categories based on the percentage of sources mentioning each concept. The Major Disadvantages category consists of the four concepts discussed by the majority of participants in the study. One of these, Communication, is further subdivided into specific types of disadvantage since the sources that commented on this topic did not all address the same type of detriment that technology causes for the process of human communication. There are eight Minor Disadvantages that were mentioned by ten to forty-nine percent of the participants, and six Miscellaneous disadvantages that were mentioned by fewer than ten percent.

Major Disadvantages

Time/Workload

As was the case in my preliminary study, this is the category that received the overwhelming majority of faculty responses. Fifty-eight interviewees (eighty-four percent) stated that the biggest disadvantage of information technology in their work lives was the increase in time and labor required to set up and maintain both distance and hybrid courses, and to participate in email communication. In addition, there were two documents – the City Community College Technology Committee minutes and the Inner-city Community College website – that listed increased time and workload as a detriment to faculty from the use of technology, and four speakers at the District-wide Technology Conference who also addressed this topic.

Many of the comments in this category related to setting up and running distance and hybrid courses. For example, one interviewee contended, "Grading papers is a nightmare. It takes much, much longer online... it's hugely time intensive...to teach online." In addition, there were many comments regarding the time needed to read, answer, and send emails. As one participant put it, "[email] makes you feel so stressed out because you have so many. It's just more time consuming. I just can't get enough time." In addition, the problem of increased time/workload was mentioned more than ten times during the panel discussion at the District-wide Technology Conference. One panelist said, "It took me five years to get from no technology to an online course," while another stated, "It took me two summers to set up a [technology-infused] course the first time." Furthermore, one panelist insisted that information technology "makes extra work for students as well as instructors because reading and writing emails takes longer than verbal communication." When asked by an attendee of the conference whether they had received release time[vi] for infusing technology into their instruction, three out of the four panelists responded that they had not, while the fourth replied, "Not right away, but later on." Several interviewees expressed the view that administrators should be more accommodating to faculty needs by granting more release time, more technical support, or smaller class sizes for technology-based courses. However none reflected any optimism that such assistance would be forthcoming in the near future.

Obsolescence/Cost

This category resulted from the merging of two concepts in the Disadvantages of Technology tree node: Obsolescence/Rapid Change and Cost of Technology. I combined these two groups of comments into one after I observed that virtually all discussions of the excessive cost of technology centered on its continual change and frequent need for upgrading or replacement. There were fifty interviewees (seventy-two percent), two documents, and speakers from the District-wide Technology Conference, that made references to this category.

Although one interviewee lamented the necessity of charging students a lab fee to defray maintenance costs on campus computers, most of the comments in this category referred to the costs that the colleges themselves had to bear in order to maintain or upgrade technological investments. Twenty-one respondents (thirty percent of all interviewees) referred to the need for more funding to acquire or update instructional technology. In contrast, only five respondents called for less funding for technology on their campuses, generally because of the perception that too much money was wasted on either redundant or underutilized equipment. Eight respondents offered a different perspective on the funding question, calling for not more or less spending, but rather for a more equitable and balanced distribution of funds among departments and programs, or for better foresight and planning via the technology budgeting process. For example, a Vocational/Technical department chair explained that his department was "pushing the state of the art" in order to prepare their students for the labor market, and that therefore funds needed to be shifted away from programs that had less need for technological

innovation and toward programs with greater need. An even smaller number of commenters, only three of the respondents in this category, indicated that they were satisfied with their college's level of spending on technology. In addition, twenty-four respondents merely commented on the speed of obsolescence of computer technology. Most of these comments dealt with the need for the college or district to keep up with advances in computer technology in order to remain competitive with other postsecondary institutions or to prepare students for the job market.

Overall, then, this category reflects both the speed of change in the technology field, and the cost to colleges of keeping up with that change. Most respondents in this category advocated more funding for technology on their campuses. However, few believed that this would be possible without the pulling of funding from other areas, unless other funding sources, such as contributions from businesses or industry, could be obtained, since none of the interviewees advocated charging students higher tuition or increased technology user fees. Nevertheless, several pointed out that the technological investments already made by the colleges would be wasted if the colleges did not invest more funding in upgrades and maintenance. In this respect, the Obsolescence/Cost category overlaps with the Inflexible Technology category in that the technology currently in use is resulting in an altered environment that necessitates the continuation and improvement of the technology.

Glitches/Limitations

In this category are all references to "glitches" (malfunctions or breakdowns) in technology during usage, as well as the inability of current technological systems to perform all the tasks desired by users, or to perform adequately under the conditions of the college environment. Forty interviewees (58%) made references to these problems. Additionally, two documents (City Community College Technology Committee minutes and Inner-city Community College website), and both conferences, contributed to this category. Typical of comments in this category were, "The electricity goes off or the technology does not work, you need a back up;" and, "A lot of times we get set up to make the system work and there's a computer glitch which just fouls up the entire presentation." Several commenters in this category also mentioned the detriment to students when technology fails. Perhaps the sentiments in this category were summed up best by the instructor who declared, "When technology goes wrong, it can really go wrong, and it makes your life hell!"

In addition, some in this category spoke of the failure of the technology to meet the needs of the users. Examples include too little memory in the computer and the inability of instructors to guard against misuse by students, such as using library computers for games instead of research. And a teaching librarian narrated an embarrassing incident that took place during a Library Skills class in which she was attempting to demonstrate an Internet search by looking up "teenage girls" and "depression." Instead, the classroom computer projected onto the overhead screen page after page of websites on the development of breasts in adolescent girls. As another

instructor put it, "I just always have to have a 'Plan B' because... I just cannot totally rely that things are going to go the way I expect them to."

Communication

The fourth and last of the Major Disadvantages of Technology is communication problems, which is somewhat ironic in that communication was also the most commonly cited advantage of technology among the interviewees. Yet over half of the participants, as well as the City Community College Technology Committee minutes and both technology conferences, listed communication problems as a disadvantage to the use of technology. These responses fell into six distinct types of problems caused mainly by email communication: 1) The impersonal nature of electronic messages; 2) "Spam," which is computer users' jargon for unwanted mass transmissions of email messages; 3) Misuse by administrators to maintain distance from faculty; 4) Abuse, which refers to rude or hostile messages; 5) Misunderstandings caused by the wording of email messages; and 6) Lack of response to a message by the recipient.

Impersonal Medium

Thirty interviewees (forty-nine percent) expressed their dislike of email communication, or their students' dislike of it, because of its impersonal nature. Also, the City Community College document and both conferences mentioned this problem. Although most of the respondents in this category spoke of their own aversion to email communication, some described the impact on students of the loss of face-to-face

communication with instructors. An English instructor argued that English as a Second Language students in particular, of which she has "an abundance" in her classes, need personal attention from instructors. "You really need them right there. You need to help them every inch of the way." And a counselor explained, "The things that counselors talk to students about many times – depression, suicidal ideation, problems in the family – we don't counsel [via] high tech." Thus, although the percentage of faculty listing impersonal communication as a disadvantage of technology is lower than that of faculty naming communication overall as an advantage of technology, a significant number of instructors perceive that email weakens the rapport necessary for establishing and maintaining satisfying interpersonal relationships among peers and with students.

Spam

This category consists of comments decrying the use of the district email system by some individuals to send messages of limited relevance to everyone with an email address in the system[vii]. Thirty-two percent of the interviewees mentioned this problem; however, there were no documents or conferences in this category. One instructor, who admitted to being one of the most prolific "spammers" in the district, defended this use of the email system as a way to keep everyone informed about "important issues" and to provoke discussion among the faculty of vital topics. However, his was the minority position among the interviewees. While two thirds of the participants did not mention this issue at all, those that did were overwhelmingly against the sending of mass email messages over the district computer system.

Administrative Distance

Administrative distance was a difficult issue to categorize throughout the data analysis process. As mentioned earlier, it began as a free node in the N6 system, while I struggled to find a category to which it was logically related. In the end, I decided it represented a disadvantage of technology under the heading of communication, even though the respondents who mentioned this phenomenon did not describe it as a detriment so much as a normal state of affairs in the district to which they had become accustomed. The concept was always mentioned in response to the third part of my fourth interview question (see Appendix B), in which I asked participants whether technology impacted the relationship between administrators and faculty. While most participants responded that they never had dealings with administrators and thus could not answer the question, fifteen interviewees (twenty-two percent) indicated that administrators used email communication to maintain an intangible barrier, or distance, between themselves and faculty. There were, however, no documents or conferences in this category.

It could be argued that I have rather arbitrarily labeled this concept a "disadvantage," when it does not actually reflect a deterioration of the lines of communication between faculty and administration. Rather, the computer seems to have a neutral effect in this situation, neither alleviating nor exacerbating the torpor of the faculty-administrator relationship. However, since technology is clearly not an advantage in this situation, and since one of the foremost benefits of information technology is purported to be its expansion and facilitating of communication among constituents in colleges making the investment in technology, it seems reasonable to me to conclude that

a disadvantage of technology is its apparent failure in many instances to extend that benefit to the faculty-administrator relationship.

Students' Lack of Access to Computers

Fourteen participants (20%) indicated that many community college students are disadvantaged by their lack of access to computers outside the classroom. In addition, two documents addressed this issue: the City Community College Technology Committee minutes and the Inner-city Community College website. It was pointed out by the interviewees in this category that heavy usage of computer technology on campuses stratifies students according to income level, since those with computers at home have better access to the information and programs desired by instructors than those that do not. Other participants spoke of efforts by their campuses to make computers more accessible to students via on-campus computer labs and "check out" laptops. However, one instructor at Suburban Community College complained that "our students do not have time to access the computers [in the computer lab]" because the lab was too often in use by classes. And the laptops were still available only for on-campus use due to the expense of maintaining them.

Abuse

Twelve interviewees (17%), but no documents or conferences, mentioned that email is sometimes used to convey rude, hurtful, or vitriolic messages by individuals who would not express themselves in such terms in a face-to-face encounter. Respondents in

this category spoke of colleagues sending "toxic emails," or "stirring up hornets' nests all the time," yet refusing to engage in face-to-face communication with those they had offended. Although most of the "abusive email" comments referred to messages between faculty, an adjunct instructor stated that she never gives out her email address to students because she has heard of other faculty being harassed by students.

Misunderstandings

As with the abuse category, twelve respondents (17%), but no documents or conferences, brought up the issue of email contributing to increased instances of misunderstandings that in some cases damaged relationships between email communicants. Unlike abuse, however, this communication problem was not deliberate, but rather was attributed to the email sender's ignorance of how the message would sound to the recipient. Commenters in this category mentioned email messages that had been misinterpreted as critical or insulting where no criticism or insult was intended by the sender. One instructor explained that the email messages "always have a tendency to look more negative" than the sender realizes, and a department chair referred to email communication as "always dangerous," and the cause of more complaints by students about faculty than occur when the means of communication is face-to-face or by phone.

