AN ANALYSIS OF TECHNOLOGY INFUSION IN COLLEGE AND UNIVERSITY CAREER SERVICES OFFICES IN THE SOUTHWEST REGION OF THE UNITED STATES IN THE TWENTY-FIRST CENTURY

A Dissertation

by

BONITA DESIREE McCLAIN VINSON

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2006

Major Subject: Educational Administration

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Co-Chairs of Committee,	Stan Carpenter
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ABSTRACT

An Analysis of Technology Infusion in College and University as Perceived by Career Services Offices in the Southwest Region of the United States in the Twenty-First Century. (May 2006)

Bonita Desiree McClain Vinson, B.S., Mississippi State University;

M.A., Louisiana State University

Co-Chairs of Advisory Committee: Dr. Stan Carpenter
Dr. Bryan R. Cole

The purposes of this study were to: (a) provide a recent analysis of technology infusion in career services offices (CSOs) in the southwest region of the United States, (b) address the three recommendations from the 1998 Charoensri study of technology infusion in CSOs, and (c) provide an empirical examination of the impact of selected technologies in CSOs since 1998.

Field survey methods were adopted and modified for use with electronic distribution of the survey. A pilot study was conducted and suggestions were incorporated into the final version of the survey. CSO members of the Southwest Association of Colleges and Employers were electronically surveyed in the summer of 2004. The overall usable response rate achieved was 72.62%, nearly mirroring the 1998 response rate.

There are several findings from this study. First, significant differences existed in CSO use of computer and communication technology in the 2004 national study compared to the 1998 regional study. The majority of the uses of

technology by CSOs increased significantly over time. Second, significant differences were found in the use of selected technologies/uses of technology from the 2002 national study to the 2004 regional study. Third, institutional size and type were significantly different related to the use of one-way and two-way methods of communication and 15 selected uses of technology between CSOs, other CSO staff, faculty, staff, students, alumni, and employers. Fourth, CSOs have not increased the number of computer workstations from 2002 to 2004. Fifth, newer national vendor technology products used for job search assistance tasks were slow to be utilized in the southwest region, but regionally developed products were used more often. Finally, technology used to provide many of the services provided to students, alumni, and employers received above average satisfaction ratings (although varied) by CSOs.

Overall, the data gathered and analyzed through this study further support previous research and confirm significant changes in CSO technology use from 1998 to 2004. CSOs have also experienced significantly higher technology use from 2002 to 2004. CSOs are satisfied with technology products used in a variety of ways in their offices.

DEDICATION

To my father, the late Calvin Carl McClain, Sr., and my mother, Emily Williams McClain. It is with them that this all began. It is with them that this was nurtured many years before now. It is because of them that this has become a reality.

ACKNOWLEDGEMENTS

My Lord and Savior, Jesus Christ: Thank you for giving me this mission and providing me the inner strength to complete the task I was sent out to do.

Mr. Bradley Vinson, husband: You typed and typed and typed. You read and read and read. You edited and edited and edited. You saw me stare at the computer screen for hours on end when I should have been staring into your eyes. You wiped my tears and held me, and then you encouraged me. You hung in there through the good and challenging times. You were there for each victory. For all this and more I am ever so grateful. Some things words cannot express. All I can say now is, “brother, hang on to your britches!”

Mr. Leslie D. McClain, big brother: Out of your love for me and concern for my health, safety, and future, you issued a warning/threat to me when I was a teenager. I heeded your warning. Thank you for your role in shaping my life’s path toward this end and keeping me from another.

Mr. Nicolas Rical Fields, son: To the one God spoke into existence. You reminded me of the reason adults should never give up on teenagers. I still admire your resilience. This one is for you! Whatever you want in life is yours, but you have got to work hard and go get it.

Ms. Andria Nicole Fields, daughter: You were born to be many things including the sunshine of my life. Thank you for your light that shone on some of my darkest days and made them bright. I hope that your personal witness of

this project and process has made you as strong as it has made me. I did this for you. The future is yours.

Dr. Stan Carpenter, major professor and committee chair: You sacrificed so much of yourself to move the San Antonio cohort through this program. Thank you for your willingness to travel to San Antonio to instruct, lead, and guide us, encourage us, and fellowship us. Personally, thank you for the gentle reminders to keep going to the end without stopping. As a child hopes of her parents, I hope of you—my academic parent—that I have made you proud.

Dr. Bryan Cole, committee co-chair: Just when I thought I was pretty good, you became the keeper of the fiery furnace—making my work pure as gold. Thank you for taking a chance on me, providing sound and objective advice and instruction, and leading me through this process.

Mr. Richard Ringhand, sixth grade teacher (38th Street School, Milwaukee, Wisconsin, 1974-1975): You are my first memory of a teacher who had high expectations for his class and for each student to perform his/her best. My fifth grade teacher did not have high expectations, and I gave her what she expected. Thank you for instilling in me a high degree of expectancy, and thank you for the reward (a special trip for those of us who did well in class to the Milwaukee Museum and McDonald's). I know there are many more from which you have not heard, so on behalf of all of us, you made a big difference!

Dr. Brenda Richardson, mentor: Watching you is what started all this higher education business for me. Thank you for your influence, guidance, and advice. I will always admire you, your tenacity, smile, and good spirit.

Dr. Forest Dent Smith, mentor: You have been through it all and have emerged pure as gold. I can only hope that I can be to my children what you have been to me. Thank you for your superb example and allowing me to note your weaknesses. It is through the witness that I realized what it is like to be human, a complete woman, and a child of God.

Drs. Vicki A. Williams and Fred Bonner, II, colleagues: What in the world would I have done without you, cousins? You two were my cheerleaders throughout this process. Thank you for answering my endless questions. You helped make this process run smoothly and timely.

Dr. Patt Linden, colleague: It is not often that you run into someone you seem to have known before. Thank you for your timeless and endless pep talks. I love the stories you have shared with me over the last two years.

Ms. Lisa Cradit, colleague: Your command of the English language helped to make my drafts so near flawlessness that even the committee could not complain. Thank you for your time away from your family to edit a project with which you were not familiar.

Dr. John Sieben, colleague: I am baffled at how you could be dean of one college and interim of another and at the same time while willing to assist me in running and interpreting statistics. Thank you for your countless hours in assuring me that I really did know what I was doing all along. I promised that I would assist you on a future grant project in return. I am awaiting the call.

Dr. Maria Avalos, colleague: My most recent example of how to win at being a winner! The trips to Lola's were fabulous and appreciated.

Dr. Sonny Barrera, former supervisor: The many “teachable moments” have been worth it. You allowed me to do many things in my work that would expand my skill set and make me more marketable. Thank you for your support and sending a message to stretch myself.

Family, friends, colleagues, neighbors: There are too many to name here individually. Thank you for checking up on me and understanding when I hibernated that I did not turn my back on you. This is the evidence of the time I spent away from you.

Texas Lutheran University, work community: I know I talked and talked and talked about this over the years. Thank you for putting up with the talk and for your support and well-wishes.

Resurrection Baptist Church, spiritual community: Thank you for the well-wishes and prayers you provided. I know that on those days when I felt weak and unable to continue, your efforts lifted me up and gave me strength to do what others thought could not be done.

Southwest Association of Colleges and Employers: To the many career services office staff who responded to the requests to complete the survey. Truly, without your support, this study would not be completed.

National Association of Colleges and Employers: Thank you for the many reports and statistics I requested of you that you provided without reservation.

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CHAPTER I

INTRODUCTION

Background of the Study

The use of computer and communication technology has undergone dramatic change since the mid-1990s (Davidson, 2001; Sverko, Akik, Babarovic, Brcina, & Sverko, 2002). Colleges and universities have had to adjust their mode of operation with the infusion of technology in higher education (Bates, 2000; Brown & Duguid, 1996; Chickering & Ehrmann, 1996; Upcraft & Goldsmith, 2000). Individual divisions and departments on college campuses have made major shifts in order to accommodate their constituents and to benefit from the technology. Student services providers must meet the needs of students utilizing the technological applications they expect and demand.

College and university career services offices (CSOs) are no exception (Allen, 2000b; Stevens & Lundberg, 1998). Many changes have occurred in how technology is now used to provide services for students and employers—the main constituencies of CSOs. A gradual progression toward utilizing technology for CSO operations and day-to-day business and service to students can be tracked over the last 7-10 years (National Association of Colleges and Employers (NACE), 2002, 2004, 2005a, 2005b; Noll & Graves,

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The style of this dissertation follows that of *The Journal of Educational Research*.

1996). Charoensri (1998) was among the first to provide empirical insight into this trend through the findings of his dissertation research. His study examined the use of computer and communication technologies at CSOs in the Southwest. Major findings of his research included (a) a 100% usage of computers and communication technologies for daily office procedures such as word processing, for responding CSOs; (b) differences in the number of technologies used by small institutions (fewer) as compared to larger institutions (more); (c) public and private institutions did not show any significant difference in their usage of technology; (d) technology resources were used more for career counseling and job placement functions than for career education; (e) fiscal resources were not readily available to CSOs to experiment with or implement current technologies; and (f) CSO future plans did not include implementing new technologies due to lack of technical expertise. Furthermore, a survey by Nagle and Bohovich (2000) revealed CSO administrators “agreed that technology has completely transformed the way their offices operate” (p. 47). The National Association of Colleges and Employers (2002) concurred in that CSO respondents to their 2002 survey cited the impact and increasing use of technology as the biggest change in their jobs since the year 2000. By 2002, CSOs were using computers, Web sites, e-mail, and faxes to deliver career counseling, résumé exchange, and job announcements to students and employers.

Most college career services offices have three main obligations: (a) career development, (b) job placement, and (c) administration (Sampson,

1999). First, the career development component includes career counseling or advising, career education, and career planning for students and alumni. Next, the job placement component of CSOs entails assisting students and alumni in their job search, job preparation, and employer identification activities including job fairs, résumé referrals, and on-campus recruitment. In addition, most CSOs offer assistance with résumé writing, interviewing, and graduate or professional school preparation. And third, the staff must serve in an administrative capacity managing the technology, resources, fiscal responsibilities, and personnel involved. The explosion of technology infusion (mostly through computers and the Internet) in society, higher education, and CSOs since 1998 has impacted all facets of CSO operation (Eisler, 2001; McCarthy, Moller, & Beard, 2003). Adjustments in staff, fiscal allocation to technological resources, and interactions with outsourced vendors—just to name a few—have been made to accommodate both the need to compete with other entities and the need to keep up with constituent demands (Watts, 2002).

An emerging body of literature examined the use of technology in mental health counseling and career counseling. College students are the main constituents who seek assistance from the career services office in the form of career counseling or advising (Sampson, 1999). In fact, according to Nagle and Bohovich (2000), “of all the services available through career centers, career counseling is offered by the highest percentage” (p. 42) of career services office respondents—a trend that has remained the same since 1991. Duly noted in the research is support for the flexibility of using technological systems

in career counseling; however, valid concerns emerge from these publications that address the ethical questions of unsupervised Internet-based intervention (Sampson, Kolodinsky, & Greeno, 1997; Sampson & Lumsden, 2000). In addition, computer-aided career guidance systems (CACGS) have recently transitioned from computer work stations located in the CSOs or some other office to Internet-based systems that offer users more convenience and better accessibility for using the tools 24 hours a day, seven days a week (Sampson, 1999; Savard, Gingras, & Turcotte, 2002). As well, several commercial, online software systems (e.g., DISCOVER, SIGI) are offered to CSOs for a price (Schiller, 2000).

According to Feld (2003), very few peer-reviewed publications can be found that explore the use of technology on the job search assistance side of university career services offices. Technology in college student job search has become the recruitment tool of choice for employers and college-degreed job seekers compared to devices such as CD-ROMs, fax machines, and résumé disks used in years past (Charoensri, 1998; Nagle, 2001; Nagle, Bohovich, & Gold, 2001). Increasingly over the last 7-10 years, college students cite university CSO Web sites as their number one means of seeking employment (Allen, 2000a; Scott, 2002), thus eliminating the need for the previously listed job search technologies. Further, many proprietary and commercial vendors (i.e., MonsterTRAK, eRecruiting, NACELink, CSO Research, & Simplicity) provide job posting systems, résumé writing, and résumé exchange systems, in addition to career fair management software or services that are in high

demand by CSO staff, students, and employers. In fact, the competition has been fierce for companies wooing CSOs to sign up for their products at professional conferences, conventions, and annual meetings, and through direct mail marketing campaigns and campus visits. This outsourcing requires the CSO staff to become technology experts as new systems are adopted for the benefit of students, alumni, employers, and staff.

Statement of the Problem

University career services offices have been affected by the technological revolution; yet, little empirical, peer reviewed research has focused on the vast number of changes in the operation and services provided by CSOs. One of the first to do so was a 1998 dissertation research study by Pijarn Charoensri. He examined the infusion of technology in university CSOs in the six-state region claimed by the Southwest Association of Colleges and Employers (SWACE). In the study, Charoensri examined the use of technology by university CSOs and compared his data with that of a 1993 national CSOs survey. The dissertation mainly focused on the day-to-day use of technological devices in CSOs such as fax machines, word processors, and photocopiers.

Since then, no research has sought to follow up the study for progression and trends of technology in CSOs in the SWACE region or nationally. Furthermore, technological systems have drastically changed the manner in which CSOs operate since 1998. CSO administrators have little empirical data with which to base recommendations to their institutions for additional staff, technology, and budgetary resources to support changing

technological trends. Based on the recommendations by Charoensri (1998), further research is needed in eight areas of technology in CSOs. This study is designed to provide CSO administrators with empirical data needed to address technology issues within their offices by focusing on three of the eight recommendations from the Charoensri study. The three recommendations were:

1. A similar study should be conducted on the same population over the next 2 to 3 years for the progression and trends;
2. Additional research about the effective use of technologies in career centers should be conducted; and
3. Further detailed research should be conducted on a few selected technologies, such as job placement technologies or telecommunications technologies. (Charoensri, 1998, p. 153)

Purpose of the Study

This study served three purposes. The first purpose of this study was to provide a recent analysis of technology infusion in career services offices in the southwest region of the United States surveying the exact population suggested by Charoensri in his recommendation to study the same population for progression and trends. More specifically, the second purpose of the study addressed the three recommendations from the Charoensri study of technology infusion in CSOs as a whole by offering a comparison to one of the more recent surveys conducted by the National Association of Colleges and Employers (NACE). Finally, the third purpose of this study was to provide an empirical examination of the impact of selected technologies in CSOs since 1998—specifically addressing the Charoensri recommendation to conduct

research on selected technologies. In order to accomplish this examination of technological trends in university CSOs, the following research questions were used for the study:

1. Is there any difference in the use by career services offices of computer and communication technology in 2004 compared to the 1998 Charoensri dissertation study?
2. How do the 2004 research data on selected technologies used in career services offices in the southwest region of the United States compare with the career services office technology infusion trends found in the NACE “2002 Career Services Performance Measurement Survey”?
3. Is the size (as measured by student head count) of an institution a determining factor in the use of technology by career services offices?
4. Is the type of institution (private or public) a determining factor in the use of technology by career services offices?
5. Are there differences in use of technology in career services offices over time according to institutional size and type?
6. Since the 2002 NACE study, have career services offices increased the number of computer lab/workstation(s) under their supervision?
7. Are there differences in the numbers of computer workstations available to different groups in career services offices (as measured

by the number of computers available to professional staff/support staff/student staff)?

   a. As related to institutional size?
   b. As related to institutional type?

8. Does a relationship exist between the use of technology and percentages of resources (employee time and operational funds) that are allocated for
   a. Career education?
   b. Career counseling?
   c. Job search assistance?
9. Do career services offices use commercially based technology for use in
   a. Career education?
   b. Career counseling?
   c. Job search assistance?
10. What is the level of career services office personnel satisfaction with the use of technology in
   a. Career education?
   b. Career counseling?
   c. Job search assistance?

Operational Definitions

The following definitions were pertinent to this study:

Career Counseling: Deep level of client and professional counseling relationship and interaction. This may include addressing career development beyond those found in career planning (Oliver & Zack, 1999).

Career Development: The process of discovery, research, exploration, identification, and engagement into a career field.

Career Planning: The gathering of information, identification of occupations, and job search support. Clients may plan on their own or with the assistance of a professional (Oliver & Zack, 1999).

Career Services: College or university department that renders career development and/or job search assistance to students.

Internet: Electronic communications network that connects computerized networks worldwide in order to transfer information electronically between users (Sampson, Kolodinsky, & Greeno, 1997).

Job Search: The process of researching company information, preparing written communications, seeking employment, interviewing, and accepting employment offers.

Links: A piece of text or graphic used in a document or Web page to connect the user to another Web page via an Internet address (Sampson, Kolodinsky, & Greeno, 1997).

National Association of Colleges and Employers (*NACE)*: This professional organization comprises career services office personnel and corporate human resources professionals. Any institution in the United States may belong to this national organization.

Southwest Association of Colleges and Employers (SWACE): This professional organization comprises career services office personnel and corporate human resources professionals. States included in this regional association are Texas, Arkansas, Oklahoma, Louisiana, and New Mexico. Many SWACE members also belong to NACE.

Technology: Electronic devices, tools, computers, and machines designed to provide automation to its users in various applications.

Web Site: The collection of information resources on the World Wide Web for an organization or individual. It usually includes a home page and intra- or Internet links (Sampson, Kolodinsky, & Greeno, 1997).

Limitations of the Study

1. This study was limited to participation from career services offices in the five states included in the Southwest Association of Colleges and Employers.
2. This study was limited to participation from SWACE members with working e-mail addresses.

Significance of the Study

This research was necessary in order to provide empirical evidence of the trends of technology use in higher education career services offices. As the nature of work in college and university CSOs has changed, the research should reflect operational changes. CSOs have little, by way of empirical evidence, to support that changes have occurred in the way they have done business since 1998. The aim of this work was to add to the literature base that

outlines specific changes directly related to the increase in the infusion of technology in CSOs over the last several years. This study replicated and expanded a 1998 dissertation research study conducted on the infusion of technology in CSOs. It provided an examination of the same population in order to track technological progression and trends of technology use in CSOs in the Southwest. Further, size and type of institution was examined as related to the delivery of career services using technology. Additionally, data from this study were compared to that compiled by the National Association of Colleges and Employers (NACE), focusing on a few selected commercial vendors and the technological systems they use for career education, career counseling, and employment exploration. Finally, this study examined the effectiveness of technologies utilized by CSOs. The data resulting from this study were presented to and used by the Southwest Association of Colleges and Employers (SWACE) who in turn shared the results with its membership for the advancement of the body of knowledge in the career services profession. This study was designed to provide CSO administrators with empirical data with which they can base institutional recommendations for additional staff, equipment, hardware/software, and budgetary resources to support changing technological trends in the field of career services.

Contents of the Dissertation

The dissertation is organized into five major divisions or chapters. Chapter I contains an introduction, a statement of the problem, purpose of the study, research questions, operational definitions, assumptions, limitations, and

a research significance statement. Chapter II contains a review of the literature. The methodology and procedures implemented in the data collection are found in Chapter III. Chapter IV reports the analysis and comparisons of the data collected in the study as well as implications. Chapter V, the final chapter, presents the researcher's summary of findings, conclusions, and recommendations to the field and for future study.

CHAPTER II

REVIEW OF LITERATURE

This chapter focuses on the literature related to the infusion of technology in university career services offices. Specifically, it will review the impact of technology on society; in higher education, and its departments; major changes in CSO technology since 1998; recent CSO functions as they relate to technology; changes in career counseling and technology since 1998; changes in job search assistance and technology since 1998; and, CSO operations and technology since 1998.

Impact of Technology

Impact of Technology on Society

In 1997, Patterson warned, “Ready or not, here technology comes” (Opening section, ¶2)! The use of computer and communication technology has undergone dramatic change since the 1990s (Davidson, 2001; Langenberg & Spicer, 2001; Sverko, Akik, Babarovic, Brcina, & Sverko, 2002). Our society as a whole has been transformed by technological applications and innovations (Upcraft & Goldsmith, 2000). Davidson (2001) submitted that our lives are changing at a fast rate in virtually every aspect because of computers and technology. Five years ago, Allen (2000b) predicted the trend would continue. In fact, Allen held, “technology—electronic communications—will continue to refine and redefine the world of work as long as there are people inventing new technologies” (Opening section, ¶2). Miller and McDaniels (2001) note how challenging it has become to keep up with technology and that the greater

challenge is predicting where it is headed in the future. The benefits of technology are that it provides society with the ability to streamline processes, substitute resources, and support functions that are more and more complex (Falduto, 1999).

One phenomenon helps explain the transformation of technology as it transforms society. Moore's law holds that every 12-18 months, the power of computer chips or transistors per integrated circuit will double (Ehrmann, 2000; Falduto, 1999; Langenberg & Spicer, 2001). This means that components used today are twice as powerful as those used a year and a half ago; and those used in the year 2007 and 2008 will be twice as powerful as what are used today. The law has proven true, according to Langenberg and Spicer (2001), for over 35 years. Similarly, Katz (2001) likens technologies to buildings, but says technologies are more extreme in that they need to be replaced often. Mainframe computer systems had a life expectancy of 5-7 years prior to 1999, but by then the maximum expectancy was 3 years. Even software needs to be replaced or upgraded every 6-12 months.

According to Watts (1997), information technology including the Internet and the World Wide Web has had a major impact on how information is made available. Impacting the daily lives of its users, the Internet is an essential and widely used tool that increases accessibility to information and is used for communication, information gathering, and self-help (Korac-Kakabadse, Kouzmin, & Korac-Kakabadse, 2000; Kruger, 2000; McCarthy, Moller, & Beard, 2003; Reile & Harris-Bowlsbey, 2000). Additionally, Langenberg and Spicer

(2001) remind us “that the Internet, which is now an integral feature of all our lives, is [at the turn of the 21st century], less than a decade old” (p. 5). With changes occurring every decade, information technology does not have the chance to mature; therefore, the term *cutting edge* becomes difficult to define. In fact, an Internet year can be considered only three months according to futurists (Kruger, 2000). The most striking advantage of the Internet for its users is that it provides the option of accessing assessments, information, and instruction at almost any time and in any place including home or other locations (Kleiman & Gati, 2004; McCarthy, Moller, & Beard, 2003; Sampson & Lumsden, 2000).

Increasingly, higher education technology has become disposable and users must invest time and financial resources in keeping their systems up-to-date (Falduto, 1999). Langenberg and Spicer (2001) propose higher education information technology investments must be made to parallel technological changes—often every three to five years—a pattern unlikely to change in the immediate future. Unlike the relatively simple technology budgets of the 1980s, today’s higher education technology budgets are complex—far surpassing the million-dollar mark—as a result of the pervasiveness of technology (Falduto, 1999). Further, Falduto states, “ [higher education] technology may reduce the cost of an old process, it may make work simpler and provide less time-on-old-task for faculty and staff; but the money and time saved is used to support the cost of technology or to do other things” (p. 44). Mahoney (1998) found when it comes to controlling costs and improving educational quality, there is a growing

sentiment in society that technology is the key. But, even though Internet use doubles each year, connectivity costs cannot be proven to decrease at a pace comparable to its use (Lassner, 2000).

Impact of Technology in American Higher Education

The technological transformation sweeping organizations across the United States and the world also affects American higher education (Katz, 2001; Maughan, 2001a, 2001b; McRae, 1999; Upcraft & Goldsmith, 2000). A rising and widening array of computer and information technologies exists and the higher education enterprise must take advantage of them in order to keep up with a global economy (Pascarella & Terenzini, 1998). Maughan (2001a, 2001b) warned: “we have come to understand that if the United States is to maintain its place in the global economy, we must transform our institutions of higher education (IHEs) by infusing technology across the campus” (p. 17). In fact, critical to the future of American higher education is the relationship it shares with technology use within its enterprise (McRae, 1999). Colleges and universities have had to adjust their mode of operation with the infusion of technology (Bates, 2000; Brown & Duguid, 1996; Chickering & Ehrmann, 1996; Upcraft & Goldsmith, 2000). As early as 1999, Falduto recognized “technology is the most rapidly changing support factor that higher education has yet experienced” (p. 39). That fact has not changed. In recent years, Eisler (2001) considered communications networks and information technology as optimistically “wonderful opportunities for meaningful change in higher education” (p. 71). The environmental forces and internal dynamics faced by

institutions help them to determine the need to be connected. But, the concern becomes the quickness and adeptness of higher education as a whole to respond to these opportunities as well as any challenges (Korac-Kakabadse, Kouzmin, & Korac-Kakabadse, 2000; Upcraft & Goldsmith, 2000). In addition, Langenberg and Spicer (2001) concur that for future success, technology must be fully integrated on the contemporary college or university campus. This does not mean that higher education will change because of changing technologies, but rather "the emerging computational infrastructure will be crucially important in shaping an already changing system" (Brown & Duguid, 1996, p. 11).

It is important to understand that the quality of an institution's information technologies influences every aspect of its mission. Every person and effort (internal or external) must rely upon some form of technological magic from the information technology structure of the institution (Kruger, 2000; Lassner, 2000; Maughan, 2001b). But, if the power of the new technologies is to be fully realized, then the technologies should be employed in ways consistent with the "Seven Principles for Good Practice in Undergraduate Education" initially developed by Chickering and Gamson in 1987 (Chickering & Ehrmann, 1996). The *Seven Principles* are faculty and student interaction, community-building among students, active learning, feedback, task completion, expecting the best, and embracing diverse views.

Wireless communication is an increasingly popular technology in the higher education enterprise (Upcraft & Goldsmith, 2000). Lassner (2000)

established the importance and nature of technology use at institutions of higher education in previous years, and his theory holds true today. He contended:

> Although telephone service has long been considered a basic requirement, data networking has now joined telephony and electrical power as one of the standard utilities for the operation and management of the institution. A modern campus environment includes a data network outlet in every office, lab, library, classroom, and lecture hall. This outlet must provide access to campus network and information services as well as the Internet. Although telephone service is sometimes managed as an auxiliary enterprise and although video networks (for example, campus cable television systems) may have been developed by a media or audiovisual services unit, their management today is often combined as part of an integrated suite of telecommunications services. (Lassner, 2000, p. 37)

In addition, computing technology and network usage make it critical for institutions to develop clear and concise policies concerning access, content, privacy, fair, acceptable and responsible use, and security. Higher education technology administrators should give priority to ensuring that software, hardware, and communication media are user-friendly when institutional policies concerning learning resources are developed (Chickering & Ehrmann, 1996; Eisler, 2001).

The transformations higher education institutions have had to endure to integrate new technologies forced them to change in a way that was indicative of institutional management. Langenberg and Spicer (2001) pointed out the differences in what are called the old model of management versus the new management model. Operating under the old model, institutions were very time-and-place oriented, dealing with paper and physical credit card

transactions, physical locations, and staff. However, under the new model of management, institutions can operate as anytime, anywhere, self-service enterprises that use assessments to make administrative decisions. Electronic transfer is the mode of commercial transactions in the new model replacing the need for paper and pencil operations. Perhaps the best way to transform institutions of higher education is to use variety in our interventions, incorporating new technologies and traditional methods (Upcraft & Goldsmith, 2000).

The manner in which students receive instruction in the higher education enterprise has changed because of technology. New information and communication technologies are increasingly important to extend the reach of students and alumni across time and space. They are a major resource used in teaching and learning in higher education (Brown & Duguid, 1996; Chickering & Ehrmann, 1996; Hirt, Cain, Bryant, & Williams, 2003). They can help students learn in new and different ways. According to Chickering and Ehrmann (1996), for individuals these technologies can also provide organization and structure, self-reflection, self-evaluation, and self-help.

The Internet is only one aspect of the many technologies that are significant to educators and students in American higher education today (McRae, 1999). Students are “the new generation [who are] the ‘favorable’ and more dynamic learner, user and ‘explorer’ of any kind of information through the worldwide networking – without ‘suffering’ from any ‘barriers’ that the formal education system might impose,” offers Papas and Stefaneas (2001) (p. 1448).

They are willing to try out any new technology introduced to them. Watts (1997) contends that students are more and more technologically savvy and know how to make the Internet and technology useful for their lives. They also expect cutting-edge information technology from their institutions. “Peripatetic” is the descriptor Langenberg and Spicer (2001) ascribed to students of this new, modern generation (p. 10). They are willing to go or be anyplace at anytime to conduct institutional and personal business and leisure activities 24 hour a day, seven days a week (Katz, 2001; Lassner, 2000; Upcraft & Goldsmith, 2000).