Lack of Response

Ten participants (14%) complained that email communication made it easier for recipients of messages to ignore the information or request and simply not respond.

Typical responses in this category included, "Some people never read their emails," and "You feel as if your message has dropped into a black hole." One instructor described an administrator who "has a habit of ignoring emails. It took me three emails to finally get a response from him." And another instructor mentioned that sometimes students "don't like that medium and so will not respond" to email communication from instructors.

Minor Disadvantages of Technology

The six minor disadvantages of information technology, each of which was discussed by fewer than ten percent of the participants, included: 1) an overload of information, mentioned by four respondents (6%), 2) the failure of information technology to reduce the amount of paperwork in academic department offices, mentioned by three respondents (four percent), 3) students' lack of interpersonal skills due to excessive use of impersonal technology, also mentioned by three respondents, 4) a general loss of interest in print media by many students (and some administrators), mentioned by two respondents, 5) computer usage becoming addictive, especially to young students, also mentioned by two respondents, and 6) intellectual property rights disputes, which was mentioned by two interviewees, one document, and one conference speaker. As was the case with the minor advantages, these issues are included here because they reflect concerns, which may prove to have a greater impact on faculty than the scope of this study indicates.

Summary of Disadvantages

Clearly the increased workload and extended time frame for completing work-related tasks is a serious problem for college faculty. In addition, the rapid obsolescence and consequent expense of maintaining and upgrading technology is a major concern of faculty who have come to rely on computer systems for office work, communication, and instruction. Participants in this study also cited the steep learning curve of technological innovation, both for faculty and students, as a major drawback to the use of new technologies. Other issues of concern to participants were communication problems such as the impersonality of email and other distance technologies, students' over-reliance on technology at the expense of the development of critical thinking skills, poorly coordinated purchases of technology resulting in incompatible hardware and software among departments and programs, and the lack of access some students have to computers outside of the classroom. While the percentages of faculty mentioning each disadvantage were, in general, lower than the percentages mentioning advantages of technology, the number of disadvantages was slightly higher than the number of advantages. Consequently, it can be seen that information technology creates at least as many problems for community college faculty as it does benefits.

Overall Effect of Technology

The "Overall Effect of Technology" category contains the responses to my final interview question which asked participants whether information technology, in general, made their work lives easier, more difficult, or had no effect. Forty-two participants

(61%) indicated that technology generally made their work lives easier. Only nine participants (thirteen percent) declared that technology made their work lives more difficult, most of whom blamed the volume of information available online for the increased difficulty. Surprisingly, none of the "more difficult" respondents seemed particularly resentful of the increased difficulty they perceived from their technology usage. One instructor explained, "Overall, I would say it probably has made [my work life] more difficult, but I'm learning ways to cope with that..." And another instructor announced that her work was "more difficult, but more fun."

Twelve respondents (17%) indicated that technology made their work lives easier in some respects and more difficult in others. An example is the instructor who admitted, "In the same moment that it frustrates the hell out of me it also makes some things... easier." In addition, six participants (9%) told me that technology had no effect on the difficulty level of their work lives. One instructor, who was one of the four "resisters" of technology in my study, admitted that technology had little effect on her work life because she uses little technology. But the other respondents attributed the lack of noticeable change to their having used technology for so long that recent innovations had little impact on the difficulty of their work overall. Finally, there were five respondents (7%) who insisted that the biggest effect of technology on their work lives was not on the difficulty level but on the quality. In other words, these five contended that technology made their working conditions better.

Free Thoughts

The Free Thoughts were mentioned during the free flow of discourse by the interviewees, independent of any prompting or questioning, yet seemed to be issues of importance to a significant number of participants. These concepts arose mainly in reply to my first two questions: "Tell me about your experiences with computer technology at work, both in and out of the classroom," and "Has technology changed how you do your job?" The purpose of these questions was to encourage the participants to talk at length about technology without addressing any specific issues or questions. I wanted them to tell me their "stories" at that point in the interview, and during the "storytelling" process, I identified certain concepts with enough frequency to warrant categorization.

The first Free Thought, "Students' Prior Knowledge of Technology," was placed into a free node because I could not find a tree node concept to which it was clearly related, and because it did not have component parts of any great significance. The other two Free Thought categories, "Purpose of Technology" and "Types of Technology Usage," were placed in tree nodes because they had subcategories of interest and of sufficient numbers to justify their distinction from the overall concept. Again, these are concepts that arose spontaneously during the interview process (as well as being embedded in some of the documents and conference notes), rather than as direct responses to questions.

Students' Prior Knowledge of Technology

Almost a quarter of the interviewees made statements about the level of technological competence that students exhibited at the time they entered the community college. Fifteen respondents (22%) mentioned that students were already proficient in computer usage before taking their first college course, while only one indicated that many students were ignorant of computer usage. Furthermore, six respondents commented that most of their students were" much more sophisticated" technology users than the faculty.

Ten of the comments in this category came from Suburban Community College with only three each from Inner-city Community College and Transitional Community College. The only respondent who did not indicate that most students were computer competent prior to matriculation was a math instructor at Inner-city Community College who commented that students' ignorance of computers "occasionally is a disadvantage, but again, with the [in-class] groups, there's usually one or two people who know what they are doing who can kind of assist the others." I had expected the student body of ICC to have less access to, and therefore less experience with, computers in their home and previous schooling environments than the students at the other two campuses because of the demographic differences. However, this is not corroborated by my data, since two of the three ICC faculty who commented on this topic indicated that the students overall are familiar with computer usage.

Purpose of Technology

A number of my interviewees made comments concerning the overall purpose they believed information technology serves for college educators. These comments are in the Free Thought category because I did not specifically ask my participants about the functions or worth of technology. Instead, these comments simply surfaced during the participants' discussions of other ideas. I found that the purposes mentioned fell into three categories: 1) Tool, 2) Workforce Preparation, and 3) Academic Support.

Tool

The largest of these categories was "Tool." Sixteen interviewees (twenty-three percent) made references to computer technology as being just one more tool that they used in their work. A Vocational/Technical instructor explained that in his department, "We view the computer as a tool. I will stand in front of all my classes and say, 'The computer is a dumb screwdriver.' We want it to do something for us." And another instructor stated that the majority of his students used computers outside of their college classes, and therefore he used computers in the classroom in order "to offer them the tool that they are already comfortable with."

Workforce Preparation

The second largest category in the Purpose of Technology tree node was Workforce Preparation. Thirteen data sources (fifteen percent), including ten interviewees (fourteen percent), described the use of information technology as primarily

for the purpose of preparing students for the labor force they would some day enter. One instructor observed that "[Technology] helps prepare our students for the world of work." The Chair of Mortuary Science at Suburban Community College informed me that the funeral industry had become much more dependent on computers in recent years; in fact, some states now require death certificates to be computer generated. He continued that, for this reason, he had to use information technology heavily in the classroom to prepare his students for the work in the field. And an English instructor insisted that technology "is what society is all about these days. When students start learning to use the technology now, it's going to make it easier for them when they get out [of college]."

The two documents that mentioned workforce preparation as the purpose of information technology included the City Community College Technology Committee minutes and The District Website. In the former, it was stated, "The college serves students! The [campus technology] plan needs to address student needs for access, critical technology skills, and resources required to prepare them for the world in which they now live." The latter contained the statement, "As the job market continues to demand greater competency in basic skills, and technology requires new training or retraining in many occupations, the number of students attending [the District] increases annually."

Academic Support

This subdivision of Purpose of Technology was mentioned in only two data sources - a conference and an interview. In the District-wide Technology Conference, a

speaker maintained that the major purpose of information technology was "reading and writing improvement." In addition, one interviewee commented that "the only purpose" for information technology in an academic institution is to assist the "academic process."

Types of Usage

The category labeled "Types of Usage" includes all comments concerning the ways in which faculty use information technology on the job. As the participants in this study discussed their experiences with information technology, four distinct types of information technology usage were evident in the discourse. Two of these were types of instruction: hybrid and distance. The other two were concerned with non-instructional, yet professional usage: routine office work and research. Some of these types were also referred to in email messages, documents, and by conference speakers.

Hybrid Classes

The largest subcategory of Types of Usage was the use of technology in "hybrid classes," which are courses in which advanced computer technology is infused into regular classroom instruction. This usage of technology was mentioned by forty-six interviewees (sixty-seven percent), as well as the City Community College Technology Committee minutes, the Transitional Community College website, the District-wide Technology Conference, and the CCC email messages. The CCC Technology Committee document describes hybrid instruction as adding "distance components to 'traditional' classes. Students either access resources online (assignment, syllabus) or they attend class

part of the time and participate electronically for other time [sic]." And the Transitional Community College website describes examples of this type of instruction: "A group of faculty [at TCC] are exploring using hybrid methodologies for teaching...Instructors are piloting the use of Personal Home Page (PHP) technology to publish student work, including building web pages and portfolios."

Forty-one of the respondents who mentioned hybrid instruction described or referred to their own experiences teaching hybrid courses. Only two of these respondents indicated that they did not like hybrid teaching. One complained that rapid changes in technology made the preparation of hybrid course frustrating, and the other remarked that the technology did too much of the work for the students and thus did not permit them to fully develop their skills or abilities. However, the majority of respondents who teach hybrid courses were exuberant in their praise of this type of instruction. One instructor exclaimed, "I have 16 wonderful laptops in my classroom, so my students all have wireless Internet in my class. We use the Internet sometimes to search for particular activities or sites I want them to do." And another instructor described how she uses all types of information technology in her classes, including " overhead projection, pad camera, digital camera, video, audio... PowerPoint, and multimedia to enhance learning."

The five interviewees in this category who did not teach hybrid classes at the time of the interview commented that they were interested in doing so but either did not have time to set up the courses, or taught in classrooms that lacked the necessary equipment or infrastructure for hybrid teaching. Furthermore, the four City Community College email messages that mentioned hybrid courses called for better equipped classrooms and more

support for instructors that want to create this type of course. At the District-wide Technology Conference, the four panel speakers discussed the pros and cons of hybrid instruction. The advantages mentioned mainly concern improved instructional methods and effects on student participation and retention. The disadvantages to hybrid instruction included excessive time burdens on faculty, technical problems, cost, and, in contrast to the advantages mentioned by panel, deleterious effects on student learning.

Thus, it can be seen that, as was the case with the advantages and disadvantages of technology in general, the advantages and disadvantages of hybrid instruction are virtually equal in number and percentage of response. Nevertheless, the majority of those instructors who have experimented with this type of course are pleased with the results. In addition, more faculty would teach hybrid courses if the obstacles of time and classroom setup could be overcome.

Office Work

The second-largest subcategory of Types of Usage was routine office work. Forty-three interviewees (sixty-two percent) described their usage of technology as including routine tasks such as word-processing (generally the preparation of exams and course materials), and sending and receiving email. There was also one document, the City Community College Technology Committee minutes that referred to "technologies that people use in their every day work activities." According to most of the respondents in this category, these activities include email, record keeping (especially student grades and other information), and word-processing of course materials such as exams and

handouts. Other routine uses of technology include budgeting (for department chairs), jotting down notes to oneself throughout the day on a hand-held computer, and ordering office supplies over the Internet.

Distance Learning

The third subsection of Types of Usage is distance learning, which refers to courses taught entirely online, with little or no face-to-face contact between instructor and students. Fewer sources addressed the issue of distance instruction than of hybrid instruction. Twenty-nine interviewees (forty-two percent), two documents (City Community College Technology Committee minutes and Suburban Community College website), the District-wide Technology Conference, and two email messages to the Dean of Instruction at CCC made some type of comment about distance learning, for a total of thirty-four sources (39% of all sources). Unlike the Hybrid Classes category in which nearly all comments were favorable, the Distance Learning category was almost evenly divided between approving and disapproving respondents. Therefore, I found it useful for analysis purposes to classify all comments made about distance learning as "positive" (referring to advantages of distance instruction), or "Negative" (referring to disadvantages of distance instruction). There were thirty-two positive comments about distance learning, which addressed fourteen separate benefits of this type of instruction, and twenty-seven negative comments, which addressed twelve types of detriments.

Positive Comments

Nine of the positive comments about distance learning dealt with its flexibility in regards to time and location of coursework. Five interviewees and four speakers at the District-wide Technology Conference praised the flexibility of distance learning as a benefit for many students, particularly those with full-time jobs, children, or homes at a considerable distance from the college. In addition, four District-wide Conference speakers listed career preparation for students as an advantage of distance learning. This mainly referred to the development of students' computer skills at the same time that the students were learning the course content.

All other types of positive comments concerning distance learning were mentioned from one to three times. These included: students' and instructors' enjoyment of the distance format, and worldwide information available online (three times each); better instruction than traditional lecture format, better student-teacher interaction via email than face-to-face, and the ability of the instructor to post all course information online (twice each); and better student-student interaction than in a traditional classroom, improvements in students' overall literacy, and preclusion of biased grading based on students' observable personal attributes (once each). In addition, one instructor argued that the students who sign up for distance courses are, in general, a higher caliber of student than those who take most traditional courses.

Negative Comments

The largest number of negative remarks about distance education concerned its impersonal nature (which should be compared to the subcategory Communication in the Disadvantages of Technology section above.) Nine sources criticized distance education as lacking the warmth and humanity of a traditional classroom. For example, one instructor speculated that she might like to try a distance course some day, but then confessed, "I don't know if I am a distance teacher really because I like the students so much, and I like being with them."

Two other types of negative comments on distance learning were mentioned by four participants each. The first is that the instructor just did not like this type of instruction, which was most forcefully stated by the interviewee who declared, "I would rather sweep the freeway at night wearing black than teach a course online!" The second type of negative comment about distance education that also occurred four times was the amount of time required for an instructor to set up and run a distance course (which should be compared to the first subcategory of the Disadvantages of Technology section above). These commenters bemoaned the excessive time burden for course planning and maintenance, compared to three respondents in the Hybrid Classes subcategory that listed time as a detriment. It should be noted, however, that the breakdown of comments into the specific topics of "Hybrid Classes" and "Distance Learning," while useful for overall comparison, does present at least a somewhat misleading view of the issue of time as related to instructional technology. This is because most of the comments on the problem of time and workload that occurred in the data sources did not specify a particular type of

course or instruction, but rather referred to the general use of technology in instruction. Therefore, it can be deduced from the Time/Workload section of Disadvantages of Technology above that this issue is a much larger problem with both hybrid and distance instruction than the numbers of comments in either subcategory suggest.

The other negative comments in this subcategory were mentioned by only one or two sources each. This includes the much higher student attrition rate in distance courses than in traditional courses, the lack of institutional technical support for instructors, technical malfunctions of equipment, and the need for better overall institutional planning and organization of the distance education program, each of which was mentioned by two sources. Also, one source each mentioned poorer quality instruction with distance education, and students' lack of adequate computer skills to handle the online coursework. Distance education would appear from these data to be a more complex issue for college educators than hybrid instruction, as evidenced by the nearly equal distribution of positive and negative comments. Clearly, more research needs to be done on this topic to discern whether the benefits or the drawbacks have the greater impact on instructors and students.

Research

The final type of technology usage mentioned by respondents in this study was personal or professional research. (The former refers to any non-work related studies, such as researching one's own genealogy, and the latter refers to institutional or instructional research conducted by faculty either on behalf of the college or as modeling

behavior for students.) Although this was the least mentioned type of usage, twenty-six percent of the interviewees indicated that they used their office computers to do some type of research. There were, however, no documents or conferences in this category. Specific types of research mentioned include Internet "marketplace" searches for office or classroom supplies, archive searches by librarians, and in-class modeling of online research techniques for students.

Summary of Free Thoughts

Three major concepts emerged from the data that were not specifically related to my research questions. The first is that, by and large, students enter the community colleges already familiar with computer technology. The second is that information technology is generally perceived as a tool for facilitating instruction and office work, and secondarily as a means of preparing students for the labor force. Finally, most faculty use information technology to teach hybrid courses and to do routine office work, with fewer employing it to teach distance courses or to do research.

Chapter Summary

In this chapter, I have described the concepts that arose from the data sources via the process of discourse analysis and the application of grounded theory. I grouped these concepts into two main categories: Research Issues, which included those concepts that addressed the research questions, and Free Thoughts, which included those concepts that did not. Among the most notable of the Research Issues are that faculty generally

perceive their input into technological decisions to be respected, that most faculty would increase their usage of technology if that were feasible, that the technology used in community colleges is largely "inflexible," in that it causes people and the environment to adapt to the technology, and that technology is perceived by most faculty as either making their work lives easier or else not effecting the difficulty level. Furthermore, the most salient advantages of technology included enhanced communication, increased efficiency, improved instruction, and access to a wide variety of information, and the most prominent disadvantages of technology included increased time/workload burdens for faculty, the rapid obsolescence and consequent high cost of technological innovations, equipment malfunctions and limitations, and hindrances to communication. The Free Thoughts category included the comments indicating that students are generally familiar with computers prior to enrolling in college, that technology is seen as mainly a tool and as a method of workforce preparation by most faculty in the study, and that faculty generally use technology to teach hybrid courses and to do ancillary office work.

In Chapter 5, the relationships among the data categories will be examined in more detail. In particular, I will discuss how they relate to my overall topic and original research questions, as well as their relationship to the theoretical framework of this study.

CHAPTER 5

DISCUSSION

Introduction

The discourse of the interviewees in this study, as well as the other data sources, revealed a plethora of disparate and sometimes conflicting issues and perceptions of technology's impact on community college faculty. These issues will be examined and discussed in this chapter in order to draw conclusions concerning the overall effects of the proliferation of technology on faculty in this community college district. The first section of this chapter discusses the research questions on which this study was based. The second section discusses some of the issues raised by participants that did not pertain to the research questions. The over-arching purpose of the data collection, analysis, and this discussion of the data is to gain insight into how information technology is changing what community college faculty do, how they do it, and how they perceive their working conditions.

Research Questions

The interview, email messages, documents, and conference data were collected for the purpose of determining: 1) whether individual characteristics of faculty, including teaching field, gender, employment status, and the timing of the individual's adoption of technological innovations, affect the impact of technology adoption on the individual; 2) the extent of faculty input into decisions to purchase technology; 3) whether information technology usage tends to change the power and status of faculty, and if so, in what ways;

4) what advantages and disadvantages of technology usage faculty observe; and 5). whether the changes brought about by technology usage can be attributed mainly to the nature of the technologies themselves, by the ways in which the technologies are used, or by some combination thereof. In this chapter, each of these questions will be examined in light of the data analysis described in Chapter 4.

Effects of Individual Characteristics on Technology's Impact on Faculty

The first question examined in this study was to what extent faculty idiosyncrasies such as gender, teaching field, employment status, and timing of technology adoption affected the impact of technology on the individual. The data revealed no perceivable differences between men and women on any of the issues discussed in the interview process. There were thirty-nine women and thirty men who participated in the interviews, and the proportion of responses in each category was virtually the same for both genders. Likewise, there were no observable differences among the teaching fields on any of the issues discussed, although it is important to note that many of the fields represented in the study had only two or three participants each, while none had more than thirteen. Thus, the sample size of any particular field was too small to draw any generalizable conclusions. The same applies to the samples of adjunct faculty and department chairs, neither of which were represented by enough participants to yield discernible contrasts. As a result, the participants in this study must be considered a sample of the overall faculty population of this community college district, rather than samples of subsections

of that population, with the exception of the subsection "early adopters" (Rogers, 1983) discussed below.

About a third of the interview participants self-identified, as early adopters of technological innovations, according to Rogers' (1983) definition. The most notable finding concerning the early adopters is the lack of any notable differences between them and the other interviewees. There were equal numbers of men and women in this group, and their distribution among the three interview sites was proportional to the numbers of participants at each site. Most of the early adopters were in the fields of Communication/Fine Arts/Theater and Languages/Humanities, with slightly fewer in Science/Math and Library, two in Business/Computer Information Systems, and one each in Social/Behavioral Sciences, Vocational/Technical, and Counseling. Furthermore, the language they used in discourse and their responses to questions did not vary in any appreciable ways from the other participants.

As mentioned in Chapter 3, the fact that nearly half the faculty who were invited to participate in the study elected to do so, and the fact that a disinterest in the topic was a frequent reason given for their refusals, lead me to surmise that all participants were either undisclosed early adopters or "early majority" (Rogers, 1983), except the four who clearly identified themselves as resisters of technology proliferation. If this assumption is correct, the self-identified early adopters are representative of the participants as a whole. And the participants as a whole are representative of community college faculty who willingly embrace technology in their work.