Watts (2002) acknowledged anxieties in the ranks of professional counseling due to the use of technology in guidance services. He noted concern about the potential elimination of the human element in counseling once technology began to take over guidance tools. However, Kruger’s (2000) findings disproved the fears of some in higher education that the infusion of technology would lead to a decrease in the sense of academic community and human interactions. In his research on commuter students, Kruger submitted, “that for today’s users of the Internet, human interaction may actually be increasing [in that]…technology advances offer an array of benefits to commuter students that will strengthen their relationships with faculty, staff, and peers” (p. 68).

Upcraft and Goldsmith (2000) reminded higher education administrators that it is not necessary for users of services to be physically present on campus for them to be influenced by campus resources. Further, emphasis in programs and services will experience an enormous shift as service providers change the

campus environment to accommodate the wherever/whenever constituents. Similar to the old versus new management model presented by Langenberg and Spicer (2001), Upcraft and Goldsmith (2000) suggested that the impact of traditional technology and emerging technology on the student affairs profession is that student services have moved from the traditional campus-focused model to the emerging student-focused model in order to adapt to the needs and demands of constituents with new technologies.

Behrens (1998) proposed that small colleges and universities can maintain a competitive level of service because of technological advances. In fact, data provided by McRae (1999) reveals “34% of the top 100 ‘most wired’ colleges and universities were schools with an enrollment of fewer than 5,000 and 29 (29%) were from institutions with more than 20,000 students” (p. 86). Further investigation uncovers the critical need and value of Web sites for both the small and larger institutions to remain competitive within American higher education, as they were more likely to offer services to students on the Internet. Previously, many institutions merely provided informational Web pages containing general brochure-type information.

Boody (2001) exclaimed, “the use of technology in education, then, seems to be turning from an opportunity to an imperative—without any sound pedagogical basis without informed communal dialogue and decision” (p. 11). Institutions vary from a mile to a millennium in how much and to whom they deliver such a technological environment. However, as constituent expectations rise, new technological capabilities increase, and competitors

flourish, new forms of cooperation and innovation among traditional colleges and universities will be fostered (Katz, 2001). Replacing and updating technological systems is a costly and complex venture. In order for all the pieces of the puzzle to fit together, perhaps a coordinated effort is needed between many institutions of higher education in the United States and abroad (Bork, 1997).

Impact of Technology on Divisions and Departments

Dictated by the need for institutional survival, demands by constituents, and commands from administration, individual divisions and departments on college campuses have made major shifts in order to accommodate these demands and also benefit from technology. Fortunately and unfortunately, university divisions and departments rely on specialized information systems unique to the enterprise that assist administrators in the management of recruiting and admissions, registration and records, and academic advising among others (Lassner, 2000). In some ways, according to Eisler (2001), institutional departments have developed a dependency on technology resources for daily administrative processes. And certainly in student affairs as in other divisions of the institution, there are and will be many options for utilizing new technologies—making such efforts and possibilities endless (Kruger, 2000). Rather than make the department fit with the latest technology, Massy and Wilger offered in 1998 that only the areas that could profit most from technology-based strategies were those that had a high volume of students, thus eliminating the perceived need for some departments to invest

time and financial resources into elaborate, useless technologies. In 1999, student services in institutions of higher education were rarely offered online, McRae (1999) postulated, because at the time, student services practitioners were not well trained in technology. Those who ventured to learn flourished and found offering student services online well worth the effort. They discovered what Upcraft and Goldsmith (2000) suggested in reference to students,

> We can use technology to
>
> [1] communicate with students, and 'customize' our interactions with them without being restricted by time or place…
>
> [2] enable us to make students more knowledgeable about the many resources available to them, and provide needed information when they encounter a problem…
> [3] make our services, programs, and facilities more efficient and user-friendly. (p. 224)

Interestingly, McRae (1999) promised that the future of student services will include more sophisticated user-friendly technology.

Changes in Technology in Career Services Offices

The Last Decade

College and university career services offices are no exception when it comes to mainstream technological changes (Allen, 2000b; NACE, 2005b; Stevens & Lundberg, 1998). Over the last 30 years, CSOs have undergone phenomenal change and growth (McGrath, 2002). As they struggle with technological changes, they must make shifts in their daily operations to accommodate constituents rather than require them to hold fast to a specific

time and place and benefit from technology as well (NACE, 2005b). They tend to be one of two campus offices (along with the Financial Aid office) more likely to offer services online, believing that constituents expect them to be on the cutting edge of career-related technologies (Behrens & Altman, 1998; Mackert & McDaniels, 1998; McRae, 1999; Watts, 1997). As pioneers and explorers in technological systems and electronic communications, CSO staffs were some of the first in the higher education enterprise to discover ways in which they could streamline their operations, get work to move faster, and accommodate constituents more efficiently and effectively (NACE, 2005b; Patterson, 1997; Reile & Harris-Bowlsbey, 2000; Stevens & Lundberg, 1998). In fact, CSOs predicted that within the next 10 years, technology would have both negative and positive effects on their operations. They expect to be able to provide more services and to serve more students faster as distance counseling becomes more popular. They also expect a depersonalization of services, thus sacrificing high touch for high tech in a field where most CSO employees are trained to be relationship builders (NACE, 2005b).

Watts (1997) outlined the three ways to view the relationship of information technology to careers services. According to the researcher, the relationship

> Can be seen a) as a tool, extending the range of resources available, b) as an alternative, replacing other elements of the service; or c) as an agent of change, providing an opportunity to review the basic design of the service as a whole. The more it is viewed in the latter terms, the more its potential is likely to be realized. (p. 52)

Expanding the guidelines Watts designed, the National Career Development Association (NCDA) (1997) developed four creative ways the Internet could be used to provide career services to clients. NCDA suggested CSOs utilize these four methods:

1. To deliver information about occupations, including their descriptions, employment outlook, skills requirements, estimated salary, etc. through text, still images, graphics, and/or video….

2. To provide online searches of occupational databases for the purpose of identifying feasible occupational alternatives….

3. To deliver interactive career counseling and career planning services. This use assumes that clients, either as individuals or as part of a group, have intentionally placed themselves in direct communication with a professional career counselor….

4. To provide searches through large databases of job openings for the purpose of identifying those that the user may pursue….(Introduction section, ¶1)

On another note, in her study on the effects of university financial constraints on student affairs services from 1992 to 1997, Rames (2000) reviewed the frequency of changes in university funding to student affairs services offices. Relative to the job search side of CSO operations, 35.48% of the respondents noted a reduced amount of funds while another 35.48% noted no change in their funding. Still, only 12.9% declared an increase in the funds they received from their university. All in all, Rames' data reveal that during a time when technological advances were making their debut on the higher education fronts, CSO operating budgets overwhelmingly (70.96%) decreased or remained unchanged for the five-year period. The indication here is that CSOs had little if any financial resources to contribute to experimenting with

technological advancement during the same time period. Noll and Graves (1996) concurred: “although many career centers may have access to technology, they may not be using the technology as effectively as possible to increase productivity and streamline operations” (p. 46). One of the respondents to the NACE (2005a) survey spoke of the value of online resources to students, the need to be on the cutting edge of resources, but anticipating the costly use of such services. Davidson (2001) supported the need for financial and personnel resources to embrace technological changes and advances. However, by 2005, outside of personnel expenses CSOs spent more on technology than any other expenditure at an average of 14% of the operating budget (NACE, 2005a). This was true for institutions with more than 5,000 students, but not for smaller institutions. Interestingly, the same survey revealed 10% of CSOs believed that technology was “most likely to be targeted in a budget cut” (p. 10).

Fortuitously, CSOs on university and college campuses are increasingly making use of the Internet and Web pages to assist their users with career-related needs. Notwithstanding, technology affords many advantages, but it changes CSOs drastically (Davidson, 2001; Stevens & Lundberg, 1998). The mission and goals—along with the person or group targeted for access of a particular CSO—will determine the number of advantages it receives as a result of its online availability (Davidson, 2001; Sampson, & Lumsden, 2000). Today, nearly all CSOs (99.5%) utilize their office Web site and 93.5% offer a job posting system to their constituencies (NACE, 2005b).

Given the Internet as well as career information found on the Internet changes and expands constantly, CSOs must evaluate the resources they have, need, and desire in order to effectively and efficiently deliver online career services to an audience that can be vast in number and geographically dispersed (Davidson, 2001; Feduccia, 2003; Hansen, 2000; McCarthy, Moller, & Beard, 2003; Reile & Harris-Bowlsbey, 2000; Watts, 1997, 2002). Further, staff roles may be more important given the vast array of Internet sites that host information and resources related to career needs (Feduccia, 2003; McCarthy, Moller, & Beard, 2003). CSO staffs, then, serve as counselors, advisors or guides to information found online.

Career services and career assessment delivery have also been influenced by technology (Feduccia, 2003; NACE 2005b). Many changes have occurred in the manner in which technology is now used to provide services for students and employers—the main constituencies of CSOs. Davidson (2001) reminded us that in the midst of all the techno-hoopla that CSOs should keep in mind not all students need the same career services nor do all students operate the same way. What happened, according to Harris-Bowlsbey, Dikel, and Sampson (2002), was that resources and services for career choice became more accessible through the use of the Internet, but that does not mean that all students need the same level of access. Employers come to the table with varying levels of technological expertise as well.

Student services through CSOs make use of online, vendor-supported products. Career-related services are provided by the CSO using in-house

technology and/or commercial vendor supported hardware, software, or Web sites. Additionally, many CSO and commercial Web sites offer online résumé/job banks and online career assessment tests for student use (McRae, 1999; NACE, 2005b).

One concern of higher education administrators, namely CSO directors, is that of the impact of technology on student traffic to the office. Behrens and Altman (1998) discovered a negative correlation in CSO Web site sophistication and student activity at the office. Further, in her case study investigating the computerization of CSOs, Davidson (2001) reported the "issue of less and less walk-in students as a consequence of a Web site is an important one for career center professionals to consider" (p. 219). In that study, the university under investigation experienced a dramatic decrease in the number of walk-in students as the number of Web site users increased. This may not be as critical of an issue as Davidson reported in her case study because the number of visitors to a Web site can be tracked. Nevertheless, as Davidson goes on to point out, CSOs should be careful not to dismiss the high-touch approach to service delivery when high-tech methods are utilized. The high-touch approach maintains and involves human interaction between service provider and user; it also serves as an incentive to students who visit the CSO for assistance from personnel.

Increasingly more employers use high-tech means to recruit and hire new employees (Luckenbaugh, 1999). Job posting Web sites, electronic résumés, online applications, and optical character recognition (OCR) résumé

scanners are some of the technological tools utilized by employers to recruit and select individuals for interviews. Employers view high-tech methods as much more effective than traditional methods of advertising positions such as in newspapers (Fein, 1999; Horwitz, 2001; Noll & Graves, 1996). CSOs reported positive changes in their relationships with employers because of technology citing enhanced, time-efficient communication as a benefit especially to small schools/offices (NACE, 2005b) Still, face-to-face, on-campus recruitment remains the most effective method to recruit college students.

As stated earlier, commonly used computer and communication technology was incorporated for use in higher education systems during the 1990s. Specifically, a gradual progression toward utilizing technology for CSO operations and day-to-day business and services to students can be tracked over the last 7-10 years (NACE, 2002, 2004, 2005a, 2005b; Noll & Graves, 1996). For example, both the Compact Disc-Interactive (CD-I) multimedia and a Macintosh version of DISCOVER (a computer-assisted guidance system, (CACGS), were released in 1995 (Taber & Luzzo, 1999).

The Noll and Graves (1996) survey of CSOs is significant for tracking the origins of office-wide technology use in CSOs. Findings from the study include:

- Technologies of the day required personnel to redesign their work processes to gain the resulting improved functionality for both staff and clients.

- Personal computers were used by 94% of CSOs.
- The sole primary funding source (as cited by 13% of CSOs) was the university. Fifty percent of the CSOs generated additional revenues through their own efforts such as career/job fairs, while 35% accepted donations and gifts.
- Computerized counseling assessment (also known as computer-aided guidance systems or CACGS) was utilized by 64% of the respondents.
- Technology and its resources were catching on fast with students and employers so much that computer and information resources not already in use by CSOs were planned to be in use in the future by one-third or greater of the respondents.
- Nearly 100% of the respondents still used paper and clip boards in their facilities to post job openings

The researchers were careful to acknowledge that though technology use in CSOs was beginning to catch on, “what seems new and innovative today will soon become ‘standard operating procedure’ as new delivery systems are perfected and both job-seeking students and hiring employers can rely on consistent and reliable information [from CSOs]” (Noll & Graves, 1996, p. 46). They also note that as technology changes, CSO goals will adjust to reflect those changes, allowing them to provide the most cutting-edge, state-of-the-art tools.

A.G. Watts (1997) prepared a report on “Strategic Directions for Career Services in Higher Education” for the Association of Graduate Careers Advisory Services. The extensive, consultative report examined all aspects of CSOs including the infusion of technological systems. Section 10 of the document focused on the impact of information technology in CSOs. Watts made several salient observations, the most prophetic of all being that from 1997 and into the future, technology use would continue to grow and take new forms.

Two years after their previous publication, Noll and Graves (1998) surveyed only directors of CSOs to determine the centers’ infusion of technology and methods they use to familiarize students with new systems. Among the outcomes of the study, the researchers found:

- Position openings were advertised by 44% of the respondents on Web sites.
- Custom or in-house developed programs topped the list of software programs used to manage CSO services as reported by 30% of the directors.
- Although many CSOs did utilize various forms of technology in their office operations, they did not overwhelmingly infuse all available technology applications.

The same year as the follow-up study by Noll and Graves and the dissertation study by Charoensri (1998), Behrens and Altman (1998) released

the results of their study on the impact and implications of technology in CSOs. Their survey includes responses from corporate recruiters, CSOs, and students about their expectations of CSOs today and into the future. Findings from the study confirmed many issues lurking in the minds of CSO professionals. They include:

- Corporate employers were less advanced than CSOs in terms of technological advancement.
- Few employers utilized widespread, well-known technologies.
- CSOs found themselves in a state of transition and struggled within their own centers with technological changes.
- Ninety percent of CSOs provided Internet access for student use representing themselves as a technologically wired center.
- Eighty-three percent of CSOs indicated that they felt pressured to keep up with technological advances.
- CSOs felt confident in students' use and benefit from their technology-related offerings.
- CSOs felt that the infusion of technology in their center was very important to its operation and expected to rely on technology to a greater degree in the future.
- Pressures from top-level administrators to incorporate technology into office operations were felt by CSO personnel.

Similarly, Mackert and McDaniels (1998) noted a trend that CSOs may not take full advantage of technology and the Internet to advance their centers. Nagle and Bohovich (2000) warned that CSOs must take full advantage of computer and communication technologies. In some institutions, CSO Web sites are used for research on companies, résumé uploads, and credentials files by students. Additionally, students apply for jobs, develop cover letters, and sign up for campus interviews—all online and at any time or place they choose (Upcraft & Goldsmith, 2000). Both employers and CSOs realized by the year 2000 that electronic recruiting tools such as e-mail, databases, and Web sites were increasingly important in identifying college graduates because it is on those media that college students traffic (Allen, 2000b).

Sarah M. Toman previewed 696 articles published in six journals in an attempt to examine future research statements from authors. Her purpose was to identify subthemes related to technology use for career counseling (Toman, 2000). She predicted that technology would be a major theme found in authors' recommendations for future research. Her findings fell short of her expectations in that out of nearly 700 articles, "only four future-research statements related to the subtheme of technology" (p. 321). She attributes the extreme between her predicted outcome and the actual outcome of only 4 articles to mean that either she needed a new crystal ball with which to make predictions or that there was a large gap in the literature on technology use in CSOs (Toman, 2000). The latter is consistent with the findings of the researcher of this study.

Davidson (2001) held that CSO Web-based services provide a comprehensive environment of thousands of pages of information in one place at the touch of the fingertips. She later cautioned that the impact of Web-based career services is a mystery in that little data proves Web-based outcomes mirror outcomes of services provided in a traditional manner. In addition, Miller and McDaniels (2001) attributed the development of online technological systems like online career fairs, résumés, assessments, virtual career counseling, and job listings to CSOs by 2001.

Nagle (2001) was the only source that refers to the amount and use of office space CSOs are allotted on their campuses. CSOs report the breakdown of office space by function in that CSOs reported at least 10.8% of their total office space was devoted to computer lab/workstations for student use.

The value of recruitment information sources is tracked by Scott (2002) in her survey of students regarding technology use in recruitment. The longitudinal study gathered recruitment information over a five-year period beginning 1997. Scott benchmarked student perceptions of recruitment information for 1997, 2000, and 2002. The rankings represented several sources of information students' use in their job search. Consistently over the course of time, interaction with company representatives proved to be the number one source of job search information. Company Web sites as a source for job search information rose significantly from sixth place in 1997 to third place in 2002. Interestingly, commercial job boards were not cited as a source

of job search information by students in 1997 or 2000; however, by 2002 students utilized the sites enough for them to land a 7th place ranking out of 10.

Empirical Research

Feld (2003) acknowledged the lack of literature focusing on comprehensive CSOs, adding that most up-to-date literature placed emphasis on career counseling services, and that services are not always provided through the auspices of a CSO. He also noted the prevalence of technological resources and tools adopted by CSOs (Feld, 2003).

Charoensri (1998) was among the first researchers to provide empirical insight into the technological impasse facing CSOs through the findings of his dissertation research. His study examined the use of computer and communication technologies within CSOs in the Southwest. Major findings of his research included:

- a 100% usage of computers and communication technologies for daily office procedures such as word processing
- differences in the amount of technologies used by small institutions (fewer) as compared to larger institutions (more)
- type of institution (public or private) did not show any significant difference in their usage of technology
- technology resources were used more for career counseling and job placement functions than for career education

- fiscal resources were not readily available to CSOs to experiment with or to implement current technologies
- CSO future plans did not include implementing new technologies due to lack of relevant expertise.

In a survey by Nagle and Bohovich (2000) CSO administrators “agreed that technology has completely transformed the way their offices operate” (p. 47). The National Association of Colleges and Employers (2002) concurred in that CSO respondents to their 2002 survey cite the impact and increasing use of technology as the biggest change in their jobs since the year 2000. By 2002, CSOs were using computers, Web sites, e-mail, and faxes to deliver career services, résumé exchange, and job announcements to both students and employers.

Oliver and Zack (1999) acknowledged through their research the lack of published studies on career assessment on the Web despite the volumes of career-related Web sites. As such, by 1999, empirical literature available to support the use of the relatively large number of Computer-assisted Career Guidance System (CACGS) and the increasing number of Internet-based career assessment services was close to zero (Taber & Luzzo, 1999). In the few pieces of literature that were found, career assessment resources remained only a small portion.

Functions of Career Services Offices

Few empirical, peer-reviewed studies have been conducted on CSOs as comprehensive career service providers. In fact, literature written in the late 1970s and early-to-mid 1980s focuses almost exclusively on career *counseling* services provided to a large undergraduate population (Feld, 2003). This is important because while there is a lack of recent, relevant literature to support it, most college career services offices have *three* main obligations: career development, job search assistance, and administration (Sampson, 1999). The National Association of Colleges and Employers (NACE) conducted a national survey of CSOs in 2002. The organization learned that the Centers provide an array of services including:

- Career counseling/advising for individuals and groups
- Career development workshops
- Career resource library/center
- Résumé critiques
- Information sessions given by employers
- Job search workshops
- Career/job fairs
- Online/electronic job postings
- On-campus interviewing

In addition, Sampson (1999) added outreach to the list of services. Graduate and professional school practice exams and mock interviews are

additions to the CSO resource list provided by McKinnon (2002). Most of these services are provided solely to students although some CSOs allow alumni of the institution to access their services (NACE, 2002).

Career Development and Technology Since 1998

The career development component of career services offices includes career counseling or advising, career education, and career planning specifically designed for students and alumni. According to Ray (1998), a "Career Center is an office at a college or university with a mission to include any one of the following student services: 1) career counseling, 2) assistance with finding experiential education opportunities, and 3) assistance with finding full-time positions" (Ray, 1998, pp. 20-21). College and university students should expect CSOs to help them plan and actualize their career decisions (Harris-Bowlsbey, Dikel, & Sampson, 2002; Watts, 2002). CSOs can facilitate the career development process in various ways. The National Career Development Association (1997) insisted that CSOs and private career assistance entities actively engage in providing information and services such as those identified by NACE (2002). The NCDA listing also includes job networking assistance and career assessments. A CSO that is comprehensive, according to Ray (1998), should also included opportunities such as (a) drop-in/walk-in advising, (b) outreach programs, (c) experiential education, and (d) a Web site.

Increasingly, arguments are made in favor of the infusion of technology in the delivery of career services at colleges and universities (Noll & Graves,

1998). Computer and communication technologies designed for CSOs can take on many forms and assist constituents in many ways (Behrens & Altman, 1998, McCarthy, Moller, & Beard, 2003; Reile & Harris-Bowlsbey, 2000). Mahoney (1998) argued that technology should assist students to access and arrange internships as well as seek careers. The Internet technologies, according to McCarthy, Moller, and Beard (2003), have made great strides over the years and for career counseling and advising are increasingly important tools. With the infusion of technology, CSOs can provide assistance by communicating with constituents through e-mail and online videoconferencing (McCarthy, Moller, & Beard, 2003; Reile & Harris-Bowlsbey, 2000). Additionally, Dagley and Salter (2004) suggest benefits to college students and others with the use of an Internet-based career development system. In fact, one study cited by Dagley and Salter found nearly 40% of users of a specific Internet-based career development system would recommend the program to a classmate or friend.

Job Search and Technology Since 1998

Another component of CSOs—job search assistance—is no longer referred to as job placement by CSOs. It entails assisting students and alumni in their job search, job preparation, and employer identification activities including job fairs, résumé referrals, and on-campus recruitment. In addition, most CSOs offer assistance with résumé writing, interviewing, and graduate or professional school preparation. Students surveyed by Collins and Giordani (2003) and Nagle, Bohovich and Gold (2001) overwhelmingly cite CSOs and

their resources and assistance as the most helpful job search resource available to them over alumni, faculty, parents, and friends. Ray (1998) supported the notion that CSOs must provide their students job search assistance, job development, and employer/community relations.

Behrens and Altman (1998), Davidson (2001), and Upcraft and Goldsmith (2000) all agreed that CSOs can assist students with job search efforts by incorporating technological systems and applications into their daily operations. Boody (2001) suggested CSOs "provide…technology for students…to prepare them for the workplace" (p. 5). One of the key trends Allen (2000b) found was that many CSOs were "giving students online access to the career center's programs to take workshops, sign up for interviews, send résumés, and do research from their own dormitory rooms or homes" (Collaboration section, ¶3).

Students seemed to be a big support for the infusion of technology in their interactions with CSOs. A study conducted by Behrens and Altman (1998) identified the preferences and perceptions of college students in regard to their interaction with CSO personnel versus technology. An overwhelming 70% favored technology as a means to assist them in the job search process faster than traditional methods.

Employer expectations of CSO use of technology do not differ from those of students. In 1999, Fein declared from the employer standpoint that "high-tech means [for employers and CSOs will] include Internet job posting Web sites, electronic résumés and applications by e-mail, and optical character

recognition (OCR) to read and to enter résumés into data bases" (First ¶). And when corporate recruiters were surveyed (Behrens & Altman, 1998), data analyses revealed their preferences when interacting with CSOs. Seventy-six percent expect cutting-edge technologies for job/candidate placement and nearly all (91%) admit the technological advances made in the business sector should be mirrored by CSOs.

Administrative Operations and Technology Since 1998

To maintain the daily operations of the CSOs is a monumental task within itself. According to McGrath (2002), CSOs must meet the expectations of several constituencies including faculty, staff, students, employers, senior administrators, etc. Additionally, CSO directors must serve in an administrative capacity managing the technology resources, fiscal responsibilities, and personnel.

The explosion of technology infusion (mostly through computers and the Internet) in society, higher education, and CSOs since 1998 impacts all facets of CSO operation (Eisler, 2001; McCarthy, Moller, & Beard, 2003). Early on, researchers were concerned about the use of technology in CSOs. Behrens and Altman (1998), Mackert and McDaniels (1998), and Noll and Graves (1998) made note of the painful transition CSOs experienced as they attempted to incorporate technological advances in their centers even as technology improved and the Internet expanded. By 2000, the concerns had dissipated. Nagle and Bohovich (2000) conducted a survey of CSO leaders

and their use of technology. As a result of surveying 927 CSO directors, the data revealed:

> [CSO administrators are] enthusiastic about the effect of technology on their services. However, they also pointed out some drawbacks. On the plus side, technology has greatly facilitated communication with students and employers. It has afforded students' access to job listings and career information 24 hours a day, seven days a week. As a result, some practitioners have been able to discontinue evening office hours and, to a lesser degree, save on printing costs. Other technical capabilities, such as online registration and résumé banks, have enabled practitioners to streamline their office operations. On the minus side, the technology is expensive, in terms of its cost and the technical expertise required to use and maintain it. In many cases, technology has cut down on student traffic through the career services office, requiring greater effort on the part of practitioners to develop relationships with students, not coincidentally through electronic means. Overall, however, the respondents agreed that technology has completely transformed the way their offices operate. (p. 47)

Much can be said for CSO administrators and the daily decisions they must make not only about the use of technology, but about the ripple effect technology can have on everything they do and the manner in which they do it. Allen (2000b) warned CSO administrators about the importance of using technology to support their mission instead of writing mission statements to support technology.

Another concern of CSO administrators not mentioned by Nagle and Bohovich (2000) is the impact technology has had on CSO personnel. Notwithstanding the days of old when career counselors (for example) solely utilized counseling expertise and maybe a few printed resources, career counselors of today feel pressure and expectations to develop expertise in technological resources or already possess it when they are hired (Miller &

McDaniels, 2001). Similarly, in an overview of career services providers (university and other entities) and the impact technology has had on their work, Davidson, Heppner, and Johnston (2001) noted concerns for new requirements on credentials and training for career services providers given the emphasis placed on the need to be technologically savvy. Respondents to the NACE (2002) survey suggested, “the biggest change in their jobs was the impact and increasing use of technology” (staffing section, ¶3). It is important to note that during the same time period (academic years 2000-2001 and 2001-2002), the entire profession experienced the same impact and increase in the use of technology. One challenge for CSOs is to keep up with technology, but the other is to predict the direction in which it is heading and the impact that will have on their offices (Miller & McDaniels, 2001).

Adjustments in staff, fiscal allocation to technological resources, and interactions with outsourced, commercial vendors—just to name a few—have been made by career services offices to accommodate both the need to compete with other entities and the need to keep up with constituent demands (Watts, 2002). In fact, nearly 20% of CSOs thankfully added staff due to technological demands in their offices while other CSOs “reworked job responsibilities of existing staff” (NACE, 2005b, p. 5). CSO professionals have come to know that students and other constituencies desire a technologically advanced CSO and expect to have access to cutting edge technology to assist them with their career needs (Behrens & Altman, 1998).

The “2002 Career Services Performance Measurement Survey” was conducted by the National Association of Colleges and Employers (NACE, 2002). One part of the study inquired about changes CSO leaders identified in the amount of time staff members spent on various services in the 12 months prior to the survey. The greatest increases reported, “were in time spent working with technology and conducting career counseling via e-mail” (NACE, 2002, staffing section, ¶2). In addition, the results of the survey indicated an increase or leveling off in personnel time spent reviewing/evaluating vendors and their products. The study also reported the number of personnel assigned to CSOs. Respondents reported an average of 1.29 professionals employed in their centers specifically as technical staff whose primary responsibility was to deal with the day-to-day technological needs, issues, and strategies. By 2005, the need to keep up with technology was so great that “…some CSOs reported hiring student workers to help manage” the technology and technological systems used within the office (NACE, 2005b, p. 5).

Unfortunately, CSOs are at the mercy of the technology and technology-products industries for software, hardware, and systems that make office and program operations run effectively and efficiently. Technology has cost-saving potential for institutions, according to Upcraft and Goldsmith (2000), but data proving the savings were not overwhelmingly found. So, financial investments in technologies by CSOs must be calculated not just from year-to-year, but short and long-range plans must be enacted if CSOs wish to run state-of-the-art systems. CSO administrators should know that a good working information

technology plan should include making technology-driven purchases every three years (Langenberg & Spicer, 2001; Upcraft & Goldsmith, 2000).