Faculty Input into the Technology Decision-Making Process

The data reveal some basis for optimism that faculty have a voice in the decisions concerning technology made on their campuses and in the district as a whole. There are two major indications that faculty are not excluded from the technology decision-making process. First, two thirds of the participants in this study responded to the interview question on faculty input by stating directly that faculty have as much input into technology decisions as they choose to have, while less than a third indicated the contrary. Most of the respondents spoke of serving on institutional or district-wide technology committees either currently or in the past, or else of having regular contact with members of those committees. These committees form the basis of the "loop," or channel of communication by which information on new technologies or components of existing technology is transmitted among interested parties before purchasing decisions are made. Decision makers on individual campuses and in the district administration rely on the committees to provide the data needed to formulate sound technology policies and to choose among competing technology vendors to make purchasing decisions that will satisfy the demands of students, faculty, and other employee groups. Thus, membership on an institutional technology committee is the key method of influencing the technological decisions of a college, and membership on the district technology committee is the primary means of impacting technology decisions for the district as a whole. Furthermore, all the interviewees who mentioned the technology committees, including those participants who admitted to resisting technology, described the makeup of the committees as entirely voluntary. In other words, since faculty in this district self-

select their committee assignments, any faculty who chooses to can serve on a technology committee. Indeed, two of the four resisters of technology who participated in the study admitted that their lack of information or input regarding technology was due to their personal preference not to be involved in the process. Therefore, the data indicate that the decision-making process on technological purchases is open to all faculty who choose to participate.

The second indication that faculty have a voice in technology decisions is that only three of the sixty-nine interviewees indicated a desire to decrease their usage of technology, while nearly ninety percent expressed either satisfaction with their level of technology usage or the desire for increased usage. When added to the fact that less than fifteen percent of the participants mentioned being pressured to use technology by administration, these data reveal a general acceptance of technological decisions by the participants overall. Given that it is unlikely that faculty would so overwhelmingly embrace technologies they did not approve of, these data suggest that faculty viewpoints on technology usage form at least part of the foundation on which technological decisions are made in the participants' colleges.

However, there are also two reasons why caution should be taken in concluding, on the basis of these data, faculty have sufficient voice in technology decisions on their campuses and in the district. First, since only four of the participants in this study identified themselves as resistant to technology usage, whereas twenty identified themselves as early adopters of technological innovations, and nearly all expressed willingness to use technology in their work, the data in this study generally reflect the

perceptions of faculty who are likely either to place themselves on technology committees or else have regular meaningful contact with others who do. Thus, there is an inherent bias in the data toward the views of both early adopters and of those faculty who accept technological innovation even though not among the first to begin using it.

A second indication that faculty may not have as much voice in technological decisions as the responses to the direct question on faculty input might suggest is that more than a third of the respondents in this study were critical of the patterns of distribution of technology on their campus. This implies that the concerns expressed by faculty regarding dissemination of technological purchases have less impact on institutional policies than faculty presence on technology committees would indicate. This is particularly significant in light of the fact that most of the respondents were willing participants in the expansion of technology usage on their campuses, and thus would be more likely to place themselves in positions of influence in the technology decision-making process than resisters of technology would be. If more than a third of the faculty who are making an effort to incorporate new technologies into their work lives are dissatisfied with the distribution process, it would appear that faculty voice in the distribution process is not as powerful or effective as the majority of the participants in this study declared it to be.

Overall, the data give a strong impression of respected faculty voice in the technology decision-making process. This process is primarily guided by the efforts of technology committees in the individual colleges and for the district as a whole, and these committees are open to any faculty who choose to participate in them. Furthermore, most

faculty in this study expressed satisfaction with the types and amount of technology which with they work. However, most of the participants in this study are "early adopter" or "early majority" (Rogers, 1983) users of technology, and thus may not reflect the views of the population of all faculty in the district. In addition, despite the fact that the majority of respondents are willing technology users, more than a third expressed dissatisfaction with the distribution process of new technology purchases, indicating that their views on technology dissemination are not impacting policy decisions to the fullest extent possible.

Affect of Technology Usage on Power/Status Relationships

There was little in the interview discourse that overtly indicated that any major alterations in the formal power structure of community colleges are taking place due to technology proliferation. Only two participants mentioned a change in the overall chain of command at their colleges, with both declaring that information technology usage resulted in a flattening of the institutional hierarchy. One, a librarian at Inner-city Community College, referred to information technology as "the great leveler" on the grounds that the technology was too recent for any individual or small group of individuals to have so much expertise that they could purchase or use technology without collaborating with others. Thus, administrators were forced to include all employee groups in the decision-making process in order to obtain information necessary for the college as whole to allocate resources efficiently. In a variation on the same theme, a counselor at Transitional Community College speculated that email communication

would act to equalize power on campus by providing a swift and private channel of communication between lower and upper echelons of power. In other words, faculty and staff with grievances could bypass the normal chain of command and complain directly to top administrators without being observed to do so by their immediate superiors.

However, these two opinions must be contrasted with the eleven participants who spoke of administrative pressure on faculty to increase technology usage, and the fifteen participants who observed no change at all in faculty-administrator relationships. The former implies a reduction in faculty members' control of their work lives, and the latter suggests that technology has little or no effect on the power structure of community colleges. These conflicting data need to be examined in light of the theories of technologically influenced power shifts discussed in Chapter 2.

Of these theories, there is weak support at best for the enskilling theory of employee increased empowerment due to increased technological skill level (Vallas, 1993) since the participants in this study who had obtained technological competence had not advanced to higher status positions, and did not indicate any "increased degrees of freedom and decision-making responsibilities" (Rhoades, 1998, p. 180). In spite of the fact that about half of the participants indicated that they would like to increase the usage of information technology in their work, and about half asserted that faculty have a voice in the technology decision-making process both in the district and on their campus, the increase in skill level appears to affect only the work that faculty are already doing, and not to affect their position in the institutional or district hierarchy, or to increase their

professional autonomy and power to control their working conditions, as enskilling theory would predict.

In addition, the deskilling theory of employee reduced autonomy and status due to technology usage in the workplace (Vallas, 1993) also received little support from the data in this study, insofar as it predicts "more routinized jobs with downgraded skill requirements" (Rhoades, 1998, p. 180). Virtually all the participants in this study, including those who were admittedly resistant to technology infusion in their work, are advancing in technological skill level as is demonstrated by the fact that all participants mentioned using frequently upgraded computers and software programs on their jobs for communication and materials preparation, even if they did not use them in instruction. Furthermore, the data revealed that faculty regularly receive the latest technological innovations purchased by the district or the individual colleges, and that training in the usage of the latest technologies was continuously made available to faculty on every campus. As a result, the work faculty do both in their offices and in the classroom is actually increasing in complexity and variability as the technologies on their campuses are upgraded.

There is, however, some evidence in the data that technology proliferation on community college campuses promotes a variation of deskilling, referred to as the managerial extension of power (Rhoades, 1998), since technology usage results in the elevated skill level of faculty while increasing the control of administration over working conditions (such as longer work hours and more emphasis on distance courses in the curriculum). In addition, the managerial extension theory predicts that management will

ignore the current skill levels of employees even as managers "impose new skill requirements on jobs that are otherwise...compartmentalized" (Rhoades, 1998, p. 181), and there is evidence in the data sources that this may be occurring. None of the data sources gave any indication that faculty who incorporate new technologies into their work receive any recognition or compensation from either the college or district administration. Rather, the data indicate that faculty are not even granted release time from other duties in order to create and maintain technology-infused courses. Thus, managerial extension of power appears to receive the strongest support from the data of the theories of technology-influenced power relationships discussed in Chapter 2.

However, before the managerial extension theory can be accepted as the model that best explains power changes in the community college sector, further research is needed to examine whether other factors are contributing to alterations in the status and autonomy of faculty. For example, state and societal pressure on community colleges to increase technology usage may be diminishing the discretionary power of administrators as well as faculty. Furthermore, the technologies in use on college campuses may have inherent characteristics that limit the choices faculty can make about their work once the technologies come into usage. Therefore, the impact of technology on faculty-administration power relationships is an area that is critically in need of in-depth study to determine which factors are having the most influence, and how the working conditions of faculty are changing as a result.

Advantages and Disadvantages of Technology Usage

The data reveal an ironic parallel between the advantages and disadvantages of information technology usage mentioned by the participants, with each commonly reported type of one category offset by an equally prominent type of the other. In other words, most major advantages have corresponding disadvantages with nearly equal numbers of occurrences in the discourse. In fact, as Tables 3 and 4 show, the advantages and disadvantages categories are nearly equal in both number of subcategories listed and percentages of data sources mentioning each subcategory. The subcategories of both advantages and disadvantages are discussed below in relation to one another.

Relationship of Technology to Workload, Time, and Efficiency

The most commonly mentioned advantages of information technology usage were communication and efficiency, which overlapped considerably since much of the increased efficiency was attributed to the speed and convenience of email. Conversely, the most commonly mentioned disadvantages of technology usage were time/workload and obsolescence/cost/rapid change, which also overlapped since most of the increased time burden was attributed to the necessity of retraining faculty on new technologies before older ones were fully mastered. The irony is that the same technology that is reported, by more than eighty percent of the participants, to increase efficiency in the workplace is also reported, by more than eighty percent of the participants, to increase the amount of work that faculty must do and the time it takes them to accomplish it. A more detailed examination of the discourse only deepens this paradox. Twenty-two of the

participants who cited efficiency as an advantage of technology extolled email communication as a major reason for the increase in efficiency since messages could be transmitted to large groups of people at once and sometimes eliminated the need for departmental meetings. However, the same number of participants attributed the increase in time burden partially to email communication on the grounds that it takes longer to read a message and type a reply than it does to hear a message and respond verbally. Thus, equal numbers of data sources indicated that email communication increases efficiency and increases the time burden for faculty.

Similar paradoxes occurred with other aspects of efficiency and time/workload as well. Concerning course preparation, twenty-five participants attributed their increased efficiency to computers facilitating the organization of course materials, yet nineteen participants complained of the excessive preparation time necessary to create and maintain a technology-infused course. Similarly, six participants stated that they could accomplish more in less time with computer technology, while five insisted that computerized work takes more time than manual. And three respondents asserted that students learn faster in a technology-infused course, while three complained of having to take time away from content presentation to teach students how to use the technology.

There were some areas in which efficiency and time/workload were not directly parallel, and yet the two categories still tended to offset each other overall. For example, there were more than twice as many participants who attributed their increased efficiency to the speed of Internet searches for finding information as there were participants who attributed their increased time and work burdens to Internet searching that made too

much information available. Yet, this was offset by the thirty-one respondents who attributed their time and work increases to the continual need for retraining in the usage of new technologies. The other words, the gain in efficiency in one area is offset by increased time burdens in another.

Despite the ambivalence of the perceptions of technology's effects on efficiency and workload, a common thread can be discerned running through most of the comments in the efficiency and time/workload subcategories. This thread is that, on the one hand, computer technology creates more work for faculty, and that, on the other hand, it facilitates the accomplishment of the extra work. Respondents in both these subcategories insisted that they had more work to do since incorporating technology into their work lives, yet they also found that the technology permitted them to accomplish more in a shorter amount of time. Nevertheless, more than ten percent of the participants also spoke of the disintegration of work time/free time boundaries, indicating that they often stayed late at work, took schoolwork home, or read and answered work-related email at night and over the weekend.