Some of the software, hardware, Internet, proprietary, information, and communication technologies are widely used among CSOs. As well, some variation in usage exists across time and from center to center. Fax machines, personal computers, and the Internet topped the list of technologies used most often by CSOs, according to Nagle and Bohovich (2000). Their data has shown a significant increase in the use of fax machines in 1991 (64.3%) to 97.3% in 2000. As expected, the Internet and the World Wide Web were not reported to have been used in 1991 or 1993, but rates of 89.4% CSO usage of those two tools in 1997 and 93.6 % in 2000 indicate their immediate popularity in a relatively short time. Further, the research shows 26.2% of CSOs conduct video interviewing within their centers (Nagle & Bohovich, 2000). In the same study, career exploration software topped the list of the most commonly used software by CSOs.

Two years later, NACE (2002) published a report that released data showing that for CSOs, the following types of technology used most were a fax, e-mail, and Web site to deliver career assistance. In his dissertation study of Master of Business Administration (MBA) program CSOs, Feld (2003) asked participating centers about their use of technology for managing résumés, scheduling interviews, and position postings. He found that CSOs use a variety of systems including in-house developed systems, vendor-distributed products, and proprietary software to deliver the services.

Career Counseling and Technology

An emerging body of literature examines the use of technology in mental health counseling, career counseling, and career development. Feduccia (2003) reports that “technology has had a major influence on the delivery of career services and career assessment” (p. 19) now that the Internet is expanding exponentially (Reile & Harris-Bowlsbey (2000). Further, Watts (2002) viewed the role of technology for career services “as a tool, as an alternative, or as an agent of change” (p. 153). Change and growth occur over time indicating that CSO emphasis should be placed on a lifelong career process rather than primarily on job placement. It is critical that a variety of strategies be used to teach constituents proper use and evaluation of career-related technology systems (Hansen, 2000) given the increasing concern about the quality of career-related sites found on the Internet (Oliver & Zack, 1999).

Harris-Bowlsbey, Dikel, and Sampson (2002) outlined the following as three methods career service professionals can help students employ in the career decision-making process:

- First, upon assessing the needs of an individual, career counselors can assign specific Web sites for review.
- A second method…a counselor uses the Internet as a means of delivery of career interventions.
- Third, these two modes of service may be combined to form a *virtual career center*, a cyberplace that provides an integrated system of websites as well as support of their use by a cybercounselor. (pp. 4-5)

Use of Technology in Career Counseling

Duly noted in the research is support for the flexibility of using technological systems in career counseling (Harris-Bowlsbey, Dikel, & Sampson, 2002; Malone, 2002) given that the Internet is standard for use by career counselors (Maples & Luzzo, 2005; O'Halloran, Fahr, & Keller, 2002). CSO personnel have left no stones unturned when investigating technological considerations that benefit the career counseling profession (Feduccia, 2003). In fact, Maples and Luzzo (2005) found in their review of the literature and in the findings of their study that college students experienced an increase in their career decision-making self-efficacy when allowed to utilize the computer-based DISCOVER career development system as opposed to only career counseling. Integral to providing online services, CSOs must have a functioning Web site. And, according to Harris-Bowlsbey, Dikel, & Sampson (2002), a well-designed CSO Web site can provide users internal and external sources of career-related information and access to the most recent, user-friendly applications. This information must be periodically evaluated by CSO staff to determine the advantages and disadvantages of the new tools while deciding how they can best enhance (not eliminate or replace) the traditional face-to-face services (Bratina & Bratina, 1998; Savard, Gingras, & Turcotte, 2002).

The benefit of all this technology rhetoric is that it offers service providers options for providing career assistance in traditional means or with technological help. It allows CSOs to offer their services to constituents in whichever format works best for them given individuals are at different stages

in their decision-making process (Savard, Gingras & Turcotte, 2002; Watts, 2002).

Demand for Career Counseling

College students often seek assistance from the career services office in the form of career counseling or advising (Sampson, 1999). In fact, according to Nagle and Bohovich (2000), “Of all the services available through career centers, career counseling is offered by the highest percentage” (p. 42) of CSO respondents—a trend that has remained the same since 1991. Chickering and Gamson (1987) reminded CSO personnel to provide services that help students ingest what they learn so that it becomes a part of them. One way to do this, offers Schiller (2000) and McGrath (2002), is to provide a variety of opportunities for career, educational, and job search decisions early and comprehensively.

Cybercounseling or distance career counseling that is assisted by technology can be as effective in the delivery of career-related assistance as CSO Web sites (Feduccia, 2003; Harris-Bowlsbey, Dikel, & Sampson, 2002). Technology offers career counselors a variety of program delivery methods (Papas & Stefaneas, 2001). “It also provides counseling and personal assessment in various domains, including assistance in career-related issues” (Kleiman & Gati, 2004, p. 41). The trick with utilizing technology in counseling is that technologically supported applications should be accessed along with personalized attention by a professional (Oliver & Zack, 1999). Harris-Bowlsbey, Dikel, & Sampson, (2002) urged professionals to be sure to

incorporate a joint high-tech/high-touch approach to career counseling that involves a strategic junction of technology with a counselor or professional.

Computer-Aided Career Guidance Systems (CACGS)

After more than 40 years of use, computer-aided career guidance systems (CACGS) have recently transitioned from computer work stations located in the career services office or some other office to Internet-based systems that offer users more convenience and better accessibility (Barak, 2003; Hansen, 2000; Sampson, 1999; Sampson, Purgar, & Shy, 2003; Savard, Gingras, & Turcotte, 2002). Feduccia (2003) predicted the number of online vendor supported computerized systems would expand, users would increase, and the sophistication of the systems would increase as well. CACGS are widely utilized by CSOs, many of which "believe that computerized career guidance systems have helped their students to identify career options" (Schiller, 2000, pp. 134-135). Schiller also noted, "CACGSs have been effective with many other types of students, including alumni who are changing careers, multitalented students who are strong in several areas and need assistance in narrowing down their options, seniors entering careers, and undecided students" (p. 136).

Stevens and Lundberg (1998) identified CACGS as well known by college and university CSOs and utilized by career counselors as early as the late 1980s. As well, several commercial online software CACGS systems (e.g., DISCOVER, SIGI, CHOICES, and PROSPECT HE) are offered to the CSOs for a price (Harris-Bowlsbey, Dikel, & Sampson, 2002; Mau, 1999; Schiller,

2000; Watts, 2002). They offer a variety of assessments and psychological tests (Savard, Gingras, & Turcotte, 2002). Some of the assessments now delivered on the Internet were originally designed for a counseling context (Harris-Bowlsbey, Dikel, & Sampson, 2002; Sampson & Lumsden, 2000; Watts, 2002). Keep in mind, "most of the CACG systems are designed to assist an individual in learning about themselves, but very few systems are designed to teach individuals about how to process career information (i.e., decision making approach)" (Mau, 1999, p. 262) indicating that CACGS online may not benefit every person. Oliver and Zack (1999) held that anxiety production may be increased in individuals who are indecisive as opposed to finding answers from the systems.

Ethical Considerations

Valid arguments emerge from these publications that address the questionably ethical/unethical nature of unsupervised Internet-based intervention (Sampson, Kolodinsky, & Greeno, 1997; Sampson & Lumsden, 2000). Hansen (2000) noted, "technology must be employed in a variety of ways for the purpose of teaching students how to evaluate and use information systems in career counseling; instructional focus should also attend to the potential promise and possible ethical issues of the internet in career counseling and career development" (p. 8). And, O'Halloran, Fahr, and Keller (2002) recognized in their writing that the use of the Internet for the purpose of career counseling had its potential benefits as well as its drawbacks.

Internet-based career assessments are easily accessed as self-help interventions. Concerns emerge, as specified by Kleiman and Gati (2004) because the Internet systems have unrestricted, unsupervised access to information and assessment results which may be unreliable. Users may not be trained in ways to distinguish the level of quality offered on one Web site over another. Unfortunately, users of these Internet-based systems are not likely to interact with a counseling professional, and this, according to Reile and Harris-Bowlsbey (2000), could be harmful to the user. The authors recognized the existence of two governing Boards that have developed usage guidelines for professionals engaging in Internet-based counseling and services. As a novel idea, "the identified technology gap [in virtual CACGS] also could be filled with an intervention focus" (Toman, 2000, p. 323). Further, Toman boldly asked the question whether or not we fully comprehend the importance of providing valid assessment results to users of the online CACGS. On the contrary, Sampson and Lumsden (2000) defended the notion of benefits for CSOs of Internet-based career assessment, but they too, recognized the potential danger of such systems.

Technology Used for Job Search

Lack of Literature

According to Feld (2003), very few books, dissertations, journal articles, and other peer-reviewed publications using empirical data could be found that explore the use of technology on the job search assistance side of university career services offices. Most of the recent literature tends to focus on the use

of technology for career counseling and assessments. Statements, then, about research on CSO use of technology on the job search side of the house are limited and must refer mostly to sources some may consider less academically valued than those that are peer-reviewed.

Use of Technology

Electronic communications—otherwise known as technology—impact the world of higher education and the departments that operate therein. This trend will continue to develop along with new technologies that are developed (Allen, 2000b). In fact, the entire profession of career services has been led to place more attention on the recruitment aspect of CSO operation (Watts, 2002). Technology in college student job search has become the recruitment tool of choice for CSOs, employers, and college-degreed job seekers compared to cumbersome devices such as CD-ROMs, fax machines, and résumé disks used in years past (Charoensri, 1998; Nagle, 2001; Nagle & Bohovich, 2000; Nagle, Bohovich, & Gold, 2001). The preferred method allows employers and students to communicate variably through tools such as e-mail and online job applications as opposed to traditional phone calls, faxes, and postal mail (Miller & McDaniels, 2001). As an example, it was common in the early part of the 21st century for CSOs around the nation to offer online career fairs. The fairs were located on or linked from CSOs Web sites for students to attend during a set number of weeks at any time that was convenient for them (Miller & McDaniels, 2001).

Allen (2000b) estimated and Collins and Giordani (2003) agreed that a domino effect of companies using the Internet for recruiting employees begins first with the largest enterprises. But Allen also predicted that technology would not be the end-all, for-all, cure-all in that the need for relationship-building and personal interaction between recruiters, CSOs, and potential employees would not dissipate. Fortunately, a survey captured the sentiment that employers are indeed successful in balancing working with technology and establishing/maintaining personal interaction (Collins & Giordani, 2003).

Increasingly over the last 7-10 years, college students cite university CSO Web sites as the number one means of seeking employment (Allen, 2000a; Scott, 2002). Students conduct a variety of career-related tasks such as company research, job searches, and applying for jobs utilizing technological applications provided by CSOs (Allen, 2000a, 2000b; Collins & Giordani, 2003; McGrath, 2002; NACE, 2002). But Dikel and Roehm (2002) warned students that just because a job search can be conducted online, does not necessarily make it easy given the vast array of career-related information that can be accessed electronically.

Commercial Vendors

Many proprietary and commercial vendors (i.e. MonsterTRAK, eRecruiting, NACELink, CSO Research, Simplicity) provide job posting systems, and résumé exchange systems; in addition, they provide career fair management software or services—all of which are in high demand by CSO staff, students, and employers. NACE (2002) reported nearly three-quarters

(71%) of CSOs utilize vendor created products for electronic job postings and a nearly 50/50 split in CSOs reporting that employee time increased (43.9%) or remained the same (44.3%) in reviewing/evaluating commercial vendors and their products. In fact, NACE (2004) reported CSOs using not only one product, but nearly 40% of CSOs "using more than one system in support of student résumé data bases, job listing services, or recruitment scheduling systems." (p.2) In 2005, NACE (2005b) reported even more CSOs (77%) utilizing vendor created products for electronic job postings and other CSO services. However, there is a tendency for the products to "remove the career centres from the graduate recruitment process and establish a direct customer relationship with the student and employer" (Watts, 2002, p. 152). In fact, the competition has been fierce for companies wooing CSOs to sign up for their products at professional conferences, conventions, annual meetings, and through direct mail marketing campaigns and campus visits. Nationwide, growing concerns are felt by CSO administrators about utilizing vendor applications for so many mission-critical activities (Watts, 2002). In some cases, CSOs have the opportunity to avoid binding relationships with vendors by utilizing applications that are custom or developed by the office or institution (Noll & Graves, 1998). But, not all CSOs have financial and/or technical resources with which they may accomplish this task.

In summary, technology will remain a part of our society for a long time to come and will continue to shape the world of work as well (Allen, 2000b). American higher education is one of the institutions affected by and forever

changed by technology. Moreover, as Brown and Duguid (1996) suggested nearly a decade ago, “new interactive technologies are starting to pick away at some previously invisible seams [in the higher education enterprise]” (p. 18). Nevertheless, technology should support not drive the enterprise. Today though, it appears to be driving institutions.

Career services offices have not been immune to the impact of technology in higher education. They have had to adjust their mode of operation in order to utilize technological structures to their benefit given the demands made by their constituencies. Many facets of CSO operations (i.e., career development, career education, job search, and administration) can now be streamlined because of technological advances. But CSOs ought to be careful so that they do not completely rely on the technological exchange when human interaction is needed at all levels (Allen, 2000a).

CHAPTER III

METHODOLOGY

This chapter articulates the procedures and methods utilized to examine data related to technology infusion in four-year college and university career services offices. This study served three purposes. The first purpose of this study was to provide a recent analysis of technology infusion in career services offices in the southwest region of the United States surveying the exact population suggested by Charoensri (1998) in his recommendation to study the same population for changes and trends. More specifically, the second purpose of the study addressed the three recommendations from the Charoensri study of technology infusion in CSOs as a whole by offering a comparison to one of the more recent surveys conducted by the National Association of Colleges and Employers (NACE). Finally, the third purpose of this study was to provide an empirical examination of the impact of selected technologies in CSOs since 1998—specifically addressing the Charoensri recommendation to conduct research on selected technologies. In order to accomplish this examination of technological trends in university CSOs, the following research questions were used for the study:

1. Is there any difference in the use by career services offices of computer and communication technology in 2004 compared to the 1998 Charoensri dissertation study?
2. How do the 2004 research data on selected technologies used in career services offices in the southwest region of the United States

compare with the career services office technology infusion trends found in the NACE “2002 Career Services Performance Measurement Survey”?

3. Is the size (as measured by student head count) of an institution a determining factor in the use of technology by career services offices?
4. Is the type of institution (private or public) a determining factor in the use of technology by career services offices?
5. Are there differences in use of technology in career services offices over time according to institutional size and type?
6. Since the 2002 NACE study, have career services offices increased the number of computer lab/workstation(s) under their supervision?
7. Are there differences in the numbers of computer workstations available to different groups in career services offices (as measured by the number of computers available to professional staff/support staff/student staff)?
    a. As related to institutional size?
    b. As related to institutional type?
8. Does a relationship exist between the use of technology and percentages of resources (employee time and operational funds) that are allocated for
    a. Career education?
    b. Career counseling?

c. Job search assistance?

9. Do career services offices use commercially based technology for use in
    a. Career education?
    b. Career counseling?
    c. Job search assistance?
10. What is the level of career services office personnel satisfaction with the use of technology in
    a. Career education?
    b. Career counseling?
    c. Job search assistance?

Research was conducted during the spring and summer semesters of 2004. These data were collected toward the end of the spring semester and into the beginning of the summer semester of 2004. Contained within this chapter are discussions of the research design, the population surveyed, the instrumentation used for collecting the data, the pilot study used for perfecting the questionnaire, and procedures used in the analysis of the collected data.

The research methodology used in this study closely follows that of the Charoensri (1998) study to make comparisons of the previous and present research. Similar to the Charoensri study, the survey method was chosen because of its ease of distribution to “members of a large and widely diffused population” (Charoensri, 1998, p. 74). Additionally, it was distributed electronically as an alternate to using the paper-and-pencil method of

administration. As an alternative to the Web-based version of the survey, a pdf form, MS Word document, and a printed hard copy (Appendix A) version were created and provided upon request.

Research Design

This study was designed as a replication and expansion of a previous examination of technology infusion in four-year college and university career services offices in the southwest region of the United States. Field survey methods were adopted and modified for use with electronic distribution for collecting the required data. A cross-sectional survey questionnaire was used as the data collection instrument. An experimental research design was not employed for this study because the emphasis was upon identifying patterns within the data instead of inferring causality.

Population

Career services offices of member four-year public and private higher education institutions of the Southwest Association of Colleges and Employers (SWACE) participated in the study. This inquiry targeted the top-level administrator of each CSO. In some cases (e.g., The University of Texas at Austin has several decentralized, major-specific CSOs), there may be multiple CSOs at one institution of higher education, in which case, each career services office participated separately. Prior to the distribution of the survey questionnaire, it was estimated that the number of CSOs was approximately 111. SWACE provided an e-mail listing containing 95 e-mail addresses. After sorting through contact information and deleting contacts of duplicate CSO

representatives as well as several two-year institutions, the actual number of working, individual CSO contact e-mails was 84—nearly 30 short of the predicted 111.

Table 1 outlines the distribution of e-mails from the original list obtained by SWACE. Eighty-eight percent were working and usable, eight belonged to two-year college CSOs, two e-mail addresses did not go through and were returned as non-existent, and one e-mail belonged to the researcher, who is a CSO director and was not included in the survey.

Table 1. Distribution of Results of Original E-mail List Obtained by SWACE

E-mail Status Category	N	Percent
Usable, non-duplicated, working e-mails	84	88.42
Two-year college e-mails	8	8.42
Non-working e-mails	2	2.11
Researcher's CSO e-mail	1	1.05
Total	95	100.00

Survey questionnaires were sent via electronic mail to the 84 institutional members. Table 2 details the return rate. All together, 15 (17.86%) of the 84 institutional members chose not to participate in the survey. A total of 69 questionnaires were returned. Although 69 questionnaires were returned, not all of them were usable. It was determined that eight of the questionnaires were less than one-half complete. The overall usable response rate achieved was 72.62% (61 surveys), which is very close to the response rate obtained by Charoensri (1998) at 73.39%.

Table 2. Responses to the Questionnaire

Response Category	N	Percent
Usable responses	61	72.62
Unusable responses	8	9.52
Declined participation/no response	15	17.86
Total	84	100.00

The size of responding institutions is shown below in Table 3. Small institutions (fewer than 5,000 students) were represented by 34.4% of the respondents while large institutions (5,000 or more students) constituted the majority (65.6%) of the respondents.

Table 3. Distribution of Usable Responses by Size of Institution

Response category	N	Percent
Small institutions (fewer than 5,000 students)	21	34.40
Large institutions (5,000 or more students)	40	65.60
Total	61	100.00

Table 4 outlines the distribution of the type of institutions represented that responded to the study. Fewer than one-third (32.8%) were private institutions, whereas two-thirds (67.2) of the institutions were public.

Table 4. Distribution of Usable Responses by Type of Institution

Response category	N	Percent
Private institutions	20	32.80
Public institutions	41	67.20
Total	61	100.00

Instrumentation

The survey used a cross-sectional questionnaire that included revisions of the Charoensri (1998) study and incorporated part of the NACE “2002 Career Services Performance Measurement Survey” based on the review of the literature. The survey questionnaire was modified and formatted for Web-based administration. As an alternative to the Web-based version of the survey, a pdf form, MS Word document, and a printed hard copy (Appendix A) version were created and provided upon request. Four experts in higher education were selected and served as a select panel of judges because of their experience and expertise in working with dissertation questionnaires. The judges were professors of higher education who oversaw this research project. The panel of judges checked the survey instrument for content validity and length and provided suggestions and recommendations. Their main suggestion was to collapse the nine research questions into four or five research questions. The suggestions by the panel of judges were carefully reviewed. It was determined not to collapse the research questions into four or five questions to keep the uniqueness of each of the nine questions in tact. Then, the questions were incorporated into the pilot study version of the

questionnaire that was administered on the Web. Reliability coefficients could not be assessed meaningfully because the items contained in the survey questionnaire were independent of each other.

The Southwest Association of Colleges and Employers (SWACE) Technology director and committee chairman were CSO administrators who viewed and approved the instrument prior to distribution to SWACE Executive Board members. Once the SWACE Executive Board gave approval, the instrument was distributed to the survey population. In both cases of the SWACE Technology director and committee chairman, strict guidelines were followed so that another member of their institution's career services office received and completed the survey.

Pilot Study

In order to evaluate the use of the electronic, Web-based survey process, a selected group of professionals working in higher education CSOs outside of the SWACE membership region or at a sub-director level within the SWACE membership region, and a computer/Web site expert served as the pilot study participants. These experts reviewed the revised pilot study version of the Web-based survey questionnaire and the electronic survey process. The pilot study experts tested the instrument and examined the survey procedures from the beginning phase to the end. Each of the pilot study participants was asked to scrutinize the survey instrument for (a) appropriateness and validity of content, (b) clarity of the instructions found in the e-mail, (c) clarity of the directions in the Web-based information sheet and questionnaire, (d)

readability of the content, (e) the general format of the Web-based questionnaire, and (f) length of the questionnaire. As well, they offered comments about the Web-based survey process as a whole. Suggestions and recommendations from the pilot study were as follows:

1. Add, “Like you, I am also amazed at how rapidly our field is changing” to the end of the first paragraph of your e-mail.
2. It might be good to tell them here that the results will be shared with them via e-mail, SWACE newsletter or Web site, or any other way that you can think of. That might be an incentive to participate.
3. 1st page, 4th paragraph, 3rd sentence: “with out” should be one word “without,” I think.
4. Question 12: Does this question refer to how many people (i.e., 50% of my staff) do each task or what percentage of everyone's time, summed together, goes toward each task? Or does it matter?
5. Questions 12 and 13 refer to four functional areas when only three are listed.
6. Questions 12-14, perhaps Directors/Associate Directors might know this information, so if they are your sole target audience, you'll get better results than I could provide.
7. Questions 12-13 stated “... each of the following four functional areas? ...”, but there were only three options: Career Education, Career Counseling, Job Placement. What was supposed to be the

fourth area? BTW - We've driven the stake through the phrase “Job Placement.” It is taboo here!

8. Question 14 was a little confusing when you asked for combined resources, maybe list a such as ....for clarification.
9. Question 14: What does “combined resources” mean? Is it staff + operating funds?
10. Question 17: What does “fax on demand” mean?
11. This whole section (one-way vs. two-way communication) really confused me - what do phone calls and e-mail exchanges count as? Are either of these means of communication accounted for in the list of choices in either the one-way or two-way section?
12. Under your technology questions, there was not a response for not applicable. Maybe future is broad enough, things change so even if something is not under consideration now maybe in the future, but I felt like I was making a forced choice and committing to something that I wasn't sure would happen in the future.
13. Questions 27 & 28: These really confused me, too. Overall, starting with question 17, I was a little lost. It might be easier to talk via phone about it, but just know that I really wasn't sure what you were asking for....
14. It probably took 15 minutes to go through the answers that I could answer. But researching the info I did not know added 40-45 minutes.

15. I would give the recipients a “Head's Up” to have their 2002-2003 Annual Report data handy. Questions 7-14 may not be easily answered without the annual report handy.
16. You might want to clarify “2002-2003.” Does this mean May 2002, August 2002, December 2002, May 2003, September 2003, and December 2003?
17. I don't have many of the stats for the questions you are asking. Do you want me to estimate or can I put any numbers in?

These suggestions and recommendations were carefully reviewed and considered and were applicable and not detracting from the essence of the Charoensri questionnaire, were incorporated into the final electronic, Web-based survey process and questionnaire, MS Word questionnaire, pdf questionnaire, or paper-based questionnaire.

After researching several online survey companies, the researcher chose SurveyMonkey.com© as the survey administration vendor for the purpose of this study. SurveyMonkey.com© allowed the researcher the flexibility in survey design and administration, data collection, and data analysis compatible with the expertise of the researcher. The online product tracked the IP address of each respondent based on the unique link they were sent in the e-mail. This feature made it easy to identify respondents who did not complete or who did not respond at all to the survey. It was possible to send subsequent e-mails to those who met certain search criteria. Access to this information was

strictly confidential, as it required the researcher to hold a special user name and password in order to access the data.

Data Collection Procedures

In conjunction with the SWACE technology director and committee chair, four-year public and private college and university CSO members with e-mail addresses were sent a letter of support from the SWACE technology director via e-mail notifying them about the upcoming Web-based questionnaire within one week prior to the research study e-mail. After the assigned period, the survey software was programmed to generate an e-mail that was sent to the members' e-mail contact list by the researcher. This e-mail included a brief introduction of the research asking for their participation in the study. A unique Internet link to the Web-based survey was provided in the e-mail along with a unique login. In addition, the e-mail contained information about consent, confidentiality, and instructions for requesting an alternative paper copy of the survey. After numerous responses about login trouble, the researcher changed the commands in the survey to eliminate the need for a login. Requested paper surveys were coded in order to maintain participant confidentiality.

The beginning page of the instrument explained confidentiality and offered consent in the form of an information sheet that required participants to accept or decline participation electronically. If the consent form was not electronically accepted, the participant was not allowed to participate in the study. When the consent form was accepted, the participant was prompted to

continue to the first page of the survey. In order to increase the percentage of returns, a follow-up e-mail was sent to the nonresponding SWACE members every five to seven days by the researcher and/or the SWACE technology director. A postcard was sent out and/or telephone call to the director was made as the final communication to those CSOs that did not respond to the survey. The overall response rate was 72.62%, which is very close to the response rate of the Charoensri (1998) study at 73.39%.

Data Analysis

The survey questionnaires were exported from SurveyMonkey.com© as Microsoft Excel© files and then transferred into the Statistical Package for the Social Sciences (SPSS©) in order to execute statistical analysis of the data. Data received through a paper copy of the survey were manually entered into SPSS. The data gathered were examined through the use of descriptive statistics (i.e., percentages, means) to analyze data related to research questions three through five and eight and nine that were descriptive in nature. The normal test of proportions was used to analyze data related to research questions one through four and question eight that were comparative in nature. The chi-square Test of Independence was used to analyze data related to research question two. The t-test and the analysis of variance were used to analyze data related to research question six that were comparative in nature. The Pearson's product-moment was used to analyze data related to research question seven that was correlational in nature. The results of the study were reported using numerical and graphical techniques. Analysis and interpretation

of the data followed quantitative research principles outlined in *Educational Research: An Introduction* (Gall, Borg & Gall, 1996).

CHAPTER IV

DATA ANALYSIS

Introduction

This chapter reports the research findings of this study. Data results are presented in two sections. The first section of this chapter presents selected survey questionnaire results that outline the demographic distribution of the survey population. Section two provides results of the survey responses as associated with each research question presented in Chapter I. At the end of each research question, a summary is provided of all the analyses for that research question. In addition, implications are made in the summary section of each research question based on the findings. For the purpose of this study, the statistical significance level for each test was set at .05, although a significance level of .01 was utilized where noted.

Analysis of Research Questions

This study served three purposes. The first purpose of this study was to provide a recent analysis of technology infusion in career services offices in the southwest region of the United States surveying the exact population suggested by Charoensri (1998) in his recommendation to study the same population for progression and trends. More specifically, the second purpose of the study addressed the three recommendations from the Charoensri study of technology infusion in CSOs as a whole by offering a comparison to one of the more recent surveys conducted by the National Association of Colleges and Employers (NACE). Finally, the third purpose of this study was to provide an

empirical examination of the impact of selected technologies in CSOs since 1998—specifically addressing the Charoensri recommendation to conduct research on selected technologies.

Research Question One

Research question one asked, “Is there any difference in the use by career services offices of computer and communication technology in 2004 compared to the 1998 Charoensri dissertation study?” For this question, the normal test of proportions was calculated to compare the 2004 data outcomes with those of the 1998 study.

As noted in Chapter III, data from the Charoensri (1998) dissertation study were used as guidelines for comparing descriptive data and expected values using the normal test of proportions. In Tables 5-7, data were drawn from the 1998 study and the 2004 study. The normal test of proportions was calculated on a Microsoft Excel spreadsheet program (see Table 5).