According to Perlow (1998), this type of amorphous "boundary control" is typical of professionals who work in "knowledge organizations" (p. 328). Since knowledge work is difficult for managers to control, and since knowledge professionals generally have high enough status to work relatively unsupervised, the amount of time an employee spends at the worksite becomes the standard of measuring productivity. And high-status knowledge employees find themselves either spending a greater proportion of their time at work or taking large amounts of work home because the types of tasks they need to

accomplish are, in essence, never completed. The perception that "there is always something more that could be done" (Perlow, 1998, p. 330) also contributes to an overall "time famine" in which professionals are burdened with more work than can realistically be accomplished in any given work day (Perlow, 1999).

This sense of "time famine" and loss of boundary control made up the largest category of complaint among the participants in this study. Many bemoaned the ignorance of administrators who seemed to have no awareness of the extra workload that technology was placing on faculty. Indeed, only one data source – a conference speaker – had received any release time in order to establish a technology-infused course. Thus, it appears from the data that information technology is increasing the amount of work faculty accomplish while blurring the boundaries of work and home life, and decreasing leisure time.

Quality of Technology-Infused Instruction

A second area in which advantages and disadvantages both paralleled and offset each other was the quality of instruction using information technology. Improved quality of instruction was the third most commonly cited advantage of technology, after efficiency and communication, with nearly half the interviewees praising the effects of computer-assisted instruction on student interest, comprehension, skill or critical thinking development, and responsibility for learning. However, a larger percentage of respondents overall mentioned drawbacks of information technology to the learning process. Nearly sixty percent of these commenters spoke of frequent equipment failures

during class time, almost half contended that technological instruction (particularly in distance courses) was too impersonal for effective learning, over a third mentioned students' misuse of, or over-reliance on, technology (particularly the Internet), and almost a fourth insisted that technological instruction disadvantaged many students, especially those of low income, who lacked access to computers outside of class and thus could not keep up with wealthier students who had computers in their homes.

It would seem, then, that Eder (2001) is correct in insisting that the benefits of technology-infused instruction are unsubstantiated.

> When we consider the impact of computer-mediated communication on classroom instruction, on the interaction between faculty and students, on student-to-student interaction, and on student performance, the educational benefits asserted [by proponents of educational technology] have not been demonstrated (p. 29).

The interview discourse revealed a palpable enthusiasm and excitement concerning the growing use of technology in the classrooms of the interviewees, most of whom enjoy and support computer-aided instruction, yet, at the same time, revealed a "dark side," as one participant labeled it, of technology's impact on students and thus on the educational process as a whole. Although the comments concerning technology-infused instruction are generally more supportive than detracting, the detriments listed are serious enough to warrant further examination as soon as possible before technology's impact on instruction spreads further.

Availability of Information

The third most commonly mentioned type of advantage was the availability of information on the Internet and World Wide Web. Forty-three participants praised the volume of data made accessible via electronic search engines, many of whom observed that much of this information, including U.S. government archives and publications of international organizations, would not be accessible to faculty or to students without information technology. In contrast, only five participants argued that the Internet has expanded access to information too far, making more information available than can possibly be managed. However, an additional seventeen participants pointed out that much of the information available over the Internet is of questionable value either to students or faculty, and that students in particular often lack the critical thinking skills necessary to discern which Internet sites are reputable and which are frivolous or deceptive. Nevertheless, the data indicate that the majority of participants who commented on the availability of information via computer technology considered it to be an advantage of technology for community college instruction. These participants spoke of both faculty's use of the Internet for personal and professional research, and students' use of the Internet to develop research skills and obtain information for class assignments. Librarians in particular were likely to extol the value of the Internet in making global information accessible to students, faculty, and staff. In general, then, despite the corresponding drawbacks raised by interviewees, the participants were generally supportive of the use of electronic sources for obtaining information, and perceived this to be one of the major advantages of technology to college education.

Improvements in Technology

The fourth most commonly cited advantage of technology was the continuing improvements in the technologies used in community colleges. Thirty-one interviewees expressed the view that information technology is getting better all the time, and that current problems with technology will soon be remedied by these improvements. One example cited was the anticipated conversion of all computer hardware to wireless technology. If, as some participants predicted, the technology becomes completely wireless, this would eliminate the current disadvantage, mentioned by thirteen interviewees, of unequipped classrooms or older campus buildings lacking the necessary infrastructure to support technology-infused instruction. Furthermore, other improvements in technology mentioned by participants may eliminate or reduce the disadvantage, cited by twenty-two participants, of faculty and students using incompatible computer systems or software. In short, one of the greatest advantages of instructional technology is perceived by forty-five percent of the participants to be its continuous improvement, which has the capability of rendering moot current drawbacks to its usage in community colleges.

Other Advantages and Disadvantages

The remainder of the subcategories of advantages and disadvantages were mentioned by fewer numbers of participants, yet also exhibited the curious parallel contrasts shown by the above mentioned subcategories. One example is the advantage, mentioned by nineteen interviewees, of the pleasure that computer enthusiasts – among

both faculty and students - experience as technology is incorporated into every aspect of community college work. However, this contrasts with the fear or dislike of computers listed by thirteen participants as a disadvantage to technology usage at work. A second example is the flexibility of course time and location provided to students via distance education, mentioned by nineteen participants, which contrasts with the impersonal content delivery cited by thirty-seven participants as a major drawback to distance education. A third example is the support of technology by college and district administrators, mentioned by eighteen participants, in contrast to the failure of email communication to enhance faculty-administration relationships, mentioned by fifteen participants. Finally, helpful technical support, mentioned by twelve participants as an advantage on their campuses, contrasts with complaints about unhelpful technical support by eighteen respondents.

Summary of Advantages and Disadvantages

The most notable feature of the discourse on advantages and disadvantages of technology in community colleges is the virtually equal number of both categories and respondents. While this would not, perhaps, have been so impressive had the faculty sample included nearly equal numbers of resisters and early adopters of technology, it is remarkable that a sample so strongly skewed towards technology adoption would list slightly more types of disadvantages than of advantages of technology usage, and would exhibit similar percentages of respondents for both advantages and disadvantages. It would seem, then, that even among the faculty who are most willing to embrace new

technologies, the perception is strong that information technology creates serious problems that have not yet been sufficiently addressed by college leaders. While the overwhelming majority of participants indicated a desire to continue using information technology in both their instruction and their office work, they nevertheless revealed a level of frustration and apprehension that will clearly be problematic for community college instruction if not acknowledged and alleviated by campus leadership.

It must be reiterated here that these findings are particularly impressive in light of the fact that the sample population is biased towards early adopters and early majority users of technology. Had the interviewees been more evenly divided between users and non-users of technology, the nearly equal numbers of benefits and detriments of technology usage would have merely reflected the biases of the respondents. However, since nearly all the respondents were either high-end users, or aspiring high-end users, of technology, the number of references to technology problems and drawbacks is noteworthy as it indicates that these detriments are troubling even among those faculty most eager to use technology in their work. If the faculty who are most desirous of using technology are aware of as many drawbacks to technology usage as benefits, it can be deduced that the laggards and resisters of technology, who may comprise as much as 50% of all faculty, have valid reasons for their resistance. It would, therefore, behoove administrators in colleges that are seeking to increase technology usage to become more proactive in addressing the problems and hindrances that technology causes for faculty who use it.

Inflexibility of Information Technology

One issue raised in the literature review of this study, although not specifically asked of interviewees, is whether information technology impacts faculty by human design, or whether the technology acts on faculty work lives by its very nature, regardless of how it is used. Although the interviewees in this study were not specifically asked about the flexibility or inflexibility of the technology in use on their campuses, over seventy percent of the participants used language expressing the concept that the technology itself was altering the work environment apart from human intention. Thus, the discourse, as well as the other data sources, provides support for the view that the information technology used in community colleges is largely inflexible, according to Winner's (1986) definition.

The two strongest aspects of this concept were that faculty perceived themselves to be conforming their practices and behaviors to the technology, rather than adapting the technology to their practices and behaviors, and that faculty have come to rely on the technology to such an extent that it is no longer possible to choose not to use it, even though to do so necessitates continuous retraining and inordinate time commitments. While five participants attributed the pressure to continue using technology to administrative hegemony, nearly five times as many attributed the pressure in some way to the technology itself. In some cases, the pressure was perceived as coming from inherent aspects of the technology, such as online databases rendering other forms of information storage and retrieval obsolete. However, most of the respondents in this category attributed the need to continue and expand technology usage to an altered

environment in which society in general, and students in particular, could no longer function without the use of information technology. Examples of this altered environment include the increasing replacement by email of other forms of communication and the permeation of the workforce by computer technology to such an extent that job seekers lacking technological competence will no longer be employable in the near future.

Thus, if further research corroborates the findings of this study, it may indicate that debate over whether to employ or increase technology usage in higher education has already become irrelevant. Instead, the issue now facing community colleges, as well as other segments of postsecondary education, may be how best to incorporate technology into the mission and policies of the institution so as to maximize technology's benefits while mitigating its detriments to faculty and students.

Summary of Research Question Findings

First, idiosyncratic differences among interviewees in this study did not yield any conclusive trends or patterns concerning subgroups of community college faculty. While the sixty-nine interviewees in this study constituted a large enough percentage of the three interview sites to be considered representative of those sites, there were too few department chairs, adjuncts, and members of each teaching field to be considered representative of those populations, and there were no salient differences between male and female participants' responses or comments. In addition, twenty of the interviewees identified themselves as early adopters of technology, yet this group did not differ in their responses from the sample as a whole. The most likely explanation for this lack of

differentiation is that the sample population consisted of more than ninety percent early adopters and early majority (Rogers, 1983), and thus held similar views to those of the disclosed early adopters.

Second, the data reveal inconsistencies in the power of faculty to affect technological decisions on their campuses and in the district at large. While two thirds of the respondents affirmed that faculty input into the decision-making process was respected, a third of the participants also indicated that only those faculty situated within the appropriate channels of communication had access to the information necessary to technological decision making. Furthermore, over a third complained of inequitable or illogical distribution of innovations among employees and departments. On the other hand, faculty identifying themselves as resisters of technology infusion in their work admitted that they chose not to participate in the decision-making process. Thus, it appears that faculty input is solicited and acknowledged by college and district administrations, and that the decision-making process is open to any faculty who choose to participate, yet the input of faculty in this process may not be incorporated consistently into decisions made on technology purchases or diffusion.