Table 5. Results of Test of Proportions for Two Samples Analyzing CSO Use of Technology Comparing 1998 Southwest Data and 2004 Southwest Data

Use of Technology	N	1998 data in %	N	2004 data in %	z-score	p-value
N		91		61		
weight		0.60		0.40		
Computer presentation w/network connection	18	19.78	44	72.10	6.43	<.01*
Presentation—non-computerized (i.e., flip chart, transparency, or slide)	78	85.71	29	47.50	-5.06	<.01*
Local Access Network	80	87.91	31	50.80	-5.05	<.01*
Computer presentation or application	47	51.65	54	88.50	4.72	<.01*
Fax-on-demand (automated fax on server)	34	37.36	6	9.52	-3.83	<.01*
Electronic student database	70	76.92	31	51.25	-3.29	<.01*
Résumé writing	67	73.63	29	47.55	-3.27	<.01*
Spreadsheet or statistical software to analyze data	49	53.85	48	78.70	3.13	<.01*
Student one card system shared w/other campus departments	1	1.10	8	13.10	3.07	<.01*
Multimedia-aided career materials	40	43.96	13	20.93	-2.92	<.01*
Share databases & electronic info w/other campus departments	41	45.05	42	68.90	2.89	<.01*
Virtual fairs	1	1.10	7	11.50	2.81	<.01*
Automated touch-tone telephone system	29	31.87	33	54.76	2.81	<.01*
Computer-aided Career Guidance System	60	65.93	26	43.00	-2.80	<.01*
Telephone interview	36	39.56	38	62.30	2.75	<.01*
Job listings	65	71.43	53	86.90	2.24	0.02*
Telephone/audioconferencing	53	58.24	46	75.72	2.22	0.03*

Table 5 (continued)

Use of Technology	N	1998 data in %	N	2004 data in %	z-score	p-value
N		91		61		
weight		0.60		0.40		
Video and computer conferencing interview	9	9.89	14	23.00	2.21	0.03*
Layout and publish electronic materials	48	52.75	43	70.50	2.19	0.03*
Financial or spreadsheet software to balance budget	57	62.64	48	78.70	2.10	0.04*
Fax	83	91.21	49	80.30	-1.95	0.05*
Computer to type memos and letters	89	97.80	56	91.80	-1.73	0.08
Online assessment tools	61	67.03	34	55.70	-1.41	0.16
Face-to-face on-campus interview	85	93.41	53	86.90	-1.36	0.17
Company profiles/contacts/Web site link	54	59.34	30	48.38	-1.33	0.18
General information, events and services	67	73.63	39	63.55	-1.32	0.19
Electronic alumni database	42	46.15	22	36.48	-1.18	0.24
Career-aided materials catalog	33	36.26	17	27.45	-1.13	0.26
Video/computer conferencing	19	20.88	18	28.88	1.13	0.26
Staff meeting schedule	26	28.57	23	37.30	1.13	0.26
E-mail/electronic file transfer	80	87.91	57	92.78	0.98	0.33
Computer to create mailing labels	88	96.70	57	93.40	-0.95	0.34
Videotape interview	12	13.19	10	16.40	0.55	0.58
On-campus interview scheduling	49	53.85	30	49.60	-0.51	0.61
Computer to create presentation materials	83	91.21	57	93.40	0.49	0.62
Computer to create presentation materials	83	91.21	57	93.40	0.49	0.62

Table 5 (continued)

Use of Technology	N	1998 data in %	N	2004 data in %	z-score	p-value
N		91		61		
Counseling appointment scheduling	36	39.56	22	36.88	-0.33	0.74
Answering machine/Voice-mail	75	82.42	51	84.28	0.30	0.76
Internet/Intranet	75	82.42	51	83.60	0.19	0.85
Person-to-person communication	86	94.51	57	94.08	-0.11	0.91
Layout and publish printed materials (i.e., newsletter)	72	79.12	48	78.70	-0.06	0.95
Group meetings/conferences	76	83.52	51	83.26	-0.04	0.97

*Significant at the α=.05 criterion level.

There were significant differences at the α=.05 level between the use of 21 (51.2%) of the 41 technology functions in the 1998 Southwest Career Services Offices survey and the use of those technology functions in the 2004 Southwest CSO survey. Tables 6-7 provide further analyses of the items in Table 5. The 41 items in Table 5 were separated by positive z-scores in Table 6 and negative z-scores in Table 7.

Table 6. Test of Proportions Results From Table 5 Showing Items With Positive Z-scores

Use of Technology	z-score	p-value
Computer presentation with network connection	6.43	<.01*
Computer presentation or application	4.72	<.01*
Spreadsheet or statistical software to analyze data	3.13	<.01*
Student “one card” system shared with other campus departments	3.07	<.01*
Share databases & electronic info with other campus departments	2.89	<.01*
Virtual fairs	2.81	<.01*
Automated touch-tone telephone system	2.81	<.01*
Telephone interview	2.75	<.01*
Job listings	2.24	0.02*
Telephone/audio-conferencing	2.22	0.03*
Video and computer conferencing interview	2.21	0.03*
Layout and publish electronic materials	2.19	0.03*
Financial or spreadsheet software to balance budget	2.10	0.04*
Video/computer conferencing	1.13	0.26
Staff meeting schedule	1.13	0.26
E-mail/electronic file transfer	0.98	0.33
Videotape interview	0.55	0.58
Computer to create presentation materials	0.49	0.62
Answering machine/Voice-mail	0.30	0.76
Internet/Intranet	0.19	0.85

*Significant at the α=.05 criterion level.

Table 7. Test of Proportions Results From Table 5 Showing Items With Negative Z-scores

Use of Technology	z-score	p-value
Presentation—non-computerized (flip chart, transparency, or slide)	-5.06	<.01*
Local Access Network	-5.05	<.01*
Fax-on-demand (automated fax on server)	-3.83	<.01*
Electronic student database	-3.29	<.01*
Résumé writing	-3.27	<.01*
Multimedia-aided career materials	-2.92	<.01*
Computer-aided Career Guidance System	-2.80	<.01*
Fax	-1.95	0.05*
Computer to type memos and letters	-1.73	0.08
Online assessment tools	-1.41	0.16
Face-to-face on-campus interview	-1.36	0.17
Company profiles/contacts/Web site link	-1.33	0.18
General information, events, and services	-1.32	0.19
Electronic alumni database	-1.18	0.24
Career-aided materials catalog	-1.13	0.26
Computer to create mailing labels	-0.95	0.34
On-campus interview scheduling	-0.51	0.61
Counseling appointment scheduling	-0.33	0.74
Person-to-person communication	-0.11	0.91
Layout and publish printed materials (i.e., newsletter)	-0.06	0.95
Group meetings/conferences	-0.04	0.97

*Significant at the α=.05 criterion level.

Table 6 represents uses of technology from Table 5 with a positive z-score. Twenty (48.8%) of the 41 items in Table 5 were found to have a positive z-score. The positive z-score in the 20 items above suggests an increase in each use of technology from 1998 to 2004 by CSOs; however; only 13 (65%)

of the 20 items in the Table 6 show significant positive movement at the α=.05 criterion level. This additional analysis reveals that 13 out of 41 of the items (32%) from Table 5 significantly increased in usage from 1998 to 2004. Of the 13 statistically significant items in Table 6, all were expected to show positive change. These findings concur with the Charoensri (1998) and NACE (2002) studies and are an indication that CSOs still commonly use these 13 items and usage has increased from 1998 to 2004. This is a clear indication that based on the 13 items (computer presentation with network connection, computer presentation or application, spreadsheet or statistical software to analyze data, student “one card” system shared with other campus departments, share databases and electronic info with other campus departments, virtual fairs, automated touch-tone telephone system, telephone interview, job listings, telephone/audio-conferencing, video and computer conferencing interview, layout and publish electronic materials, and financial or spreadsheet software to balance budget), there were differences in the use by CSOs of computer and communication technology in 2004 compared to the 1998 Charoensri study.

Conversely, of the items in Table 6 that could not be determined as having significant, positive movement, the following items were expected to show positive movement at a statistically significant level, but did not: e-mail/electronic file transfer, computer to create presentation material, answering machine/voicemail, and Internet/Intranet (Fein, 1999; McCarthy, Moller, & Beard, 2003; McRae, 1999; NACE, 2002; Nagle & Bohovich, 2000;

Nagle, Bohovich, & Gold, 2001; Upcraft & Goldsmith, 2000). The non-significance of these items suggests that not all CSOs in the Southwest utilize these items to the same degree.

Table 7 represents uses of technology from Table 5 with a negative z-score. Twenty-one (51.2%) of the 41 items in Table 5 were found to have a negative z-score. The negative z-score in the 21 items above indicates a decrease in the use of each technology from 1998 to 2004 by CSOs; however, only eight (40%) of the 20 items in Table 7 (or 8/41 [19.5%] of the original items in Table 5) show significant negative change at the α=.05 criterion level, indicating a decline in usage from 1998 to 2004. This additional analysis revealed, of the eight negative statistically significant items in Table 7, the only item expected to show significant negative change based on the review of the literature was the use of presentation—non-computerized, but it did not. More recent use of technology systems created from 1998 to 2004 for use by CSOs could account for the lack of use of this item, thus CSOs have moved to utilizing computerized or Internet-based presentations (Allen, 200b).

In further reference to Table 7, it was not expected that local access network, electronic student database, résumé writing, multimedia-aided career materials, and computer-aided career guidance system would show a significant decrease in usage between 1998 and 2004 (Dagley & Salter, 2004; McRae, 1999; NACE, 2002; Upcraft & Goldsmith, 2000). Given that this listing of uses of technology was duplicated from the 1998 study, this could be an

indication that some of the items in the table were antiquated and not understood by the responding CSOs.

The significant decrease in use of fax-on-demand and fax could not be explained in that the literature was not consistent in whether facsimile items were utilized more or less over time. While the findings here concerning the use of facsimile technology concur with the literature in that more computerized methods such as email are preferred, facsimile technology was not as popular among CSOs (Allen, 2000b; McRae, 1999; Miller & McDaniels, 2001; NACE, 2005b; Noll & Graves, 1998; Scott, 2002; Upcraft & Goldsmith, 2000). Conversely, facsimile technology was reportedly on the rise by other authors (NACE, 2002; Nagle & Bohovich, 2000). It is probable that because this study and the most recent literature (NACE, 2005b) support the decreased use of facsimile technology, CSOs are not likely to continue an upward trend in the use of this particular technology.

In summary, as combined uses of technologies, the majority (21) of the 41 items found in Table 5 showed significant differences over the course of time from 1998 to 2004. When items in Table 5 were separated and clustered by positive or negative degrees of change in z-score (see Tables 6-7), 13 of the items showed significant differences in the positive direction from 1998 to 2004. The increased use of these items is an indication that they are still commonly used and at an increased level by CSOs. Eight of the items showed significant decrease in their use by CSOs over the course of time; five of them were not expected. It could be that—since the listing of items was drawn from

the 1998 study—some of the items were antiquated and not understood by the respondents. The use of facsimile technology was determined to be on the decline. In short and to answer the research questions, while some of the uses of technology were utilized significantly more in 1998, some were utilized significantly less, but still others showed no significant change at all by 2004. The findings of this study indicate that there are differences in CSO use of computer and communication technology in 2004 compared to 1998. In fact, the majority of the uses of technology by CSOs, changed significantly over time. It was important to track changes in the uses of technology by CSO over the six-year period in order that college and university administrators, CSOs, and commercial vendors, may be aware of these changes. Awareness of the changes are necessary so that appropriate fiscal, physical, and human resources are allocated as to avoid lagging behind in providing services to students, alumni and employers.

Research Question Two

Research question two asked, “How do the 2004 research data on selected technologies used in career services offices in the southwest region of the United States compare with the career services office technology infusion trends found in the NACE ‘2002 Career Services Performance Measurement Survey’?” The NACE 2002 survey was utilized to provide a comparison of more recent career services research activity since 1998. The 2002 national survey asked CSOs about their usage of specific, more modern technologies and about their resources spent on technology. Research from 1998 did not focus

on these elements, thus could not be used as a basis for comparison to the 2004 study. Further, a comparison between the 2002 national survey and the 2004 regional survey may or may not reveal differences between the two populations, but may not reveal differences over time. The 2002 national study results did not collect information from respondents about the region from which they belonged. For comparison purposes, we do not have knowledge of the number of members from the SWACE region who responded to the NACE survey.

Both the 2002 NACE and 2004 Southwest surveys asked responding career services offices to report an increase, decrease, or no change in the amount of employee time they spent in 12 months prior to the survey: (a) working with technology or (b) reviewing/evaluating commercial vendors and their products. For these analyses, descriptive statistics and the chi-square test was utilized to compare the 2004 data with selected data from the 2002 study (see Tables 8-9). Further, the 2002 and 2004 surveys measured (a) the types of technology CSOs used, (b) computerized services CSOs offered to students and alumni, and (c) computerized services CSOs offered to employers. For these separate analyses, the normal test of proportions was utilized to compare the 2004 data with selected data from the 2002 study.

Table 8 represents data for the amount of employee time career services offices spent working with technology in the 12 months prior to the survey reported in the survey as an increase, decrease, or no change in the amount of employee time spent working with technology.

Table 8. Chi-Square Results and Rate of Change in the Amount of CSO Use of Employee Time Spent in the 12 Months Prior to the Survey Working With Technology Comparing 2002 National and 2004 Southwest Data

Amount of Time	2002 National data in % (expected)	2004 Southwest data in % (observed)	% Change	$(O-E)^2/E$
Increase in time spent working with technology	83.00	68.90	-14.1	2.39
No change in time spent working with technology	17.00	31.10	+14.1	11.69*
Decrease in time spent working with technology	0.00	0.00	0.0	0.00
Total	100.00	100.00		
Chi-square = 14.09*				

*Significant at the α=.05 level.

According to NACE (2002) and illustrated in Table 8, 83% of CSOs experienced increases in the amount of employee time spent working with technology in 2002, while only 68.9% of Southwest CSOs reported increases in 2004. The percent change was -14.1 between the two years. Seventeen percent of CSOs nationally reported no change in the amount of employee time they spent working with technology in 2002, while 31.1 of Southwest CSOs reported no change in 2004—a percent change of +14.1 between the two years. For both years, neither group reported decrease in the amount of employee time spent working with technology.

Further, the chi-square test was calculated for all the employee time CSOs spent working with technology in the 12 months prior to the survey in Table 8. For two degrees of freedom, the critical value of chi-square for significance at the α=.05 level is 5.99. The calculated chi-square value of 14.09

for the table is higher than the critical value of 5.99 at the α=.05 level. There is a significant difference between the rate of change in the amount of employee time CSOs spent working with technology from 2002 to 2004. In order to determine where the differences exist, each item in the table was evaluated. The degrees of freedom for each item in the table were established at one with a critical value of 3.84 at the α=.05 level. For the first category, Increase in time spent working with technology, the calculated chi-square value of 2.39 was smaller than the critical value of 3.84 at the α=.05 level. Thus, the increase in time spent working with technology category did not appear to be significantly different between 2002 national and 2004 regional CSOs. This is an indication that there was not more technology to work with nationally in 2002 or regionally in 2004, but the same relative amount. Similarly, for decrease, the calculated chi-square value of 0.0 was smaller than the critical value of 3.84 at the α=.05 level. The decrease in time spent working with technology category was not significantly different between 2002 and 2004. This is an indication that there was not less technology to work with nationally in 2002 or regionally in 2004, but the same relative amount. However, when the calculated chi-square value of 11.69 for the no change category was measured against the critical value of 3.84 at the α=.05 level, it was determined that the no change in time spent working with technology category did appear to be significantly higher in the 2004 regional study than 2002 national study.

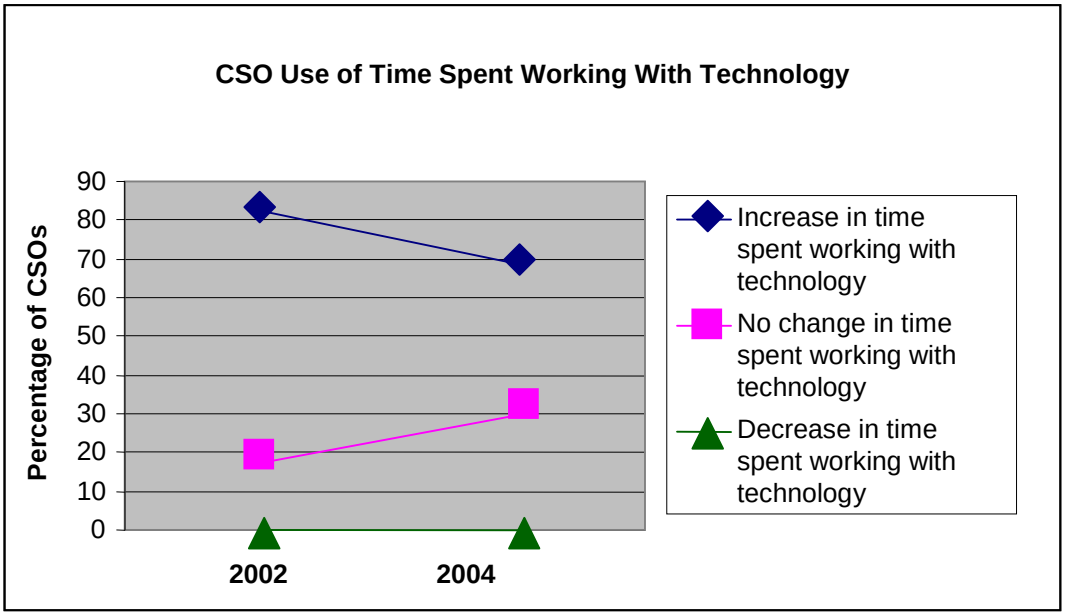
The chi-square analysis suggests that for CSOs in the southwest region of the United States, the rate of change in the amount of employee time spent

working with technology in the 12 months prior to the survey compared with CSOs in all regions of the United States, appeared to have stabilized. This may be true because as the rate of increase went down between the two studies, the rate of decrease showed no differences; however, the rate of no change was significantly higher. It is also possible that a comparison between national and regional CSOs does not appropriately measure this type of change.

Figure 1 gives a further explanation of the Table 8 results. Figure 1 identifies (in graphic format) the trends reported for Table 8.

Fewer CSOs reported significantly higher employee time utilized in working with technology between 2002 national and 2004 regional CSOs (14.1% fewer), while more CSOs in the 2004 regional study identified no change in the amount of employee time spent working with technology compared to CSOs in the 2002 national study (14.1% more). CSOs reported no decrease in employee time spent working with technology in either year.

Figure 1. Rate of Change in the Amount of CSO Use of Employee Time Spent in the 12 Months Prior to the Survey Working With Technology as Reported in 2002 and 2004



Both Table 8 and Figure 1 suggest that CSOs did not experience a significantly higher or lower amount of employee time that was spent working with technology, but that the use of employee time was not significantly different between the two studies. The comparison of national and regional CSOs may not appropriately detect such a difference. The indication is that for CSOs in the Southwest and nationally, working with technology is a trend that will remain part of overall employee time. This finding is important to CSOs in that it suggests that hiring employees who are knowledgeable or who have expertise in working with technology and the distribution of employee time to allow for or incorporate working with technology should be a consideration.

Table 9 represents data for the amount of employee time career services offices spent in the 12 months prior to the survey reviewing/evaluating commercial vendors and their products reported in the survey as an increase, decrease, or no change in the amount of employee time spent reviewing/evaluating vendors and their products.

Table 9. Chi-Square Results and Rate of Change in the Amount of CSO Use of Employee Time Spent in the 12 Months Prior to the Survey Reviewing/ Evaluating Commercial Vendors and Their Products Comparing 2002 National and 2004 Southwest Data

Amount of Time	2002 data in % (expected)	2004 data in % (observed)	% Change	$(O-E)^2/E$
Increase in time spent working with technology	43.90	31.10	-12.8	3.73
No change in time spent working with technology	44.30	59.00	+14.7	4.88*
Decrease in time spent working with technology	11.70	9.80	-1.9	0.31
Total	100.00	100.00		
Chi-square = 8.92*				

*Significant at the α=.05 level.

According to NACE (2002) and illustrated in Table 9, the rate of increase in the amount of employee time they spent reviewing/evaluating commercial vendors and their products was 43.9%, while only 31.1% for Southwest CSOs—a percent change of -12.8. CSOs reporting no change in employee time spent reviewing/evaluating commercial vendors and their products was 44.3%, while nearly 60% for Southwest CSOs—representing a percent change of +14.7 between the two studies. However, 11.7% of CSOs nationally and 9.8% of Southwest CSOs reported a lower amount of employee time reviewing/evaluating commercial vendors and their products. For this comparison, a percent change of -1.9 was recorded.

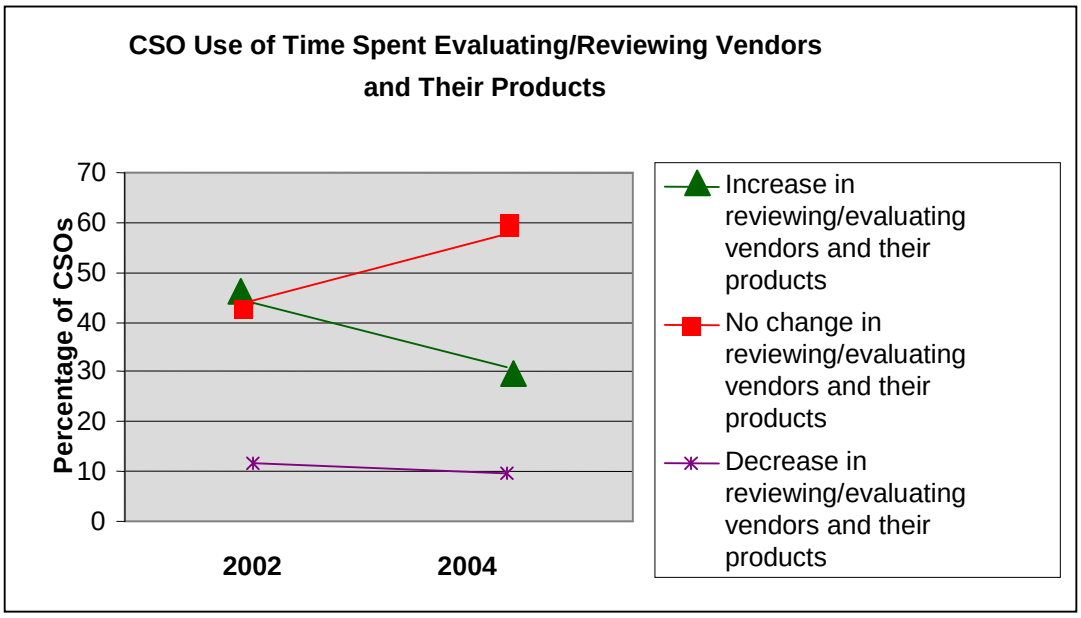
Further, the chi-square test was calculated for all the employee time CSOs spent working with technology in the 12 months prior to the survey in Table 8. For two degrees of freedom, the critical value of chi-square for significance at the α=.05 level is 5.99. The calculated chi-square value of 8.92 for the table is higher than the critical value of 5.99 at the α=.05 level. There was a significant difference between the rate of change in the amount of employee time 2002 national and 2004 regional CSOs spent reviewing/evaluating commercial vendors and their products. In order to determine where the differences exist, each item in the table was evaluated. The degrees of freedom for each item in the table was established at one with a critical value of 3.84 at the α=.05 level. For the first category, increase, the calculated chi-square value of 3.73 was smaller than the critical value of 3.84 at the α=.05 level. Thus, the increase category did not appear to be

significantly different between 2002 national and 2004 regional CSOs indicating that CSOs were not conducting the review/evaluation to a greater degree, nor that there were more commercial vendors and products to review/evaluate. Similarly, for decrease in reviewing/evaluating commercial vendors and their products, the calculated chi-square value of 0.31 is smaller than the critical value of 3.84 at the α=.05 level. The decrease category was not significantly different between 2002 national and 2004 regional CSOs indicating that CSOs were not conducting the review/evaluation to a lesser degree, nor that there were fewer commercial vendors and products to review/evaluate. However, when the calculated chi-square value of 4.88 for the no change category was measured against the critical value of 3.84 at the α=.05 level, it was determined that the no change category did appear to be significantly higher in the 2004 regional study than in the 2002 national study.

The chi-square analysis suggests that for CSOs in the southwest region of the United States, the rate of change in the amount of employee time spent reviewing/evaluating commercial vendors and their products in the 12 months prior to the survey compared with CSOs in all regions of the United States, appeared to have stabilized. This may be true because as the rate of increase went down between the two studies, the rate of decrease showed no differences, and the rate of no change was significantly higher. It is also possible that a comparison between 2002 national and 2004 regional CSOs was not an appropriate measure for this type of change. Figure 2 gives a further explanation of the Table 9 results.

Figure 2 identifies (in graphic format) the trends reported for Table 9. Fewer CSOs reported lower employee time utilized in reviewing/ evaluating commercial vendors and their products between 2002 national and 2004 regional CSOs (12.8% fewer), while more CSOs identified no change in the amount of employee time spent reviewing/evaluating commercial vendors and their products in the 2004 regional study compared to the 2002 national study (14.7% more). A slightly fewer number of CSOs reported decrease (1.9%) in employee time spent reviewing/evaluating commercial vendors and their products.

Figure 2. Rate of Change in the Amount of CSO Use of Employee Time Spent in the 12 Months Prior to the Survey Reviewing/ Evaluating Vendors and Their Products as Reported in 2002 and 2004



Both Table 9 and Figure 2 suggest that CSOs did not experience significantly higher or lower employee time that was spent reviewing/evaluating

commercial vendors and their products, but that the use of employee time conducting this function had stabilized between the two years. The comparison between 2002 national and 2004 regional CSOs may not have been appropriate to detect such a difference. Also, there may have been no changes in commercial vendors and their products between 2002 national and 2004 regional CSOs.

In summary, the chi-square and percent change analyses (Tables 8-9 and Figures 1-2), were useful in that they provided a comparison between two studies of the use of employee time conducting two technology-related tasks. CSOs reported a stabilization in the employee time spent working with technology and reviewing/evaluating vendors and their products for 2002 national and 2004 regional CSOs. There is an indication that overall no more or no less employee time was spent working with technology and reviewing/evaluating commercial vendors and their products during the two-year period. It is also possible that a comparison between 2002 national and 2004 regional CSOs may not have been appropriate to detect such differences. Further, it may be that for CSOs in the Southwest and nationally, working with technology is a trend that will remain part of overall employee time spent on the job. These findings are important to CSOs because they suggest that hiring employees who are knowledgeable or who have expertise in working with technology and the distribution of employee time to allow for or incorporate working with technology should be considerations.

In order to further analyze research question two, “How do the 2004 research data on selected technologies used in career services offices in the southwest region of the United States compare with the career services office technology infusion trends found in the NACE ‘2002 Career Services Performance Measurement Survey’?” the following additional analyses were conducted. Technology items from the 2002 National Career Services Performance Measurement Survey were used for the 2004 study. Data were drawn for Tables 10-12 from both studies. The normal test of proportions was calculated on a Microsoft Excel spreadsheet.

In Table 10, there was a significant difference at the $\alpha=.05$ level between the use of 6 of the 16 (37.5%) technologies/uses of technology in the 2002 National Career Services Performance Measurement Survey and the use of those functions in the 2004 Southwest CSO survey. Two of the six items (33%) were significantly lower in 2004 than the previous findings, while four items (67%) were significantly higher in 2004 than the previous findings. Of the two items in Table 10, Web site usage was not expected to be used less in 2004; it was expected to be significantly higher (Feduccia, 2003; Fein, 1999; Harris-Bowlsbey, Dikel, & Sampson, 2002; McRae, 1999; NACE 2002, 2005a; Noll & Graves, 1998; Scott, 2002). This finding does not concur with recent literature. Perhaps the comparison of 2002 national and 2004 regional CSOs was not appropriate for evaluating this particular item in that Web sites may not have made major changes during this period. It is also likely that CSOs do not regularly attend to their office Web sites, thus do not think of the Web use as

significant. Also, CSO respondents could have read the 2004 survey question incorrectly regarding Web site usage. Another possibility is that CSO personnel may not have been in control of their Web site management in order to think of its use as significant. CSOs should reevaluate their office Web sites on a regular basis in order to keep up with changing technological advances.