Third, there was little evidence in this study that faculty are being enskilled or deskilled by their increased technology usage. Faculty are clearly increasing in technological skill level, yet not in power, status, or autonomy. Thus, the data suggest that technology proliferation in community colleges may be contributing to managerial extension of power by simultaneously increasing the technological skill level of faculty and reducing faculty control over working conditions. However, further research is

needed to control for other factors that may be contributing to the changes in faculty work life.

Fourth, participants in this study discussed approximately twenty advantages and disadvantages of technology usage in their work. The nearly equal numbers both of categories of advantages and disadvantages, and of respondents who commented on each category, preclude any clear assessment of the value of technology to community college faculty since, in effect, the scale tips evenly. However, the data do show a strong perception among the participants that information technology greatly increases their workload and time burden on the job even as it provides more efficient ways of accomplishing tasks. The data also reveal an ambivalence toward electronic communication, with nearly equal numbers of respondents praising the speed and convenience of email, on the one hand, and bemoaning the nearly unmanageable volume of email communication with which they must contend, on the other. In addition, the data indicate that faculty are hampered in their work by the rapid changes and consequent need for continual retraining in technological innovations, as well as by frequent equipment failures and limitations in the classroom. Nevertheless, many are optimistic that continuing improvements in the technology will eliminate these problems in the near future.

The fifth issue addressed by the data is the flexibility of information technology. There is considerable support in the data for Winner's (1986) theory of inflexible technology, since over seventy percent of the participants used word choices in their discourse that revealed perceptions of technology usage as unavoidable. Furthermore,

technology proliferation was described as both causing and resulting from alterations in the macro and micro environments of faculty (that is, society at large and the community college district). The result is a perception of technology as inevitable, self-sustaining, and necessitating the adaptation of people in the technological environment to the technology itself.

Discussion of Free Thoughts

As mentioned in Chapter 4, there were a number of comments during the interview process that did not answer specific interview questions. Nevertheless, these comments, which are referred to as "free thoughts," revealed topics that were of importance to many of the interviewees, and thus could be concerns of community college faculty in general. Two of these issues – students' knowledge of technology prior to matriculation, and the major purposes of technology as perceived by faculty - will be discussed in this section. The three other types of free thoughts - the speed of innovation adoption by faculty, administrative pressure on faculty to increase technology usage, and the inflexibility of technology - were incorporated into the discussion of research questions above because they yielded information that pertained to the research questions even though they were not responses to direct interview questions. Consequently, they are not discussed further in this section.

Students' Prior Knowledge of Technology

More than a fifth of the participants commented on the level of technological expertise exhibited by students entering the community college for the first time, with all but one of these respondents indicating that the new students were generally familiar with computer usage. In fact, six of these participants commented that most new students, particularly those entering community colleges directly from high school, are more technologically competent than most faculty. However, this reflects a paradox in the data since less than ten percent of the interviewees acknowledged that most students have access to computers outside of class, while nearly a fourth contended that many students lack access to technology off campus. Some possible reasons for this discrepancy include: 1) Students may be acquiring their technological competence in high school courses or on-the-job training programs, yet still not have computers in their homes; or 2) Participants describing student access to computers as limited may have been observing a lower-income population than the participants who described new students as technologically competent. Or third, faculty perceptions may simply be inaccurate, not knowledgeable about student behaviors and conditions. Clearly more research is needed to determine which of these possibilities, if any, accounts for the inconsistency of the data.

Purpose of Technology

The largest percentage of participants who made statements concerning technology's purpose in education listed it as a "tool" for accomplishing objectives rather

than as an end in itself. More than a fifth of the respondents indicated that they used technology to facilitate instruction or office work, yet did not consider it to be more central to their work than any other piece of equipment such as a telephone or overhead projector. The second most common purpose of technology mentioned by participants was the preparation of students for the labor force. Seventeen percent of all interviewees described technology as a necessary component in the career preparation of students, regardless of the students' majors or career plans. Finally, only two participants described the purpose of information technology in community colleges as academic support or public relations (that is, a method of attracting students to the institution).

It is particularly noteworthy that so few participants listed academic support as the major purpose of technology, especially in light of the fact that over half of all community college courses are in the academic (as opposed to vocational) curriculum (Kintzer, 1999), and that a third of all academic courses in colleges and universities now employ email as the method of assignment transmission and/or communication between students and faculty (Bee, 2000). Yet only two participants in this study described their usage of technology as primarily for the purpose of enhancing academic achievement of students. Further research is needed therefore to determine, first of all, whether these findings are generalizable to community college faculty across the nation and, if so, why academic support does not hold a more central position in technology usage on community college campuses. Some possible reasons for the latter that should be examined include: 1) The increased vocationalism in community colleges (Dougherty, 1994; Levin, 2001b); 2) The growing demand for technological career preparation by

students and society (Flowers, Pascarella, & Pierson, 2000); and 3) The overall pragmatism of community college faculty (Frye, 1994).

Conclusion

The "technology revolution" is changing every aspect of education in this country and creating enormous challenges for higher education faculty (Groves & Zemel, 2000). In spite of the fact that "educators are more averse to using computers than other professionals" (Dusick & Yildirim, 2000), during the four-year period between 1994 and 1998, the use of email in academic instruction jumped from eight percent of postsecondary courses in the U.S. to forty-four percent, and the use of the Internet in instruction doubled from fifteen to thirty percent of postsecondary courses. Furthermore, by 1998 nearly half of all colleges and universities had a mandatory student "user" fee for information technology (Flowers, Pascarella, & Pierson, 2000).

These data are not surprising given the student and public demand for technology-infused instruction. Students entering community colleges directly from high school in the twentieth-first century consider information technology vital to career development in a competitive global job market (Flowers, Pascarella, & Pierson, 2000). Add to this the pressure from federal and state government, as well as business and industry, on colleges to allocate more resources to technology, and it is little wonder that community colleges across the nation are increasing both their purchase and usage of technology on a wide scale. Yet, while numerous studies have examined the impact of information technology proliferation on students, few have looked at the effects this proliferation is having on the

faculty who must alter their teaching methods and adapt their courses and their work lives to an ever-changing, and ever increasing, array of technological innovations. Thus, this study is an attempt to fill in this gap in the literature by examining the discourse of community college faculty concerning the changes in their work brought about by computer technology.

First, however, the findings of this study must be contrasted with the findings of earlier studies with which they conflict. The first of these is the impressive, in-depth examination of instructional practices in community colleges across the United States by Grubb (1999). During his study of thirty-two colleges in eleven states, Grubb observed very little technological innovation in classroom instruction. This is a striking contrast to my own study in which the majority of respondents were using, or intended to begin using, some form of technology in their teaching. While it is possible that population differences may account for the variance in technology usage, I consider this unlikely given the number of participants and sites in each study. Rather, I consider it more likely that the discrepancy can be accounted for by a difference in observation and interview techniques. Specifically, it is possible that Grubb (or his research assistants) did not specifically ask faculty whether they used technology in their work, and that the classroom observations happened to occur on days in which technology was not being used. The latter could be accounted for by a possible perception on the part of Grubb's participants that the research team did not want to observe classes in which students were interacting with technology rather than with the instructor. While this, of course, is conjecture, it seems to be a reasonable explanation for the fact that such a recent study as

Grubb's failed to reveal high levels of technology usage among community college faculty, when my own study of just a few years later revealed considerable technology usage.

The second study that contrasts with mine is Seidman's (1985) landmark three-year research project on community college faculty opinions and perceptions of their work. The major conflict between Seidman's findings and mine involves the degree of satisfaction and optimism with which faculty view the community college work environment. Seidman described his seventy-six participants as largely frustrated and unhappy with their profession. He attributed this to intra-campus politics, student demographics, and "university envy," or the aspiration of most community college faculty to teach in universities. In contrast, the participants in my study were almost universally enthusiastic about their work, eager to incorporate new methods and technologies into their instruction, and optimistic about the future of their careers. In addition, none indicated any plans or desires to teach in universities.

Possible reasons for the differences between Seidman's study and mine could be: 1) The time difference (Seidman's study predates mine by more than fifteen years); 2) Population differences (About two-thirds of Seidman's participants were in the Northeastern United States, while only one third were in the Southwest); or 3) Differences in interview techniques, including how questions were phrased, and what types of feedback were given to participants during the interview process. However, I believe that the most likely explanation is the relationship of participants to the topic being investigated. In Seidman's study, faculty were invited to participate in focus groups

in which faculty discussed their work lives with one another in an open-ended format. It is possible that colleagues in such groups would tend to discuss and commiserate on problems far more than to extol the benefits of their working conditions, either in an effort to seek solutions to issues that were foremost on their minds at the time, or because they perceived that the problems were what the researcher wanted to hear. On the other hand, the participants in my study were nearly all technology enthusiasts who were responding to questions about technology. As a result, their discourse tended to reflect the enthusiasm they had for their work insofar as technology was a part of it.

In short, this study reveals a view of community college faculty that differs from those described in the studies of Grubb (1999) and Seidman (1985). The faculty who participated in my study were incorporating technology into their coursework to a significant extent, as opposed to Grubb's participants who appeared to use technology very little. And my participants expressed overall satisfaction with their work lives, and an expectation that their instruction and working conditions would continue to improve, in contrast to Seidman's participants who were generally dissatisfied with their work. The most likely explanation for both of these differences is, I believe, related to the percentage of participants in my study who were willing to use technology on the job. This bias toward technophiles in my sample resulted in data that reflected innovativeness in instruction and enjoyment of working with technology among community college faculty.

The stories told and language used by the participants in this study suggest five main conclusions. First, although faculty in this community college district have a voice

in technological decisions, and their input is both sought and respected by district and college administrators, faculty views on technology purchases and distribution among employees are not consistently reflected in the decisions ultimately made on individual campuses and throughout the district as a whole. Second, while the increasing use of technology at these three colleges does not appear to be enskilling or deskilling faculty to an observable degree, the data suggest that faculty are increasing in skill level while decreasing in professional autonomy and control of their working conditions, which is consistent with the theory of managerial extension (Rhoades, 1998). Third, the advantages and disadvantages of technology infusion into college instruction and office work are nearly equal both in number and salience to the faculty in this study. Yet one clear pattern emerges from the discourse: Technology usage increases both workload and time burden for faculty at the same time that it increases efficiency. As a result, faculty work longer hours on technology-infused course preparation and maintenance than they do on traditional courses, yet without any corresponding decrease in other duties or time demands, such as committee work, number of classes taught per semester, or number of students per course. This, again, is especially significant in light of the bias toward pro-technology sentiments among my participants. If this burden is a notable issue to nearly all the technology enthusiasts in my study, it must indeed be a serious problem among community college faculty in general, and especially to those who do not adopt new technologies quickly or easily.

Fourth, information technology appears to be inflexible in its effects on the people and environment surrounding it. This means that people and the environment must adapt

to the technology, and that usage of the technology creates the necessity for continued usage and continually upgraded technology. Fifth, despite the numerous drawbacks to technology usage mentioned by the interviewees, the majority of participants in this study are willing to incorporate technology into their work lives, and would do so to a greater extent if the time and resources were available, generally because they view technology as an educational tool, and as a necessary component of students' workforce preparation.

The major implication of this study is that since information technology may already have altered the community college environment to such an extent that its continued usage is irrevocable, it is critical that technology's impact on faculty and students be studied more thoroughly so that policies can be instituted quickly to minimize the detriments technology can produce for those who use it. In particular, community college leadership needs to become aware of the excessive time burden placed on faculty who create and implement technology-infused courses, and take steps to relieve this time burden via some type of clearly delineated policies, such as reduced teaching load for faculty proportional to the number of technology-infused courses they teach. In addition, technology purchasing and distribution decisions should be correlated more closely to the needs of the technology users – the faculty and staff – whose input should constitute the basis for planning and implementing technology policies. Finally, and most importantly, faculty need to be aware of the extent to which technology usage erodes faculty autonomy and power, and faculty and administrators need to negotiate and establish clear boundaries between work hours and personal time that are inviolable, even by email communication. Furthermore, these boundaries need to be explained to students as part of

institutional policy, so that student expectations of faculty availability are not unrealistic for the students or burdensome for the faculty.

No one has sounded the warning for higher education in the early twenty-first century more clearly than Hausknecht (2001).

> What we need is a real, full-scale critical discourse about the structure of the Internet, and we need it as soon as possible. We need not to wait, as with television; not until our social environment had been permanently transformed did media studies emerge as a legitimate field of study (p. 45).

The Internet, as well as other forms of informational technology, has already altered the educational landscape for community college faculty. Pressure from state and federal government, business and industry, students, and society at large is interacting with the nature of the technology itself to promote and increase technology usage on college campuses. As this study has revealed, the results are at once both beneficial and detrimental in ways that are paradoxically similar, that is, the benefits and detriments are often two sides of the same coin. Thus, continued technology proliferation needs much more careful planning than it has received up to this point, planning based on sound, empirical data that reveal the full scope of effects on faculty from technology-infused coursework. Only in this way can community colleges hope to attract the qualified and dedicated professionals necessary for these institutions to continue to fulfill their historic mission of making higher education accessible, and meaningful, for the local community.

[i] In this community college district, guidance counselors who also teach courses (such as Study Skills, or Lifestyle Changes) are referred to as "counseling faculty," and these were the members of Counseling Departments that were included in my study.

[ii] Similar to the counseling faculty described in Note #1, librarians in this district who also teach courses (such as Library Skills and Research Methods) are referred to as "teaching librarians," and it was this type of librarian that was included in my study.

[iii] The original collection of email messages sent to me from the Dean's office numbered 16. However, three of these were from professional or support staff, and one was my own response to the Dean's memo, none of which were included in my data set.

[iv] There was a considerable difference in this regard between the smaller community college district of my preliminary study and the large district of the present study. At the former, the faculty participants averaged an hour per interview with none less than 45 minutes. At the latter, interviews lasted an average of 30 minutes, with a range of 15-45 minutes.

[v] In this district, students who are native speakers of English and who are enrolled in remedial English, Reading, or Math courses are referred to as "developmental" students.

[vi] In this district, "release time" refers to a reduction of teaching load (usually from the required five classes per semester to four classes) for full-time faculty members who take on official extra duties, such as chairing a department or participating in a particularly demanding committee assignment.

[vii] In the fall semester of 2002, after the data collection phase of this study had been completed, the district administration reprogrammed the District-wide online messaging system to send an error message to anyone attempting to send email to everyone in the district at once, in order to reduce the number of "Spam" messages sent through the district email system.

APPENDIX A

Subject's Consent Form

PROJECT: Effects of Instructional Technology on Community College Faculty.

I AM BEING ASKED TO READ THE FOLLOWING MATERIAL TO ENSURE THAT I AM INFORMED OF THE NATURE OF THIS RESEARCH STUDY AND OF HOW I WILL PARTICIPATE IN IT, IF I CONSENT TO DO SO. SIGNING THIS FORM WILL INDICATE THAT I HAVE BEEN SO INFORMED AND THAT I GIVE MY CONSENT. FEDERAL REGULATIONS REQUIRE WRITTEN INFORMED CONSENT PRIOR TO PARTICIPATION IN THIS RESEARCH STUDY SO THAT I CAN KNOW THE NATURE AND RISKS OF MY PARTICIPATION AND CAN DECIDE TO PARTICIPATE OR NOT PARTICIPATE IN A FREE AND INFORMED MANNER.

PURPOSE
I am being invited to participate voluntarily in the above-titled research project. The purpose of this project is the principal investigator's completion of the requirements for a Ph.D. in Higher Education from the University of Arizona.

SELECTION CRITERIA
I am being invited to participate because I am an employee of a community college district. Approximately 30 subjects will be enrolled in this study.

PROCEDURE(S)
If I agree to participate, I will be asked to consent to the following: Approximately one hour of open-ended interview questions at a convenient location and time.

RISKS
There are no known physical risks to participation in this study. Psychological or social risks include the publication of personal information from the interview that the participant did not wish to be made public. I understand, therefore, that the principal investigator intends to take the steps described under "CONFIDENTIALITY" below to minimize this risk.

BENEFITS
I understand that participation in this research project will not benefit me in any way.

CONFIDENTIALITY
Pseudonyms will be assigned to all participants, their colleges, and the college district, and will be used in all written notes, transcripts of the interview tapes, drafts and final copies of the resulting dissertation. Only the principal investigator and her doctoral

committee will have access to the taped interviews, and these will be destroyed as soon as the dissertation is approved by the committee.

CONTACTS
I can obtain further information from the principal investigator: Cristie E. Roe, M.A. at (602) 285-7353. If I have questions concerning my rights as a research subject, I may call the Human Subjects Committee office at (520) 626-6721.

AUTHORIZATION
BEFORE GIVING MY CONSENT BY SIGNING THIS FORM, THE METHODS, INCONVENIENCES, RISKS, AND BENEFITS HAVE BEEN EXPLAINED TO ME AND MY QUESTIONS HAVE BEEN ANSWERED. I MAY ASK QUESTIONS AT ANY TIME AND I AM FREE TO WITHDRAW FROM THE PROJECT AT ANY TIME WITHOUT CAUSING BAD FEELINGS. MY PARTICIPATION IN THIS PROJECT MAY BE ENDED BY THE INVESTIGATOR FOR REASONS THAT WOULD BE EXPLAINED. NEW INFORMATION DEVELOPED DURING THE COURSE OF THIS STUDY WHICH MAY AFFECT MY WILLINGNESS TO CONTINUE IN THIS RESEARCH PROJECT WILL BE GIVEN TO ME AS IT BECOMES AVAILABLE. THIS CONSENT FORM WILL BE FILED IN AN AREA DESIGNATED BY THE HUMAN SUBJECTS COMMITTEE WITH ACCESS RESTRICTED TO THE PRINCIPAL INVESTIGATOR, Cristie E. Roe, M.A. OR AUTHORIZED REPRESENTATIVE OF THE Higher Education DEPARTMENT. I DO NOT GIVE UP ANY OF MY LEGAL RIGHTS BY SIGNING THIS FORM. A COPY OF THIS SIGNED CONSENT FORM WILL BE GIVEN TO ME.

_____

Subject's Signature Date

INVESTIGATOR'S AFFIDAVIT: I have carefully explained to the subject the nature of the above project. I hereby certify that to the best of my knowledge the person who is signing this consent form understands clearly the nature, demands, benefits, and risks involved in his/her participation and his/her signature is legally valid. A medical problem or language or educational barrier has not precluded this understanding.

_____

Signature of Investigator Date

APPENDIX B

INTERVIEW QUESTIONS

1. Tell me about your experiences with computer technology at work, both in and out of the classroom.

2. Has technology changed how you do your job?

3. What are the advantages and disadvantages of computer technology in a community college?

4. Does technology have any impact on the quality of relationships between:
   a) Faculty and students?
   b) Faculty and other faculty?
   c) Faculty and administrators?

5. Do you feel that you have any input into decisions about purchasing technology on your campus?

6. Would you change anything about either the purchase or use of technology on your campus if you could?

7. Would you like to use technology in your work more than you do now, less than you do now, or about the same? If more or less, what keeps you from doing so?

8. In general, does technology make your work life easier, more difficult, or no different?

APPENDIX C

TABLE 1
Site Characteristics

	Inter-City Community College	Suburban Community College	Transitional Community College	City Community College
Location	Inner-city; Low income to upper class; Am. Indian Tribe	Suburb; Lower to upper mid. Class; Retired	Outlying Suburb. Some agricultural. New mid class housing – rapid growth	Inner-city; mostly low income, large diverse immigrant population
Year Founded	1979	1965	1985	1920
# Students in Spring 2002	3,734	23,106	6,103	12,891
# F/T Faculty as of 9-6-2002	52	278	81	162
# P/T Faculty as of 9-6-2002	131	833	320	495

APPENDIX C, *continued*

Table 2
E-mail messages from Faculty to Dean of Instruction at City Community College

Respondent	Concepts
1. Female-Business/CIS	Disadvantages of Technology ▪ Obsolescence/Rapid Change/Cost ▪ Inadequate Technical Support ▪ Students' Lack of Access to Computers
2. Female-Communication/ Theatre/Fine Arts	Disadvantages of Technology ▪ Communication --Impersonal
3. Female-Languages/Humanities Chair	Purchase and Dissemination of Technology ▪ Faculty Input Respected
4. Female-Languages/Humanities	Disadvantages of Technology ▪ Obsolescence/Rapid Change/Cost
5. Female-Legal Studies	Disadvantages of Technology ▪ Obsolescence/Rapid Change/Cost ▪ Glitches/Limitations Purchase and Dissemination of Technology ▪ Misdistribution of Technology
6. Female-Librarian	Disadvantages of Technology ▪ Obsolescence/Rapid Change/Cost
7. Female-Science/Math	Disadvantages of Technology ▪ Inadequate Technical Support ▪ Unequipped Classrooms
8. Female-Wellness/Health/ Physical Education	Disadvantages of Technology ▪ Inadequate Technical Support Purchase and Dissemination of Technology ▪ Information Loop
9. Male-Communication/Theatre/ Fine Arts	Disadvantages of Technology ▪ Obsolescence/Rapid Change/Cost Purchase and Dissemination of Technology ▪ Misdistribution of Technology
10. Male-Languages/Humanities	Desired Usage ▪ More Technology
11. Male-Languages/Humanities	Types of Usage ▪ Distance Learning
12. Male-Wellness/Health/ Physical Education	Disadvantages of Technology ▪ Inadequate Technical Support Types of Usage ▪ Hybrid Classes ▪ Distance Learning Purchase and Dissemination of Technology ▪ Faculty Input Respected