Table 10. Test of Proportions for Two Samples of Technologies/Uses of Technology by Career Services Offices Comparing 2002 National and 2004 Southwest Data

Technologies/ Uses of Technology	N	2002 data in %	N	2004 data in %	z-score	p-value
N		225		61		
weight		0.79		0.21		
Wireless computer	21	9.30	18	29.50	4.08	<.01*
Web site	213	94.70	50	82.00	-3.24	<.01*
Fax	207	92.00	49	80.30	-2.64	0.01*
Telephone job listing service	6	2.70	6	9.80	2.45	0.01*
Telephone broadcast system	25	11.10	14	23.00	2.40	0.02*
Mainframe computer	75	33.30	29	47.50	2.05	0.04*
General information, events and services	166	73.60	39	63.60	-1.55	0.12
Scanner	131	58.20	31	50.80	-1.03	0.30
E-mail	212	94.20	56	91.80	-0.68	0.49
LCD/computer projector	154	68.40	39	63.90	-0.67	0.51
Computer to fax	64	28.40	15	24.60	-0.59	0.56
CD-ROM	129	57.30	37	60.70	0.48	0.63
Desktop	196	87.10	52	85.20	-0.39	0.70
Laptop	138	61.30	36	59.00	-0.33	0.74
Video conferencing	46	20.40	13	21.30	0.15	0.88
Local Access Network	116	51.60	31	50.80	-0.11	0.91

*Significant at the α=.05 level.

The significantly lower use of the item called fax was expected from 2002 to 2004; it could be that the comparisons made in Table 10 between 2002 national and 2004 Southwest data are an indication that regional and national trends are more similar rather than dissimilar. While it is also possible that comparisons made between 2002 national and 2004 regional CSOs may not be appropriate, it is probable that because the 2004 study and the most recent literature (NACE, 2005b) support the lower use of facsimile technology, CSOs are not likely to continue an upward trend in the use of this particular technology, thus could save money that would be invested in newer fax technology.

Table 11 represents data drawn from the 2002 National Career Services Performance Measurement Survey and the 2004 study related to computerized services offered to students and/or alumni by CSOs. The normal test of proportions was calculated on a Microsoft Excel spreadsheet program. There were significant differences at the $\alpha=.05$ level in 5 out of 16 computerized services (31%) offered to students and alumni in the 2002 National Career Services Performance Measurement Survey and the use of those same computerized services in the 2004 Southwest CSO survey. Only one out of five were significantly lower in 2004 than previous findings, while four items were significantly higher in 2004 than previous findings.

Table 11. Test of Proportions for Two Samples of Computerized Services Offered to Students and Alumni by Career Services Offices Comparing 2002 National and 2004 Southwest Data

Services	N	2002 data in %	N	2004 data in %	z-score	p-value
N		225		61		
weight		0.79		0.21		
Virtual job fairs	91	40.40	7	11.50	-4.22	<.01*
Workshops	85	37.60	40	65.60	3.91	<.01*
Résumé development	129	57.20	51	83.60	3.78	<.01*
Campus interview requests/scheduling	136	60.40	48	78.70	2.65	0.01*
Candidate database	140	62.00	46	75.40	1.94	0.05*
Résumé referral	155	68.80	49	80.30	1.76	0.08
Ability to submit résumés to campus recruiters	168	74.80	51	83.60	1.44	0.15
Cooperative education /intern program management	107	47.60	35	57.40	1.36	0.17
Registration for services	126	56.00	39	63.90	1.11	0.27
Access to campus recruitment schedules	159	70.80	47	77.00	0.96	0.34
Job listings	189	84.00	53	86.90	0.56	0.58
Online assessment tools	134	59.60	34	55.70	-0.55	0.58
Database for alumni for networking purposes	115	51.20	29	47.50	-0.51	0.61
Career service office listserv/mailing list/ electronic newsletter	133	59.20	34	55.70	-0.49	0.62
Advising/questions and answers (e.g., via e-mail or Web site)	177	78.80	47	77.00	-0.30	0.76
Fee-based information database(s) (Hoovers, Career Search, etc.)	50	22.00	13	21.30	-0.12	0.91

*Significant at the α=.05 level.

The only significantly lower item (virtual fairs) is supported by the literature in that virtual fairs were popular prior to the turn of the century (Miller & McDaniels, 2001), but it was surprising for virtual fairs usage to be significantly lower with this study. It is likely that CSOs do not know how to set up the online job fairs, do not have the human resources to monitor them or do not have much success with employer or candidate use of them. Perhaps the heyday of virtual job fairs has come and gone. If CSOs, employers, and vendors would like to continue to utilize virtual job fairs, they should take the necessary steps in reinventing the virtual job market process. This process should be as user-friendly as possible.

Table 12 represents data drawn from the 2002 National Career Services Performance Measurement Survey and the 2004 study related to services offered to employers by CSOs. Table 12 examines computerized services offered to employers that are markedly different than those services offered to students and alumni although the outcomes may seem the same.

The normal test of proportions was calculated on a Microsoft Excel spreadsheet program. There were no significant differences at the $\alpha=.05$ level in the use of the nine technology uses by employers in the 2002 National Career Services Performance Measurement Survey and the use of those technology functions in the 2004 Southwest CSO survey. The findings from Table 12 indicate that the uses of technology for employer services were stable between 2002 national and 2004 regional CSOs. Unless CSOs experience a need for the technological uses for employer services to be significantly higher,

then they should maintain the level of services offered to employers by computers and computer technology.

Table 12. Test of Proportions for Two Samples of Computerized Services Offered to Employers by Career Services Offices Comparing 2002 National and 2004 Southwest Data

Employer Services	N	2002 data in %	N	2004 data in %	z-score	p-value
N		225		61		
weight		0.79		0.21		
Registration for career events	131	58.00	43	70.50	1.77	0.08
Recruiting information	170	75.60	40	65.60	-1.57	0.12
Salary data on recent grads	82	36.40	27	44.30	1.13	0.26
Direct input of job or internship/coop listings	156	69.20	39	63.90	-0.79	0.43
Links to employer Web sites	158	70.00	40	65.60	-0.66	0.51
Candidate database/student profile	104	46.40	31	50.80	0.61	0.54
General info for employers	177	78.80	50	82.00	0.55	0.58
Access to recruiting schedules	141	62.80	36	59.00	-0.54	0.59
Access to résumés	157	69.60	44	72.10	0.38	0.71

In summary, the answer to research question two is that the 2004 regional research data compared with the 2002 national survey reveal similarities and differences between the two populations surveyed. The analyses offered a comparison between 2002 national and 2004 regional CSOs and (a) the amount of employee time career services offices spent working with technology, (b) the amount of employee time CSOs spent

evaluating/reviewing commercial vendors and their products, (c) the types of technology CSOs used, (d) computerized services CSOs offered to students/alumni, and (e) computerized services CSOs offered to employers. CSOs reported a stabilization in the employee time spent working with technology and reviewing/evaluating vendors and their products between the 2002 national and 2004 regional studies. One comparison revealed that hiring employees who are knowledgeable or who have expertise in working with technology as well as the distribution of employee time to allow for or incorporate working with technology are important considerations with respect to the work of CSOs.

The additional analyses found in Tables 10-12 were useful in providing insight into usage of technology of CSOs and those utilized for students/alumni and employer services. First, the significantly lower use of Web sites found in this study does not concur with recent literature. Perhaps the comparison of 2002 national and 2004 regional CSOs was not appropriate for evaluating this particular item in that Web sites or their usage have not made major changes during this period. It is likely that CSOs do not regularly attend to their office Web sites, may have read the survey question incorrectly, may not be in charge of the management of their Web sites, and/or do not think of their use as significant. CSOs should reevaluate their office Web sites on a regular basis in order to keep up with changing technological advances. It could also be that the comparisons made between 2002 national and 2004 Southwest data in Table 10 are an indication that regional and national trends are more similar

rather than dissimilar between those two years than between 1998 and 2004. It is probable that because the 2004 study and the most recent literature support the significantly lower use of facsimile technology, CSOs are not likely to continue a higher usage of this particular technology in the region or nationally.

Second, it was surprising for virtual fairs usage to be lower significantly in this study. It is likely that CSOs do not know how to set up such fairs, do not have the human resources to monitor them, or do not have much success with employer or candidate use of them. If CSOs, employers, and vendors would like to continue to utilize virtual job fairs, they should take the necessary steps in reinventing the virtual job market process. Third, services of CSOs to employers showed no significant changes between 2002 national and 2004 regional groups. There may not be a need in the future for CSOs to increase the level of services offered to employers by computers and computer technology.

Research Question Three

Research question three asked, “Is the size (as measured by student head count) of an institution a determining factor in the use of technology by career services offices?” To answer this question, each technology chosen for the study was analyzed based on institutional size. Descriptive statistics and normal test of proportions were used to analyze the data found in Tables 13-15. This section examined institutional size related to CSO utilization of one-way and two-way methods of communication between CSOs and other CSO staff, faculty, staff, students, alumni, employers, and 15 selected technology

uses that were profiled in the 1998 study. Charoensri (1998) compared the same listings to data in 1993 and 1991 studies (see Appendix B). Institutions with fewer than 5,000 students were categorized as small institutions while large institutions consisted of 5,000 or more students (see Table 3).

Tables 13A-13B illustrate the results of CSO usage (in percentages) of one-way methods of communications using technology. These data are distributed by size of institution and year.

In Table 13A, the normal test of proportions was applied to the 1998 data for both small and large institutions. Z-scores and p-values were calculated for small institutions and large institutions for one-way methods of communication. Out of the six items in the table utilized for one-way communication, significant differences existed among size of institution in three items (67%). Only one item indicated small institutions utilized it significantly more than large institutions, while three items indicated large institutions utilized them significantly more than small institutions. The items called automated touch-tone telephone system, answering machine/voicemail, and Internet/Intranet suggest that these may be utilized significantly more by large institutions because newer technology makes them easier to use and large institutions had more access than small to the newer technologies. The item called e-mail/electronic file transfer was utilized significantly less by large institutions than small perhaps because large institutions had access to other means of communicating via one-way methods of communication. There was

no significant difference in the facsimile technology in 1998 between small and large institutions.

Table 13A. Results of Test of Proportions Analysis of Size of Institution by One-way Methods of Communication Comparing 1998 Small and Large Southwest Data

One-way Method	N	1998 data in % (Small)	N	1998 data in % (Large)	z-score	p-value
N		42		49		
weight		0.46		0.54		
Automated touch-tone telephone system	10	23.81	44	89.80	6.39	<.01*
Answering machine/voicemail	31	73.81	48	97.96	3.39	<.01*
Internet/Intranet	29	69.05	46	93.88	3.10	<.01*
E-mail/electronic file transfer	32	76.19	22	44.90	-3.03	<.01*
Fax-on-demand (automated fax on server)	12	28.57	19	38.78	1.02	0.31
Fax	36	97.62	47	95.92	-0.45	0.65

*Significant at the α=.05 level.

In Table 13B, the normal test of proportions was applied to the 2004 data for both small and large institutions. Z-scores and p-values were calculated for small institutions and large institutions for one-way methods of communication. Out of the six items in the table utilized for one-way communication, significant differences existed among size of institution in three items (50%). Only one item indicated that small institutions utilized it significantly more than large institutions, while two items indicated large institutions utilized them significantly more than small institutions. The item called fax-on-demand was utilized significantly less by large institutions than

small perhaps because by 2004, large institutions had begun to utilize online systems that replaced the facsimile technology. On the other hand, this finding suggests the items used significantly more by large institutions called automated touch-tone telephone system and answering machine/voicemail are on the increase because newer technology makes them easier to use and large institutions had more access than small to the newer technologies.

Table 13B. Results of Test of Proportions Analysis of Size of Institution by One-way Methods of Communication Comparing 2004 Small and Large Southwest Data

One-way Method	N	2004 data in % (Small)	N	2004 data in % (Large)	z-score	p-value
N weight		21 0.34		40 0.66		
Fax-on-demand (automated fax on server)	21	100.00	5	12.00	-6.61	<.01*
Automated touch-tone telephone system	1	4.80	26	64.00	4.43	<.01*
Answering machine/voicemail	8	37.14	33	83.00	3.63	<.01*
Internet/Intranet	20	93.34	31	78.50	-1.49	0.14
Fax	11	53.36	26	65.00	0.89	0.38
E-mail/electronic file transfer	18	87.62	36	89.50	0.22	0.82

*Significant at the α=.05 level.

Tables 13A and 13B illustrate the results of changes in size of institution over time in the use of one-way methods of communication. Both tables yielded two out of six of the same significant items. The items called answering machine/voice-mail and automated touch-tone telephone system changed significantly in the positive direction in both tables indicating an increase in

usage between sizes of institution over time. This could be because technology makes it easier to use and larger institutions had more access to newer technologies than did small.

Tables 14A-14B illustrate the results of CSO usage (in percentages) of communications using technology. These data are distributed by size of institution and year.

In Table 14A, the normal test of proportions was applied to the 1998 data for both small and large institutions. Z-scores and p-values were calculated for small institutions and large institutions for two-way methods of communication. Out of the four items in the table utilized for two-way communication, significant differences existed among size of institution in three items (75%). One item indicated that small institutions utilized it significantly more than large and two items indicated that large institutions utilized them significantly more than small. The items called video/computer conferencing and telephone/audioconferencing showed that large institutions utilized them significantly more than small in 1998 perhaps because resources available to large institutions for the use of these items were not available to small institutions. Similarly, perhaps increased use of the previous two technologies made the item called group meeting/conferences less utilized by large institutions than by small institutions in 1998.

Table 14A. Results of Test of Proportions Analysis of Size of Institution by Two-way Methods of Communication Comparing 1998 Small and Large Southwest Data

Two-way Methods	N	1998 data in % (Small)	N	1998 data in % (Large)	z-score	p-value
N weight		42 0.46		49 0.54		
Video/computer conferencing	3	7.14	47	95.92	8.49	<.01*
Group meetings/conferences	32	76.19	16	32.65	-4.15	<.01*
Telephone/audioconferencing	19	45.24	34	69.39	2.33	0.02*
Person-to-person	39	92.86	44	89.80	-0.51	0.61

*Significant at the α=.05 level.

In Table 14B, the normal test of proportions was applied to the 2004 data for both small and large institutions. Z-scores and p-values were calculated for small institutions and large institutions for two-way methods of communication. Out of the four items in the table used for two-way communication, significant differences existed among size of institution in three items (75%). Only one item indicated that large institutions utilized them significantly more than small while two indicated that small institutions utilized them significantly more than large. Person-to-person communications were significantly more utilized by large institutions in 2004 than by small institutions. Perhaps this is true because large institutions began to pay more attention to their level of human interaction than technology—starting to opt for high touch rather than high tech. The items called video/computerconferencing and group

meetings/conferences were utilized significantly less by large institutions in 2004 than by small institutions. This could be true because large institution resources may have afforded them the option to utilize other two-way methods of communication.

Table 14B. Results of Test of Proportions Analysis of Size of Institution by Two-way Methods of Communication Comparing 2004 Small and Large Southwest Data

Two-way Methods	N	2004 data in % (Small)	N	2004 data in % (Large)	z-score	p-value
N weight		21 0.34		40 0.66		
Person-to-person	3	16.18	37	91.50	5.88	<.01*
Video/computerconferencing	18	87.64	11	28.00	-4.43	<.01*
Group meetings/conferences	21	100.00	32	81.00	-2.13	0.03*
Telephone/audioconferencing	14	65.72	32	81.00	1.32	0.19

*Significant at the α=.05 level.

Tables 14A and 14B illustrate the results of changes in different sizes of institutions from 1998 to 2004. The tables yielded two of the same significant items. The item called group meetings/conferences that large institutions utilized it significantly less than small in both tables indicating the consistent lack of use of this item by large institutions over time. Perhaps group meetings/conferences were easier to conduct at small institutions than large in 1998 and in 2004.

However, for the item called video/computer conferencing, large institutions utilized it significantly more than small in Table 14A indicating an

increase in usage for different sizes of institutions in 1998. But, the same item indicated that large institutions utilized it significantly less than small in Table 14B—a decreased usage for different size of institutions in 2004. This could be true because large institutions found other methods of conferencing by 2004.

Tables 15A-15B illustrate the results of CSO usage (in percentages) of the 15 selected uses of technology that were profiled in the 1998 study by size of institution. Charoensri (1998) compared the same listing to data in 1993 and 1991 studies (see Appendix B). These data were distributed by size of institutions and year.

In Table 15A, the normal test of proportions was applied to the 1998 data for both small and large institutions. Z-scores and p-values were calculated for small and large institutions for the 15 selected uses of technology. Out of the 15 items in the table, significant differences existed among size of institution in 12 items (80%). Two items indicated that large institutions utilized them significantly less than small (word processing and mailing labels) and 10 indicated that large institutions utilized them significantly more than small. Less usage of word processing by large institutions could not be explained; however, it could be that large institutions used other resources to produce mailing labels whereas small institutions could not. The items called company profiles, budgeting, sign-up counseling schedule, library information, alumni files, job bank/employer database, VCR, statistical reports, student records, and interview schedule were significantly positive indicating significantly more usage by large institutions in 1998 than by small institutions.

This finding concurs with the findings of the Charoensri (1998) study in that large institutions tended to have more resources for technology use than did small institutions in the same year.

Table 15A. Results of Normal Test of Proportions Analysis Comparing CSO Utilization of 15 Selected Uses of Technology in 1998 for Small and Large Institutions

15 Selected Uses of Technology	N	1998 data in % (Small)	N	1998 data in % (Large)	z-score	p-value
N weight		42 0.46		49 0.54		
Company profiles	15	35.71	48	97.96	6.41	<.01*
Word processing	41	97.62	19	38.78	-5.90	<.01*
Budgeting	19	45.24	47	95.92	5.40	<.01*
Sign-up/counseling schedule	11	26.19	39	79.59	5.10	<.01*
Library information	23	54.76	46	93.88	4.35	<.01*
Alumni files	13	30.95	36	73.47	4.06	<.01*
Job bank/employer database	29	69.05	48	97.96	3.81	<.01*
VCR	9	21.43	29	59.18	3.64	<.01*
Statistical reports	16	38.10	33	67.35	2.79	0.01*
Mailing lists/labels	40	95.24	38	77.55	-2.40	0.02*
Student records	24	57.14	38	77.55	2.08	0.04*
Interview schedule	13	30.95	25	51.02	1.94	0.05*
Career guidance/counseling/ advising	23	54.76	36	73.47	1.86	0.06
Fax	36	85.71	37	75.51	-1.22	0.22
Student résumé	29	69.05	38	77.55	0.92	0.36

*Significant at the α=.05 level.

In Table 15B, the normal test of proportions was applied to the 2004 data for both small and large institutions. Z-scores and p-values were

calculated for small and large institutions for the 15 selected uses of technology. Out of the 15 items in the table, significant differences existed among size of institution in five items (33%). Two items indicated that large institutions utilized them significantly less than small and three items indicated that large institutions utilized them significantly more than small. The items called VCR and company profiles were used significantly less by large institutions in 2004 than by small institutions. VCR usage was expected to be utilized less by both sizes of institutions, but perhaps large institution resources allowed them the use of other technology to a degree not available to small institutions. The reported less use of company profiles could be an indication that CSOs expect job seekers to use company Web sites for company information. The items called mailing lists/labels (negative in 1998), job bank/employer database, and alumni files were utilized significantly more by large institutions in 2004 than by small institutions.

Table 15B. Results of Normal Test of Proportions Analysis Comparing CSO Utilization of 15 Selected Uses of Technology in 2004 for Small and Large Institutions

15 Selected Uses of Technology	N	2004 data in % (Small)	N	2004 data in % (Large)	z-score	p-value
N		21		40		
weight		0.34		0.66		
VCR	20	95.2	11	27.5	-5.03	<.01*
Mailing lists/labels	11	50.0	37	92.5	3.80	<.01*
Job bank/employer database	11	52.4	35	87.5	3.03	<.01*
Alumni files	2	9.5	18	45.0	2.81	0.01*
Company profiles	16	76.2	19	47.5	-2.15	0.03*
Statistical reports	21	100.0	40	100.0	0.00	0.00
Interview schedule	12	57.1	32	80.0	1.90	0.06
Library information	12	57.1	31	77.5	1.66	0.10
Budgeting	20	95.2	32	80.0	-1.59	0.11
Student records	15	71.4	34	85.0	1.27	0.20
Career guidance/counseling/ advising	17	81.0	27	67.5	-1.12	0.26
Student résumé	17	81.0	35	87.5	0.68	0.50
Word processing	18	85.7	36	90.0	0.50	0.62
Fax	16	76.2	32	80.0	0.34	0.73
Sign-up/counseling schedule	16	76.2	31	77.5	0.11	0.91

*Significant at the α=.05 level.

Tables 15A and 15B illustrate the results of size of institution over time. Both tables yielded five of the same items as significant. The items called job bank and alumni files changed significantly in the positive direction in both tables indicating that large institutions utilized them significantly more than small. However, the items called company profiles and VCR indicated positive

significance in Table 15A suggesting an increase in usage for size in 1998. Interestingly, both significantly negative items found in Table 15B for 2004 were significantly positive in 1998 by large institutions suggesting a change in the type of technology used to deliver the services that these items provided. Further, the lack of use of VCR in 2004 could be an indication that CD-Roms and VCRs have become the multimedia resources of the past. Similarly, the item called mailing list/labels changed negatively in 1998, but positively in 2004 although significant in both tables. Perhaps CSO use of technology for producing mailing lists/labels changed from 1998 to 2004.

In summary, for one-way communications, when small institutions in 1998 were compared to large institutions in 1998 significant differences existed for two-thirds (67%) of the methods of communication. For one-way communications, when small institutions in 2004 were compared to large institutions in 2004 significant differences existed for one-half (50%) of the methods of communication. When both sizes in both years were compared to each other, it was discovered that two out of six items shared significance in change. The items called answering machine and automated touch tone telephone system indicated that large institutions utilized them significantly more than small institutions in both 1998 and 2004.

In summary, for two-way communications, when small institutions in 1998 were compared to large institutions in 1998, significant differences existed for one-half (50%) of the methods of communication. For two-way communication, when small institutions in 2004 were compared to large

institutions in 2004, significant differences existed for three-quarters (75%) of the methods of communication. When both sizes in both years were compared to each other, it was discovered that two out of four items shared significance in change. The item called group meetings/conferences was the only item that decreased significantly in usage for both small institutions over time and in large institutions over time.

In summary, concerning the listing of 15 selected uses of technology, when small institutions in 1998 were compared to large institutions in 1998 significant differences existed for 80% (12 out of 15) of the uses of technology. For the 15 selected uses of technology, when small institutions in 2004 were compared to large institutions in 2004, significant differences existed for one-third (33%) of the technology uses. When both sizes in both years were compared to each other, it was discovered that 5 out of 15 items shared significance in change. The items called job bank and alumni files increased significantly in usage for both sizes of institutions over time.

Finally, the previous analyses provide the answer to research question three, which reveals that size is a determining factor in the use of technology by CSOs. The previous in-depth analyses examined and discussed institutional size related to use by CSOs of one-way (Tables 13A-13B) and two-way (Tables 14A-14B) methods of communication and the use of 15 selected uses of technology (Tables 15A-15B). Explanations were provided for changes in usage of technology between the sizes of institutions.

Research Question Four

Research question four asked, “Is the type of institution (private or public) a determining factor in the use of technology by career services offices?” For these analyses, each technology chosen for the study was analyzed based on institutional type. Descriptive statistics and normal test of proportions were used to analyze these data (see Tables 16-18).

This section illustrates the results of institutional type related to CSO utilization of one-way and two-way methods of communication between CSOs and other CSO staff, faculty, staff, students, alumni, and employers, and 15 selected technology uses. Tables 16A-16B illustrate the results of CSO usage (in percentages) of one-way methods of communications using technology. These data are distributed by type of institution.

In Table 16A, the normal test of proportions was applied to the 1998 data for both private and public institutions. Z-scores and p-values were calculated for private institutions and public institutions for one-way methods of communication. Out of the six items in the table utilized for one-way communication, significant differences existed among type of institution in three items (50%). All three items indicated public institutions utilized them significantly less than private.

Table 16A. Results of Test of Proportions Analysis of Type of Institution by One-way Methods of Communication Comparing 1998 Private and Public Southwest Data

One-way Methods	N	1998 data in % (Private)	N	1998 data in % (Public)	z-score	p-value
N		35		56		
weight		0.38		0.62		
Automated touch-tone telephone system	5	14.29	24	42.86	-2.85	<.01*
Internet/Intranet	24	68.57	51	91.07	-2.74	<.01*
Fax-on-demand (automated fax on server)	8	22.86	26	46.43	-2.26	0.02*
E-mail/electronic file transfer	28	80.00	52	92.86	-1.83	0.07
Fax	31	88.57	52	92.86	-0.70	0.48
Answering machine/ voicemail	30	85.71	45	80.36	0.65	0.51

*Significant at the α=.05 level.

In Table 16B, the normal test of proportions was applied to the 2004 data for both private and public institutions. Z-scores and p-values were calculated for private institutions and public institutions for one-way methods of communication. Out of the six items in the table used for one-way communication, no significant differences existed among type of institution. Tables 16A and 16B did not share any of the same items that showed significance because Table 16B had no significant items.

Table 16B. Results of Test of Proportions Analysis of Type of Institution by One-way Methods of Communication Comparing 2004 Private and Public Southwest Data

One-way Methods	N	2004 data in % (Private)	N	2004 data in % (Public)	z-score	p-value
N		20		41		
weight		0.33		0.67		
E-mail/electronic file transfer	20	100.00	37	90.24	1.45	0.15
Internet/Intranet	19	93.00	32	79.20	1.37	0.17
Fax	10	52.00	27	65.36	-1.00	0.32
Fax-on-demand (automated fax on server)	1	5.00	5	11.72	-0.84	0.40
Answering machine/voicemail	18	88.00	34	82.92	0.52	0.61
Automated touch-tone telephone system	11	54.00	23	55.10	-0.08	0.94

*Significant at the α=.05 level.

Tables 17A-17B illustrate the results of CSO usage (in percentages) of two-way methods of communications using technology. These data are distributed by type of institution. The normal test of proportions was applied to the 1998 data and the 2004 data separately for both private and public institutions. Z-scores and p-values were calculated for private institutions and public institutions for two-way methods of communication.

In Table 17A, the normal test of proportions was applied to the 1998 data for both private and public institutions. Z-scores and p-values were calculated for private institutions and public institutions for two-way methods of communication. Out of the four items in the table, significant differences

existed among type of institution in only one item (25%). The one item indicated public institutions utilized it significantly less than private.

Table 17A. Results of Test of Proportions Analysis of Type of Institution by Two-way Methods of Communication Comparing 1998 Private and Public Southwest Data

Two-way Methods	N	1998 data in % (Private)	N	1998 data in % (Public)	z-score	p-value
N weight		35 0.38		56 0.62		
Video/computerconferencing	1	2.86	18	32.14	-3.34	<.01*
Telephone/audioconferencing	19	54.29	34	60.71	-0.60	0.55
Group meetings/conferences	29	82.86	47	83.93	-0.13	0.89
Person-to-person	33	94.29	53	94.64	-0.07	0.94

*Significant at the α=.05 level.

In Table 17B, the normal test of proportions was applied to the 2004 data for both private and public institutions. Z-scores and p-values were calculated for private institutions and public institutions for two-way methods of communication. Out of the four items in the table, no significant differences existed between type of institution.

Table 17B. Results of Test of Proportions Analysis of Type of Institution by Two-way Methods of Communication Comparing 2004 Private and Public Southwest Data

Two-way Methods	N	2004 data in % (Private)	N	2004 data in % (Public)	z-score	p-value
N weight		20 0.33		41 0.67		
Telephone/audioconferencing	13	64.00	33	81.46	-1.49	0.14
Person-to-person	20	100.00	38	92.18	1.28	0.20
Group meetings/conferences	18	89.00	33	80.48	0.84	0.40
Video/computerconferencing	4	18.00	11	26.84	-0.76	0.45

*Significant at the α=.05 level.

Tables 17A and 17B did not share any of the same items with significance because Table 17B had no significant items.

Tables 18A-18B illustrate the results of CSO usage (in percentages) of the 15 technology functions that were profiled in the 1998 study by type of institution. Charoensri (1998) compared the same listing to data in 1993 and 1991 studies (see Appendix B). These data were distributed by type of institution. The normal test of proportions was applied to the 1998 data and the 2004 data separately for both private and public institutions.