APPENDIX C, *continued*

TABLE 3

Full-time Faculty

	Inner-city Community College				Suburban Community College				Transition Community College			
	M	F	DC*	Total	M	F	DC*	Total	M	F	DC*	Total
# Full time faculty in college				52				278				81
# Full time faculty interviewed	7	13	4	20	18	15	12	33	4	5	0	10
Business - CIS	2	0	0	2	1	0	0	1	0	1	0	1
Communication and Fine Arts	1	1	1	2	1	3	1	4	1	1	0	2
Counseling	0	1	1	1	1	0	0	1	1	0	0	1
Education	0	0	0	0	1	0	1	1	0	0	0	0
Justice Studies	0	0	0	0	1	1	1	2	0	0	0	0
Language and Humanities	1	2	1	3	3	3	2	6	1	1	0	2
Library	2	4	0	6	0	3	1	3	1	0	0	1
Science and Math	1	5	1	6	4	1	1	5	0	2	0	2
Social and Behavioral Sciences	1	5	1	6	1	3	1	4	0	1	0	1
Wellness/Health/ Nutrition/PE	0	0	0	0	1	1	1	2	0	0	0	0
Vocational Educ.	0	0	0	0	4	0	3	4	0	0	0	0

* Department Chair

APPENDIX C, *continued*

TABLE 4

Adjunct Faculty

	Inner-city Community College				Suburban Community College				Transition Community College			
	M	F		Total	M	F		Total	M	F		Total
# Adjunct faculty in college				131				833				320
# Adjunct faculty interviewed									1	4	n/a	5
Business - CIS												
Communication and Fine Arts												
Counseling												
Education												
Justice Studies												
Language and Humanities	0	1	n/a	1					0	2		2
Library												
Science and Math												
Social and Behavioral Sciences									1	0		1
Wellness/Health/ Nutrition/PE												
Vocational Educ.									0	2		2

APPENDIX C, *continued*

Table 5
On-Line Documents

Name of College Name of Document	Concepts Contained in Document
City Community College ▪ Minutes of Technology Committee Meeting	Purpose of Technology: Workforce preparation 1. Faculty Required Usage 2. Inflexible Technology 3. Speed of Adoption ▪Early Adopter ▪Resister 4. Advantages of Technology ▪Availability of Information ▪Flexibility ▪Collaboration with Others ▪Technical Support Helpful ▪Support by Administration --Belief in Increased Productivity ▪Improved Public Image of Institution 5. Disadvantages of Technology ▪Time/Workload ▪Obsolescence/Rapid Change/Cost ▪Glitches/Limitations ▪Communication --Impersonal ▪Learning Curve ▪Student Misuse/Over dependence of Technology ▪Inadequate Technology Support ▪Incompatible Systems ▪Students' Lack of Access to Computers ▪Poorer Quality Education ▪Property Rights Disputes 6. Types of Usage ▪Office Work ▪Hybrid Classes ▪Distance Learning 7. Purchase and Dissemination of Technology ▪Faculty Input Respected ▪Misdistribution of Technology ▪Information Loop

APPENDIX C, *continued*

Table 5, continued

Name of College Name of Document	Concepts Contained in Document
Suburban Community College	1. Advantages of Technology ▪ Communication ▪ Flexibility ▪ Improved Public Image of Institution 2. Types of Usage ▪Distance Learning

Name of College Name of Document	Concepts Contained in Document
Transitional Community College	1. Advantages of Technology ▪ Better Instruction ▪ Improvements in Technology ▪ Technical Support Helpful ▪ Supported by Administration --Belief in Increased Productivity ▪ Professional Development 2. Types of Usage ▪Hybrid Classes

APPENDIX C, *continued*

Table 6
District-wide Technology Conference

Concepts Mentioned	1. Speed of Adoption ▪ Early Adopter 2. Purpose of Technology ▪ Workforce Preparation ▪ Academic Support 3. Advantages of Technology ▪ Communication ▪ Efficiency ▪ Better Instruction ▪ Availability of Information ▪ Improvement in Technology ▪ Facilitates Writing/Editing ▪ Enjoyment of Usage ▪ Flexibility 4. Disadvantages of Technology ▪ Time/Workload ▪ Obsolescence/Rapid Change/Cost ▪ Glitches/Limitations ▪ Communication ▪ Impersonal ▪ Sloppy Writing ▪ Learning Curve ▪ Student Misuse/Over dependence of Technology ▪ Inadequate Technical Support ▪ Incompatible Systems ▪ Fear/Dislike of Technology ▪ Poorer Quality Education ▪ Security ▪ Property Rights Disputes 5. Types of Usage ▪ Hybrid Classes ▪ Distance Education

APPENDIX C, *continued*

Table 7
City Community College All Employee Day of Learning

Concepts Mentioned	
	1. Speed of Adoption • Early Adopter 2. Advantages • Communication • Efficiency • Better Instruction • Availability of Information • Enjoyment of Usage • Flexibility 3. Disadvantages • Glitches/Limitations • Communication • Impersonal • Learning Curve • Fear/Dislike of Technology 4. Types of Usage • Hybrid Classes • Distance Learning

APPENDIX C, *continued*

TABLE 8

RESEARCH ISSUES

Category	Number of sources	% of sources
Speed of Adoption		
1. Resister	7	9.3%
2. Early adopter	22	29%
Purchasing / Disseminating Technology		
1. Purchases not timely	9	12%
2. Ignorant administration/students	4	5.3%
3. Good dissemination	5	6.7%
4. Faculty input respected	49	65%
5. Faculty input ignored	20	27%
6. Need to be in loop to get information	23	31%
7. Misdistribution of technology among faculty	26	35%
Desired Usage		
1. Want more technology	37	49%
2. Want less technology	3	4%
3. Satisfied with current usage	30	40%
4. Want different usage	2	2.7%
Overall Effect of Technology		
1. Easier	41	55%
2. More difficult	9	12%
3. No change	6	8%
4. Both easier and more difficult	12	16%
5. Better	5	6.7%

APPENDIX C, *continued*

Table 8, continued

TYPES OF USAGE

Office Work	Respondents 44	Percentage 59%

Hybrid Classes	Respondents 50	Percentage 67%
1. Use it (1 doc)	40	80%
2. Want to use it, but		
a. Lack time	3	
b. Lack infrastructure	2	
3. Don't like it		
a. Passive learning	2	
b. Glitches	1	
4. One CCC e-mail: need more support for instructors	1	
5. Conference Speakers		

ADVANTAGES	DISADVANTAGES
A. Better Instruction	A. Learning curve
B. Real world preparation	B. Time (e-mails and set-up)
C. Developmental students write longer papers on line.	C. Incompatible computer systems.
D. Students communicate more in depth with instructors.	D. Glitches
	E. Cost for students (technology fees)
	F. Students interaction more superficial.
	G. Unengaged students do their own business.

Research	Respondents 18	Percentage 24%

Distance	Respondents 33	Percentage 44%
1. 30 interviews, 2 CCC e-mails, 1 document, 8 conference speakers)	41	
2. 13 types of positive comment	32	78%
3. 11 types of negative comment	27	66%

APPENDIX C, *continued*

Table 8, continued

ADVANTAGES OF TECHNOLOGY

Advantage	Number of sources	% of sources
1. Efficiency	59	79%
2. Better instruction	49	65%
3. Communication	64	85%
4. Availability of information	43	57%
5. Cost effective	3	4%
6. Universal contact with colleges	21	28%
7. Access to computers is easy for most students	7	9.3%
8. Tech support, helpful	12	75%
9. Supported by administration • Make funds available • Believe technology improves productivity	18 3 2	24% 4% 2.7%
10. Paper trail/records	8	11%
11. Facilitates writing/editing	23	31%
12. Improved public image of institution	3	4%
13. Flattens hierarchy	3	4%
14. Pro-development	8	11%
15. Enjoyment of usage	19	25%
16. Improvement in technology	31	41%
17. Data analysis	2	2.7%
18. Flexibility	19	25%

APPENDIX C, *continued*

Table 8, continued

DISADVANTAGES OF TECHNOLOGY

Disadvantages	Number of sources	% of sources
1. Time/workload	61	81%
i. Class time	1	
ii. Out of class time	1	
2. Fear/dislike of technology	13	17%
3. Student misuse or over dependence	28	37%
4. Classrooms not set-up for technology	13	17%
5. Learning Curve	33	44%
i. TS	16	
ii. SS	17	
6. Quality of web information	13	17%
7. Tech support unhelpful	18	24%
i. Staff conflict with faculty	11	15%
ii. Slow	4	5.3%
iii. Unknowledgeable	4	5.3%
iv. Tech staff under compensated	1	1.3%
8. Obsolescence/Cost/Rapid Change	54	72%
9. Addictive	2	2.7%
10. Incompatible systems/user conflict	22	29%
11. Communication		
i. Misunderstandings	12	16%
ii. Lack of response	19	13%
iii. Impersonal	37	49%
iv. Abuse	12	16%
v. Spam	22	29%
vi. Fear of viruses	1	1.3%
vii. No change in Admin/Faculty Relations	15	20%
12. Too much information available	5	6.7%
13. Student access to computers difficult	17	23%
14. Security	8	11%
15. Glitches/Limitation	40	50%
16. No reduction in paperwork	3	4%
17. Property rights disputes	4	5.3%
18. Loss of interest in print media	2	2.7%
19. Students lack of interpersonal skills	3	4%
20. Take up space	3	4%

APPENDIX C, *continued*

TABLE 9

FREE THOUGHTS

Students Prior Computer Knowledge	Respondents 16	Percentage 21%
1. Students competent – Positive	8	
2. Students ignorant	1	
• Negative (not sure whether it's good or bad)	1	
3. Students know more than teachers	6	

Required Usage	Respondents 13	Percentage 17%
1. Feel pressure	5	
2. Accept being pressured	4	
3. Have heard of others being pressured	2	
4. Are pressuring others	2	

Purpose of Technology		
1. Academic support	2	2.7%
2. Tool	16	21%
3. Attracts students	1	1.4%
4. Workforce preparation	13	17%

Inflexible Technology	Respondents 53	Percentage 71%
1. Reliance on technology	23	43%
2. Conforming to technology	23	43%
3. Technology changes people	12	23%
4. Technology changes society	5	9%
5. Technology changes colleges	7	13%
6. Inevitable	7	13%
7. Blurs work boundaries	6	11%

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