In Table 18A, the normal test of proportions was applied to the 1998 data for both private and public institutions. Z-scores and p-values were calculated for private institutions and public institutions for the 15 selected uses of technology. Out of the 15 items in the table, significant differences existed

among type of institutions in four items (27%). All four items indicated public institutions utilized them significantly more than private.

Table 18A. Results of Normal Test of Proportions Analysis Comparing CSO Utilization of 15 Selected Uses of Technology in 1998 for Private and Public Institutions

15 Selected Uses of Technology	N	1998 data in % (Private)	N	1998 data in % (Public)	z-score	p-value
N weight		35 0.38		56 0.62		
Budgeting	16	45.71	41	73.21	2.64	0.01*
Interview schedule	13	37.14	36	64.29	2.53	0.01*
Statistical reports	14	40.00	35	62.50	2.09	0.04*
Student records	23	65.71	47	83.93	2.01	0.04*
Company profiles	17	48.57	37	66.07	1.65	0.10
Career guidance/ counseling/advising	20	57.14	40	71.43	1.40	0.16
Alumni files	13	37.14	29	51.79	1.36	0.17
Sign-up/counseling schedule	11	31.43	25	44.64	1.25	0.21
Library information	21	60.00	40	71.43	1.13	0.26
Fax	31	88.57	52	92.86	0.70	0.48
Job bank/employer database	26	74.29	39	69.64	-0.48	0.63
Word processing	34	97.14	55	98.21	0.34	0.74
Mailing lists/labels	34	97.14	54	96.43	-0.18	0.85
Student résumé	26	74.29	41	73.21	-0.11	0.91
VCR	11	31.43	17	30.36	-0.11	0.91

*Significant at the α=.05 level.

In Table 18B, the normal test of proportions was applied to the 2004 data for both private and public institutions. Z-scores and p-values were

calculated for private institutions and public institutions for the 15 selected uses of technology. Out of the 15 items in the table, significant differences existed between the type of institution in one item (7%) indicating public institutions utilized student records significantly more than private.

Table 18B. Results of Normal Test of Proportions Analysis Comparing CSO Utilization of 15 Selected Uses of Technology in 2004 for Private and Public Institutions

15 Selected Uses of Technology	N	2004 data in % (Private)	N	2004 data in % (Public)	z-score	p-value
N		20		41		
weight		0.33		0.67		
Student records	12	60.00	34	82.90	1.95	0.05*
Sign-up/counseling schedule	18	90.00	29	70.70	-1.68	0.09
VCR	2	10.00	11	26.80	1.50	.13
Fax	14	70.00	35	85.40	1.42	0.16
Career guidance/ counseling/advising	11	55.00	28	68.30	1.02	0.31
Alumni files	11	55.00	18	43.90	-0.81	0.42
Student résumé	16	80.00	36	87.80	0.81	0.42
Word processing	18	90.00	38	92.70	0.36	0.72
Mailing lists/labels	19	95.00	38	92.70	-0.34	0.73
Company profiles	10	51.25	19	46.95	-0.32	0.75
Job bank/employer database	17	85.00	36	87.80	0.30	0.76
Budgeting	16	80.00	32	78.00	-0.18	0.86
Interview schedule	16	80.00	32	78.00	-0.18	0.86
Library information	15	75.00	31	75.60	0.05	0.96
Statistical reports	20	100.00	41	100.00	0.00	1.00

*Significant at the α=.05 level.

Tables 18A and 18B illustrate the results of changes in type of institution over time. Both tables yielded the same one item as significant. The item called student records changed significantly in the positive direction indicating an increase in usage between types of institutions over time.

In summary, for one-way communications, when private institutions in 1998 were compared to public institutions in 1998, significant differences existed for one-half (50%) of the methods of communication. For one-way communications, when private institutions in 2004 were compared to public institutions in 2004, significant differences did not exist. When both sizes in both years were compared to each other, it was discovered that there were none of the same items that showed significant differences. No conclusions could be made based on this set of comparisons.

In summary, for two-way communications, when private institutions in 1998 were compared to public institutions in 1998, significant differences existed for one-quarter (25%) of the methods of communication. For two-way communication, when private institutions in 2004 were compared to public institutions in 2004, no significant differences existed. When both sizes in both years were compared to each other, it was discovered that there were none of the same items that showed significant differences. No conclusions could be made based on this set of comparisons.

In summary, concerning the listing of 15 selected uses of technology, when private institutions in 1998 were compared to public institutions in 1998 significant differences existed for 27% (4 out of 15) of the uses of technology.

For the 15 selected uses of technology, when private institutions in 2004 were compared to public institutions in 2004, significant differences existed for one (7%) of the technology uses. When both sizes in both years were compared to each other, it was discovered that 1 out of 15 items shared significance in change. Only technology usage related to student records showed a significant difference with public institutions utilizing student records technology at a significantly higher rate than private institutions in both 1998 and 2004.

Finally, the previous analyses provided the answer to research question four, which revealed that there are differences according to type of institution and the use of technology by CSOs. The previous in-depth analyses examined and discussed institutional type related to use by CSOs of one-way (Tables 16A-16B) and two-way (Tables 17A-17B) methods of communication and the use of 15 selected uses of technology (Tables 18A-18B). Explanations were provided for changes in usage of technology between the types of institutions.

Research Question Five

Research question five asked, “Are there differences in use of technology in career services offices over time according to institutional size and type?” For these analyses, each technology chosen for the study was analyzed based on institutional type. Descriptive statistics and normal test of proportions were used to analyze these data (see Tables 19A-24B).

This section illustrates the results of institutional size related to CSO utilization of one-way and two-way methods of communication between CSOs and other CSO staff, faculty, staff, students, alumni, and employers, and 15

selected technology uses. Tables 19A-21B illustrate the results of CSO usage (in percentages) of one-way methods of communications using technology. These data are distributed by size of institution.

Table 19A compared usage by small institutions of one-way methods of communication in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for small institutions. Z-scores and p-values were calculated for small institutions for one-way methods of communication. Out of the six items utilized for one-way communication, significant differences existed from 1998 to 2004 in four items (67%). Two items indicated significant change in the negative direction and two changed positively. The items called fax and fax-on-demand were utilized significantly less by small institutions in 2004 than in 1998. This finding concurs with previous findings from this study that the use of facsimile technology is on the decline. For small institutions, the items called e-mail/electronic file transfer and Internet/Intranet were utilized significantly more in 2004. Perhaps these technology uses serve to replace the facsimile technology.

Table 19A. Results of Test of Proportions Analysis of Size of Institution by One-way Methods of Communication Comparing 1998 Small and 2004 Small Southwest Data

One-way Method	N	1998 data in % (Small)	N	2004 data in % (Small)	z-score	p-value
N		42		21		
weight		0.67		0.33		
Fax	36	97.62	11	53.36	-4.40	<.01*
E-mail/electronic file transfer	32	76.19	21	100.00	2.44	0.01*
Fax-on-demand (automated fax on server)	12	28.57	1	4.80	-2.20	0.04*
Internet/Intranet	29	69.05	20	93.34	2.16	0.03*
Answering machine/voicemail	31	73.81	18	87.62	1.26	0.21
Automated touch-tone telephone system	10	23.81	8	37.14	1.11	0.27

*Significant at the α=.05 level.

Table 19B compared usage by large institutions of one-way methods of communication in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for large institutions. Z-scores and p-values were calculated for large institutions for one-way methods of communication. Out of the six items in the table utilized for one-way communication, significant differences existed from 1998 to 2004 in four items (67%). Three items indicated significant change in the negative direction, while only one changed positively. Here again, the items called fax and fax-on-demand were utilized significantly less by large institutions in 2004 than in 1998. This finding concurs with previous findings from this study that the use of facsimile technology is on

the decline. For small institutions, the item called Internet/Intranet was also utilized significantly less in 2004, but cannot be explained. The item called automated touch-tone telephone system was the only item in the table used significantly more by large institutions in 2004 than in 1998. Perhaps this item was utilized more because of the increased technologies involved with caller ID and voice message options.

Table 19B. Results of Test of Proportions Analysis of Size of Institution by One-way Methods of Communication Comparing 1998 Large and 2004 Large Southwest Data

One-way Method	N	1998 data in % (Large)	N	2004 data in % (Large)	z-score	p-value
N		49		40		
weight		0.55		0.45		
Fax	47	95.92	26	65.00	-3.78	<.01*
Fax-on-demand (automated fax on server)	22	44.90	5	12.00	-3.37	<.01*
Automated touch-tone telephone system	19	38.78	26	64.00	2.37	0.02*
Internet/Intranet	46	93.88	31	78.50	-2.14	0.03*
E-mail/electronic file transfer	48	97.96	36	89.50	-1.69	0.09
Answering machine/voicemail	44	89.80	33	83.00	-0.94	0.35

*Significant at the α=.05 level.

Tables 19A and 19B illustrate the results of changes in same size of institution over time. Both tables yielded three of the same items as significant. The items called fax and fax-on-demand changed significantly in the negative direction in both tables supporting the notion of decreased usage over time for small institutions and large institutions. The item called Internet/Intranet significantly increased for small institutions indicating it was utilized significantly more in 2004; however, it was significantly less for large institutions indicating it was utilized significantly less in 2004. Perhaps during the six-year period, small institutions were catching up to the Internet technologies which large institutions already had accessed.

Table 20A compared usage by small institutions of two-way methods of communication in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for small institutions. Z-scores and p-values were calculated for small institutions only for two-way methods of communication. Out of the four items used for two-way communication, no significant differences were found indicating no significant change in usage for small institutions over time. It could be that small institution resources did not change enough from 1998 to 2004 in order to affect the use of these two-way communication methods.

Table 20A. Results of Test of Proportions Analysis of Size of Institution by Two-way Methods of Communication Comparing 1998 Small and 2004 Small Southwest Data

Two-way Methods	N	1998 data in % (Small)	N	2004 data in % (Small)	z-score	p-value
N		42		21		
weight		0.67		0.33		
Telephone/audioconferencing	19	45.24	14	65.72	1.53	0.13
Person-to-person	39	92.86	21	100	1.25	0.21
Video/computerconferencing	3	7.14	3	16.18	1.12	0.26
Group meetings/conferences	32	76.19	18	87.64	1.07	0.28

*Significant at the α=.05 level.

Table 20B compared usage by large institutions of two-way methods of communication in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for large institutions only. Z-scores and p-values were calculated for large institutions for two-way methods of communication. Out of the four items in the table used for two-way communication, significant differences were not found. It could be that large institution resources did not change enough from 1998 to 2004 in order to affect the use of these two-way communication methods.

Table 20B. Results of Test of Proportions Analysis of Size of Institution by Two-way Methods of Communication Comparing 1998 Large and 2004 Large Southwest Data

Two-way Methods	N	1998 data in % (Large)	N	2004 data in % (Large)	z-score	p-value
N		49		40		
weight		0.55		0.45		
Telephone/audioconferencing	34	69.39	32	81.00	1.25	0.21
Group meetings/conferences	44	89.80	32	81.00	-1.18	0.24
Person-to-person	47	95.92	37	91.50	-0.87	0.38
Video/computerconferencing	16	32.65	11	28.00	-0.47	0.64

*Significant at the α=.05 level.

Tables 20A and 20B illustrate the results of changes in two-way methods of communication in same size of institution over time. Neither table yielded items as significant when the same size was compared over time. Thus, there was a lack of significant change in items representing two-way methods of communication over time shared by both small institutions and large institutions. This was not expected because the characteristics of small versus large institutions in the Charoensri (1998) study suggest that the two sizes of institutions use technology differently and the data here suggest that CSO use technology for this set of items may not be different.

Table 21A compared usage by small institutions of 15 selected uses of technology in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for small institutions. Z-scores and p-values were calculated for small institutions for two-way methods of communication. Out of the 15 items in the table, significant differences were found in four of the 15

items (27%). All four items indicated that small institutions utilized them significantly more in 2004 than in 1998. Small institutions utilized statistical reports and budgeting significantly more over time perhaps due to better, more efficient software to run the reports and track budgets. Technology used for sign-up/counseling schedule increased significantly with small institutions over the six-year period, again perhaps due to better software availability to handle the scheduling.

Table 21B compared usage by large institutions of 15 selected uses of technology in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for large institutions. Z-scores and p-values were calculated for large institutions for two-way methods of communication. Out of the 15 items in the table, significant differences were found in four items (27%). Two items indicated that large institutions utilized them significantly more in 2004, while two indicated that large institutions utilized them significantly less in 2004. Technology used for company profiles and fax decreased in 2004 while the use of statistical reports and sign-up/counseling schedule increased significantly.

Table 21A. Results of Normal Test of Proportions Analysis Comparing CSO Utilization of 15 Selected Uses of Technology in 1998 and 2004 for Small Institutions

15 Selected Uses of Technology	N	1998 data in % (Small)	N	2004 data in % (Small)	z-score	p-value
N		42		21		
weight		0.67		0.33		
Statistical reports	16	38.10	21	100.00	4.70	<.01*
Sign-up/counseling schedule	11	26.19	16	76.20	3.78	<.01*
Interview schedule	13	30.95	16	76.20	3.40	<.01*
Budgeting	19	45.24	16	76.20	2.33	0.02*
Alumni files	13	30.95	11	52.40	1.65	0.10
Job bank/employer database	29	69.05	18	85.70	1.43	0.15
Library information	23	54.76	15	71.40	1.27	0.20
VCR	9	21.43	2	9.50	-1.18	0.24
Company profiles	15	35.71	11	50.00	1.09	0.28
Student résumé	29	69.05	17	81.00	1.01	0.31
Word processing	41	97.62	20	95.20	-0.52	0.61
Fax	36	85.71	17	81.00	-0.48	0.63
Career guidance/counseling/ advising	23	54.76	12	57.10	0.18	0.86
Mailing lists/labels	40	95.24	20	95.20	-0.01	0.99
Student records	24	57.14	12	57.10	0.00	1.00

*Significant at the α=.05 level.

Table 21B. Results of Normal Test of Proportions Analysis Comparing CSO Utilization of 15 Selected Uses of Technology in 1998 and 2004 for Large Institutions

15 Selected Uses of Technology	N	1998 data in % (Large)	N	2004 data in % (Large)	z-score	p-value
N		49		40		
weight		0.55		0.45		
Statistical reports*	33	67.35	40	100.00	3.99	<.01*
Company profiles*	39	79.59	19	47.50	-3.16	<.01*
Sign-up/counseling schedule*	25	51.02	31	77.50	2.57	0.01*
Fax*	47	95.92	32	80.00	-2.37	0.02*
Job bank/employer database	36	73.47	35	87.50	1.64	0.10
Word processing	48	97.96	36	90.00	-1.62	0.10
Student records	46	93.88	34	85.00	-1.38	0.17
Alumni files	29	59.18	18	45.00	-1.33	0.18
Mailing lists/labels	48	97.96	37	92.50	-1.24	0.22
Student résumé	38	77.55	35	87.50	1.22	0.22
VCR	19	38.78	11	27.50	-1.12	0.26
Career guidance/counseling/ advising	37	75.51	27	67.50	-0.84	0.40
Interview schedule	36	73.47	32	80.00	0.72	0.47
Budgeting	38	77.55	32	80.00	0.28	0.78
Library information	38	77.55	31	77.50	-0.01	1.00

*Significant at the α=.05 level.

Tables 21A and 21B illustrate the results of changes in sizes of institutions in 2002 and 2004. The tables yielded two of the same items as significant. The items called statistical reports and sign-up/counseling schedule changed significantly in the positive direction indicating consistent increased usage for size of institution from 1998 to 2004. Perhaps large institutions utilized technology for statistical reports and sign-up/counseling more for the same reasons small institutions did during the same period.

The following section illustrates the results of institutional type related to CSO utilization of one-way and two-way methods of communication between CSOs and other CSO staff, faculty, staff, students, alumni, and employers, and 15 selected technology uses. Tables 22A-24B illustrate the results of CSO usage (in percentages) of one-way methods of communications using technology. These data are distributed by type of institution.

Table 22A compared usage by private institutions of one-way methods of communication in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for private institutions. Z-scores and p-values were calculated for private institutions for one-way methods of communication. Out of the six items in the table used for one-way communication, significant differences existed from 1998 to 2004 in four items (67%). Three items indicated that private institutions utilized them significantly more in 2004, while one indicated that private institutions utilized it significantly less in 2004.

Table 22A. Results of Test of Proportions Analysis of Type of Institution by One-way Methods of Communication Comparing 1998 and 2004 Private Southwest Data

One-way Methods	N	1998 data in % (Private)	N	2004 data in % (Private)	z-score	p-value
N		35		20		
weight		0.64		0.36		
Automated touch-tone telephone system	5	14.29	11	54.00	3.13	<.01*
Fax	31	88.57	10	52.00	-3.02	<.01*
E-mail/electronic file transfer	28	80.00	20	100.00	2.14	0.03*
Internet/Intranet	24	68.57	19	93.00	2.09	0.04*
Fax-on-demand (automated fax on server)	8	22.86	1	5.00	-1.72	0.09
Answering Machine/voicemail	30	85.71	18	88.00	0.24	0.81

*Significant at the α=.05 level.

Table 22B compared usage by public institutions of one-way methods of communication in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for public institutions. Z-scores and p-values were calculated for public institutions for one-way methods of communication. Out of the six items in the table utilized for one-way communication, significant differences existed from 1998 to 2004 in two items (33%). Both items indicated that public institutions utilized them significantly less in 2004.

Table 22B. Results of Test of Proportions Analysis of Type of Institution by One-way Methods of Communication Comparing 1998 and 2004 Public Southwest Data

One-way Methods	N	1998 data in % (Public)	N	2004 data in % (Public)	z-score	p-value
N		56		41		
weight		0.58		0.42		
Fax-on-demand (automated fax on server)	26	46.43	5	11.72	-3.63	<.01*
Fax	52	92.86	27	65.36	-3.43	<.01*
Internet/Intranet	51	91.07	32	79.20	-1.67	0.10
Automated touch-tone telephone system	24	42.86	23	55.10	1.19	0.23
E-mail/electronic file transfer	52	92.86	37	90.24	-0.46	0.64
Answering machine/voicemail	45	80.36	34	82.92	0.32	0.75

*Significant at the α=.05 level.

Tables 22A and 22B shared one of the same items that showed significance. The item called fax changed significantly in the negative direction in both tables indicating a decrease in usage among types of institutions over time.

Table 23A compares usage by private institutions of two-way methods of communication in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for private institutions. Z-scores and p-values were calculated for private institutions for two-way methods of communication. Out of the four items in the table used for two-way communication, significant positive differences were found in one out of four

items (25%) indicating that private institutions utilized video/computer conferencing significantly more in 2004.

Table 23A. Results of Test of Proportions Analysis of Type of Institution by Two-way Methods of Communication Comparing 1998 and 2004 Private Southwest Data

Two-way Methods	N	1998 data in % (Private)	N	2004 data in % (Private)	z-score	p-value
N		35		20		
weight		0.64		0.36		
Video/computerconferencing	1	2.86	4	18.00	1.95	0.05*
Person-to-person	33	94.29	20	100.00	1.09	0.28
Telephone/audioconferencing	19	54.29	13	64.00	0.70	0.48
Group meetings/conferences	29	82.86	18	89.00	0.62	0.54

*Significant at the α=.05 level.

Table 23B compared usage by public institutions of two-way methods of communication in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for public institutions. Z-scores and p-values were calculated for public institutions for two-way methods of communication. Out of the four items in the table used for two-way communication, significant positive differences were found in one out of four items (25%) in the table indicating that public institutions utilized it significantly more in 2004.

Table 23B. Results of Test of Proportions Analysis of Type of Institution by Two-way Methods of Communication Comparing 1998 and 2004 Public Southwest Data

Two-way Methods	N	1998 data in % (Public)	N	2004 data in % (Public)	z-score	p-value
N		56		41		
weight		0.58		0.42		
Telephone/audioconferencing	34	60.71	33	81.46	2.19	0.03*
Video/computerconferencing	18	32.14	11	26.84	-0.56	0.57
Person-to-person	53	94.64	38	92.18	-0.49	0.62
Group meetings/conferences	47	83.93	33	80.48	-0.44	0.66

*Significant at the α=.05 level.

Tables 23A and 23B illustrate the results of changes by type of institution over time. Neither table yielded items that showed significant differences when the same type was compared over time. Thus, there appears to be a lack of significant change in items representing two-way methods of communication by type over time shared by both private institutions and public institutions.

Table 24A compared usage by private institutions of 15 selected uses of technology in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for private institutions. Z-scores and p-values were calculated for private institutions for two-way methods of communication. Out of the 15 items in the table, significant differences were found in four items (27%). All four items indicated that private institutions utilized them significantly more in 2004.

Table 24A. Results of Normal Test of Proportions Analysis Comparing CSO Utilization of 15 Selected Uses of Technology in 1998 and 2004 for Private Institutions

15 Selected Uses of Technology	N	1998 data in % (Private)	N	2004 data in % (Private)	z-score	p-value
N weight		35 0.64		20 0.36		
Statistical reports	14	40.00	20	100.00	4.41	<.01*
Sign-up/counseling schedule	11	31.43	18	90.00	4.19	<.01*
Interview schedule	13	37.14	16	80.00	3.06	<.01*
Budgeting	16	45.71	16	80.00	2.48	0.01*
VCR	11	31.43	2	10.00	-1.80	0.07
Fax	31	88.57	14	70.00	-1.72	0.09
Alumni files	13	37.14	11	55.00	1.28	0.20
Library information	21	60.00	15	75.00	1.13	0.26
Word processing	34	97.14	18	90.00	-1.12	0.26
Job bank/employer database	26	74.29	17	85.00	0.93	0.35
Student résumé	26	74.29	16	80.00	0.48	0.63
Student records	23	65.71	12	60.00	-0.42	0.67
Mailing lists/labels	34	97.14	19	95.00	-0.41	0.68
Company profiles	17	48.57	10	51.25	0.19	0.85
Career guidance/ counseling/advising	20	57.14	11	55.00	-0.15	0.88

*Significant at the α=.05 level.

Table 24B compared usage by public institutions of 15 selected uses of technology in 1998 and 2004. The normal test of proportions was applied to the 1998 and 2004 data for public institutions. Z-scores and p-values were

calculated for public institutions for two-way methods of communication. Out of the 15 items in the table, significant differences were found in three items (20%). All three items indicated that public institutions utilized them significantly more in 2004.

Table 24B. Results of Normal Test of Proportions Analysis Comparing CSO Utilization of 15 Selected Uses of Technology in 1998 and 2004 for Public Institutions

15 Selected Uses of Technology	N	1998 data in % (Public)	N	2004 data in % (Public)	z-score	p-value
N		56		41		
weight		0.58		0.42		
Statistical reports	35	62.5	41	100	4.43	<.01*
Sign-up/counseling schedule	25	44.64	29	70.7	2.55	0.01*
Job bank/employer database	39	69.64	36	87.8	2.11	0.03*
Company profiles	37	66.07	19	46.95	-1.88	0.06
Student résumé	41	73.21	36	87.8	1.75	0.08
Interview schedule	36	64.29	32	78	1.46	0.15
Word processing	55	98.21	38	92.7	-1.35	0.18
Fax	52	92.86	35	85.4	-1.19	0.23
Mailing lists/labels	54	96.43	38	92.7	-0.82	0.41
Alumni files	29	51.79	18	43.9	-0.77	0.44
Budgeting	41	73.21	32	78	0.54	0.59
Library information	40	71.43	31	75.6	0.46	0.65
VCR	17	30.36	11	26.8	-0.38	0.70
Career guidance/ counseling/advising	40	71.43	28	68.3	-0.33	0.74
Student records	47	83.93	34	82.9	-0.13	0.89

*Significant at the α=.05 level.

Tables 24A and 24B illustrate the results of changes in types of institutions over time. Both tables yielded two items with significant change in both tables. The items called sign-up/counseling schedule and statistical reports changed significantly in the positive direction in both tables indicating increased usage for both types of institutions from 1998 to 2004. The same was true for sizes of institutions.

For one-way communications, when small institutions in 1998 were compared to small institutions in 2004 significant differences existed for one-half (50%) of the methods of communication. When large institutions in 1998 were compared to large institutions in 2004 significant differences existed for two-thirds (67%) of the methods of communication. When the two sizes in both years were compared to each other, it was discovered that the use of the item called fax decreased significantly in usage for both small institutions over the years and in large institutions over the years. Additionally, for one-way communications, when private institutions in 1998 were compared to private institutions in 2004 significant differences existed in four (67%) of the methods of communication. When public institutions in 1998 were compared to public institutions in 2004 significant differences existed for two (33%) of the methods of communication. When the two types in both years were compared to each other, it was discovered that the use of the item called fax decreased significantly in usage for both private institutions over the years and in public institutions over the years. The examinations and comparisons of sizes and

types of institutions clearly demonstrate that the use of the item called fax was on the decline from 1998 to 2004.

For two-way communications, when small institutions in 1998 were compared to small institutions in 2004, no significant differences existed for the methods of communication. When large institutions in 1998 were compared to large institutions in 2004, no significant differences existed for the methods of communication. These data suggest that when same size institutions were compared over time, no significant changes occurred in usage of two-way methods of communication. Additionally, for two-way communications, when private institutions in 1998 were compared to private institutions in 2004 significant differences existed for one-fourth (25%) of the methods of communication. When public institutions in 1998 were compared to public institutions in 2004 significant differences existed for one-fourth (25%) of the methods of communication. When the two types in both years were compared to each other, it was discovered that there was a lack of significant change in items representing two-way communication by type of institution over time shared by both private and public institutions. This trend was true when size of institutions was evaluated. Perhaps two-way methods of communication did not represent technology that was rapidly changing or utilized by CSOs.

In summary, concerning the listing of 15 selected uses of technology, when small institutions in 1998 were compared to small institutions in 2004, significant differences existed for 27% (4/15) of the methods of communication. When large institutions in 1998 were compared to large institutions in 2004,

significant differences existed for 27% (4/15) of the uses of technology. When the two sizes in both years were compared to each other, it was discovered the items called statistical reports and sign-up/counseling schedule increased significantly in usage for both small institutions over the years and in large institutions over the years. Perhaps large institutions utilized technology for statistical reports and sign-up/counseling for the same reasons small institutions did during the same period.

Additionally, for listing of 15 selected uses of technology, when private institutions in 1998 were compared to private institutions in 2004 significant differences existed for four (27%) of the methods of communication. When public institutions in 1998 were compared to public institutions in 2004 significant differences existed for three (20%) of the methods of communication. When the two types in both years were compared to each other, it was discovered that the use of the items called sign-up/counseling schedule and statistical reports increased significantly in usage for both private institutions over the years and in public institutions over the years. These are the same items proven to have increased in use when institutional size was evaluated and discussed. Perhaps the use of technology for statistical reports and scheduling worked so well that CSOs chose to continue their usage over time. The technology for these items may have been affordable and easy to use.

Finally, the previous analyses provide the answer to research question five, which reveals that there are differences over time according to size and

type of institution and the use of technology by CSOs. The previous in-depth analyses examined and discussed institutional size and type over time related to use by CSOs of one-way (Tables 19A-19B, 22A-22B) and two-way (Tables 20A-20B, 23A-23B) methods of communication and the use of 15 selected uses of technology (Tables 21A-21B, 24A-24B). Explanations were provided for changes in usage of technology between the sizes and types of institutions over time.

Research Question Six

Research question six asked, “Since the 2002 NACE study, have career services offices increased the number of computer lab/workstation(s) under their supervision?” The only data available from the 2002 survey results were the range of computer workstations and mean number of computer workstations used primarily by students and alumni.

Table 25 illustrates the distribution of the range and mean values of computer workstations used by CSOs captured in the national survey data in 2002 and in the 2004 survey of the Southwest region.

Table 25. Distribution of Range and Mean Values of Computer Workstations Used by Career Services Offices Nationally in 2002 and in the Southwest Region in 2004

Response Measure	2002 National Survey	2004 Southwest Regional Survey
Range of number of computer workstations utilized	0-40	1-35
Mean number of computer workstations utilized	5.70	5.125

In 2002, CSOs nationally reported a range of 0-40 computer workstations under their supervision used primarily by students and alumni. In 2004, regional CSOs reported a smaller range (1-35) of computer workstations under their supervision primarily for student and alumni use. The mean number of computer workstations reported in 2002 was slightly higher (5.70) than the number reported in 2004 (5.125). Thus, it appears that CSOs did not have more computer workstations in 2004 than in 2002. The number was essentially the same.

Table 26 represents the distribution of computer workstations under CSO supervision for 2004 only. These data were not available for the 2002 study. This table is intended to provide benchmark data for future research.

For each user group (professional staff, support staff, student/alumni), a breakdown is provided for all institutions—private institutions, public institutions, small institutions, and large institutions showing the mean, standard deviation, median, and interquartile range statistics. For all types, sizes, and groups, public and large institutions utilized more computer workstations than private. Small and private institutions used fewer computer workstations than did large.

Table 26. Distribution of Number of Computers in Career Services Office Supervision by Group Use, Data Type, and Statistics for 2004

	Data Type	Mean	SD	Median	Interquartile Range
Professional Staff Use					
	Combined	5.13	2.32	3.00	4.75
	Private	3.11	1.53	2.50	2.50
	Public	6.08	2.47	4.50	5.00
	Small	2.72	1.46	2.00	2.50
	Large	6.26	2.46	4.50	4.50
Support Staff Use					
	Combined	4.13	2.22	2.00	4.00
	Private	1.72	1.09	1.00	1.25
	Public	5.26	2.36	3.00	5.25
	Small	1.67	1.01	1.00	1.25
	Large	5.29	2.36	3.00	5.25
Student/Alumni Use					
	Combined	5.73	2.41	4.00	5.00
	Private	2.67	1.37	2.00	3.00
	Public	7.18	2.55	5.50	4.25
	Small	2.89	1.42	2.50	3.50
	Large	7.08	2.56	5.00	5.00

In summary, while not measured for significance, slight differences appear to exist in 2004 in the number of computers utilized by CSOs when the size and type of institutions were examined, but not overall. To answer the question of whether CSOs increased the number of computer workstations, the data analysis did not reveal large increases or decreases, but slightly more were utilized overall by regional CSOs in 2004 compared to national CSOs in 2002. When comparing all institutional types and sizes and groups of users,

public and large institutions utilized more computer workstations than private. Contrary to recent literature (McRae, 1999), small and private institutions in 2004 used fewer computer workstations than did large, but the opposite was expected. In the 2004 study, CSOs have not increased the number of computer workstations from 2002 to 2004. The number is essentially the same.

The results of these analyses may be useful benchmarking data for CSO evaluation of internal computer technology. These data may prove useful for CSO proposals to higher administration for more computer technology or to justify their current usage. Further, these data may also be used to justify computer technology utilized for certain groups of users by CSOs.

Research Question Seven

Research question seven asked, “Are there differences in the numbers of workstations available to different groups in career services offices (as measured by the number of computers available to professional staff/support staff/student staff) as related to institutional size and as related to institutional type?” Descriptive statistics and Analysis of Variance (ANOVA) were used to analyze the data (see Tables 27-28).

Tables 27-28 provide an analysis of differences in the numbers of computer workstations available to three groups of CSO employees. A single-factor Analysis of Variance (ANOVA) was performed to test the hypothesis of no difference between the mean number of computer workstations available to (a) professional staff, (b) support staff, and (c) student staff.

Table 27 is a distribution of the summary results of the three groups of CSO employees, the sum total, mean value, and standard deviation for computer workstations for each group.

Table 27. Summary of Descriptive Statistics for Three Groups of CSO Employees

Groups	N	Sum	Mean	SD
Professional staff	61	296	4.85	5.24
Support staff	59	236	4.00	4.82
Student staff	61	321	5.26	5.80

Three hundred twenty-one computer workstations were assigned for student staff use as reported by 61 institutions, while support staff were assigned 236 computer workstations reported by 59 institutions, and 296 computer workstations were assigned to student staff reported by 61 institutions. The mean number of computers ranged from 4.00 for support staff to 5.26 for student staff. The standard deviation values ranged from 4.82 to 5.82 in availability of computer technology to the groups. From this overall analysis, it was determined that there is essentially no difference in the number of computer workstations assigned to the three groups.

Table 28 is the distribution of the statistical results of the ANOVA test. For the three groups of computer workstation users of CSOs (professional staff, support staff, and student staff), a single factor ANOVA was performed to

test the null hypothesis of no difference among the mean numbers of computer workstations assigned to the user groups.

Table 28. Distribution of ANOVA Statistical Results for Three Groups of CSO Employees

Source of Variation	SS	df	MS	F	P-value	F-crit
Between groups	49.59	2	24.79	0.88	0.42	3.05
Within groups	5009.48	178	28.14			
Total	5059.06	180				

The degrees of freedom were 2 and 178. The critical values of 3.05 for significance at α= .05 (between groups) and 4.71 for significance at α= .01 (within groups) were calculated. The F value of 0.88 did not present evidence sufficient to reject the null hypothesis. These data suggest no significant differences exist between the mean numbers of computer workstations available to the user groups.

In summary, availability of computer workstations utilized by CSOs varied by size and type, but not overall. There were no significant differences in the mean number of computers available to CSOs when examined by professional staff, support staff, and student staff groups.

Research Question Eight

Research question eight asked, “Does a relationship exist between the use of technology and percentages of resources (employee time and operational funds) that are allocated for career education, career counseling,

and job search assistance?" Pearson's product-moment correlation coefficient was used to analyze the data (see Tables 29-30). For the purpose of these analyses, the dependent variable is use of technology and the independent variables are employee time or operating funds devoted to career education, career counseling, and job search assistance.

Table 29 is a correlation matrix of the percentage of employee time devoted to each career center function and the use of technology. Does a relationship exist between the percentage of employee time allocated for each CSO function and the use of technology? To answer this question, CSOs reported the amount of employee time (equal to 100%) devoted to career education, career counseling, and job search assistance tasks. In addition, a composite score for the use of technology found in Tables 15A and 15B was computed for each institution using SPSS. Then, Pearson's correlation statistic was calculated using SPSS. For Table 30, the results of the analysis indicate that there is no significant relationship between the use of technology and employee time devoted to career counseling (r=.157), career education (r= -.221), or job search (r= .027).

Table 29. Correlation Matrix of the Percentage of Employee Time Devoted to Each Career Center Function and the Use of Technology

Variable	Use of Technology	Career Education	Career Counseling	Job Search
Use of technology (n=61)	1			
Career education (n=58)	-.221 p=.09	1		
Career counseling (n=58)	.157 p=.24	-.237 p=.07	1	
Job search (n=58)	.027 p=.84	-.533 p=0.0	-.696 p=0.0	1

Table 30 is a correlation matrix of the percentage of operating funds devoted to each career center function and the use of technology. Does a relationship exist between the percentage of operating funds allocated for each CSO function and the use of technology? To answer this question, CSOs reported the percentage of operating funds (equal to 100%) devoted to career education, career counseling, and job search assistance tasks. In addition, a composite score of the uses of technology found in Tables 15A and 15B was computed for each institution using SPSS. Then, Pearson's r was calculated using SPSS. For Table 31, the results of the analysis indicate that there is no significant relationship between the use of technology and operating funds devoted to career education (r= -.126) or job search (r= -.146). However, a slight, positive, significant relationship existed between the use of technology

and operating funds devoted to career counseling (r=.287) suggesting that as operating funds for career counseling increase, so does the use of technology.

Table 30. Correlation Matrix of the Percentage of Operating Funds Allocated to Each Career Center Function and the Use of Technology

Variable	Use of Technology	Career Education	Career Counseling	Job Search
Use of technology (n=61)	1			
Career education (n=54)	-.126 p=.36	1		
Career counseling (n=54)	.287* p=.03	-.244 p=.08	1	
Job search (n=54)	-.146 p=.29	-.567 p=0.0	-.661 p=0.0	1

*Correlation is significant at the 0.05 level (2-tailed).

In summary, Charoensri (1998) found CSOs extended more resources used for technology in career counseling and job search and less for career education. In the 2004 study, no significant relationship existed between the use of technology and employee time allocated to career counseling, career education, or job search assistance tasks. Additionally, it appears that no significant relationship exists between the use of technology and operating funds allocated to career education and job search assistance tasks. However, a positive relationship existed between the use of technology and operating funds allocated to career counseling. There is a slight likelihood that as operating funds allocated for career counseling increased, the use of technology increased as well. Given that technology use in career counseling

is a major focus of career services literature, this finding is not surprising (McGrath, 2002; NACE, 2002; Nagle & Bohovich, 2000; Noll & Graves, 1996; Schiller, 2000). In fact, it was expected that a higher correlation would have been found. Unexplained in the literature are the other results of no significant correlation between the use of technology and resources allocated to the three CSO functions. It is important for CSO administrators to understand the relationship or the lack thereof between the use of technology and employee time/operating funds allocated to the three different career services functions so that future allocations of those resources can be adjusted.

Research Question Nine

Research question nine asked, “Do career services offices use commercially based technology for use in career education, career counseling, and job search assistance?” Here, data from the NACE (2002) national study were compared with the 2004 Southwest data. Descriptive statistics were utilized to analyze the data (see Table 31).

Table 31 illustrates the results of the use of commercially based technology systems that were profiled in the 2002 national study. In Table 31, career services offices reported use of these commercially based technology systems for job search assistance tasks such as student résumés, job listings, career fairs, and/or recruitment scheduling from the 2002 and 2004 national data that was compared with the 2002 Southwest data. The least used system across the studies was Exeter© that was only used by 0.5% of CSOs in the 2004 national study. The Experience© system was used by one-third or fewer

CSOs across the studies, but are the same across time and geographic regions. The use of on-site or institutionally developed systems showed a steady decline across the years.

Table 31. Distribution of CSO Use of Selected Commercially-Based Technology Systems Comparing 2002 National, 2004 National and 2004 Southwest Data

System	% of CSOs Using in 2002 (National)	% of CSOs Using in 2004 (National)	% of CSOs Using in 2004 (Southwest)
Exeter©	0.0	0.5	0.0
CSO Interfase©	0.0	3.7	14.2
Symplicity©	0.0	5.5	1.6
NACELink©	0.0	24.6	8.8
Experience©	33.3	29.8	26.8
MonsterTRAK©	41.0	44.9	28.4
On-site/school developed system	46.0	25.0	15.3

The newer products (Interfase©, NACELink©, and Simplicity©) were not reported in 2002. Interfase© was launched in the Southwest region in the fall of 2002. By 2004, 14.23% of CSOs in the Southwest region reported utilization of the product. By 2004, a few CSOs (3.7%) nationally utilized the product. As the use of Interfase© showed an increase between national and regional groups, there was a drop in the use of MonsterTRAK, Symplicity©, and on-site/school developed systems. NACELink came on the scene nationally in 2003 capturing

nearly one-quarter of the national market, but less than 10% of the Southwest region.

Thus, newer, nationally adopted products were slow to be utilized in the Southwest region. It could be that Interfase users had become faithful to the product over the two year period from 2002 to 2004 and were not willing to switch to a new vendor and system. If commercial vendors wish to promote their products regionally and/or nationally, they should study trends such as these that reveal CSO usage of commercial products.

Research Question Ten

Research question ten asked, “What is the level of career services office personnel satisfaction with the use of technology in career education, career counseling, and job search assistance?” CSOs were asked their level of satisfaction with technology used to provide all student, alumni, and employer services. The entire listing of services was analyzed. Then, the uses of technology for all student, alumni, and employer services were divided into CSO job categories and analyzed a second time by: (a) student/alumni services used for career education, (b) student/alumni services used for career counseling, (c) student/alumni services used for job search assistance, (d) employer services used for job search assistance. Descriptive statistics were used to analyze these data (see Tables 32-36) only available for 2004.

Table 32 illustrates the distribution of CSOs satisfaction with the use of technology in providing all 24 services for students and alumni. A 5-point Likert scale was utilized to measure satisfaction from one (low satisfaction) to five

(high satisfaction). The mean satisfaction rating and standard deviation for each service provided by CSOs to students and alumni was recorded. The final item on the table contains the average satisfaction score for all the services.

Table 32. Distribution of CSO Satisfaction With Technology Utilized for All Student, Alumni, and Employer Services in 2004

2004 *All* Student/Alumni Services	Mean Satisfaction Level	SD
Online assessment tools	4.23*	0.84
CSO listserv/mailing list/electronic newsletter	4.19*	0.83
Electronic portfolios	4.17*	0.75
Workshops	4.07*	0.94
Other	4.00*	1.67
Career education	3.95*	0.97
Ability to submit résumés to campus recruiters	3.88*	1.05
Advising/questions and answers (e-mail or Web site)	3.84*	1.19
Registration for services	3.83*	1.03
Access to campus recruitment schedules	3.81*	1.10
Computer-assisted guidance	3.81*	1.17
Job listings	3.80*	1.02
Résumé scanning system	3.80*	1.48
Fee-based information database(s) (Hoovers, etc.)	3.77*	0.93
Résumé development	3.76*	1.08
Résumé referral	3.75	1.14
Campus interview requests/scheduling	3.73	1.12
Candidate database	3.71	1.20
Reference file scanning system	3.67	1.75
Computer-assisted comprehensive career development package	3.40	1.27
Career library	3.38	1.18
Database for alumni for networking purposes	3.27	1.31
Cooperative education/intern program management	3.13	1.20
Virtual fairs	3.00	1.31
Satisfaction Level Average Score	3.75	1.15

*Indicates above average score based on the average for this table.

All items in the cluster of services for students and alumni received an average or above average score (based on 3=average). Virtual fairs received the lowest satisfaction rating of 3.0. The category named online assessment tools received the highest satisfaction rating at 4.23. The overall average score for the entire cluster of services provided to students and alumni is 3.75. CSOs experienced a better than average satisfaction level in most (62.5%) of the technology utilized to provide all student and alumni services.

Table 33 is the distribution of CSO satisfaction with technology used to provide career education services for student and alumni. This listing for Table 33 was extracted from Table 32 and determined by the researcher to be services used to provide career education for students and alumni. A 5-point Likert scale was utilized to measure satisfaction from one (low satisfaction) to five (high satisfaction). The mean satisfaction rating and standard deviation for each service used to provide career education to students and alumni were recorded. The final item on the table contains the average satisfaction score for all the services used to provide career education.

All items in the cluster of services used to provide career education for students and alumni received an average or above average score (based on 3=average). Database of alumni for networking purposes received the lowest satisfaction rating at 3.27. The category named CSO listserv/mailing list/ electronic newsletter received the highest satisfaction (4.19). The overall average score for the entire cluster of services used to provide career education to students and alumni is 3.73. CSOs experienced a better than

average satisfaction level with the majority (71%) of technology used to provide career education for students and alumni received.

Table 33. Distribution of CSO Satisfaction With Technology Utilized for Career Education for Students and Alumni in 2004

2004 Student/Alumni Services in Career Education	Mean Satisfaction Level	SD
CSO listserv/mailing list/electronic newsletter	4.19*	0.83
Workshops	4.07*	0.94
Career education	3.95*	0.97
Registration for services	3.83*	1.03
Fee-based information database(s) (Hoovers, etc.)	3.77*	0.93
Computer assisted comprehensive career development package	3.40	1.27
Career library	3.38	1.18
Database for alumni for networking purposes	3.27	1.31
Career Education Satisfaction Level Average Score	3.73	1.06

*Indicates above average score based on the average for this table.

Table 34 is the distribution of CSO satisfaction with technology used to provide career counseling services for students and alumni. This listing for Table 34 was extracted from Table 32 and determined by the researcher to be services used to provide career counseling services for students and alumni. A 5-point Likert scale was utilized to measure satisfaction from one (low satisfaction) to five (high satisfaction). The mean satisfaction rating and standard deviation for each service used to provide career counseling to students and alumni were recorded. The final item on the table contains the

average satisfaction score for all the services used to provide career counseling.

Table 34. Distribution of CSO Satisfaction with Technology Utilized for Career Counseling for Students and Alumni in 2004

2004 Student/Alumni Services in Career Counseling	Mean Satisfaction Level	SD
Online assessment tools	4.23*	0.84
Advising/questions and answers (via e-mail or Web site)	3.84	1.19
Computer assisted guidance	3.81	1.17
Career Counseling Satisfaction Level Average Score	3.96	1.07

*Indicates above average score based on the average for this table.

All items in the cluster of services used to provide career counseling for students and alumni received an above average score (based on 3=average). Computer-assisted guidance received the lowest satisfaction rating at 3.81. The category named online assessment tools received the highest satisfaction (4.23). The overall average score for the entire cluster of services used to provide career counseling to students and alumni is 3.96. CSOs experienced a better than average satisfaction level with some (33%) of the technology used to provide career counseling for students and alumni.

Table 35 illustrates the distribution of CSO satisfaction with technology used to provide job search assistance for students and alumni. This listing for Table 35 was extracted from Table 32 and determined by the researcher to be services used in job search assistance for students and alumni. A 5-point Likert

scale was utilized to measure satisfaction from one (low satisfaction) to five (high satisfaction). The mean satisfaction rating and standard deviation for each service used to provide job search assistance to students and alumni were recorded. The final item on the table contains the average satisfaction score for all the services used to provide job search assistance.

Table 35. Distribution of CSO Satisfaction With Technology Utilized to Offer Job Search Assistance for Student and Alumni in 2004

2004 Student/Alumni Services in Job Search Assistance	Mean Satisfaction Level	SD
Electronic portfolios	4.17*	0.75
Ability to submit résumés to campus recruiters	3.88*	1.05
Access to campus recruitment schedules	3.81*	1.10
Résumé scanning system	3.80*	1.48
Job listings	3.80*	1.02
Résumé development	3.76*	1.08
Virtual fairs	3.75	1.15
Résumé referral	3.75	1.14
Campus interview requests/scheduling	3.73	1.12
Candidate database	3.71	1.20
Reference file scanning system	3.67	1.75
Cooperative education/intern program management	3.13	1.20
Job Search Assist. Satisfaction Avg. Scores	3.75	1.17

*Indicates above average score based on the average for this table.

The items in the cluster of services used to provide job search assistance for students and alumni received an above average score (based on 3=average). Cooperative education/intern program management received

the lowest satisfaction rating of 3.13. The category named electronic portfolios received the highest satisfaction of 4.17. The overall average score for the entire cluster of services used to provide job search assistance to students and alumni is 3.75. CSOs experienced a better than average satisfaction level with one-half (50%) of the technology used to provide job search assistance for students and alumni.

Table 36 illustrates the distribution of CSO satisfaction with technology used to provide services for employers. These services assist with the job search process for students and alumni, but target employers. A 5-point Likert scale was utilized to measure satisfaction from one (low satisfaction) to five (high satisfaction). The mean satisfaction rating and standard deviation for each service provided by CSOs to employers was recorded. The final item on the table contains the average satisfaction score for all the services.

Table 36. Distribution of CSO Satisfaction With Technology Utilized to Offer Employer Services in 2004

2004 Employer Services	Mean Satisfaction Level	SD
General information for employers	3.88*	1.04
Direct input of job or internship/coop listings	3.86*	1.12
Candidate database/student profile	3.80*	1.12
Registration for career events	3.76	1.06
Links to employer Web sites	3.71	1.06
Access to résumés	3.71	1.01
Access to recruiting schedules	3.66	1.10
Recruiting information	3.63	1.23
Salary data on recent graduates	3.57	1.08
Employer Services Satisfaction Level Average Scores	3.76	1.06

*Indicates above average scores.

All items in the cluster of services for employers received above average scores (based on 3.0=average). The category named salary data on recent graduates received the lowest satisfaction of 3.57 (SD=1.08). The category named general information for employers received the highest satisfaction of 3.88 (SD=1.04). The overall average score for the entire cluster of services provided to employers for job search assistance was 3.76 (SD=1.06). CSOs experienced average satisfaction level with the technology used for 33% of the services provided.

In summary, CSOs reported varying levels of satisfaction with technology utilized to provide services for students, alumni, and employers. The average satisfaction level for the entire listing of technology used for students and alumni services (Table 32) was 3.75 (SD=1.15). Above average scores were found for the use of technology to provide nearly two-thirds (62.5%) of services to students and alumni compared to only 33% of services to employers. When separated by office function, the average satisfaction level for technology used in services for career education (Table 33) was 3.73 (SD=1.06) with 71% of technology used for career education rated above average. For career counseling (Table 34), the average satisfaction level was 3.96 (SD=1.07) with 33% of technology used for career counseling rated above average. The average satisfaction level for technology used in job search assistance (Table 35) was 3.75 (SD=1.17) with 50% of technology used for job search assistance rated above average. Technology used to provide employer services received a score of 3.76 (SD=1.07) with 33% rated as above average.

Additionally, the students/alumni service called online assessment tools topped the list with the highest average score. This finding is not surprising given the heightened attention in the literature to computer assisted guidance systems (CAGs)—most of which are now online (Dagley & Salter, 2004; Feduccia, 2003; Harris-Bowlsbey, Dikel, & Sampson, 2002). The service called virtual fairs received the lowest score. This finding is consistent with the literature (Miller & McDaniels, 2001) and other findings in research question two. The findings of research question nine are important in that they reveal the levels of personnel satisfaction with technology used for various CSO services to students, alumni, and employers. The findings further support existing research and provide a benchmark for vendors of technology products to utilize.

In closing, CSO operation is complex. The services provided to students, alumni, and employers are immense as well as time, fiscal, and human resource demanding. This chapter provided the analysis, findings, and implications of the impact of technology on CSOs in the southwest region of the United States compared with all regions. The next chapter summarizes the key findings, closes with conclusions of the research, and provides recommendations to the field of career services and to future researchers.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter provides a summary of the findings, conclusions, and recommendations of this study. A discussion of the major findings of this research study follows. Based on the information obtained from the examination of the findings of this study, conclusions and recommendations for future research are also presented in this chapter.

This study served three purposes. The first purpose of this study was to provide a recent analysis of technology infusion in career services offices in the southwest region of the United States surveying the exact population suggested by Charoensri (1998) in his recommendation to study the same population for changes and trends. More specifically, the second purpose of the study addressed the three recommendations from the Charoensri study of technology infusion in CSOs as a whole by offering a comparison to one of the more recent surveys conducted by the National Association of Colleges and Employers (NACE). Finally, the third purpose of this study was to provide an empirical examination of the impact of selected technologies in CSOs since 1998—specifically addressing the Charoensri recommendation to conduct research on selected technologies. In order to accomplish this examination of technological trends in university CSOs, the following research questions were used for the study:

1. Is there any difference in the use by career services offices of computer and communication technology in 2004 compared to the 1998 Charoensri dissertation study?
2. How do the 2004 research data on selected technologies used in career services offices in the southwest region of the United States compare with the career services office technology infusion trends found in the NACE “2002 Career Services Performance Measurement Survey”?
3. Is the size (as measured by student head count) of an institution a determining factor in the use of technology by career services offices?
4. Is the type of institution (private or public) a determining factor in the use of technology by career services offices?
5. Are there differences in use of technology in career services offices over time according to institutional size and type?
6. Since the 2002 NACE study, have career services offices increased the number of computer lab/workstation(s) under their supervision?
7. Are there differences in the numbers of computer workstations available to different groups in career services offices (as measured by the number of computers available to professional staff/support staff/student staff)?
    a. As related to institutional size?
    b. As related to institutional type?

8. Does a relationship exist between the use of technology and percentages of resources (employee time and operational funds) that are allocated for
    a. Career education?
    b. Career counseling?
    c. Job search assistance?
9. Do career services offices use commercially based technology for use in
    a. Career education?
    b. Career counseling?
    c. Job search assistance?
10. What is the level of career services office personnel satisfaction with the use of technology in
    a. Career education?
    b. Career counseling?
    c. Job search assistance?

The major findings of this study, as they relate to the nine research questions are as follows:

Findings From Research Questions

Research Question One

The findings from research question one clearly identify and support the question of whether there are differences in CSO use of computer and communication technology in 2004 compared to 1998. Some of the uses of

technology from the 1998 study increased significantly in use by 2004, some also decreased significantly in use, and still others showed no significant change at all. In fact, the majority of the uses of technology by CSOs increased significantly over time. Additionally, the use of facsimile technology was on the decline from 1998 to 2004.

Research Question Two

Findings for research question two indicate differences in the use of selected technologies/uses of technology from the national "2002 Career Services Performance Measurement Survey" to the 2004 research study.

1. CSO employee time spent working with technology and reviewing/ evaluating vendors and their products stabilized between the 2002 national and 2004 regional studies.
2. CSOs experienced both significantly higher and lower uses of technologies identified in the 2002 national study until the 2004 regional study. The same was true for computerized services they offered to students and alumni, but the level of computerized services they offered to employers were the same.
3. The use of Web sites was significantly lower in this study than in previous findings, but this more recent finding conflicts with recent literature.
4. Results of the 2004 study and the most recent literature support significantly lower use of facsimile technology than previously found;

therefore, CSOs are not likely to continue an upward trend in the use of this particular technology.

5. Surprisingly, the use of virtual job fairs by CSOs was significantly lower in the comparison between the 2002 national and 2004 regional studies.
6. Comparisons evaluating regional and national trends for CSO use of a listing of technologies/uses of technology were more similar between 2002 national and 2004 regional studies than from 1998 regional and 2004 regional studies.

Research Question Three

Findings for research question three revealed institutional size (small/large) was a determining factor related to use by CSOs of one-way and two-way methods of communication between CSOs and other CSO staff, faculty, staff, students, alumni, and employers and the 15 selected uses of technology. The analysis of data provided the following findings:

1. Facsimile technology significantly decreased over time, while automated touch-tone telephone significantly increased.
2. The use of group meetings/conferences was significant in the negative direction 50% of the time, while the listing of two-way methods of communication for same sizes of institutions compared for differences across time showed no significant differences.
3. The use of technology for alumni files significantly increased when comparing different sizes of institutions in the same year.

4. Budgeting, library information, and interview schedule significantly increased where 1998 small institutions were compared to large institutions in 1998 or by small or large institutions in 2004. This suggests that for these items, technology used by small institutions in 1998 was not as functional for CSOs as technology used by large institutions in 1998 or by small or large institutions in 2004.
5. The comparisons for the use of technology for career guidance/ counseling/advising were surprising in that they yielded no significant findings.
6. The use of technology for sign-up/counseling schedule and statistical reports was significantly positive except when comparing small versus large institutions in 2004, because by 2004 small and large institutions could have utilized the same technology for these items.

Research Question Four

Findings for research question four revealed institutional type (private/public) was a determining factor related to use by CSOs of one-way and two-way methods of communication and the use of 15 selected uses of technology. The analysis of data provided the following findings:

1. Here again, facsimile technology significantly decreased over time. The same was true when size of institution was evaluated.
2. While significant increases and decreases occurred in five comparisons involving two-way methods of communication, no

patterns involving significant items could be identified from this macro-examination of the data.

3. The use of technology for alumni files and job bank/employer database proved significantly positive in both cases of comparing different types of institutions in the same year. Perhaps public institutions increased use of these items was a result of resources not obtained by private institutions.
4. In the three cases where 1998 private institutions were compared, technology used for budgeting and interview schedule yielded significantly positive results. This suggests that for these items, technology used by private institutions in 1998 was not as functional for CSOs as technology used by public institutions in 1998 or by private or public institutions in 2004.
5. The use of technology for sign-up/counseling schedule and statistical reports was significantly positive in every comparison except when comparing private versus public institutions in 2004. This was also the case when size of institution was evaluated. Perhaps by 2004, neither size nor type of institution was a factor in the use of technology for these items.

Research Question Five

Findings for research question five revealed differences in CSO use of technology over time according to size and type of institution by CSO use of

one-way and two-way methods of communication and the use of 15 selected uses of technology. The analysis of data provided the following findings:

1. Fax was utilized less over time by all categories of institutions. It is possible that the use of fax between 1998 and 2004 is an indication that CSOs used other technology to accomplish tasks that fax used to do. The sharing of résumés and job announcements kept the fax machines going; however, the Internet-based résumés and job-posting systems that were highly utilized by CSOs after 1998 can explain the decline in the use of fax over time.
2. The use of two-way methods of communication did not produce any significant results in use over time by all categories of institutions. It is possible that the use of two-way communications between 1998 and 2004 represent the technologies that were rapidly changing or utilized by CSOs
3. Sign-up/counseling schedule and statistical reports were utilized significantly more over time by all categories of institutions. Perhaps the use of technology for statistical reports and scheduling worked so well that CSOs chose to continue their usage over time. The technology for these items may have been affordable and easy to use.

Research Question Six

Findings for research question six showed that CSOs did not report more computer workstations between the 2002 national and 2004 regional

studies. The number was essentially the same. The availability of computer workstations utilized by CSOs varied by institutional size and type, but not overall. Additional data were collected with the 2004 data to serve as baseline data for future research.

Research Question Seven

Findings for research question seven showed that no significant differences in the number of computer workstations between the user groups.

Research Question Eight

Findings for research question eight revealed a non-significant relationship in the use of technology and the percentage of employee time allocated for career counseling, career education, or job search assistance, and in the use of technology and the percentage of operating funds for career education or job search assistance. The findings from this study contradict the findings from the Charoensri (1998) study.

Research Question Nine

Findings for research question nine showed that CSOs utilized a variety of commercial systems for job search assistance tasks. Institutionally developed systems declined in use. Newer, national vendor products were slow to be utilized in the southwest region, but the products developed and marketed to the southwest region gained momentum and loyalty within the region, and use of the products began to spread nationally to other regions.

Research Question Ten

Findings for research question ten showed that CSOs reported varying levels of satisfaction with technology utilized for their office functions. Technology used to provide many of the services provided to students, alumni, and employers received above average satisfaction ratings. When technology use was separated by office function, varying levels of satisfaction were revealed. CSO personnel level of satisfaction with the use of technology for online assessment tools received the highest rating while virtual job fairs received the lowest rating.

Conclusions

This study sought to measure the impact of technology infusion in career services offices in the southwest region of the United States by replicating a 1998 dissertation study and 2002 national study on the same topic. The study utilized a variety of measures with which to accomplish this. One- and two-way methods of communication were examined. A listing of technology uses and several technology-based commercial systems was evaluated as well. The following conclusions can be made based on the findings of this study.

1. Significant increases and decreases in most of the uses of computer and communication technology have occurred from 1998 to 2004. As well, facsimile technology was not used as frequently during the same period.

2. Comparison data between the 2002 national study to the 2004 southwest region study provide evidence in favor of significant differences in selected uses of technology. Significantly lower use of Web sites, facsimile technology, and virtual job fairs were not expected. However, the findings further prove that national and regional usage of computer and communication technology was more similar between 2002 and 2004 than between 1998 and 2004. Further, CSOs have caught up with technology trends and technology use is more of a day-to-day reality than in previous years. CSOs can expect their employees to continue to spend time performing technology-related tasks.
3. Technology used for facsimile and group meetings/conferences significantly decreased over time. Conversely, technology used for automated touch-tone telephone, library information, sign-up/counseling schedule, alumni files, and statistical reports significantly increased. Overall, the data analyses conducted to examine research question three support the findings in the 1998 Charoensri study in that differences exist in size of institution in CSO use of one-way and two-way communication and the use of 15 selected uses of technology.
4. Technology used for facsimile significantly decreased over time. While significant increases and decreases occurred in five comparisons involving two-way methods of communication, no

patterns involving significant items could be identified from this macro-examination of the data. In some cases, technology used by private institutions in 1998 was not as functional for CSOs as technology used by public institutions in 1998 or by private or public institutions in 2004. Further, by 2004, private and public institutions could have utilized the same technology for other uses. Overall, the data analyses conducted to examine research question four support the findings in the 1998 Charoensri study in that differences existed in size of institution in CSO use of one-way and two-way communication and 15 selected uses of technology.

5. The decline in use of fax and the increase in sign-up/counseling schedule and statistical reports is a clear indication that CSO use of technology over time and according to both size and type of institution has changed. Perhaps newer technology has aptly replaced the use of these items and both sizes and both types of institution are in accordance with the change.
6. The numbers of computer workstations utilized by CSOs by 2002 national as compared to 2004 regional CSOs are relatively the same. This finding may be useful to CSOs as benchmarking data when they need to make comparisons of their computer capital to similar size/type institutions or users of computers.
7. Although differences existed related to institutional size and type in the raw number of computer workstations available to CSOs as a

whole, the analyses conducted in this study did not reveal sufficient evidence to support that statistically significant differences existed in the numbers of computer workstations available to different groups.

8. The only CSO function in which the use of technology was significantly correlated was that of operating funds allocated for career counseling. The results indicate positive correlational changes in the funding of technology for career counseling from 1998 to 2004. In other words, as operating funds allotted for career counseling increased, the use of technology increased slightly. If CSOs are aware of the office functions for which there is an increased use of technology, then they will be better equipped to appropriately allocate employee time and operating funds to these functions.
9. The analyses of CSO personnel satisfaction with the use of technology in career education, career counseling, and job search assistance supports existing research and provides a benchmark of data for vendors of technology products to utilize.
10. Virtual fairs may not make a comeback in use in future years if commercial vendors that produce this service are unable to analyze and fix the problems associated with CSO personnel dissatisfaction.
11. Based on results showing the highest satisfaction of all services provided by technology, online assessment tools hold promise to continue to be highly utilized by CSOs in the future.

Overall, the data gathered and analyzed through this study further support previous research and confirm significant changes in CSO technology use from 1998 to 2004. CSOs have also experienced significantly higher technology use from 2002 to 2004. CSOs are satisfied with technology products used in a variety of ways in their offices.

Recommendations

The professional field of college and university career services can benefit from this study if those engaged in the field will adopt the following recommendations to the field:

1. It is important for college and university administrators, CSOs, and commercial vendors, to be aware of technological changes that affect their daily operations. CSO personnel, college administrators, and vendors should track increases and decreases in the uses of computer and communication technology in order to maintain cutting-edge services for students, alumni, and employers. These changes are important to track so that personnel, physical, and fiscal resources can be distributed appropriately. Further, tracking increases and decreases in the uses of computer and communication technology are important so that CSOs can be on the cutting edge of services offered to students, alumni, and employers.
2. College and university administrators should pay closer attention to the amount of CSO employee time spent working with technology in

the future so that adequate resources may be designated as applicable.

3. CSOs who would like the amount of employee time devoted to working with technology and reviewing/evaluating commercial vendors and their products to remain stable or decrease, should hire employees who are knowledgeable or who have expertise in working with technology and expect a portion of employee time to be devoted to working with technology.
4. CSOs should become more aware of the office functions for which there is an increased use of technology, such as career counseling. If this recommendation is followed, they will be better equipped to appropriately allocate employee time and operating funds to these functions.
5. Commercial vendors should study CSO usage patterns and satisfaction with commercial and on-site developed systems in order to determine marketing strategies for new or existing products if they want to be competitive.

There are several ways in which this study could be improved in order to add to the body of literature on CSO use of technology. This study prompts the following recommendations for further study:

1. A follow-up study should be conducted every two to three years to examine patterns and trends in CSO use of technology.

2. The study of technology use in CSOs dates back to 1991. A longitudinal study of patterns and trends of CSO use of technology should be conducted.
3. Future research should look at more streamlined methods with which to measure technology trends in CSOs, including a more modern, standard listing of technology and technology uses.
4. Research should be conducted to determine which technologies are being utilized that were not identified in this or the Charoensri (1998) study.
5. A national study should be conducted to compare regional differences in CSO use of technology.

This chapter provided a summary of the findings, conclusions, and recommendations of this study. The findings and conclusions overwhelmingly support the research questions and suggest differences in the uses of computer and communication technology from 1998 to 2002 to 2004. The recommendations to the field of career services and for further research will enrich the field and provide a basis for future research projects.

The use of technology changes rapidly. The ability for society, colleges and universities, and CSOs to keep up with changing technology is difficult. CSO operation and effectiveness with constituents is contingent on how well they can use technology in all facets of their operation. This study was useful to CSOs in the Southwest and perhaps nationwide in that they can use the findings, conclusions, and recommendations to understand and project the use

and need for technology by CSOs in the region. Findings from this study will help equip CSOs with empirically based tools when needed to justify fiscal, physical, and human resources.

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APPENDIX A

SURVEY INSTRUMENT

Information Sheet

An Analysis of Technology Infusion in Career Services in the Southwest United States in the Twenty-First Century

You have been asked to participate in a research study investigating the use of technology in university Career Centers. I have been given permission by the Southwest Association of Colleges and Employers (SWACE) to survey each member career center. You were selected to be a possible participant because you are or are one of the top management staff of your career center. A total of 111 people have been asked to participate in this study. The purpose of this study is to investigate the impact technology has had in university career centers over the last six years.

By completing this online survey, you agree to be in this study. The online questionnaire will take approximately 15-30 minutes of your time. The risk associated with this study is failed electronic access to the online study. The likelihood of this risk is minimal. The results of this study are intended to benefit the SWACE membership by providing empirical research concerning the use of technology in career centers. While there are no direct, personal benefits to you as a participant, your participation will assist in the greater effort. There will be no monetary compensation for participating in this study.

This is a confidential study. The researcher will protect the confidentiality by removing any and all links that may associate you or your institution with the data. Neither you nor your institution will be identified in any published results of the study. The records of this study will be kept private. Once downloaded, the electronic records will be stored on data compact discs and stored in a locked drawer only accessible by the researcher, Bonita McClain Vinson.

Your decision whether or not to participate will not affect your current or future relations with Texas A&M University or SWACE. If you decide to participate, you are free to refuse to answer any of the questions that may make you uncomfortable. You may withdraw your participation at any time without your relations with the university, job, benefits, etc., being affected. You may contact Bonita McClain Vinson, via US Mail to 1000 W. Court St., Seguin, TX 78155, via phone at (830) 372-8155, or via email at bvinson@tlu.edu. Additionally, you may contact my faculty advisor Dr. Stan Carpenter at (512) 245-8851, stanc@txstate.edu with any questions about this study.

This research study has been reviewed by the Institutional Review Board-Human Subjects in Research, Texas A&M University. For research-related problems or questions regarding subjects' rights, you may contact the institutional Review Board through Dr. Michael W. Buckley, Director of Research Compliance, Office of Vice President for Research at (979) 845-8585 (mwbuckley@tamu.edu).

You have read the above information. You have asked questions and have received answers to your satisfaction. You have had your concerns and questions addressed satisfactorily.

SURVEY SUBMISSION OPTIONS:

1. You may email your completed pdf document to bvinson@tlu.edu; or
2. You may print and fax your completed survey to Bonita Vinson at 830-372-6585 or
3. You may print and return your paper survey to: Bonita Vinson, Director of Career Services; Texas Lutheran University; 1000 W. Court t St.; Seguin, TS 78155

DEMOGRAPHIC INFORMATION

Please enter information in this section to describe your INSTITUTION. In all cases, "INSTITUTION" refers to the overall numbers for your UNIVERSITY.

Your institution is: ❑ Private Institution ❑ Public Institution

Number of **FULL-TIME** staff employed in your career services center:.....

Number of **PART-TIME** staff (including students) employed in your career services center:.....

Total student population of your **INSTITUTION** (Head count for Fall 2003 semester):.....

Number of students who used your services in the 2002-2003 academic year (Head count):.....

Approximate number of students who received a BACHELOR'S DEGREE from your INSTITUTION in the 2002-2003 academic year:.....

Approximate number of students who received a GRADUATE DEGREE from your INSTITUTION in the 2002-2003 academic year:.....

Approximate number of GRADUATING SENIORS who received employment support through your career services center in the 2002-2003 academic year:.....

Approximate number of GRADUATE STUDENTS who received employment support through your career services center in the 2002-2003 academic year:.....

OFFICE RESOURCES

Approximately what percentage of **TOTAL EMPLOYEE TIME** is dedicated to each of the following four functional areas? **Sum must equal 100%.**

- Technology.....
- Career Education.....
- Career Consultation/Advising.....
- Job Search.....

Approximately what percentage of **OPERATING FUNDS** are allocated to each of the following four functional areas? **Sum must equal 100%.**

- Technology.....
- Career Education.....
- Career Consultation/Advising.....
- Job Search.....

What is the total number of computers available through Career Services for:

- Professional staff use.....
- Support staff use.....
- Student/Employer/Alumni use.....

Please indicate any changes you have noticed in the last 12 months in the percentage of staff time devoted to the following:

	Increase	Same	Decrease
Reviewing/evaluating vendors and their products	❑	❑	❑
Working with technology	❑	❑	❑

TECHNOLOGY

Note: This is replication of a 6-year-old study. Hence, some of the terms used may seem somewhat antiquated.

Read the categories of technologies listed below. Check all the items that apply to your institution.

Past=previously used item within the last 6 years.
Current=currently use the item.
Future=currently do not use the item, but plan to use item in the future.
N/A=cannot identify if the item has been used in the past or if it will be used in the future.

Method of Communication: Between Career Services and Career Services Staff (Two-way)

	Past	Current	Future	N/A
Person-to-person	❑	❑	❑	❑
Group meetings/conferences	❑	❑	❑	❑
Telephone/audioconferencing	❑	❑	❑	❑
Video/computer conferencing	❑	❑	❑	❑

Method of Communication: Between Career Services and Faculty/College (Two-way)

	Past	Current	Future	N/A
Person-to-person	❑	❑	❑	❑
Group meetings/conferences	❑	❑	❑	❑
Telephone/audioconferencing	❑	❑	❑	❑
Video/computer conferencing	❑	❑	❑	❑

Method of Communication: Between Career Services and Student (Two-way)

	Past	Current	Future	N/A
Person-to-person	❑	❑	❑	❑
Group meetings/conferences	❑	❑	❑	❑
Telephone/audioconferencing	❑	❑	❑	❑
Video/computer conferencing	❑	❑	❑	❑

Method of Communication: Between Career Services and Employer (Two-way)

	Past	Current	Future	N/A
Person-to-person	❑	❑	❑	❑
Group meetings/conferences	❑	❑	❑	❑
Telephone/audioconferencing	❑	❑	❑	❑
Video/computer conferencing	❑	❑	❑	❑

Method of Communication: Between Career Services and Alumni (Two-way)

	Past	Current	Future	N/A
Person-to-person	❑	❑	❑	❑
Group meetings/conferences	❑	❑	❑	❑
Telephone/audioconferencing	❑	❑	❑	❑
Video/computer conferencing	❑	❑	❑	❑

Method of Communication: from Career Services to Career Services Staff (One-way)

	Past	Current	Future	N/A
FAX	❑	❑	❑	❑
FAX-on-demand (automated fax on server)	❑	❑	❑	❑
E-mail/electronic file transfer	❑	❑	❑	❑
Internet/intranet	❑	❑	❑	❑
Automated touch-tone telephone system	❑	❑	❑	❑
Answering machine/Voicemail	❑	❑	❑	❑

Method of Communication: from Career Services to Faculty/College (One-way)

	Past	Current	Future	N/A
FAX	❑	❑	❑	❑
FAX-on-demand (automated fax on server)	❑	❑	❑	❑
E-mail/electronic file transfer	❑	❑	❑	❑
Internet/intranet	❑	❑	❑	❑
Automated touch-tone telephone system	❑	❑	❑	❑
Answering machine/Voicemail	❑	❑	❑	❑

Method of Communication: from Career Services to Student (One-way)	Past	Current	Future	N/A
FAX	❑	❑	❑	❑
FAX-on-demand (automated fax on server)	❑	❑	❑	❑
E-mail/electronic file transfer	❑	❑	❑	❑
Internet/intranet	❑	❑	❑	❑
Automated touch-tone telephone system	❑	❑	❑	❑
Answering machine/Voicemail	❑	❑	❑	❑

Method of Communication: from Career Services to Employer (One-way)	Past	Current	Future	N/A
FAX	❑	❑	❑	❑
FAX-on-demand (automated fax on server)	❑	❑	❑	❑
E-mail/electronic file transfer	❑	❑	❑	❑
Internet/intranet	❑	❑	❑	❑
Automated touch-tone telephone system	❑	❑	❑	❑
Answering machine/Voicemail	❑	❑	❑	❑

Method of Communication: from Career Services to Alumni (One-way)	Past	Current	Future	N/A
FAX	❑	❑	❑	❑
FAX-on-demand (automated fax on server)	❑	❑	❑	❑
E-mail/electronic file transfer	❑	❑	❑	❑
Internet/intranet	❑	❑	❑	❑
Automated touch-tone telephone system	❑	❑	❑	❑
Answering machine/Voicemail	❑	❑	❑	❑

SATISFACTION WITH TECHNOLOGY

YOU ARE ALMOST FINISHED!

Which of the following **COMPUTERIZED** student and/or alumni services and employer services do you offer? (Please indicate if you offer that computerized service and then whether the service is web-based and/or vendor supported. Also rate your level of satisfaction with the service provider using the scale: 1=lowest and 5 = highest

Which of the following **STUDENT AND/OR ALUMNI SERVICES** do you offer, which are Web-based and/or Vendor-supported, and what is your level of satisfaction with the vendor(s) (if applicalbe)?

	Service Offered?	Web-based and/or vendor supported	Satisfaction Level	Service NOT offered
Ability to submit resumes to campus recruiters	❑	❑	1•2•3•4•5	❑
Access to campus recruitment schedules	❑	❑	1•2•3•4•5	❑
Campus interview requests/scheduling	❑	❑	1•2•3•4•5	❑
Advising/questions and answers (e.g., via e-mail or web site)	❑	❑	1•2•3•4•5	❑
Candidate database	❑	❑	1•2•3•4•5	❑
Career education	❑	❑	1•2•3•4•5	❑
Career library	❑	❑	1•2•3•4•5	❑
Computer assisted guidance	❑	❑	1•2•3•4•5	❑
Computer assisted comprehensive career development package	❑	❑	1•2•3•4•5	❑
Cooperative education/intern program management	❑	❑	1•2•3•4•5	❑
Career service office listserv/mailing list/electronic newsletter	❑	❑	1•2•3•4•5	❑
Database for alumni for networking purposes	❑	❑	1•2•3•4•5	❑
Fee-based information database(s) (Hoovers, Career Search, etc.)	❑	❑	1•2•3•4•5	❑
Job listings	❑	❑	1•2•3•4•5	❑
Electronic portfolios	❑	❑	1•2•3•4•5	❑
Online assessment tools	❑	❑	1•2•3•4•5	❑
Registration for services	❑	❑	1•2•3•4•5	❑
Reference file scanning system	❑	❑	1•2•3•4•5	❑
Resume development	❑	❑	1•2•3•4•5	❑
Resume referral	❑	❑	1•2•3•4•5	❑
Resume scanning system	❑	❑	1•2•3•4•5	❑
Virtual fairs	❑	❑	1•2•3•4•5	❑
Workshops	❑	❑	1•2•3•4•5	❑
Other:_____	❑	❑	1•2•3•4•5	❑

Which of the following **EMPLOYER SERVICES** do you offer, which are Web-based and/or Vendor-supported, and what is your level of satisfaction with the vendor(s) (if applicalbe)?

	Service Offered?	Web-based and/or vendor supported	Satisfaction Level	Service NOT offered
Access to recruiting schedule	❑	❑	1•2•3•4•5	❑
Access to resumes	❑	❑	1•2•3•4•5	❑
Candidate data bases/student profile	❑	❑	1•2•3•4•5	❑
Direct input of job or internship/coop ed. listings	❑	❑	1•2•3•4•5	❑
General information for employers	❑	❑	1•2•3•4•5	❑
Links to employer web sites	❑	❑	1•2•3•4•5	❑
Recruiting information	❑	❑	1•2•3•4•5	❑
Registration for career events	❑	❑	1•2•3•4•5	❑
Salary data on recent graduates	❑	❑	1•2•3•4•5	❑
Other:_____	❑	❑	1•2•3•4•5	❑

COMPUTER NETWORKING

ONE MORE SECTION TO GO

Note: This is replication of a 6-year-old study. Hence, some of the terms used may seem somewhat antiquated.

Read the categories of technologies listed below. Check all the items that apply to your institution.

Past=previously used item within the last 6 years.
Current=currently use the item.
Future=currently do not use the item, but plan to use item in the future.
N/A=cannot identify if the item has been used in the past or if it will be used in the future.

Computer Networking: Stand-alone computers (not connected to another computer or network)

	Past	Current	Future	N/A
Electronic student database	❑	❑	❑	❑
Electronic alumni database	❑	❑	❑	❑
Online campus library catalog	❑	❑	❑	❑
Career-aided materials catalog	❑	❑	❑	❑
General information, events and services	❑	❑	❑	❑
Company profiles/contacts/web site links	❑	❑	❑	❑
Job listings (job opportunities)	❑	❑	❑	❑
On-campus interview scheduling	❑	❑	❑	❑
Counseling appointment scheduling	❑	❑	❑	❑
Staff meeting schedule	❑	❑	❑	❑
Resume writing	❑	❑	❑	❑
Computer-aided Career Guidance System	❑	❑	❑	❑
Multimedia career-aided materials	❑	❑	❑	❑

Computer Networking: Career Center computers	Past	Current	Future	N/A
Electronic student database	❑	❑	❑	❑
Electronic alumni database	❑	❑	❑	❑
Online campus library catalog	❑	❑	❑	❑
Career-aided materials catalog	❑	❑	❑	❑
General information, events and services	❑	❑	❑	❑
Company profiles/contacts/web site links	❑	❑	❑	❑
Job listings (job opportunities)	❑	❑	❑	❑
On-campus interview scheduling	❑	❑	❑	❑
Counseling appointment scheduling	❑	❑	❑	❑
Staff meeting schedule	❑	❑	❑	❑
Resume writing	❑	❑	❑	❑
Computer-aided Career Guidance System	❑	❑	❑	❑
Multimedia career-aided materials	❑	❑	❑	❑

Computer Networking: Campus Network (a connection of 2 or more computers via electronic means for the purpose of exchanging information or sharing computer equipment)	Past	Current	Future	N/A
Electronic student database	❑	❑	❑	❑
Electronic alumni database	❑	❑	❑	❑
Online campus library catalog	❑	❑	❑	❑
Career-aided materials catalog	❑	❑	❑	❑
General information, events and services	❑	❑	❑	❑
Company profiles/contacts/web site links	❑	❑	❑	❑
Job listings (job opportunities)	❑	❑	❑	❑
On-campus interview scheduling	❑	❑	❑	❑
Counseling appointment scheduling	❑	❑	❑	❑
Staff meeting schedule	❑	❑	❑	❑
Resume writing	❑	❑	❑	❑
Computer-aided Career Guidance System	❑	❑	❑	❑
Multimedia career-aided materials	❑	❑	❑	❑

Computer Networking: Internet Access	Past	Current	Future	N/A
Electronic student database	❑	❑	❑	❑
Electronic alumni database	❑	❑	❑	❑
Online campus library catalog	❑	❑	❑	❑
Career-aided materials catalog	❑	❑	❑	❑
General information, events and services	❑	❑	❑	❑
Company profiles/contacts/web site links	❑	❑	❑	❑
Job listings (job opportunities)	❑	❑	❑	❑
On-campus interview scheduling	❑	❑	❑	❑
Counseling appointment scheduling	❑	❑	❑	❑
Staff meeting schedule	❑	❑	❑	❑
Resume writing	❑	❑	❑	❑
Computer-aided Career Guidance System	❑	❑	❑	❑
Multimedia career-aided materials	❑	❑	❑	❑

OFFICE TECHNOLOGY

THIS IS THE FINAL SECTION!

Note: This is replication of a 6-year-old study. Hence, some of the terms used may seem somewhat antiquated.

Read the categories of technologies listed below. Check all the items that apply to your institution.

For the following questions, use the following codes:

Past=previously used item within the last 6 years.

Current=currently use the item.

Future=currently do not use the item, but plan to use item in the future.

N/A=cannot identify if the item has been used in the past or if it will be used in the future.

Technology for Office Operation	Past	Current	Future	N/A
Use computer to type memos and letters	❑	❑	❑	❑
Use computer to create mailing labels	❑	❑	❑	❑
Use financial or spreadsheet software to balance the budget	❑	❑	❑	❑
Use spreadsheet or statistical software to analyze data	❑	❑	❑	❑
Layout and publish printed materials such as newsletter	❑	❑	❑	❑
Layout and publish web site	❑	❑	❑	❑
Layout and publish electronic materials	❑	❑	❑	❑
Use computer to create presentation materials	❑	❑	❑	❑
Share databases & electronic information with other campus departments	❑	❑	❑	❑
Use student "one card" system shared with other campus departments	❑	❑	❑	❑

Job Placement Interview Methods	Past	Current	Future	N/A
Face-to-face on-campus interview	❑	❑	❑	❑
Videotape interview	❑	❑	❑	❑
Telephone interview	❑	❑	❑	❑
Video and computer conferencing interview	❑	❑	❑	❑

Staff's Career Education Presentation	Past	Current	Future	N/A
Use non-computerized presentation (i.e. flip chart, transparency, or slide)	❑	❑	❑	❑
Use computerized presentation or application	❑	❑	❑	❑
Use computerized presentation with network connection	❑	❑	❑	❑

Which of the following systems/organizations do you use in support of student resume data base, job listing service or recruitment scheduling system:

	Resume database	Job listing	Recruitment scheduling	Employe database
Exeter	❑	❑	❑	❑
Experience	❑	❑	❑	❑
Interfase	❑	❑	❑	❑
MonsterTRAK	❑	❑	❑	❑
NACElink	❑	❑	❑	❑
Symplicity	❑	❑	❑	❑
On-site/school developed system	❑	❑	❑	❑
Other:_____	❑	❑	❑	❑

What method is used:	Mail	Fax	Email
For resume referrals	❑	❑	❑
To distribute credentials files	❑	❑	❑

What type of technology does your office use in providing career services? (check all that apply.)

- ❑ CD Rom
- ❑ Mainframe computer
- ❑ Computer to Fax
- ❑ Scanner
- ❑ FAX
- ❑ Telephone broadcast system
- ❑ Desktop computer
- ❑ Telephone job listing service
- ❑ E-mail
- ❑ Video conferencing
- ❑ LAN
- ❑ Web site
- ❑ Laptop computer
- ❑ Wireless computer
- ❑ LCD/computer projector
- ❑ Other (please specify)_____

Thank you for completing this important survey!

APPENDIX B

USES OF TECHNOLOGY FROM 1991, 1993, AND 1998 CSO SURVEYS

Table B1. Uses of Technology from 1991, 1993, and 1998 CSO Surveys

Use of Technology	1991 (National)		1993 (National)		1998 (Southwest)	
	N	Percent	N	Percent	N	Percent
VCR	599	72.8	860	80.5	28	30.8
Fax	529	64.3	848	79.4	83	91.2
Word processing	730	88.9	982	91.9	89	97.8
Mailing lists/labels	682	82.9	912	85.4	88	96.7
Statistical reports	546	66.3	810	75.8	49	53.9
Career guidance/ counseling/advising	454	55.2	629	58.9	60	65.9
Job bank/employer database	385	46.8	578	54.1	65	71.4
Student records	375	45.6	529	49.5	70	76.9
Student résumé	359	43.6	505	47.3	67	73.6
Budgeting	316	38.4	442	41.4	57	62.6
Company profiles	314	38.2	396	37.1	54	59.3
Interview schedule	282	34.3	401	37.5	49	53.9
Library information	259	31.5	361	33.8	61	67.0
Alumni files	243	29.6	363	34.0	42	46.25
Sign-up/counseling schedule	181	22.0	249	23.3	36	39.6

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EXPERIENCE

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January 2005 - May 2005	Adjunct Professor, Texas Lutheran University, Seguin, Texas
2003 – Present	Reviewer, American Educational Research Journal
2001 – Present	Director of Career Services, Texas Lutheran University, Seguin, Texas
Fall 2000	Adjunct Faculty, University Seminar, Texas State University, San Marcos, Texas
1997 – 2000	Assistant Director, Multicultural Student Affairs, Texas State University, San Marcos, Texas
1995 – 1997	Assistant Director, Office of Multicultural Affairs, Tulane University, New Orleans, Louisiana
1994 – 1995	Education and Training Coordinator, SERVE! Mid City AmeriCorps, Baton Rouge, Louisiana
1994 –1994	Career Counselor, Career Services, Louisiana State University, Baton Rouge, Louisiana
1993 – 1994	Assistant Coordinator, Minority Engineering, Louisiana State University, Baton Rouge, Louisiana

This dissertation was typed and edited by Marilyn M. Oliva at Action Ink, Inc.